

# United States Department of the Interior Bureau of Land Management

---

Environmental Assessment  
DOI-BLM-UT-C030-2016-0028-EA

---

May 2016

## Permit Renewals for Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lambs Knoll Grazing Allotments

**Location:** Washington County, Utah

Grafton Allotment: T. 41 & 42 S., R. 11 & 12 W.

North Grafton Allotment: T. 41 S., R. 11 W, Sec 30, 29, & 19;  
T. 41 S., R. 12 W., Sec 25 & 24

Boot Spring Allotment: T. 42 S., R. 12 W., Sec 4, 5, 6, 7, 8, & 9

Virgin Allotment: T. 41 S., R. 12 W

Lindell Allotment: T. 41 S., R. 11 W., Sec 30

Cave Allotment: T. 40 S., R. 11 W., Sec 5 & 8

Lambs Knoll Allotment: T. 40 S., R. 11 W. Sec 8, & 17

**Applicant/Address:** Bureau of Land Management, St. George Field Office  
345 E. Riverside Drive, St. George, UT 84790

---

St. George Field Office  
345 E. Riverside Drive  
St. George, UT 84790  
(435) 688-3200  
(435) 688-3252 fax





## TABLE OF CONTENTS

---

1.0 Chapter 1—Purpose and Need.....	4
1.1 Introduction .....	4
1.2 Background .....	4
1.3 Need for the Proposed Action .....	6
1.4 Purpose for the Proposed Action.....	6
1.5 Conformance with BLM Land Use Land.....	6
1.6 Relationship To Statutes, Regulations, And Other Plans.....	7
1.7 Consistency With State and Local Plans.....	8
1.7.1 Other NEPA Analyses that Limit the Scope of this EA .....	8
1.8 Identification of Issues .....	8
1.9 Issues Identified for Analysis.....	9
1.9.1 Cultural Resources .....	9
1.9.2 Range/Livestock Grazing Management.....	9
1.9.3 Riparian Resources .....	9
1.9.4 Vegetation (Invasive, Non-native Species and Noxious Weeds) .....	10
1.9.5 Migratory Birds and Species of Conservation Concern .....	10
1.9.6 Threatened and Endangered Species and BLM Sensitive Species .....	10
1.9.7 General Wildlife.....	11
1.9.8 Water Quality.....	11
1.10 Issues Considered, but Eliminated from Further Analysis.....	12
1.10.1 Wilderness and Wilderness Characteristics Lands .....	12
1.11 Summary .....	12
2.0 Chapter 2—Description of Alternatives .....	12
2.1 Introduction .....	12
2.2 ALTERNATIVE A-Proposed Action .....	12
2.2.1 Monitoring .....	13
2.2.2 Range Improvements .....	13
2.2.3 Standard Permit Terms and Conditions .....	13
2.3 ALTERNATIVE B-No Action .....	15
2.3.1 Monitoring .....	15
2.3.2 Permit Terms and Conditions .....	15
2.4 Alternatives Considered but not analyzed in Detail.....	16
2.4.1 No Livestock Grazing Alternative .....	16
3.0 Chapter 3—Affected Environment.....	17
3.1 Introduction .....	17
3.2 General Setting.....	17
3.3 Resources/issues brought forward for Analysis.....	20

3.3.1 Cultural Resources .....	20
3.3.2 Vegetation .....	21
3.3.3 Riparian Resources .....	21
3.3.4 Water Quality .....	23
3.3.5 Migratory Birds and Species of Conservation Concern .....	23
3.3.6 Threatened and Endangered Species and BLM Sensitive Species .....	24
3.3.7 General Wildlife.....	29
3.3.8 Range/Livestock Grazing Management.....	31
3.3.9 Studies Conducted .....	33
3.4 Allotment Health Monitoring Results .....	37
3.4.1 Grafton Allotment .....	37
3.4.2 North Grafton Allotment.....	40
3.4.3 Boot Spring Allotment Health Monitoring Results .....	44
3.4.4 Virgin Allotment Health Monitoring Results .....	51
3.4.5 Lindell Allotment Health Monitoring Results .....	59
3.4.6 Cave Allotment Health Monitoring Results .....	63
3.4.7 Lambs Knoll Allotment Health Monitoring Results.....	67
4.0 Chapter 4—Environmental Impacts .....	72
4.1 Introduction .....	72
4.2 General analysis Assumptions .....	72
4.2.1 Rangeland Health Conditions .....	72
4.3 4.2 ALTERNATIVE A - Proposed Action .....	72
4.3.1 Cultural Resources .....	72
4.3.2 Vegetation .....	73
4.3.3 Riparian Resources .....	74
4.3.4 Water Quality.....	74
4.3.5 Migratory Birds and Species of Conservation Concern .....	74
4.3.6 Threatened and Endangered Species and BLM Sensitive Species .....	75
4.3.7 General Wildlife.....	75
4.3.8 Range/Livestock Grazing Management.....	76
4.3.9 Mitigation Measures .....	76
4.3.10 Monitoring.....	76
4.4 ALTERNATIVE B - No Action .....	77
4.4.1 Cultural Resources .....	77
4.4.2 Riparian Resources .....	77
4.4.3 Water Quality.....	77
4.4.4 Vegetation .....	77
4.4.5 Migratory Birds and Species of Conservation Concern .....	78
4.4.6 Threatened and Endangered Species and BLM Sensitive Species .....	78
4.4.7 General Wildlife.....	78
4.4.8 Range/Livestock Grazing.....	78
4.4.9 Mitigation Measures .....	78
4.4.10 Monitoring.....	78

4.5 Cumulative Impacts.....	78
4.5.1 Cumulative Impact Area: .....	78
4.5.2 Past and Present Actions:.....	78
4.5.3 Reasonably Foreseeable Action (RFAS) .....	79
4.5.4 Cumulative Impacts Analysis .....	79
4.5.5 Irreversible and/or Irretrievable Commitments of Resources.....	83
5.0 Chapter 5—Persons, Groups, and Agencies Consulted.....	84
5.1 Persons, Groups, and Agencies Consulted.....	84
5.2 List of EA Preparers.....	84
6.0 literature cited .....	86
Appendices.....	88
6.1 Appendix A Interdisciplinary Team Checklist.....	88
6.2 APPENDIX B WASHINGTON COUNTY MIGRATORY BIRD SPECIES .....	93
6.3 APPENDIX C Migratory bird species documented within Washington County, Utah, that have conservation status (USFWS Birds of Conservation Concern, Utah-BLM Sensitive Species, Utah-PIF High-Priority Bird Species), and their primary-secondary breeding and wintering habitats. ....	96
6.4 Appendix D Preliminary Construction Drawings .....	98

## 1.0 CHAPTER 1—PURPOSE AND NEED

---

### 1.1 INTRODUCTION

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Bureau of Land Management’s (BLM) proposal to renew ten-year term grazing permits for the permit holders operating on the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lambs Knoll grazing Allotments.

This EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions. “Significance” is defined by NEPA and is found in regulation 40 CFR 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of “Finding of No Significant Impact” (FONSI). If the decision maker determines that this project has “significant” impacts following the analysis in the EA, then an EIS will be prepared for the project. If no significant impacts are identified beyond those already addressed in the *St. George Field Office Record of Decision and Resource Management Plan* (RMP; BLM 1999), a FONSI and Decision Record may be signed for the EA approving the alternative selected.

As required by NEPA, BLM must evaluate the potential environmental consequences of issuing the 10-year term grazing permit, with the new terms and conditions, through an EA or, if warranted, EIS-level analysis.

### 1.2 BACKGROUND

The federal action addressed by this EA is the proposed renewal of 7 grazing allotments to license domestic livestock grazing located on approximately 17,800 acres of BLM-administered public land in eastern Washington County, Utah (T. 41 S., 42 S., R. 11 W., 12 W., Sec 1; **Figure 1-1**). These allotments were grouped for analytic purposes into a single EA based on geographic proximity (**Figure 1-1**) and similar resource issues.

The permits for livestock grazing within these allotments were issued for a ten year period pursuant to the provisions of Public Law 108-108, Public Law 111-88 or under the authority HR 2996 Section 416. These laws state that the Terms and Conditions contained in the expired or transferred permit have been incorporated into this permit and shall continue in effect under the renewed permit until such time as the Secretary of the Interior completes the processing of this permit in compliance with all applicable laws and regulations, at which time this permit may be cancelled, suspended or modified, in whole or in part, to meet the requirements of such applicable laws and regulations.

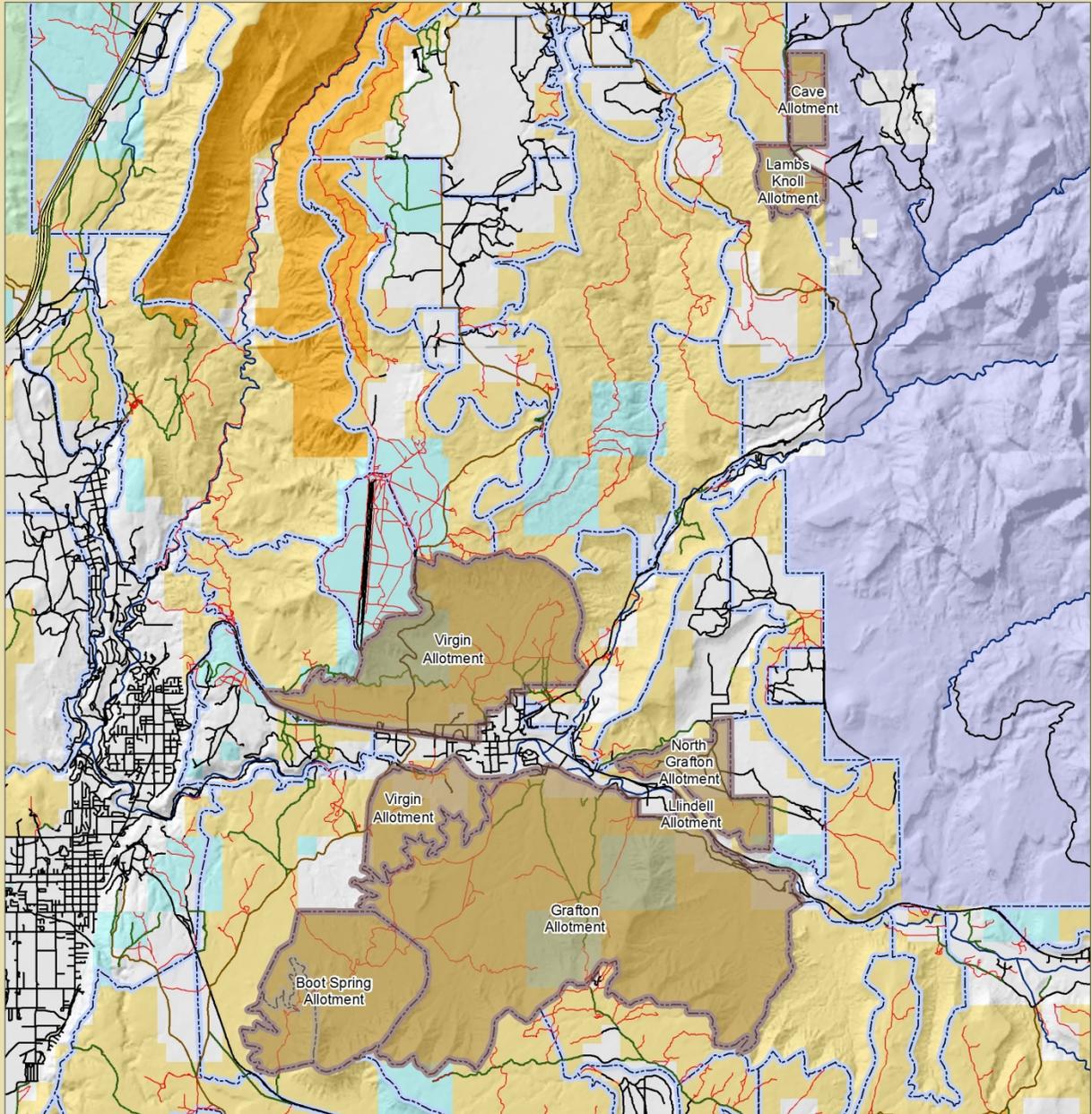
# Grafton Group Allotments

St. George Field Office

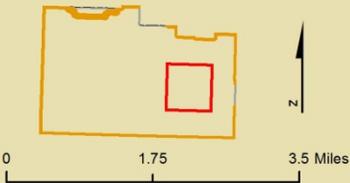
11/24/2015

No warranty is made by the BLM for use of the data for purposes not intended by the BLM.

This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.



Location within Washington County



### Land Status

ut\_igd

- BLM Wilderness Area
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- Private
- State
- US Forest Service (USFS)

**Figure 1-1:** Allotment Locations.

### **1.3 NEED FOR THE PROPOSED ACTION**

The need for action is derived from the legal requirement under NEPA that federal agencies disclose to the public information about those projects or activities authorized by federal agencies that have the potential to “significantly” impact the human environment. Livestock grazing on public lands is a federally authorized activity that could have important environmental consequences; the issuance of a term grazing permit would normally trigger the requirements for analysis and disclosure of those consequences, in compliance with NEPA.

The development of a range of alternatives for the grazing permit renewal EA was based on results of interdisciplinary Rangeland Health Assessments, conducted by BLM within the 7 allotments during October and November 2015. The Rangeland Health Assessments indicated that current livestock grazing management of these 7 allotments were meeting all rangeland health objectives and standards, as defined by the Standards and Guides.

The current ten-year term grazing permits for the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lambs Knoll grazing Allotments will expire in 2018, but due to the projected workload in subsequent years, it was decided that the Grafton Group Grazing EA will be completed in 2016.

### **1.4 PURPOSE FOR THE PROPOSED ACTION**

The purpose of the federal action is to renew seven 10-year term grazing permits for the livestock operators of the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lambs Knoll Allotments and thus continue to authorize livestock grazing within these allotments. Livestock grazing on public lands is a valid use of public lands, authorized through several legal authorities, including the Taylor Grazing Act, the Public Rangelands Improvement Act, and the Federal Land Policy Management Act (FLPMA).

Livestock grazing on public lands is managed according to regulations contained in the Code of Federal Regulations (CFR) at 43 CFR Part 4100. BLM is responsible for determining the appropriate levels of grazing and management strategies for livestock grazing on an allotment that will protect public land resource values and maintain rangeland health. Grazing permits issued must be in compliance with the mandates of FLPMA, unless superseded by subsequent legislative authority, as well as the implementing regulations that established the Fundamentals of Rangeland Health (at 43 CFR Part 4180) and Utah’s Rangeland Health Standards (1997).

The BLM will decide whether or not to offer a 10-year grazing lease with or without modification from the current lease.

### **1.5 CONFORMANCE WITH BLM LAND USE LAND**

Activities authorized on BLM-managed public lands must be in conformance with the land use plan, called Resource Management Plans or RMPs, which have been developed through a public process. The Proposed Action, to renew term grazing permits for the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave and Lambs Knoll Allotments, is in conformance with

management objectives and decisions from the St. George Field Office RMP (1999). Stated objectives for rangeland management from the RMP:

- a) *Promotion of healthy, sustainable rangeland ecosystems that produce a wide range of public values such as wildlife habitat, livestock forage, recreation opportunities, clean water, and safe and functional watersheds;*
- b) *Restoration and improvement of public rangelands to properly functioning condition, where needed;*
- c) *Providing for sustainability of the western livestock industry and communities that are dependent upon productive, healthy rangelands;*
- d) *Ensuring public land users and stakeholders have a meaningful voice in establishing policy and managing public rangelands.*

The Proposed Action is in conformance with Range Decisions GZ-01, GZ-02, GZ-09, and GZ-11 found in the RMP Record of Decision (ROD) (BLM 1999, pgs. 2.32 and 2.34).

- GZ-01 relates to the Standards for Rangeland Health and Guidelines for Grazing Management for BLM Lands in Utah, approved by the Secretary of the Interior on May 20, 1997 (BLM 1997). BLM applies these standards and guides to its grazing management program throughout Washington County.
- GZ-02 provides for review and revision of Allotment categories, where needed, to respond to changing resource conditions.
- GZ-09 states that rangeland projects may be developed where assessments show the need to improve livestock management by establishing proper livestock control or distribution.
- GZ-11 provides a list of guidelines that will be applied to grazing management in order to help achieve approved standards on public lands within Washington County.

The Proposed Action would not conflict with other decisions from the RMP.

## **1.6 RELATIONSHIP TO STATUTES, REGULATIONS, AND OTHER PLANS**

The proposed action and alternatives are consistent with all federal laws, state and local laws, regulations, and relevant plans. This section contains information about other guidance related to grazing on these allotments. The Proposed Action would be consistent with federal, state, and local laws, regulations, and plans including the following:

- Taylor Grazing Act of 1934
- FLPMA of 1976 (43 U.S.C. 1701 et seq.)
- Public Rangelands Improvement Act of 1978
- Endangered Species Act of 1973, as amended.
- Wilderness Act (1966)
- National Historic Preservation Act (1969)
- Omnibus Public Land Management Act of 2009

The Fundamentals of Rangeland Health and Utah's Standards and Guidelines (43 CFR Part 4180) address watersheds, ecological condition, water quality, and habitat for special status species. These resources are addressed on the attached IDT Analysis Record (Appendix A) and, if potentially impacted, are analyzed in Chapter 4 of this document.

## **1.7 CONSISTENCY WITH STATE AND LOCAL PLANS**

The St. George Field Office collaborates with other agencies to achieve consistency (to the extent practicable) between plans that may address the same resources. Livestock grazing on public lands is consistent with the Washington County General Plan, which identifies lands within the allotments as open for economic uses such as livestock grazing (Washington County General Plan, 2010) and the County Resource Management Plan, which states, the county supports preserving the natural scene, and maintaining AUMs (Animal Unit Month) for agriculture, a long-term use, to support the local economy (County Resource Management Plan, 2009). The Proposed Action is consistent with other plans that address other resources and uses within the geographic location of the allotments, including the Utah State Comprehensive Outdoor Recreation Plan, water quality and watershed management plans, and regional plans for game and non-game wildlife management.

Livestock grazing management of the public lands within the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lambs Knoll Allotments is consistent with management of approximately 170 acres of land administered by the State of Utah School and Institutional Trust Lands Administration (SITLA) within that Allotment. This acreage is currently leased to the permit holders for livestock grazing to meet SITLA's objective of providing funding for the public school system.

### **1.7.1 Other NEPA Analyses that Limit the Scope of this EA**

This EA is tiered to the Environmental Impact Statement (Draft 1995, Final 1998) that supported the St. George RMP; to the Final Hot Desert Grazing Management Environmental [Impact] Statement (BLM 1978), and to the Kanab Escalante Grazing Environmental [Impact] Statement (BLM 1980). The latter 2 analyses evaluated BLM's livestock grazing management program in Washington County. The resource impacts that could result from a range of livestock grazing alternatives, including a No Grazing Alternative, were disclosed in the Environmental Impact Statements. The St. George Field Office RMP incorporated by reference the analyses of livestock grazing management from the two Grazing Management Environmental Impact Statements.

## **1.8 IDENTIFICATION OF ISSUES**

Issues are essentially an effect on a particular resource component. Issues for consideration in this analysis were determined by input from the BLM Interdisciplinary Team (IDT), results of the rangeland health evaluations, and input from other governmental agencies and the public.

Public notification of BLM's intent to renew the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lambs Knoll Allotments term grazing permits through a NEPA process was posted on the BLM-NEPA national register ePlanning website (<https://eplanning.blm.gov/epl->

front-office/eplanning/nepa/nepa\_register.do), a web-based site available for public review. The initial posting was made on 05/16/2016. A BLM point of contact was identified and federal and state agency representatives (e.g., UDWR) and the interested public were invited to participate in the process and identify issues of concern (see Chapter 5, Consultation and Coordination for additional details).

The BLM Interdisciplinary Team (IDT) of resource specialists reviewed the Proposed Action and evaluated its potential effects to the human environment in order to identify resource issues that would be carried forward for analysis in the EA. Documentation of that review is attached as Appendix A, the IDT Analysis Record Checklist, which lists all resources and values considered by the IDT. The findings of the qualitative assessments of rangeland health that were conducted in 2015 in conjunction with quantitative monitoring and inventory data, were used to assess resource conditions and identify relevant issues. Resources or land uses that are not present in the project area or that would not be affected by the Proposed Action are identified on the checklist and a clear rationale provided for not carrying them forward for analysis in the EA.

## **1.9 ISSUES IDENTIFIED FOR ANALYSIS**

### **1.9.1 Cultural Resources**

Section 106 of the National Historic Preservation Act (NHPA) directs agencies to take into account the effects of their actions on archaeological sites that are determined eligible for listing on the National Register of Historic Places (NRHP). Certain types of archeological sites are susceptible to impacts related to livestock grazing, such as damage to structural features.

The seven allotments have a moderate potential for the occurrence of prehistoric and historic period sites that are eligible for listing to the NRHP. Sites would be expected along the Virgin River terraces, and around springs and seeps. Previous archaeological inventories conducted within the allotments have identified two sites that have been determined eligible for listing on the NRHP. The potential effects of the proposed renewal of the term grazing permits on cultural resources are carried forward in this EA.

### **1.9.2 Range/Livestock Grazing Management**

The potential effects of the Proposed Action on rangeland health conditions are disclosed in this EA, as improper livestock grazing management strategies can negatively impact soils and vegetation.

### **1.9.3 Riparian Resources**

The Rangeland Health Assessments delineated riparian and upland ecosites. Riparian areas consist of lands along, adjacent to or contiguous with perennial and intermittently flowing streams that exhibit vegetation characteristics reflective of permanent water influence (Standards for Rangeland Health and Guidelines for Grazing Management). Upland areas are lands at a

higher elevation than the alluvial plain or low stream terrace; all lands outside the riparian zone. Livestock grazing has the potential to adversely impact riparian vegetation and stream channel morphology.

Public lands along the Virgin River within this group of allotments, support 3 areas of riparian habitat, totaling approximately .8 miles in length. These areas are within the Grafton, Lindell, and Virgin allotments. Livestock grazing, if not properly managed, can destroy or degrade riparian vegetation and accelerate erosion within riparian zones. Riparian habitat that is found in the 3 allotment along the Virgin River has the potential to be impacted by livestock grazing. Riparian conditions on public lands along the Virgin River were assessed in relationship to livestock grazing and the findings are disclosed in this EA.

#### **1.9.4 Vegetation (Invasive, Non-native Species and Noxious Weeds)**

Invasive, non-native annuals such as cheatgrass (*Bromus tectorum*), occur throughout most of the allotment. Infestations of Scotch thistle (*Onopordum acanthium*), poison milkweed (*Asclepias* spp.), and silverleaf nightshade (*Solanum elaeagnifolium*), all species listed as Utah State noxious weeds (Belliston et al. 2010), were noted in 1 or more of the allotments.

In the past, overgrazing by livestock likely aided the introduction and spread of exotic/invasive plant species. The potential impacts of livestock grazing on native vegetation and on the introduction and/or spread on non-native species are analyzed in this EA.

#### **1.9.5 Migratory Birds and Species of Conservation Concern**

Grazing can occur during the breeding and nesting season for migratory birds or other birds that are considered to be Species of Conservation Concern by the USFWS. Grazing could cause short-term disturbances to these birds and could impact vegetation that may provide habitat for these species. Improper livestock grazing management practices or excessively high stocking rates can impact migratory bird populations and the quality of habitats that support them. The potential effects of the proposed renewal of the term grazing permits on migratory birds and Species of Conservation Concern are carried forward in this EA.

#### **1.9.6 Threatened and Endangered Species and BLM Sensitive Species**

No plant species listed under the federal Endangered Species Act (ESA) are found in these allotments. Federally-listed threatened and endangered wildlife species that may be present within or near the allotments include: California condor (*Gymnogyps californianus*; endangered); Southwestern willow flycatcher (*Empidonax traillii extimus*; endangered); Mexican spotted owl (*Strix occidentalis lucida*; threatened); and Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*; threatened). The American bald eagle (*Haliaeetus leucocephalus*) was formerly a federally-listed threatened species, but was removed from the ESA list on August 8, 2007; it is still protected under the Migratory Bird Treaty Act. Bald eagles are a migratory winter visitor (November to April) in Washington County.

BLM Sensitive species that may occur in the allotments include: Burrowing owl (*Athene cunicularia*; permanent resident, uncommon), Ferruginous hawk (*Buteo regalis*; permanent

resident, fairly common), Lewis's woodpecker (*Melanerpes lewis*; permanent resident, rare), Northern goshawk (*Accipiter gentilis*; permanent resident, rare), Short-eared owl (*Asio flammeus*; transient, rare), Big free-tailed bat (*Nyctinomops macrotis*; summer resident, rare), Fringed myotis (*Myotis thysanodes*; permanent resident, uncommon), Allen's Big-eared Bat (*Idionycteris phyllotis*; summer resident—wintering habits are unknown, rare), Spotted bat (*Euderma maculatum*; permanent resident, rare), Townsend's big-eared bat (*Corynorhinus townsendii*; permanent resident, fairly common), Western red bat (*Lasirurus blossevillii*; permanent resident, rare), Desert sucker (*Catostomus clarki*; permanent resident, fairly common), Flannel-mouth sucker (*Catostomus latipinnis*; permanent resident, fairly common), Virgin spinedace (*Lepidomeda mollispinis*; permanent resident, fairly common), and Western threadsnake (*Leptotyphlops humilis*; permanent resident, rare).

Improper livestock grazing management practices or excessively high stocking rates can impact populations and the quality of habitats that support terrestrial and aquatic species currently listed under the authority of the federal Endangered Species Act (ESA), as amended, or at risk of future listing due to declining population numbers.

This EA discloses whether impacts on federally listed species or BLM Sensitive Species could result from livestock grazing management under the Proposed Action or No Action Alternative.

### **1.9.7 General Wildlife**

General wildlife includes all wildlife not considered Threatened, Endangered, Sensitive, or otherwise of special concern. The 7 allotments provides habitat for a variety of resident small mammals, birds, and reptiles. The more common would include: badgers (*Taxidea taxus*), antelope ground squirrels (*Ammospermophilus leucurus*), kangaroo rats (*Dipodomys ordii*), deer mice (*Peromyscus maniculatus*), desert wood rats (*Neotoma lepida*), Gambel's quail (*Lophortyx gambelii*), mourning doves (*Zenaida macroura*), common ravens (*Corvus corax*), wrens (*Catherpes mexicanus*, *Salpinctes obsoletus*), house finches (*Carpodacus mexicanus*), side-blotched lizards (*Uta stansburiana*), and Western whiptail (*Cnemidophorus tigris*). Larger animals such as coyotes (*Canis latrans*), mule deer (*Odocoileus hemionus*), and gray fox (*Urocyon cinereoargenteus*) may use the area year-long or for a portion of the year.

Because livestock grazing can impact available forage, wildlife cover, and water availability, the consideration of potential impacts on general wildlife is carried forward in this EA.

### **1.9.8 Water Quality**

Inappropriate livestock grazing management practices or excessively high stock rates within or adjacent to surface waters could directly or indirectly increase the levels of nutrients, bacteria, sediment, turbidity, and water temperatures in the Virgin River. The Virgin River has been identified by the State of Utah Division of Water Quality as being impaired and is included on the State's "303d" list. Pursuant to Section 303(d) of the Clean Water Act, as amended, each State is required to identify those waters or assessment units (i.e., lakes, reservoirs, rivers, and streams) that are not currently achieving, or are not expected to achieve, applicable water quality standards. These sources are evaluated as being "water quality limited" and included on the State's 303d List of Waters (c.f., Utah's 2006 Integrated Report Volume II - 303(d) List of

Waters). The Virgin River was evaluated as exceeding current standards for Total Dissolved Solids (TDS).

Water quality will be analyzed in detail in this EA to determine whether livestock grazing on public land contributes to the TDS levels detected in the Virgin River.

### 1.10 ISSUES CONSIDERED, BUT ELIMINATED FROM FURTHER ANALYSIS

Resources or land uses that are present but that would not be measurably affected by the current proposal are identified on the IDT Checklist in Appendix A. Among the issues not carried forward to detailed analysis are:

#### 1.10.1 Wilderness and Wilderness Characteristics Lands

There are no inventoried lands with wilderness characteristics that would be affected by the proposed action.

### 1.11 SUMMARY

This chapter has presented the Purpose and Need of the Proposed Action, as well as the relevant issues (i.e., those elements that could be affected by the implementation of the Proposed Action). In order to meet the purpose and need of the Proposed Action in a way that resolves the issues, the BLM has developed a range of alternatives. These alternatives, including the No Action Alternative, are presented in Chapter 2. The potential environmental impacts or consequences resulting from the implementation of each alternative are then analyzed in Chapter 4 for each of the identified issues.

## 2.0 CHAPTER 2—DESCRIPTION OF ALTERNATIVES

---

### 2.1 INTRODUCTION

This chapter contains a description of the alternatives discussed during formulation of this proposal. All allotments were found to be functioning properly under the current livestock management strategies. Based on the findings of the 2015 rangeland health assessments, conditions within the allotments were meeting the Utah Standards and Guides. The livestock operators have not requested any changes on the allotments.

### 2.2 ALTERNATIVE A-PROPOSED ACTION

This alternative would renew the livestock term grazing permits for a period of 10 years, with no change in the seasons of use, the class of livestock, or the number of livestock permitted. Grazing under this alternative would be as depicted in **Table 2-1**.

**Table 2-1.** Livestock grazing permitted use under the proposed action and no action alternatives.

<b>Allotment Name</b>	<b>Number of Livestock</b>	<b>Class of Livestock</b>	<b>Season of Use</b>	<b>AUM's</b>	<b>Total Allotment Acreage</b>	<b>Percent Public Land Use</b>
-----------------------	----------------------------	---------------------------	----------------------	--------------	--------------------------------	--------------------------------

<b>Grafton</b>	100	Cattle	11/01 to 05/31	280	9,154	40
<b>North Grafton</b>	2	Cattle	11/01 to 05/31	14	806	100
<b>Virgin</b>	41	Cattle	12/01 to 01/31 04/01 to 5/31	144	4,831	100
<b>Lindell</b>	1	Cattle	03/01 to 02/28	12	40	100
<b>Boot Spring</b>	20	Cattle	12/16 to 05/31	90	2,380	100
<b>Cave</b>	2	Cattle	06/01 to 9/15	5	382	100
<b>Lambs Knoll</b>	2	Cattle	06/01 to 10/31	10	396	100

**Figure 2-1.** Livestock Grazing Permitted Use under the Proposed Action and No Action Alternatives

### 2.2.1 Monitoring

Utilization and trend studies would be read as scheduled (i.e. every 7 years for custodial (C) allotments and every 7 years for maintain (M) allotments). Regular monitoring of species and sites would be conducted to determine whether vegetative conditions and objectives are being achieved. Adjustments would be made to the licensed grazing use for the allotment if studies indicate that rangeland health standards are not being met as a result of current grazing management. Multiple indicator Monitoring (MIM) plots will be established along the Virgin River to monitor long term riparian conditions.

BLM resource specialists would continue to monitor and assess range and riparian conditions during the life of the term permits to ensure that conditions continue to meet Utah Standards and Guidelines for Rangeland Health. Range studies and monitoring would be conducted in accordance with Utah BLM procedures and Allotment Management Plan (AMP) requirements.

### 2.2.2 Range Improvements

No range improvements are proposed under the Proposed Action. Existing range improvements would be maintained as currently required.

### 2.2.3 Standard Permit Terms and Conditions

These terms and conditions would be applied to term permits issued for these Allotments:

- 1) *Actual use information must be reported within 15 days after completing annual grazing use.*
- 2) *No supplemental feeding of roughage is allowed on public lands except in emergency conditions, then only by written permission by the BLM.*
- 3) *Maintenance for all structural range improvements and other projects assigned to the permit holder(s) through cooperative agreements and/or range improvements is the responsibility of*

*the permit holder(s). Failure to maintain assigned projects may result in withholding the license until maintenance is completed.*

- 4) *Grazing permit or lease terms and conditions and the fees charged for grazing use are established in accordance with the provisions of the grazing regulations now or hereafter approved by the Secretary of the Interior.*
- 5) *Permits are subject to cancellation, in whole or in part, at any time because of:*
  - *Noncompliance by the permit holder/lessee with rules and regulations.*
  - *Loss of control by the permit holder/lessee of all or a part of the property upon which it is based.*
  - *A transfer of grazing preference by the permit holder/lessee to another party.*
  - *A decrease in the lands administered by the BLM within the Allotment(s) described.*
  - *Repeated willful unauthorized grazing use.*
  - *Loss of qualifications to hold a permit or lease.*
- 6) *Permits are subject to the terms and conditions of Allotment management plans if such plans have been prepared. Allotment management plans MUST be incorporated in permits or leases when completed.*
- 7) *Those holding permits or leases must own or control and be responsible for the management of livestock authorized to graze.*
- 8) *The Authorized Officer may require counting and/or additional or special marking or tagging of the livestock authorized to graze.*
- 9) *The permit holder's/lessees grazing case file is available for public inspection as required by the Freedom of Information Act.*
- 10) *Grazing permits or leases are subject to the nondiscrimination clauses set forth in Executive Order 11246 of September 24, 1964, as amended. A copy of this order may be obtained from the authorized officer.*
- 11) *Livestock grazing use that is different from that authorized by a permit or lease must be applied for prior to the grazing period and must be filed with and approved by the authorized officer before grazing use can be made.*
- 12) *Billing notices are issued which specify fees due. Billing notices, when paid, become a part of the grazing permit or lease. Grazing use cannot be authorized during any period of delinquency in the payment of amounts due, including settlement for unauthorized use.*
- 13) *Grazing fee payments are due on the date specified on the billing notice and must be paid in full within 15 days of the due date, except as otherwise provided in the grazing permit or lease. If payment is not made within that time frame, a late fee (the greater of \$25 or 10 percent of the amount owed but not more than \$250) will be assessed.*

*14) No Member of, or Delegate to, Congress or Resident commissioner, after his/her election of appointment, or either before or after he/she has qualified, and during his/her continuance in office, and no officer, agent, or employee of the Department of the Interior, other than members of Advisory committees appointed in accordance with the Federal Advisory Committee Act (5 U.S.C. App.1) and Sections 309 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) shall be admitted to any share or part in a permit or lease, or derive any benefit to arise there from; and the provision of Section 3741 Revised Statute (41 U.S.C. 22), 18 U.S.C. Sections 431-433, and 43 CFR Part 7, enter into and form a part of a grazing permit or lease, so far as the same may be applicable.*

*This permit: 1. Conveys no right, title or interest held by the United States in any lands or resources, and 2. Is subject to (a) modification, suspension or cancellation as provided by land plans and applicable law; (b) review and modification of terms and conditions as appropriate; and (c) the Taylor Grazing act, as amended, the Federal Land Policy and Management Act, as amended, the Public Rangelands Improvement Act, and the rules and regulations now or hereafter promulgated there under by the Secretary of the Interior.*

## **2.3 ALTERNATIVE B-NO ACTION**

Under the No Action Alternative, the current 10 year term grazing permits for the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave and Lambs Knoll Allotments would remain valid until their expiration date (02/28/2018), with no changes to the terms and conditions that were attached to those permits when they were issued. Licensed grazing use would then be renewed under the appropriations act, if available, and remain as currently authorized. While the No Action alternative does not satisfy the purpose and need for federal action at this time, it is carried forward in this EA to provide a baseline for the comparison of impacts related to the Proposed Action.

### **2.3.1 Monitoring**

Under the No Action Alternative, BLM resource specialists would continue to monitor and assess rangeland conditions for the duration of the term permits to ensure that conditions continue to meet Utah Standards and Guidelines for Rangeland Health. Range studies and monitoring would be conducted in accordance with BLM manual procedures and requirements.

### **2.3.2 Permit Terms and Conditions**

The Standard Permit Terms and Conditions, as shown in Section 2.2.3, would be applied to all permits renewed under the “legislative rider” authority.

## 2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

### 2.4.1 No Livestock Grazing Alternative

An alternative for No Grazing, wherein livestock grazing would not be permitted on any of these 7 allotments, was evaluated by the BLM IDT, but was not carried forward for detailed study, because the IDT did not find any unresolved conflicts or issues that could be addressed through the elimination of grazing.

The No Grazing alternative would not meet the purpose and need to authorize a legitimate use of public lands, consistent with federal legal mandates, including the Taylor Grazing Act and FLPMA. It would also not be in conformance with the St. George Field Office RMP, in which these allotments were made available to grazing.

Without unresolved conflicts, a No Grazing alternative would conflict with the Taylor Grazing Act. This act authorizes BLM to allow for and regulate livestock use of public lands, to adequately safeguard grazing privileges, to provide for the orderly use, improvement, and development of the range, and to stabilize the livestock industry dependent upon the public range.

Without unresolved conflicts, an alternative that proposes to close the 7 Allotments to grazing would be inconsistent with the intent of FLPMA which requires that public lands be managed on a “multiple use and sustained yield basis” (FLPMA Sec. 302[a] and Sec. 102[7]). FLPMA includes livestock grazing as a principal or major use of the public lands. FLPMA’s multiple use mandate does not require that all lands be used for livestock grazing. However, without identified resource conflicts that can only be resolved through closure to grazing, the removal of livestock grazing would be arbitrary and would not meet the principle of multiple use and sustained yield.

Without unresolved conflicts, a No Grazing alternative would not be in conformance with the management decisions and analysis in the St. George RMP/EIS (DEIS 1995/FEIS 1998, ROD-BLM 1999). The RMP carried forward most decisions related to livestock grazing on public lands in Washington County from the *Hot Desert Grazing Environmental Impact Statement* (BLM 1978) and the *Kanab Escalante Grazing Environmental Impact Statement* (BLM 1980). Implementation of the No Grazing alternative would require a plan amendment.

The BLM has considerable discretion, through its grazing regulations, to determine and adjust stocking levels, seasons-of-use, and grazing management activities. If, at some point in the future, monitoring indicates any of the allotments are not in compliance with the Rangeland Health Standards and Guidelines, or if any resource conflicts arise, administrative actions would be taken to modify the terms and conditions of the permit or to withhold the permit. The permit or lease may be canceled, suspended, or modified in whole or in part to meet the requirements of applicable laws and regulations.

The Proposed Action and No Action alternatives represent a reasonable range of alternatives, where additional action alternatives are not required to better address resource issues. For these reasons, the No Grazing alternative is not addressed further in this EA.

## 3.0 CHAPTER 3—AFFECTED ENVIRONMENT

---

### 3.1 INTRODUCTION

This chapter includes a description of the environment potentially affected by the alternatives described in Chapter 2 and provides the baseline for comparison of effects described in Chapter 4. Information for this chapter came from existing NEPA analyses and the most recent available data from the Allotments.

### 3.2 GENERAL SETTING

The 7 Allotments are located in the vicinity of the town of Virgin, in eastern Washington County (refer to **Figure 1-1**). The Virgin River, a major tributary to the Colorado River, flows for short distances through the Grafton, Virgin, and Lindell Allotments. The Lambs Knoll Allotment is located approximately 10 miles to the north on Smith Mesa along the boundary of Zion National Park.

This portion of Washington County is within the Colorado Plateau physiographic province, a region characterized by flat mesas and deeply incised canyons that expose multi-colored sandstone, shale, and limestone bedrock units. The Colorado Plateau is drained by the Colorado River and its tributaries which include the Virgin River. Elevations range from 3,700 feet Above Mean Sea Level (AMSL) in the Grafton Allotment to 5,800 feet (AMSL) in the Lambs Knoll Allotment.

The topography of the allotments includes mesa tops, alluvial fans, and steep-sided stream terraces along the Virgin River. The geology of the area includes the nearly barren, multicolored beds of shale, sandstone, and gypsum that comprise the Moenkopi Formation. Mesa top soils are derived from sandstone, shale, and limestone. The alluvial fans consist of soils derived from sandstone, shale, limestone, and gypsum. The gently rolling to steep side slopes of these fans are often severely eroded by run-off from the mesa tops (SCS 1977). Badland soil is described as nearly bare, rolling to very steep, and consisting of varicolored beds of eroded shale and gypsum. Precipitation run-off is very rapid, often resulting in gully head-cutting and erosion during intensive seasonal precipitation events.

The vegetative communities of the allotments vary from semi-desert shrub species with an understory of grasses and forbs to forested areas of pinyon pine (*Pinus* spp.) and Utah juniper (*Juniperus osteosperma*), at higher elevations (**Figures 3-1, 3-2**). Cryptobiotic soil crusts are also present in the allotments (**Figure 3-3**).



**Figure 3-1.** View of the Boot Spring Allotment, showing topography and typical vegetative communities of the Grafton, North Grafton and Boot Spring Allotments.



**Figure 3-2.** View of the Lambs Knoll Allotment, showing topography and typical vegetation communities of the Lambs Knoll and Cave Allotments.



**Figure 3-3.** View of Grafton Allotment showing cryptobiotic soil crusts and slopes that characterize the Grafton, North Grafton and Boot Spring Allotment.

### **3.3 RESOURCES/ISSUES BROUGHT FORWARD FOR ANALYSIS**

#### **3.3.1 Cultural Resources**

As noted above in Section 1.1.1, the NHPA requires that BLM take into account the effects of their actions on cultural resources that are eligible for or listed on the NRHP. The identification efforts used, to identify effects to cultural resources, are consistent with those outlined in Instruction Memorandum No UT-2010-026 and BLM Utah Handbook 8120, Appendix 10, and consisted of a Class I literature review, and monitoring.

The Class I literature review was performed by GERALYN McEwen in September of 2015, and included a review of cultural resource databases housed at the Utah Division of State History (CURES), the St. George Field Office cultural database files, and the BLM internet site containing historical General Land Office (GLO) records located at <http://www.glorerecords.blm.gov>. The Class I literature review identified 25 Class III field inventories that have been conducted within the 7 allotments.

Twelve archaeological sites have been identified within the allotment boundaries. Five of these sites have been determined “eligible” NRHP. These sites consist of three artifact, one Ancestral Pueblo structural site, and one bedrock mortar site. All five sites were monitored to assess

effects from grazing. Sites 42WS3188, 3671, 3672, and 3673 were monitored. No adverse effects were observed at these sites. 42WS6061 was recently recorded and no adverse effects were observed.

### 3.3.2 Vegetation

The native vegetation supported by the Badland-Eroded land association ranges from semi-desert shrub species at the lower elevations of the Boot Spring Allotment (**Figure 3-1**), to upland shrub species and a pinyon-juniper woodland on the benches and slopes of the Lambs Knoll Allotment (**Figure 3-2**). The reaches of the Virgin River that flow through the Lindell, Grafton and Virgin Allotments support riparian vegetation.

Vegetation is generally sparse in these allotments. At lower elevations, the dominant species include blackbrush (*Coleogyne ramosissima*), snakeweed (*Gutierrezia* spp.), rabbit brush (*Chrysothamnus* spp.), Mormon tea (*Ephedra* spp.), indigo bush (*Psoralea fremontii* var. *fremontii*), burro brush (*Hymenoclea* spp.), scattered creosote bushes (*Larrea tridentata*), Utah juniper (*Juniperus osteosperma*), and various native species of grasses. The higher elevation species include big sage (*Artemisia* spp.), Utah juniper, rabbitbrush, wolfberry (*Lycium* spp.), Mormon tea, and various grasses. Riparian vegetation along the Virgin River consists mostly of Russian olive (*Elaeagnus angustifolia*), tamarisk (*Tamarix ramosissima*), native cottonwood (spp.), and willows (spp.). Frequent flooding along the Virgin has hindered BLM attempts to restore native vegetation.

### 3.3.3 Riparian Resources

A number of small springs and seeps, such as Boot Spring, occur within the 7 allotments. A majority of these natural sources have been developed and surface flows piped away from the source. As a result of the spring developments, little or no riparian vegetation is at the sources.

A more extensive riparian zone is sustained along the Virgin River, where it flows along the northern boundaries of the Grafton, Virgin and the small Lindell Allotments. Common vegetation present along the river includes; Russian olive, Fremont's cottonwood (*Populus fremontii*), Gooding's willow (*Salix gooddingii*), seepwillow (*Baccharis salicifolia*); tamarisk, and cattails (spp.).

BLM evaluated the function of the Virgin River riparian area on public lands with the Lindell, Grafton, and Virgin Allotments (including all of the factors considered necessary to maintain a functioning riparian systems), and determined that: the sinuosity of the floodplain and its gradient were in balance with its landscape setting, the vegetative community was diverse/exhibited vigor, and that there was adequate cover to protect the stream banks and prevent excessive erosion of sediment (**Figures 3-4, 3-5**).



**Figure 3-4.** View of Riparian Area at the Assessment Location in the Lindell Allotment.



**Figure 3-5.** View of Riparian Area at the Assessment Location in the Virgin “River Pasture” Allotment.

### **3.3.4 Water Quality**

Livestock activity within and adjacent to surface waters can directly affect water quality parameters, such as nitrogen, phosphorus, coliform bacteria, and total dissolved solids (TDS). Indirect impacts can include increased water temperatures resulting from loss of riparian vegetation.

A few undeveloped springs/seeps and the Virgin River are the only surface water sources within this group of allotments. As part of the rangeland monitoring program, BLM monitors water quality in the Virgin River, using data collected by the State of Utah’s Department of Environmental Quality, Division of Water Quality (DWR) (reports can be viewed at the Field Office).

The Virgin River is the largest source of surface water in Washington County and is a major tributary to the Colorado River. The river flows for short distanced on private land along the eastern boundary of the Grafton Allotment, on public land through the Lindell Allotment, and for a short distance on public land through the River Pasture of the Virgin Allotment.

Surface water quality of the Virgin River varies by location. Downstream of the Pah Tempe Hot Springs complex, located near the town of Hurricane, the surface water cannot be used as a source for drinking water or for agriculture uses because of high levels of total dissolved solids (TDS) in the form of salts. The Pah Tempe Hot Springs which discharge into the river are the source of this natural pollution, contributing more than 9,000 milligrams/liter of TDS to the river. The high TDS of the Pah Tempe Hot Springs is partly derived from the upward flow of groundwater from great depth, through the gypsiferous beds of the Kaibab Formation (Permian age) and the overlying Moenkopi Formation (Triassic age) shales that are downthrown beneath the surface along the western side of the Hurricane Fault zone. Gypsum is soluble in water, so it traditionally is the source of salts that are detected in groundwater and in the surface water of the Virgin River.

Upstream of Pah Tempe Hot Springs, water quality in the Virgin River is regularly evaluated by the Utah Division of Water Quality (DWR), from samples collected at various stations. Several years of water quality data have been collected and analyzed by DWR from a station located one mile east of the Town of Virgin, downstream of the Virgin Allotment. Phosphorous levels in the water samples exceeded “Chronic Water Quality Standards” in 10 of 14 samples collected, while TDS values exceeded standards in 1 of 14 samples. The levels of phosphorous detected are also believed to be geologically derived.

### **3.3.5 Migratory Birds and Species of Conservation Concern**

Migratory bird species (e.g., raptors, songbirds, and shorebirds) are protected under the Migratory Bird Treaty Act (MBTA) of 1918, Executive Order 13186, and the Bald and Golden Eagle Protection Act (BGEPA). The MBTA protects species or families of birds that live, reproduce, or migrate within or across international borders during their life cycle. Under

authority of the MBTA, it is unlawful to take, kill, or possess migratory birds, their parts, nests, or eggs—including the disturbance or destruction of a migratory bird nest that results in the loss of eggs or young. Executive Order 13186 was enacted, in part, to ensure that environmental analyses of federal actions evaluate the impacts of actions and agency plans on migratory birds. It also states that emphasis should be placed on species of concern, priority habitats, and key risk factors and it prohibits the take of any migratory bird without authorization from the USFWS. The BGEPA makes it illegal to take (e.g., disturb, molest), possess, sell, purchase, barter, or transport any Bald or Golden eagle, alive or dead, or any part, nest, or egg thereof.

The decline of Neotropical migratory birds (NTMBs; i.e., land birds that breed north of Mexico and then migrate to Mexico, Central and South America, and the Caribbean) in North America is well documented (Rappole and McDonald 1994). Partners in Flight (PIF) is a cooperative partnership program involving Federal and State Governmental agencies (e.g., BLM, USFWS, Utah Division of Wildlife Resources; UDWR) that focuses on the conservation of migratory birds (e.g., NTMBs) and maintains a PIF High-Priority Bird Species list (Parrish et al. 2002). The USFWS maintains a list of Birds of Conservation Concern for each Bird Conservation Region in the United States (USFWS 2008). Washington County is in USFWS Bird Conservation Regions 6, the Mountain-Prairie Region. In cooperation with the UDWR, Utah-BLM maintains an avian Sensitive Species list (UDWR 2015; [http://dwrcdc.nr.utah.gov/ucdc/ViewReports/SS\\_List.pdf](http://dwrcdc.nr.utah.gov/ucdc/ViewReports/SS_List.pdf)).

A variety of migratory bird species ( $\geq 302$  spp.) have been documented using habitats within Washington County, for breeding, nesting, foraging, and migratory habitats (Fridell and Comella 2007, Parrish et al. 2002; see Appendix B), including USFWS-BLM-PIF listed species of conservation concern (see Appendix C).

### **3.3.6 Threatened and Endangered Species and BLM Sensitive Species**

Literature reviews (including species lists provided by the US Fish and Wildlife Service (USFWS) and field surveys were used to identify federally-listed threatened, endangered, and candidate species that might be present in these allotments. BLM Sensitive Species that may be present in the allotments are also described in this section. There are no federally-listed threatened or endangered plant species within the 7 allotments.

Federally-listed threatened, endangered, and candidate terrestrial, avian, or aquatic species that may be present within or near the allotments include: the California condor; Mexican spotted owl; Southwestern willow flycatcher; and Western yellow-billed cuckoo. Additional information on these species is provided below.

#### **3.3.6.1 California Condors**

The California condor is listed as an endangered species under the Endangered Species Act. However, in Arizona and Utah, where California condors have been released from captive breeding programs into the Grand Canyon and Vermillion Cliffs areas, California condors are managed as an experimental and non-essential population. Released birds from the captive breeding program have been sighted in southern Utah near the 7 allotments, in Zion National

Park, and may use Hurricane and Smith Mesas infrequently for hunting and foraging. However, no nests, roosts, or other special use areas for California condors have been identified in any of the 7 allotments.

### ***3.3.6.2 Southwestern Willow Flycatcher***

This small, migratory bird is an endangered species, listed under the ESA in March, 1995. Habitat loss was the primary cause for the decline in population numbers of these flycatchers. Critical habitat was designated for the Southwestern willow flycatcher in 1997 and a Recovery Plan approved in 2002 (USFWS 2002).

The Southwestern Willow Flycatcher nests primarily in thickets, especially of willow, though other shrubs or trees are used, near slow streams, standing water, or seeps. There may exist in an overstory of cottonwood, tamarisk, or other large trees, but this is not always the case. BLM completed a habitat suitability survey for the Southwest willow flycatcher on public lands along the Virgin River at the riparian assessment locations.

The evaluation concluded that the riparian zone was unsuitable for nesting habitat due to the narrowness of the floodplain and understory characteristics that had been impacted by flooding in the winter months of 2006. The flooding scoured the stream channel and removed much of the shrub understory.

Nesting habitat was assessed against interrelated evaluation criteria, including width of the floodplain and vegetative overstory (USFWS 2001). BLM concluded that suitable nesting habitat for Southwestern Willow Flycatcher was not present along the Virgin River on public lands within the allotments. The floodplain here was too narrow to support a riparian area large enough for a breeding pair of flycatchers (Habitat Classification Worksheets on file at St. George Field Office, BLM).

### ***3.3.6.3 Mexican Spotted Owl***

The Mexican spotted owl was listed as threatened in 1993 because of declining populations. The decline was due primarily to the loss of suitable habitat and prey base to timber management practices and catastrophic wild fires. The USFWS approved a Recovery Plan for the Mexican spotted owl in 1995 (USFWS 1995) and subsequently designated critical habitat (**Figure 3-6**). The Recovery Plan identified several recovery units, the largest of which is the Colorado Plateau Recovery Unit that encompasses suitable habitat in southern Utah and elsewhere on the Colorado Plateau. Spotted owls have been observed in the canyons of Zion, Capitol Reef, and the Grand Canyon National Parks.

In the Colorado Plateau Recovery Unit, Mexican spotted owls appear to prefer steep-walled, rocky canyons. Here, nesting occurs in caves or on cliff ledges of the canyons, in stick nests built by other birds, on debris platforms in trees, and in tree cavities. These owls consume a wide variety of prey, but commonly eat small to medium sized rodents, bats, other bird species, and reptiles.

In 2004, UDWR biologists conducted Mexican spotted owl habitat/presence surveys on Smith Mesa (UDWR unpublished data; see Gorrell et al. 2005) and within the North Grafton, Virgin,

Cave, and Lambs Knoll Allotments—during which no Mexican spotted owls were detected and the majority of the habitat was determined to be unsuitable for nesting. The habitat within these allotments though may though provide foraging and dispersal habitat for Mexican spotted owls.

Several slopes in these allotments (on the north side of Gooseberry Mesa) have been identified as having potential for nesting Mexican spotted owls (GIS Models Predicting Mexican Spotted Owl Habitat in the Canyon Lands of Utah, Utah Division of Wildlife Resources, January 2005). However, due to the steepness of these slopes, they are inaccessible to livestock. The proposed water development for the Grafton Allotment would be, in part, located within an area modeled by USDWR as having potential for nesting Mexican spotted owls. However, to date, no nests, roosts, or special use areas for have been identified on Gooseberry Mesa.

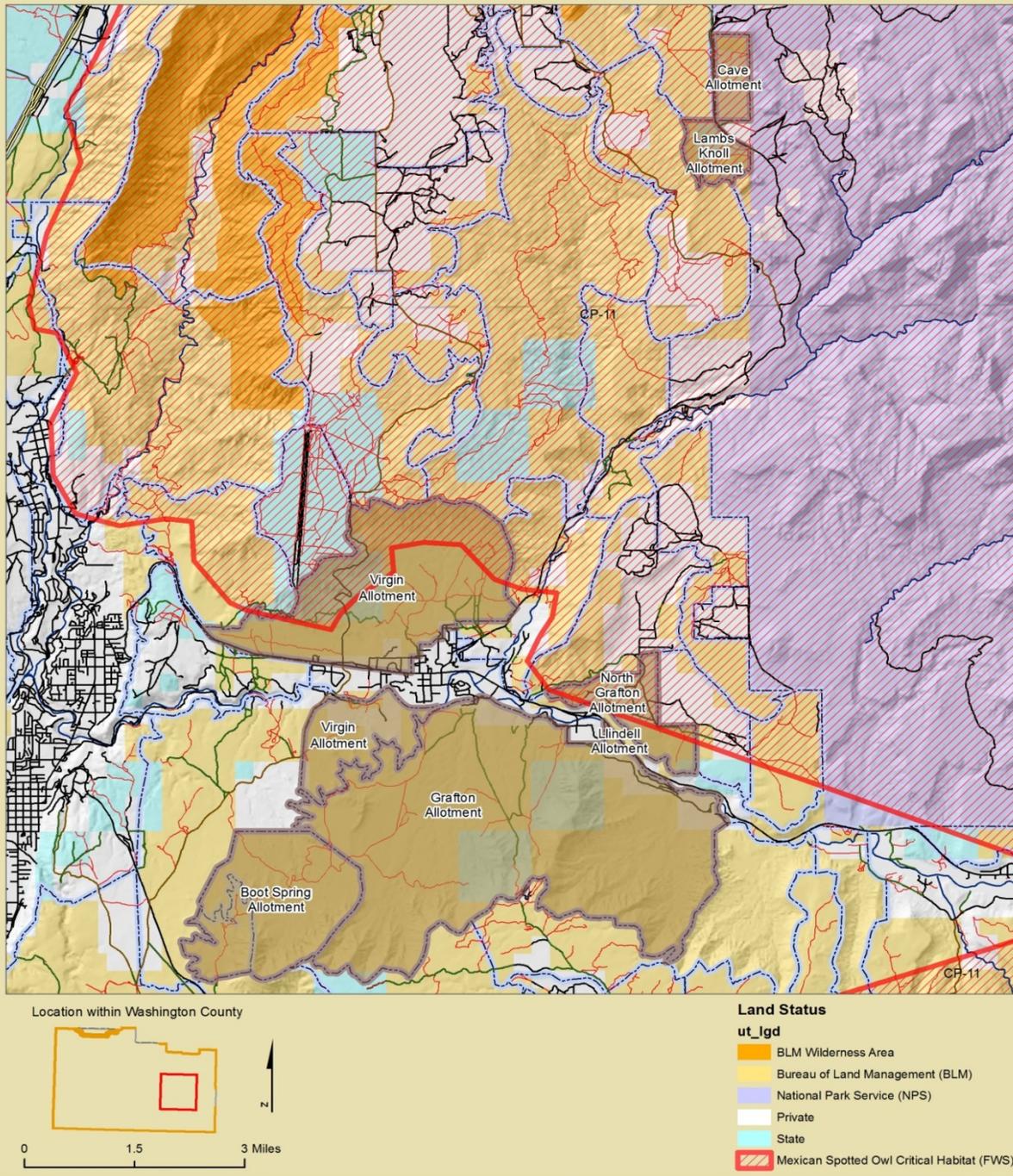
# Designated Critical Habitat for Mexican Spotted Owl

St. George Field Office  
11/24/2015

No warranty is made by the BLM for use of the data for purposes not intended by the BLM.



This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.



**Figure 3-6.** Mexican Spotted Owl Habitat

### 3.3.6.4 Western Yellow-Billed Cuckoos

The Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) was listed as threatened in 2014 because of declining populations and the loss and degradation of native riparian habitat

(USFWS 2014). A proposed rule to designate critical riparian habitat and a recovery plan for the species is pending. The Western yellow-billed cuckoo, an insect-eating bird found in riparian woodland habitats, winters in South America and breeds in western North America (Hughes 2015). Once abundant in the western United States, populations have declined for several decades, primarily due to the severe loss, degradation and fragmentation of its riparian habitat (Hughes 2015). Overgrazing and invasive exotic plants have also contributed to decline (USFWS 2014).

In May of 2006, BLM evaluated the riparian zone along the Virgin River on public lands to determine if suitable habitat for Western yellow-billed cuckoos was present. Based on the assessments, BLM determined that this riparian area provides little quality habitat with few nesting opportunities for Western yellow-billed cuckoo.

### 3.3.6.5 *BLM Sensitive Species*

The following BLM Sensitive Species are either known to occur or potentially may occur in the 7 Grafton allotments: burrowing owl (*Athene cunicularia*, summer resident, uncommon), ferruginous hawk (*Buteo regalis*, winter visitor, fairly common), Lewis's woodpecker (*Melanerpes lewis*, winter use only, rare), Northern goshawk (*Accipiter gentilis*, winter use only, rare), Allen's big-eared bat (*Idionycteris phyllotis*, permanent resident, extremely rare), big free-tailed bat (*Nyctinomops macrotis*, summer resident, rare), fringed myotis (*Myotis thysanodes*, permanent resident, uncommon), spotted bat (*Euderma maculatum*, permanent resident, rare), Townsend's big-eared bat (*Corynorhinus townsendii*, permanent resident, fairly common), Western red bat (*Lasiurus blossevillii*, permanent resident, extremely rare), kit fox (*Vulpes macrotis*, permanent resident, uncommon), Desert sucker (*Catostomus clarki*, permanent resident in the Virgin River, fairly common), Flannel-mouth sucker (*Catostomus latipinnis*, permanent resident in the Virgin River, fairly common), Virgin spinedace (*Lepidomeda mollispinis*, permanent resident in the Virgin River, fairly common), and Arizona toad (*Bufo microscaphus*, permanent resident in the Virgin River, fairly common). No nests, dens, roosts, or other special use areas for these BLM Sensitive species have been identified in the project area.

The 3 BLM Sensitive fish species (desert suckers, flannel-mouth suckers, and Virgin spinedace) are found in the Virgin River and its tributaries. The Virgin spinedace is managed by the State of Utah under a Conservation Agreement and Strategy (1995), negotiated with the USFWS to prevent the need for listing of this native fish under the federal ESA. The Conservation Strategy (Utah Division of Wildlife Resources 2002) contains management actions for the protection of this native fish. The Virgin River Recovery Program, an alliance of state and federal agencies, including BLM, and private sector partners, monitors native fish populations and habitat conditions and undertakes projects that will restore native fish populations to viable numbers in the future.

Bald eagles (*Haliaeetus leucocephalus*), which were recently removed from the Endangered Species List (ESL) in 2007, are primarily migratory winter residents in Washington County and may use the Boot Spring, Grafton, North Grafton, Virgin, Cave, Lambs Knoll and Lindell Allotments on a regular basis between November and March for hunting and foraging. Bald eagles are opportunistic predators, especially in winter, when they feed on any available fish, waterfowl, small mammals, or carrion. Those found in Washington County are considered to be

wintering populations (or northern birds) that are migrating through the area in the fall and spring. Bald eagles have not been documented in any of the allotments nor have nests or roosts been identified in the allotments. There are no breeding pairs known in Washington County. Although recently delisted (ESL), Bald eagles continue to be protected by other federal legislation.

From the rangeland health assessment completed for the allotments in 2008 and 2015, it was determined that all sites (riparian, aquatic, and upland) were functioning properly (see health assessment summary). It was also determined that the ecosystem met the Utah Rangeland Standards and conformed to all the Grazing Management Guidelines. Under the proposed grazing schedule, the vegetation within these allotments should be properly utilized by livestock and the vegetation maintained in good condition, providing good habitat, and adequate prey species for BLM Sensitive species and general wildlife and their habitats. The maintenance of fences, waters, and other livestock operations should not cause significant disturbances to these BLM Sensitive Species.

### 3.3.7 General Wildlife

General wildlife includes all wildlife not considered Threatened, Endangered, Sensitive, or otherwise of special concern. The 7 allotments provides habitat for a variety of resident small mammals, birds, and reptiles. The more common would include: badgers (*Taxidea taxus*), antelope ground squirrels (*Ammospermophilus leucurus*), kangaroo rats (*Dipodomys ordii*), deer mice (*Peromyscus maniculatus*), desert wood rats (*Neotoma lepida*), Gambel's quail (*Lophortyx gambelii*), mourning doves (*Zenaida macroura*), common ravens (*Corvus corax*), wrens (*Catherpes mexicanus*, *Salpinctes obsoletus*), house finches (*Carpodacus mexicanus*), side-blotched lizards (*Uta stansburiana*), and Western whiptail (*Cnemidophorus tigris*). Larger animals such as coyotes (*Canis latrans*), mule deer (*Odocoileus hemionus*), and gray fox (*Urocyon cinereoargenteus*) may use the area year-long or for a portion of the year.

Although mule deer are neither a federal nor state-listed species, the UDWR closely monitors deer populations and habitat in Washington County (**Figure 3-7**). The allotments identified in this proposed action are located within the Zion Deer Management Unit and a portion of the Virgin Allotment and portion of the Grafton Allotment are located within crucial deer winter range identified by the Utah Division of Wildlife Resources. The Zion Unit includes all deer habitat east of I-15 to the Kane County line. Approximately 7,500 mule deer are found in this herd unit. BLM evaluates the impacts of all projects or activities on public lands within crucial deer winter range through the NEPA process and makes every effort to avoid project-related impacts on this habitat.

From the rangeland health assessment completed for the allotments in 2008 and 2015, it was determined that all sites (riparian, aquatic, and upland) were functioning properly (see health assessment summary). It was also determined that the ecosystem met the Utah Rangeland Standards and conformed to all the Grazing Management Guidelines. Under the proposed grazing schedule, the vegetation within these allotments should be properly utilized by livestock and the vegetation maintained in good condition, providing good habitat, and adequate prey species for general wildlife and their habitats. The maintenance of fences, waters, and other livestock operations should not cause significant disturbances to these general wildlife species.

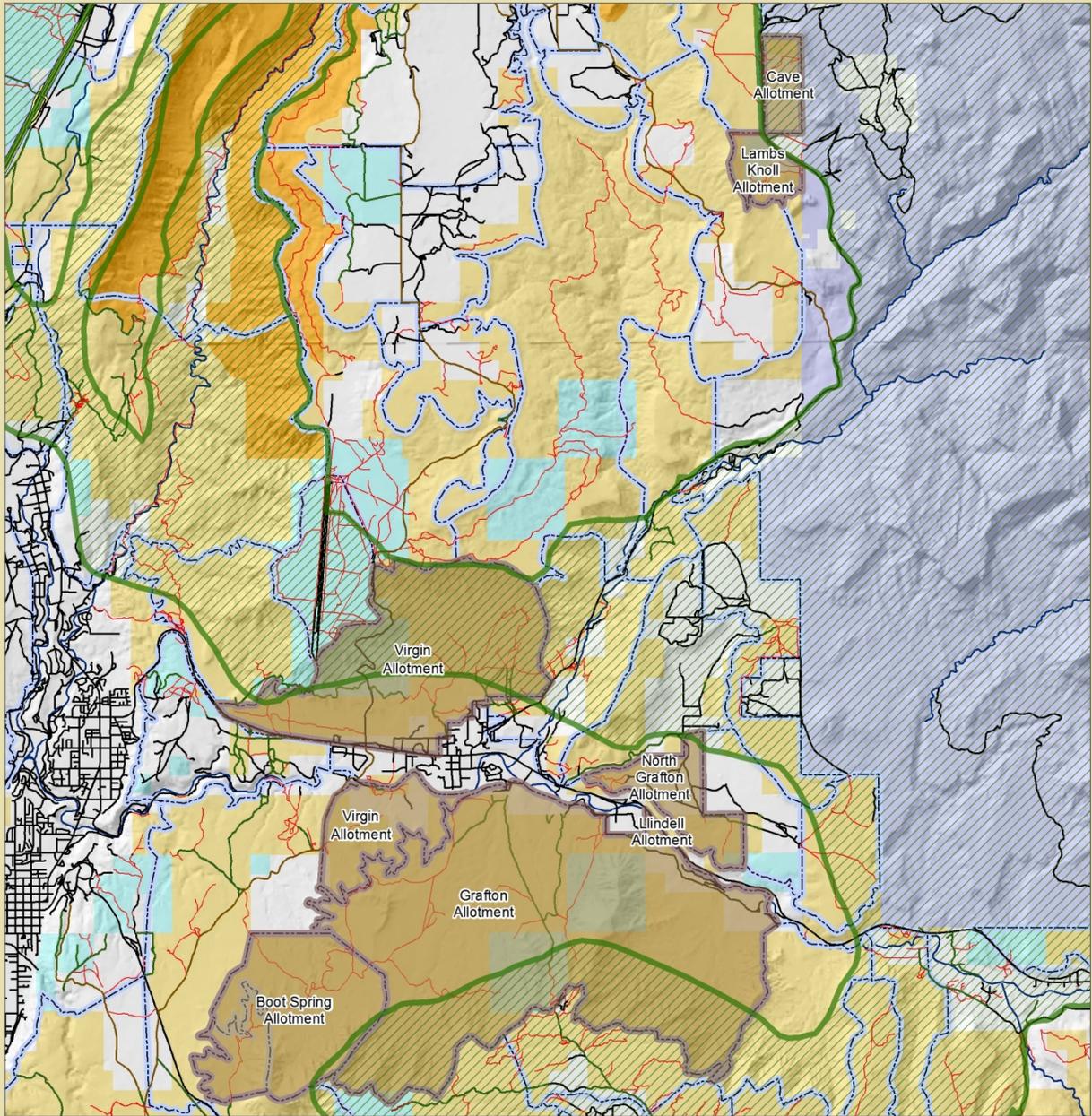
# Crucial Mule Deer Winter Range

St. George Field Office

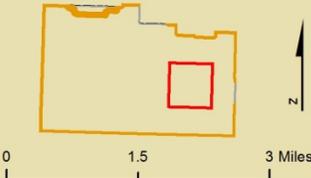
11/24/2015

No warranty is made by the BLM for use of the data for purposes not intended by the BLM.

This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.



Location within Washington County



### Land Status

ut\_lgd

- BLM Wilderness Area
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- Private
- State
- mule\_deer\_hab

**Figure 3-7.** Crucial Mule Deer Winter Range

### 3.3.8 Range/Livestock Grazing Management

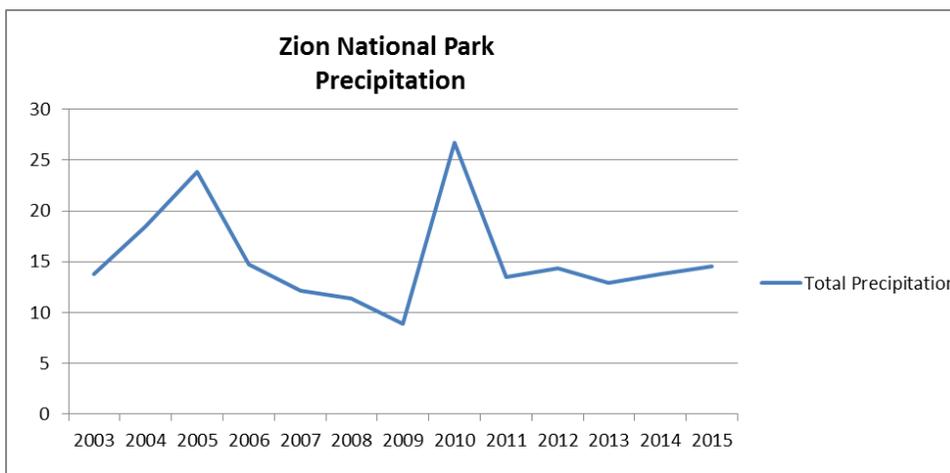
7 allotments are being evaluated in this EA for grazing permit renewal: Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave and Lambs Knoll (see **Figure 1-1**). The allotments and grazing permits are listed in Table 2-1. Five of the seven allotments are classified as “Custodial” Allotments, based on the high percentages of private land that are included within the allotments. The Grafton and Virgin Allotments are classified as “Maintain” Allotments.

A grazing lease is issued for the amount of livestock forage produced annually on the public lands and is allotted on an AUM basis as for non-custodial leases. BLM does not control the adjacent private lands owned by the permit holders. The livestock operator assumes grazing management responsibility with the intent to maintain or improve existing resources. Livestock are to be grazed on public lands only during the established season of use. If private land is used during different periods, it is the permittee's responsibility to keep livestock off the public land during non-grazing periods. BLM retains the right to manage the public lands for multiple uses and to make periodic inspections to ensure that overgrazing does not occur. If overgrazing should occur, then BLM would work with affected partners to identify and prescribe actions to be taken that would return the allotment to compliance.

Seven types of monitoring data are used to evaluate the impact livestock are making on these allotments; precipitation, actual use, trend, Utilization and Rangeland Health Assessments. Actual use, trend, utilization and the Rangeland Health Assessments are summarized under each individual allotment, precipitation data is general information based on rain gauges located closest to the allotments; the Zion rain gauge is the closest in distance to the seven allotments monitored in this EA.

Since 2003, rainfall averaged 10 to 20 inches annually. The driest months are typically May and June. The area has received below average precipitation in eight of the last eleven years. Conditions were wetter in 2010 with annual precipitation of approximately 26 inches (WRCC 2015). <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ut9717>

**Table 3-2.** Precipitation Data Zion National Park



### **3.3.8.1 Grafton Allotment**

The Grafton Allotment is approximately 9,154 total acres in size and is primarily comprised of BLM-managed public lands (7,200 acres), 1,278 acres state land, and 676 acres are private land. The allotment is in the “Maintain” category and is licensed for 100 head of cattle (279 AUMs) to graze during a season of use from November 1 to May 31 each year. The allotment has been divided into two pastures: the East and West pastures. Grazing use of this allotment has been active from 2008 to 2015. In 2010, 209 AUM’s were reported used, otherwise use has maintained at maximum AUM’s for all other years.

### **3.3.8.2 North Grafton Custodial Allotment**

The North Grafton Allotment is approximately 806 total acres, of which 380 acres are BLM-managed public lands, 32 acres are state lands, and 393 acres are private. The allotment is managed as “Custodial” and licensed for 2 head of cattle (14 AUMs) for a season of use from November 1 to May 31 each year. There is only one pasture in the allotment and no natural water sources. Grazing use of this allotment has been active from 2008 to 2015 and has been used at near maximum AUM’s.

### **3.3.8.3 Boot Spring Allotment**

The Boot Spring Allotment is totally comprised of BLM managed public land and consists of approximately 2,380 acres, divided into Southwest and Northeast pastures. The allotment is in the “Custodial” category. Approximately 21% of the allotment is not suitable grazing because of steep terrain. This custodial allotment has one pasture and is licensed for 20 head cattle (90 AUMs) for season of use from December 16 to April 30. Grazing use of this allotment in 2011, 2012, and 2013 was approximately half the allowed AUMs and no use of the allotment was reported in 2010, 2014, and 2015.

### **3.3.8.4 Virgin Allotment**

The Virgin Allotment is comprised of approximately 4,831 acres, of which 3,513 are public lands, 751 acres are state land, and 567 acres are private. The allotment is divided into two pastures: the Highway and River pastures. The allotment is in the “Maintain” category and is licensed for 41 head of cattle (82 AUMs), with two seasons of use: December 1 to January 31 in the Highway pasture and April 1 to May 31 in the Virgin River pasture. Grazing use on this allotment has been variable during the past 10 years. There were seasons of “No Use” and when in use only about half the AUMs were used.

### **3.3.8.5 Lindell Allotment**

The Lindell Allotment is comprised of approximately 25 total acres of BLM-managed land and 15 acres of private land, for a total of 40 acres. The allotment is in the “Custodial” category and is licensed for one head of cattle (12 AUMs) to be grazed yearlong, from March 1 to February 28. Grazing use of this allotment has had maximum AUM usage for the past 10 years.

### **3.3.8.6 Cave Allotment**

The Cave Allotment is located on Smith Mesa, adjacent to the boundary of Zion National Park comprised of approximately 382 acres, of which 73 acres are BLM-managed land and 309 acres are private. The allotment is in the “Custodial” category and is licensed for two head of cattle (7

AUMs) to be grazed from June 1 to September 15. Except in 2012 and 2015, this allotment has had “No Use” for the past 10 years.

#### **3.3.8.7 Lambs Knoll Allotment**

The Lambs Knoll Allotment is comprised of approximately 200 acres of BLM-managed land and 200 acres of state land. The allotment is in the “Custodial” category and licensed for two head of cattle (10 AUMs) to be grazed from June 1 to October 31. Most of the BLM-managed land is comprised of steep and/or rocky terrain, making it inaccessible to cattle for grazing. A large section of the state land near the highway was seeded with desirable forage, which draws cattle to congregate in those areas. Water for livestock use is also located on state land. Grazing use of this allotment has had maximum AUM usage for the past 10 years.

### **3.3.9 Studies Conducted**

#### **3.3.9.1 Rangeland Health**

Resource specialists from BLM regularly conduct inventories and assessments of natural resource conditions on public lands (**Figure 3-8**). The need for natural resource inventories was established in 1976 by Congress in Section 201(a) of the FLPMA and reaffirmed in 1978 in Section 4 of the Public Rangelands Improvement Act (PRIA). These acts mandate that federal agencies develop and maintain inventories of range conditions and trends on public rangelands and update inventories on a regular basis. Monitoring data that has been collected throughout the allotments include nested frequency, use pattern mapping, key area utilization, livestock, actual use, precipitation data, Proper Functioning Condition riparian-wetland standard checklist, soil stability, and Rangeland Health Assessments.

Several members of the ID Team conducted rangeland health assessments on the 7 allotments between October and November of 2015. The data collected by the rangeland health assessments in 2015, as well as data collected during previous field studies, were used in the development of this EA and are available if needed for further examination.

The purpose of a Rangeland Health Assessment is to identify “the degree to which the integrity of the soil, vegetation, water, and air, as well as the ecological processes of the rangeland ecosystem are balanced and sustained”. Integrity is defined to mean the “maintenance of the functional attributes characteristic of a locale, including normal variability”. These definitions were developed by a federal ad hoc committee established in 1995 to integrate relatively recent concepts regarding rangeland health into various agencies’ rangeland inventories and assessments (BLM 2000).

For the assessments, BLM uses a qualitative assessment protocol presented in the technical reference, “Interpreting Indicators of Rangeland Health” (BLM 2000). In general, this protocol is designed to provide a qualitative evaluation of the integrity of ecological processes important to rangeland health: the water cycle, energy flow, and the nutrient cycle. The results help land managers identify areas that are potentially at risk of degradation. The information collected focuses on critical ecosystem properties and processes. This qualitative assessment, conducted at sites, provides a relatively fast survey method to rate site protection indicators, including both plant and soil components.

Three interrelated attributes are evaluated to assess the status of the ecological processes, including soil/site stability, hydrologic function, and integrity of the biotic community. Soil/site stability is the capacity of the site to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water. Hydrologic function is the capacity of the site to capture, store, and safely release water from precipitation and run-off, to resist a reduction in this capacity, and to recover this capacity following degradation. The integrity of the biotic community is the capacity of the site to support characteristic functional and structural communities in the context of normal variability, to resist loss of this function and structure due to disturbance, and to recover following disturbance.

### ***3.3.9.2 Trend Studies***

A previous method for monitoring trend was used quite extensively prior to 2011. Except for the Boot Spring and Virgin allotments where old frequency plots were established and read the old method used the old 3 x 3 plot method to determine trend. The method identified the plants and the change in plant structure and growth over time within a small 3x3 plot but did little to determine the overall trend of a particular species on the allotment. Now the St. George Field Office uses a different long-term trend method that is believed to yield more accurate data. Because of this switch only one year's worth of data is available for each allotment. This method will be used in years to come for purposes of comparing data and looking for a trend. In the new method, data for both Nested Plot Frequency and Point Intercept are collected to examine frequency and cover within a transect. When multiple readings are done on a transect, a t-Test can be performed to detect significant changes that take place over time. Since the transects have only been read once, a trend is not able to be seen.

Trend will be read every 7-10 years with the exception of Grafton and Virgin which will be read every 5-7 years. Refer to Utah BLM Manual H-4400-1 Rangeland Monitoring and Health for information on the procedure for setting up transects. Both the old and new trend methods are posted below. Please note that the results of these two methods cannot be compared with one another because data was collected using a slightly different procedure.

An Ecological Site Description (ESD) has not yet been developed by the Natural Resources Conservation Service (NRCS) for Washington County. An ESD is used to compare what percent of certain species are present in an area to what is ideally supposed to be present. Without this information it is difficult to compare data obtained to how far off from ideal species percentage the allotments are.

The assessment protocol uses 17 indicators to gauge the condition of the three attributes described above. Since the attributes are interrelated, several of the indicators provide an assessment of more than one attribute. The indicators include soil rills, water flow patterns, pedestals, and/or terraces, bare ground, gullies, wind-scoured blowouts and/or deposition areas, litter movement, soil surface resistance to erosion, soil surface loss or degradation, plant community composition and distribution relative to infiltration and runoff, compaction layer, functional and structural plant groups, plant mortality and decadence, litter amount, annual plant production, invasive plants, and reproductive capability of perennials. For an assessment, each indicator is rated based on the degree of departure from the ecological site description or

characteristics of the ecological reference area. The ratings of departure from expected conditions are none to slight, slight to moderate, moderate, moderate to extreme, and extreme.

Other data used to determine whether allotments were meeting Utah Standards of Rangeland Health include soil stability tests, utilization studies, and Actual Use information as reported by the permittee. These will be discussed in the following descriptions of each allotment. All upland and riparian sites were found to be meeting range health standards and functioning properly.

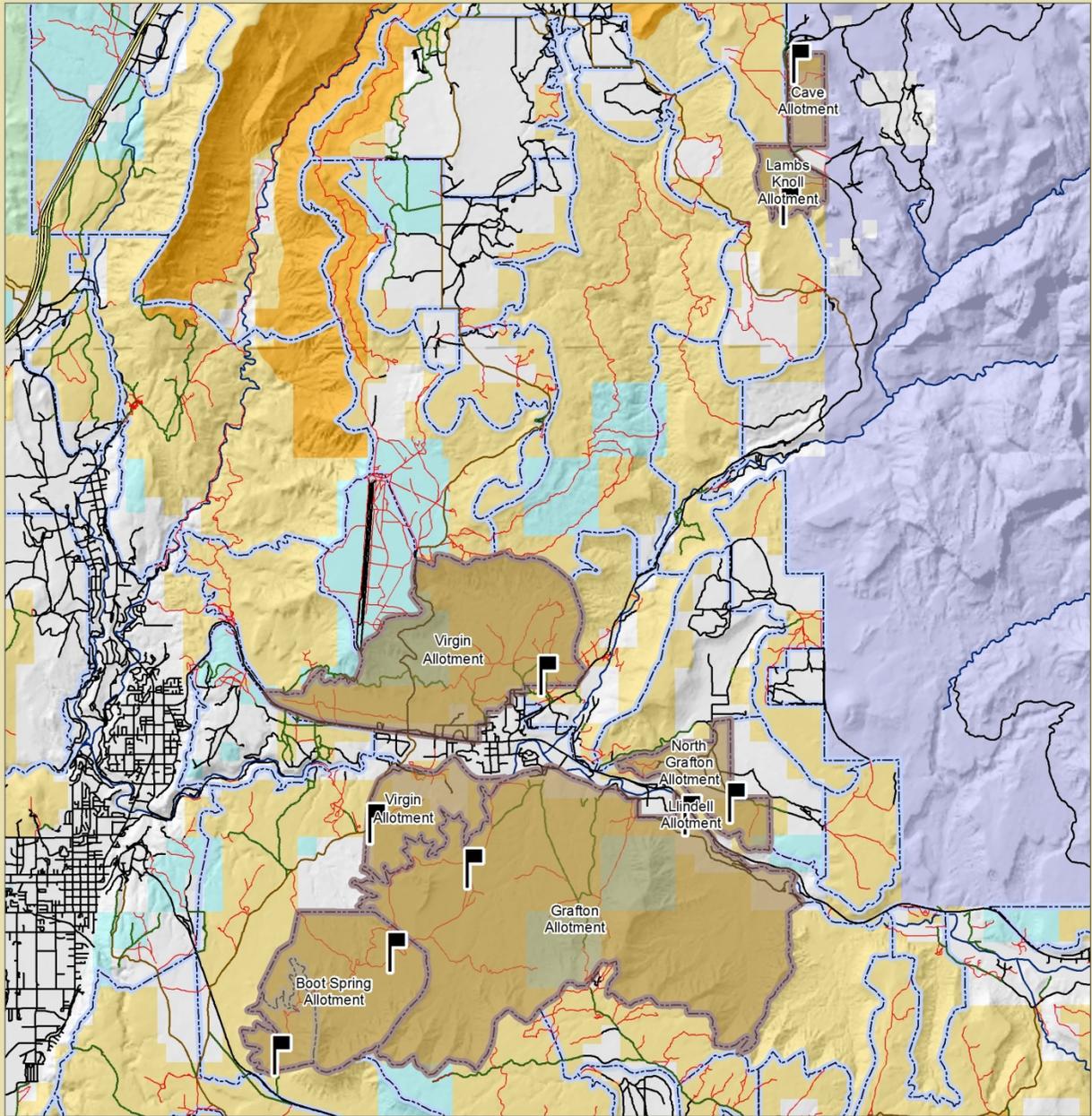
# Monitoring Locations

St. George Field Office

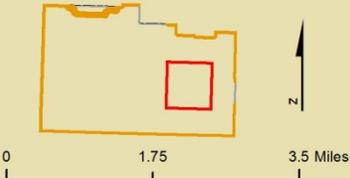
11/24/2015

No warranty is made by the BLM for use of the data for purposes not intended by the BLM.

This product may not meet BLM standards for accuracy and content. Different data sources and input scales may cause some misalignment of data layers.



Location within Washington County



### Land Status

ut\_lgd

- BLM Wilderness Area
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- Private
- State
- US Forest Service (USFS)

**Figure 3-8.** Designated Monitoring Locations within the Allotments

### **3.3.9.3 Soil Stability**

Soil Stability tests were conducted on each of the Allotments in 2015 with the exception of the Cave Allotment. Values for soil stability range from 1 being least stable, to 6 being most stable. The least stable surface layer was found in the North East pasture of Boot Spring with a value of 1.33 and subsurface layer with 2.5. Both of these numbers show that the soil found within this allotment is quite unstable. Refer to Utah BLM Manual H-4400-1 Rangeland Monitoring and Health for information on the procedure for measuring soil stability. Soil Stability forms are available for review upon request at the St. George Field Office.

## **3.4 ALLOTMENT HEALTH MONITORING RESULTS**

### **3.4.1 Grafton Allotment**

The rangeland health assessment was completed at the monitoring study site. The Rangeland health Evaluation Summary Worksheet for the Grafton Allotment showed mostly “none to slight departure” for the seventeen indicators. Two of the indicators were deemed moderate, one due to large gullies possibly as a result of historical use. The other, Functional/Structural Groups indicate that an increase of shrubs and loss cool season grasses is possibly due to climate change. One indicator was deemed “slight to moderate”. Litter movement appeared to be less than what would be expected, again possibly due to loss of cool season grasses. However, it was determined that any of these issues would be improved by the elimination of grazing.

The ecosystem within the Grafton Allotment is functioning properly according to the 2015 rangeland health assessments. The allotment met the standards and guidelines for rangeland health for upland soils, native and threatened and endangered species. The guidelines for grazing management are being conformed to within the allotment.

The Grafton Allotment used the old 3 x 3 plot method to determine trend. The method identified the plants and the change in plant structure and growth over time within a small 3x3 plot but did little to determine the overall trend of a particular species on the allotment.

A new trend plot was established in 2013 using the new Utah protocol for monitoring rangeland health. This long term trend site will be continued to be monitored every 5-7 years per the “M” Category Allotment justification.



**Photo 3-1.** Newly Established Trend Plot 2013 Grafton Allotment



**Photo 3-2.** Rangeland Health Evaluation 2015 Grafton Allotment

## Soil Cover and % Bare Ground By Transect

Site Class: BLM - Utah || Color Country District || St George Field Office || Grafton Allotment

Date: 4/4/2013

Site ID: GRAFTON-WEST-01

Examiner(s): SR MP

Cover (Point-Intercept)												
Species	Transect (#Hits)											% Cover*
	1	2	3	4	5	6	7	8	9	10	Total	
Bare Ground	60	44	48	56	51	61	45	54	49	57	525	65.63
Embedded Litter	1	1	2		1	3		1			9	1.13
Other Litter		1			4			2	4	3	14	1.75
Woody Litter >5mm	3	1	4	7	4		1	1	3	1	25	3.13
Rock >5mm	1	2	1		2						6	0.75
Coleogyne ramosissima	10	15	12	5	12	9	8	8	10	9	98	12.25
Dalea fremontii		3	3	1			3	2	1		13	1.63
Ephedra nevadensis		3	2	3			4	2	6		20	2.50
Unknown 2 - SHRUB							1				1	0.13

\* Number of decimal places does not imply level of precision

**Figure 3-9.** Presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 5-7 year intervals

## Frequency Summary

Site Class: BLM - Utah || Color Country District || St George Field Office || Grafton Allotment

Date: 4/4/2013

Site ID: GRAFTON-WEST-01

Examiner(s): SR MP

% Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.
Allium	1	1	2	1	2	1	4	2
Bromus tectorum	4	2	10	5	17	9	26	13
Coleogyne ramosissima	46	23	59	30	80	40	98	49
Dalea fremontii	5	3	6	3	10	5	15	8
Ephedra nevadensis	15	8	19	10	27	14	34	17
Eriogonum inflatum			1	1	2	1	4	2
Unknown 1-FORB							1	1
Unknown 2-SHRUB	2	1	2	1	3	2	5	3

**Figure 3-10.** Results of the Frequency Study conducted on the Grafton Allotment

## Actual Use on Grafton Allotment

This allotment is licensed for one hundred cattle from Nov. to May with a total of 279 AUMs. The average total percent use for the past four years is 89.5 % of permitted use.

**Table 3-3.** Grafton Allotment Actual Use

<b>Year</b>	<b>AUM's Used</b>	<b>% Used of Permitted AUM's</b>
2015	279	100%
2014	268	89%
2013	121	69%
2012	279	100%
2011	279	100%
2010	209	75%
2009	279	100%
2008	279	100%
2007	276	98%
2006	276	98%
2005	276	98%

## Utilization Studies on the Grafton Allotment

Utilization studies of key forage species were done for the Grafton Allotment in 2015. Average utilization was 21.3 %, classifying it as “light” utilization for the 2015 grazing season.

## Health Assessment Summary for the Grafton Allotment

Based on the results of the health assessment, actual use, rain gauge, utilization information and the trend studies, BLM concluded the upland ecosystem is functioning and the allotment is in conformance with the Standards for Rangeland Health under the current livestock grazing schedule. No changes in current livestock management appear to be needed.

### 3.4.2 North Grafton Allotment

The Rangeland Health Assessment was completed in fall 2015. The Rangeland health Evaluation Summary Worksheet for the North Grafton Allotment met the “none to slight departure” from the expected conditions for the seventeen indicators. Two indicators were noted to have a departure different than that of none to slight. The invasive plants indicator was deemed slight to moderate because of invasion of silverleaf nightshade and functional/structural Groups were deemed as moderate due to a fire that resulted in loss of shrub community and presence of invasive plants (silverleaf nightshade). However, it was determined that neither of these issues would be improved by the elimination of grazing.

The ecosystem within the North Grafton Allotment is functioning properly according to the 2015 rangeland health assessments. The allotment met the standards and guidelines for rangeland health for upland soils, native and threatened and endangered species. The guidelines for grazing management are being conformed to within the allotment.

The North Grafton Allotment used the old 3 x 3 plot method to determine trend. The method identified the plants and the change in plant structure and growth over time within a small 3x3 plot but did little to determine the overall trend of a particular species on the allotment.

A new trend plot was established in 2013 using the new Utah protocol for monitoring rangeland health. This long term trend site will be continued to be monitored every 7-10 years per the “C” Category Allotment justification.



**Photo 3-3.** Rangeland Health North Grafton Allotment

## Soil Cover and % Bare Ground By Transect

**Site Class:** BLM - Utah || Color Country District || St George Field Office || North Grafton Allotment

**Date:** 9/27/2013

**Site ID:** NORTH GRAFTON TREND 2013

**Examiner(s):** AF MP JR

Cover (Point-Intercept)												
Species	Transect (#Hits)											% Cover*
	1	2	3	4	5	6	7	8	9	10	Total	
Bare Ground	13	18	16	7	11	16	18	9	15	13	136	17.00
Embedded Litter			1			1			1	1	4	0.50
Other Litter	6	1	2	1	2	7	2	6			27	3.38
Woody Litter >5mm	1			1	2			3			7	0.88
Rock >5mm	4	4	5	3	4	3	5	8	4	1	41	5.13
Astragalus	2				2	2	2	6	9	9	32	4.00
Bromus tectorum						2					2	0.25
Chrysothamnus viscidiflorus						2					2	0.25
Ephedra viridis		2		2	1	4		5			14	1.75
Erodium cicutarium	19	15	13	9	13	7	13	6	12	11	118	14.75
Euphorbia albomarginata				1							1	0.13
Gutierrezia sarothrae		3	6	1		5	7	12	2	6	42	5.25
Hilaria jamesii	12	19	12	25	10	2	2		6	3	91	11.38
Opuntia - Cholla							2				2	0.25
Salsola tragus	8	7	9	6	8	3	2	1	9	15	68	8.50
Unknown 1 - ANNUAL GRASS		2	1	3	2	1	1	2	3	3	18	2.25
Unknown 2 - PEA	1							1			2	0.25

\* Number of decimal places does not imply level of precision

**Figure 3-11.** Presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 7-10 year intervals

## Frequency Summary

**Site Class:** BLM - Utah || Color Country District || St George Field Office || North Grafton Allotment

**Date:** 9/27/2013

**Site ID:** NORTH GRAFTON TREND 2013

**Examiner(s):** AF MP JR

% Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.
Astragalus	133	66	175	88	182	91	190	95
Bouteloua eriopoda	3	2	5	2	8	4	9	4
Bromus tectorum	7	4	21	10	35	18	51	26
Opuntia							1	
Chrysothamnus viscidiflorus	2	1	2	1	3	2	3	2
Ephedra viridis	7	4	11	6	11	6	12	6
Erodium cicutarium	191	96	197	98	197	98	197	98
Euphorbia albomarginata	10	5	10	5	11	6	13	6
Gutierrezia sarothrae	29	14	49	24	61	30	71	36
Hilaria jamesii	26	13	59	30	81	40	97	48
Lycium pallidum					1		3	2
Mirabilis multiflora	1		1		2	1	2	1
Salsola tragus	58	29	90	45	114	57	132	66
Unknown 1-ANNUAL GRASS	78	39	123	62	139	70	154	77
Unknown 2-PEA			3	2	5	2	8	4
Unknown 3-RED STEM FORB	2	1	4	2	5	2	7	4

**Figure 3-12.** Results of the Frequency Study conducted on the North Grafton Allotment

### Actual Use Data on the North Grafton Allotment

This Allotment is licensed for grazing use by 2 head of cattle from Nov. to May for a total of 14 AUM's. The average use for the past 5 years totals 82.6% of permitted use.

**Table 3-4.** North Grafton Allotment Actual Use

Year	AUM's Used	% Used of Permitted AUM's
2015	10	71%
2014	14	100%
2013	6	42%
2012	14	100%
2011	14	100%
2010	14	100%
2009	14	100%
2008	14	100%
2007	Non-use	0%

2006	14	100%
2005	14	100%

### Utilization Studies on the North Grafton Allotment

Utilization studies of key forage species were done for the North Grafton Allotment in 2015. Average utilization was 12.38% for this allotment, classifying it as “slight to none” utilization. This percentage is well within the parameters of less than 50% utilization. Due to its status as a “C” Category Allotment no utilization studies were conducted over the previous 10 years.

### Health Assessment Summary for the North Grafton Allotment

Based on the results of the health assessment, actual use, rain gauge information and the trend studies, BLM concluded the upland ecosystem is functioning and the allotment is in conformance with the Standards for Rangeland Health under the current livestock grazing schedule. No changes in current livestock management appear to be needed.

#### 3.4.3 Boot Spring Allotment Health Monitoring Results

A rangeland health assessment was completed in fall of 2015 for this Allotment. The Rangeland Health Evaluation Summary Worksheet for the Boot Spring Allotment showed mostly “none to slight departure” for the seventeen indicators. In the Southwest pasture functional/structural groups were deemed “moderate” because there has been a decrease in cool season grasses, possibly due to climate change. Litter movement, plants mortality/decadence and invasive plants were deemed “slight to moderate” due to the presence of cheatgrass in the area. In the Northeast pasture most showed “none to light departure” for the seventeen indicators. Functional/structural groups were again deemed “moderate” because there has been a decrease in cool season grasses possibly due to climate change. Water flow patterns, pedestals and/or terracettes and litter movement were deemed “slight to moderate”. However, it was determined that this issue would not be improved by the elimination of grazing.

A frequency study was conducted previously along an established transect in the trend plot in 1985, 1992, 1998 and 2005 using the old trend method (**Tables 3-5, 3-6**). Frequency studies collect two types of information. First, the percent cover of bare ground, litter, small rock, large rock, and vegetation cover are estimated along a permanent 100-foot transect. Second, the number of plants of each species is counted. These data can be compared over time to identify trends in plant growth, productivity, and composition. Custodial allotments must be evaluated every 10 years or more frequently if resource conditions warrant.

In 2006 Mormon tea was the species observed with the greatest amount of cover on the trend transect in the Southwest pasture of the Boot Spring Allotment followed closely by rabbit brush.

These trend data show Mormon tea as the key species in the Southwest pasture, with percent cover ranging from 6.9 to 16.5. Mormon tea has also been shown to be the key species in the Northeast pasture, with percent cover ranging from 1.6 to 3.6. In 2015 black brush was observed with the greatest amount of cover, having percent’s of 13 in the Southwest and 15 in the

Northeast and followed by Fremont’s indigo bush. Rabbit brush and Mormon tea have declined in frequency and Blackbrush is now the dominant species.

The ecosystem within the Boot Spring Allotment is functioning properly according to the 2015 rangeland health assessments. The allotment met the standards and guidelines for rangeland health for upland soils, native and threatened and endangered species. The guidelines for grazing management are being conformed to within the allotment.

A new trend plot was established in 2014 using the new Utah protocol for monitoring rangeland health. This long term trend site will be continued to be monitored every 7-10 years per the “C” Category Allotment justification.



**Photo 3-4.** Trend Photo Boot Spring “Northeast Pasture” Allotment



**Photo 3-5.** Trend Photo Boot Spring “Southwest Pasture” Allotment



**Photo 3-6.** Rangeland Health Boot Spring “Northeast Pasture” Allotment



**Photo 3-7.** Rangeland Health Boot Spring “Southwest Pasture” Allotment Custodial Allotment

**Table 3-5.** Old Frequency Data, Southwest Pasture

Year	1984	1988	1993	2005
Groundcover Characteristic	Percent Cover			
Bare ground	69	67	62	46.5
Litter	26	30	35	49
Small rock	1	1	0	2.5
Large rock	1	1	1	0.5
Vegetation cover	3	1	2	1.5
Plant Species	Number of Occurrences along Transect			
Rabbitbrush	25	30	29	7.5
Nevada Mormon tea	19	13	13	17
Snakeweed	13	17	18	6
Fremont’s dalea	9	6	7	9
Stiff club moss	8	7	7	4.5
Four-winged saltbush	5	3	2.5	1.5
Squirrel tail	4	1	1.5	2

## Soil Cover and % Bare Ground By Transect

**Site Class:** BLM - Utah || Color Country District || St George Field Office || Boot Spring Allotment

**Date:** 12/31/2013

**Site ID:** BOOT SPRING SOUTHWEST TREND 2013

**Examiner(s):** MP

Cover (Point-Intercept)												
Species	Transect (#Hits)											% Cover*
	1	2	3	4	5	6	7	8	9	10	Total	
Bare Ground	32	39	52	28	44	55	58	67	51	55	481	60.13
Embedded Litter		1					3	1	1	1	7	0.88
Other Litter	1	4	1	7	2		6		6	1	28	3.50
Woody Litter >5mm	4	4		1	2	2				1	14	1.75
Lichens					1						1	0.13
Moss				6	3						9	1.13
Bedrock				1							1	0.13
Rock >5mm	7	3	5	16	11				7	5	54	6.75
Chrysothamnus viscidiflorus	1	2	3		3	1		1			11	1.38
Coleogyne ramosissima	13	21	14	10	10	10	7	10	7	9	111	13.88
Dalea amoena	3	3	1	8		5	3		5	2	30	3.75
Ephedra viridis	10	1		2		5	2		1		21	2.63
Erodium cicutarium ssp. bipinnatum					1						1	0.13
Unknown 1 - UNK SHRUB	1				1						2	0.25
Yucca										3	3	0.38

\* Number of decimal places does not imply level of precision

**Figure 3-13** presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 7-10 year intervals

## Frequency Summary

Site Class: BLM - Utah || Color Country District || St George Field Office || Boot Spring Allotment

Date: 12/31/2013

Site ID: BOOT SPRING SOUTHWEST TREND 2013

Examiner(s): MP

% Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.
Astragalus	1		2	1	2	1	2	1
Bromus tectorum	12	6	20	10	22	11	23	12
Chrysothamnus viscidiflorus	4	2	5	2	8	4	13	6
Coleogyne ramosissima	41	20	63	32	74	37	85	42
Dalea amoena	12	6	17	8	23	12	27	14
Ephedra viridis	12	6	18	9	20	10	28	14
Eriogonum alatum			2	1	2	1	2	1
Erodium	1		1		3	2	4	2
Opuntia			1		1		1	
Tetradymia axillaris					1		1	
Unknown 1-UNK SHRUB	1		2	1	3	2	3	2
Yucca	2	1	2	1	2	1	2	1

**Figure 3-14.** Results of the Frequency Study conducted on the Boot Spring “Southwest” Allotment

**Table 3-6.** Old Frequency Data, Northeast Pasture

Year	1984	1988	1993	2005
Groundcover Characteristic	Percent Cover			
Bare ground	69	67	62	46.5
Litter	26	30	35	49
Small rock	1	1	0	2.5
Large rock	1	1	1	0.5
Vegetation cover	3	1	2	1.5
Plant Species	Number of Occurrences along Transect			
Rabbitbrush	25	30	29	7.5
Nevada Mormon tea	19	13	13	17
Snakeweed	13	17	18	6
Fremont’s dalea	9	6	7	9
Stiff club moss	8	7	7	4.5
Four-winged saltbush	5	3	2.5	1.5
Squirrel tail	4	1	1.5	2

## Soil Cover and % Bare Ground By Transect

**Site Class:** BLM - Utah || Color Country District || St George Field Office || Boot Spring Allotment

**Date:** 1/2/2014

**Site ID:** BOOT SPRING NORTHEAST PASTURE TREND 2013

**Examiner(s):** MP

Cover (Point-Intercept)												
Species	Transect (#Hits)											% Cover*
	1	2	3	4	5	6	7	8	9	10	Total	
Bare Ground	50	48	47	44	48	51	53	60	43	54	498	62.25
Embedded Litter			3	1	2	2		2		1	11	1.38
Other Litter	6	5	4	2	8	3	2		5	1	36	4.50
Woody Litter >5mm	1	3	1	1			3			2	11	1.38
Moss			1						2		3	0.38
Rock >5mm		1	2	8	1			2	4	1	19	2.38
Chrysothamnus viscidiflorus		1	3	3	1		1		1	2	12	1.50
Coleogyne ramosissima	8	10	11	18	9	17	13	9	11	14	120	15.00
Dalea amoena	7	2			2			1	2	1	15	1.88
Ephedra viridis	6	8	6	1	5	4	4	2	10	1	47	5.88

\* Number of decimal places does not imply level of precision

**Figure 3-15** presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 7-10 year intervals

## Frequency Summary

**Site Class:** BLM - Utah || Color Country District || St George Field Office || Boot Spring Allotment

**Date:** 1/2/2014

**Site ID:** BOOT SPRING NORTHEAST PASTURE TREND 2013

**Examiner(s):** MP

% Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.
Bromus tectorum	2	1	3	2	5	2	5	2
Chrysothamnus viscidiflorus	9	4	9	4	9	4	11	6
Coleogyne ramosissima	46	23	65	32	78	39	101	50
Dalea amoena	5	2	9	4	11	6	14	7
Ephedra viridis	15	8	21	10	29	14	36	18
Erodium cicutarium	1		1		1		3	2

**Figure 3-16.** Results of the Frequency Study conducted on the Boot Spring “Northeast” Allotment

### 3.5.2.1 Actual Use Data on the Boot Spring Allotment

The Boot Spring Allotment is licensed for twenty cattle in the winter from Dec. to April totaling at 90 AUMs. The average use for the past 10 years is 59.6% of permitted use.

**Table 3-7.** Boot Spring Allotment Actual Use

<b>Year</b>	<b>AUM's Used</b>	<b>% Used of Permitted AUM's</b>
2015	Non-use	0%
2014	Non-use	0%
2013	47	52%
2012	20	22%
2011	58	55%
2010	Non-use	0%
2009	90	100%
2008	90	100%
2007	90	100%
2006	90	100%
2005	61	67%

### Utilization Studies on the Boot Spring Allotment

Utilization studies of key forage species were done for the Boot Spring Allotment in 2015. Average utilization was 4.0% for this allotment, classifying it as “slight to none” utilization. This percentage is well within the parameters of less than 50% utilization. Due to its status as a “C” Category Allotment no utilization studies were conducted over the previous 10 years.

### Health Assessment Summary for the Boot Spring Allotment

Based on the results of the health assessment, actual use, rain gauge information and the trend studies, BLM concluded the upland ecosystem is functioning and the Allotment is in conformance with the Standards for Rangeland Health under the current livestock grazing schedule. No changes in current livestock management appear to be needed.

### 3.4.4 Virgin Allotment Health Monitoring Results

The Rangeland Health Assessment for the Virgin Allotment was completed in fall 2015. All but one of the 17 indicators met the criteria for a “none to slight departure” from expected conditions. The functional/structural group was indicated to be “moderate” due to the climate change affecting the shrub component and cool season grasses. It would be expected to see more perennial grasses within the shrub complex. The Highway Pasture on the Virgin Allotment has a good amount of bare ground with very well developed cryptobiotic soils in the open space between the shrubs. Previously there was a strong presence of Cheatgrass (*Bromus tectorum*), in 2013 the trend study showed a 76% frequency of cheatgrass. During the 2015 Rangeland Health Assessment it was observed that cheatgrass presence had drastically declined in the area.

A frequency study was conducted previously along an established transect in the trend plot in 1984, 1992, 1998 and 2005 using the old trend method (**Figures 3-8, 3-9**). The trend for percent cover of live vegetation in the Highway pasture was upward between 1985 and 2005, and the composition of key species increased over that same time period. In the River pasture the trend appeared to be static with fluctuations reflecting weather patterns.

The ecosystem within the Virgin Allotment is functioning properly according to the 2015 rangeland health assessments. The allotment met the standards and guidelines for rangeland health for upland soils, native and threatened and endangered species. The guidelines for grazing management are being conformed to within the allotment.

A new trend plot was established in 2013 using the new Utah protocol for monitoring rangeland health. This long term trend site will be continued to be monitored every 5-7 years per the “M” Category Allotment justification.



**Photo 3-8.** Rangeland Health Assessment Virgin Allotment “Highway Pasture”



**Photo 3-9.** Rangeland Health Assessment Virgin Allotment “River Pasture”



**Photo 3-10.** Trend Photo Virgin Allotment “Highway Pasture”

**Table 3-8. Old Frequency Data, Highway Pasture**

Year	1985	1992	1998	2005
Groundcover Characteristic	Percent Cover			
Bare ground	65	71	66.25	45.25
Litter	30	26	33.5	52.25
Small rock	0	0	0	0
Large rock	0	0	0	0
Vegetation cover	5	3	0.25	2.5
Plant Species	Number of Occurrences along Transect			
Snakeweed	20	20	30	17.5
Rabbit brush	8	18	17	12.5
Fremont's dalea	2	5	12	16
Mormon tea	2	1	3	7.5
Spiny hopsage	2	2	3	5.5
Four-wing saltbush	1	-	2	4
Winter fat	-	1	7	6

**Table 3-9. Old Frequency Data, River Pasture**

Year	1986	1991	1995	2005
Groundcover Characteristic	Percent Cover			
Bare ground	53	56	45	63
Plant Species	Number of Occurrences along Transect			
Snakeweed	51	24	32	5
Sand dropseed	34	57	45	
Galleta	22	29	31	18
Sand sagebrush	5	5	9	10

### Soil Cover and % Bare Ground By Transect

Site Class: BLM - Utah || Color Country District || St George Field  
Office || Virgin Allotment

Date: 01/24/2013  
Examiner(s): SR MP

Site ID: 14056-HIGHWAY-01

Cover (Point Intercept)													
Category/Species	Symbol	# Hits										% Cover	
		1	2	3	4	Transect		7	8	9	10		Total
<b>Bare Ground</b>													
Bare Ground													
Bare Ground		30	19	41	29	28	28	30	17	28	33	283	35.4
<b>Total Bare Ground</b>		<b>30</b>	<b>19</b>	<b>41</b>	<b>29</b>	<b>28</b>	<b>28</b>	<b>30</b>	<b>17</b>	<b>28</b>	<b>33</b>	<b>283</b>	<b>35.4</b>
<b>Ground Cover</b>													
<b>Litter Cover</b>													
Duff		0	0	0	0	0	0	0	0	0	0	0	0.0
Embedded Litter		2	1	0	0	0	0	2	1	1	0	7	0.9
Other Litter		15	15	12	10	5	14	16	10	12	10	119	14.9
Woody Litter >5mm		0	0	0	3	2	0	2	0	3	1	11	1.4
<b>Total: Litter Cover</b>		<b>17</b>	<b>16</b>	<b>12</b>	<b>13</b>	<b>7</b>	<b>14</b>	<b>20</b>	<b>11</b>	<b>16</b>	<b>11</b>	<b>137</b>	<b>17.1</b>
<b>Biological Crusts Cover</b>													
Lichens		0	0	1	0	0	0	4	3	0	0	8	1.0
Moss		2	5	4	4	0	9	12	22	5	10	73	9.1
<b>Total: Biological Crusts Cover</b>		<b>2</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>0</b>	<b>9</b>	<b>16</b>	<b>25</b>	<b>5</b>	<b>10</b>	<b>81</b>	<b>10.1</b>
<b>Rock Cover</b>													
Bedrock		0	0	0	0	0	0	0	0	0	0	0	0.0
Rock >5mm		0	0	0	0	0	0	0	0	0	0	0	0.0
<b>Total: Rock Cover</b>		<b>0</b>	<b>0.0</b>										
<b>Species Basal Cover</b>													
Atriplex canescens	ATCA2	0	0	0	0	0	0	0	0	2	0	2	0.3
Chrysothamnus viscidiflorus var. molestus	CHVIM2	0	1	0	4	0	7	2	0	0	1	15	1.9
Dalea fremontii	DAFR4	0	0	1	0	3	0	0	0	0	1	5	0.6
Ephedra nevadensis	EPNE	2	0	0	1	2	4	0	1	2	0	12	1.5
Gutierrezia sarothrae	GUSA2	1	2	0	1	0	1	2	0	1	5	13	1.6
Lycium andersonii	LYAN	1	0	0	0	1	0	0	0	0	1	3	0.4
Sphaeralcea	SPHAE	0	0	0	0	0	0	0	0	0	0	0	0.0
Tetradymia axillaris	TEAX	0	0	0	0	1	0	0	0	0	0	1	0.1
Unknown 1 - MESQUITE LIKE BRANCH	UNKN1 - MESQUIT	0	1	2	0	0	0	0	0	5	0	8	1.0
Yucca baccata	YUBA	0	1	0	0	0	0	0	0	0	0	1	0.1
<b>Total: Species Basal Cover</b>		<b>4</b>	<b>5</b>	<b>3</b>	<b>6</b>	<b>7</b>	<b>12</b>	<b>4</b>	<b>1</b>	<b>10</b>	<b>8</b>	<b>60</b>	<b>7.5</b>
<b>Species Canopy Cover</b>													
Atriplex canescens	ATCA2	0	0	0	0	0	0	0	0	2	0	2	0.3
Chrysothamnus viscidiflorus var. molestus	CHVIM2	1	5	2	8	8	6	3	6	0	1	40	5.0
Dalea fremontii	DAFR4	0	11	2	9	6	0	2	4	4	1	39	4.9

Site Class: BLM - Utah || Color Country District || St George Field Office || Virgin Allotment

Date: 01/24/2013

Site ID: 14056-HIGHWAY-01

Ephedra nevadensis	EPNE	8	0	3	4	12	4	0	7	3	0	41	5.1
Gutierrezia sarothrae	GUSA2	14	11	5	5	8	6	5	6	3	15	78	9.8
Lycium andersonii	LYAN	4	0	5	1	2	1	0	1	0	1	15	1.9
Sphaeralcea	SPHA	0	0	0	1	0	0	0	0	0	0	1	0.1
Tetradymia axillaris	TEAX	0	0	0	0	2	0	0	0	0	0	2	0.3
Unknown 1 - MESQUITE LIKE BRANCH	UNKN1 - MESQUIT	0	3	2	0	0	0	0	2	9	0	16	2.0
Yucca baccata	YUBA	0	5	0	0	0	0	0	0	0	0	5	0.6
Total: Species Canopy Cover		27	35	19	28	38	17	10	26	21	18	239	29.9
Total Ground Cover		50	61	39	51	52	52	50	63	52	47	517	64.7
Grand Totals:		80	80	80	80	80	80	80	80	80	80	800	100.1

Figure 3-17 presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 5-7 year intervals

### Frequency Summary

Site Class: BLM - Utah || Color Country District || St George Field Office || Virgin Allotment

Date: 01/24/2013

Examiner(s): SR MP

Site ID: 14056-HIGHWAY-01

Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	Hits	% Freq.	Hits	% Freq.	Hits	% Freq.	Hits	% Freq.
Atriplex canescens	1	T	2	1	2	1	3	2
Chrysothamnus	14	7	21	11	32	16	40	20
Dalea fremontii	16	8	19	10	26	13	34	17
Ephedra nevadensis	11	6	12	6	20	10	28	14
Gutierrezia sarothrae	26	13	35	18	58	29	78	39
Lycium andersonii	5	3	7	4	9	5	14	7
Tetradymia axillaris	1	T	1	T	1	T	1	T
Yucca baccata	1	T	1	T	2	1	2	1
Eriogonum inflatum	1	T	1	T	2	1	2	1
Sphaeralcea					1	T	1	T
Bromus tectorum	33	17	62	31	122	61	152	76
Erodium cicutarium			1	T	4	2	6	3
Unknown 1-MESQUITE LIKE BRANCH	6	3	7	4	17	9	25	13

Figure 3-18. Results of the Frequency Study conducted on the Virgin Allotment in the Highway Pasture

### Soil Cover and % Bare Ground By Transect

Site Class: BLM - Utah || Color Country District || St George Field  
Office || Virgin Allotment

Date: 01/28/2013  
Examiner(s): SR MP

Site ID: 14056-RIVER-01

Cover (Point Intercept)													
Category/Species	Symbol	# Hits										% Cover	
		1	2	3	4	Transect		7	8	9	10		Total
<b>Bare Ground</b>													
Bare Ground													
Bare Ground		36	24	30	41	43	54	47	48	47	46	416	52.0
<b>Total Bare Ground</b>		<b>36</b>	<b>24</b>	<b>30</b>	<b>41</b>	<b>43</b>	<b>54</b>	<b>47</b>	<b>48</b>	<b>47</b>	<b>46</b>	<b>416</b>	<b>52.0</b>
<b>Ground Cover</b>													
<b>Litter Cover</b>													
Duff		0	0	0	0	0	0	0	0	0	0	0	0.0
Embedded Litter		1	0	1	2	0	0	0	1	0	1	6	0.8
Other Litter		8	8	5	6	11	10	11	4	7	7	77	9.6
Woody Litter >5mm		2	3	1	1	2	2	1	1	2	3	18	2.3
<b>Total: Litter Cover</b>		<b>11</b>	<b>11</b>	<b>7</b>	<b>9</b>	<b>13</b>	<b>12</b>	<b>12</b>	<b>6</b>	<b>9</b>	<b>11</b>	<b>101</b>	<b>12.6</b>
<b>Biological Crusts Cover</b>													
Lichens		0	0	9	2	1	0	0	0	0	0	12	1.5
Moss		6	14	6	8	3	3	0	4	0	0	44	5.5
<b>Total: Biological Crusts Cover</b>		<b>6</b>	<b>14</b>	<b>15</b>	<b>10</b>	<b>4</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>56</b>	<b>7.0</b>
<b>Rock Cover</b>													
Bedrock		0	0	0	0	0	0	0	0	0	0	0	0.0
Rock >5mm		5	5	4	3	3	1	0	3	0	0	24	3.0
<b>Total: Rock Cover</b>		<b>5</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>24</b>	<b>3.0</b>
<b>Species Basal Cover</b>													
Atriplex canescens	ATCA2	0	0	0	0	3	0	0	0	2	0	5	0.6
Chrysothamnus viscidiflorus	CHV18	0	0	0	1	0	0	0	2	1	2	6	0.8
Dalea fremontii	DAFR4	0	1	0	1	0	0	0	0	0	0	2	0.3
Ephedra nevadensis	EPNE	2	2	0	1	0	2	3	2	3	1	16	2.0
Eriogonum inflatum	ERIN4	0	0	0	0	0	1	0	0	0	0	1	0.1
Gutierrezia sarothrae	GUSA2	0	0	1	1	0	0	0	0	0	6	8	1.0
Lycium andersonii	LYAN	0	0	0	0	0	0	0	0	0	0	0	0.0
Opuntia	OPUNT	0	0	0	1	0	0	0	0	0	0	1	0.1
Stephanomeria - ?	STEPH - ?	0	0	0	0	1	0	4	0	1	0	6	0.8
Tetradymia axillaris	TEAX	0	0	0	0	0	0	0	0	0	0	0	0.0
<b>Total: Species Basal Cover</b>		<b>2</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>7</b>	<b>4</b>	<b>7</b>	<b>9</b>	<b>45</b>	<b>5.6</b>
<b>Species Canopy Cover</b>													
Atriplex canescens	ATCA2	2	0	0	0	6	0	0	3	2	3	16	2.0
Chrysothamnus viscidiflorus	CHV18	6	0	0	3	0	0	0	2	3	1	15	1.9
Dalea fremontii	DAFR4	0	2	0	1	0	4	1	2	0	1	11	1.4
Ephedra nevadensis	EPNE	10	16	5	1	3	1	1	3	8	2	50	6.3
Eriogonum inflatum	ERIN4	0	0	0	0	0	1	0	0	0	0	1	0.1

Site Class: BLM - Utah || Color Country District || St George Field Office || Virgin Allotment

Date: 01/28/2013

Site ID: 14056-RIVER-01

Gutierrezia sarothrae	GUSA2	0	3	13	3	1	1	5	4	3	2	35	4.4
Lycium andersonii	LYAN	0	0	4	0	0	0	0	0	0	2	6	0.8
Opuntia	OPUNT	0	0	0	0	0	0	0	0	0	0	0	0.0
Stephanomeria - ?	STEPH - ?	2	1	1	4	2	0	7	1	1	3	22	2.8
Tetradymia axillaris	TEAX	0	1	0	0	1	0	0	0	0	0	2	0.3
Total: Species Canopy Cover		20	23	23	12	13	7	14	15	17	14	158	19.8
Total Ground Cover		44	56	50	39	37	26	33	32	33	34	384	48.0
Grand Totals:		80	80	80	80	80	80	80	80	80	80	800	100.0

**Figure 3-19** presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 5-7 year intervals

### Frequency Summary

Site Class: BLM - Utah || Color Country District || St George Field Office || Virgin Allotment

Date: 01/28/2013

Examiner(s): SR MP

Site ID: 14056-RIVER-01

Species	Frequency							
	6x6 in		12x12 in		24x12 in		24x24 in	
	Hits	% Freq.	Hits	% Freq.	Hits	% Freq.	Hits	% Freq.
Atriplex canescens	5	3	7	4	9	5	10	5
Chrysothamnus viscidiflorus	6	3	7	4	10	5	12	6
Dalea fremontii	4	2	4	2	8	4	10	5
Ephedra nevadensis	15	8	23	12	32	16	41	21
Gutierrezia sarothrae	14	7	17	9	27	14	36	18
Larrea tridentata			1	T	1	T	1	T
Lycium andersonii	1	T	3	2	3	2	6	3
Opuntia	1	T	1	T	1	T	1	T
Tetradymia axillaris	1	T	1	T	2	1	4	2
Eriogonum inflatum	2	1	2	1	3	2	3	2
Bromus tectorum	24	12	53	27	89	45	116	58
Stephanomeria-?	12	6	13	7	24	12	40	20

**Figure 3-20.** Results of the Frequency Study conducted on the Virgin Allotment in the River Pasture

## Actual Use Data on the Virgin Allotment

The Virgin Allotment is licensed for forty-one cattle with two seasons of use: December 1 to January 31 in the Highway pasture and April 1 to May 31 in the Virgin River pasture totaling at 166 AUMs. The average use for the past 10 years is 23.8% of permitted use.

**Table 3-10.** Virgin Allotment Actual Use

Year	AUM's Used	% Used of Permitted AUM's
2015	NA	NA
2014	NA	NA
2013	66	39%
2012	115	69%
2011	70	42%
2010	40	24%
2009	Non-use	0%
2008	70	42%
2007	38	22%
2006	Non-use	0%
2005	Non-use	0%

## Utilization Studies on the Virgin Allotment

Utilization studies of key forage species were done for the Virgin Allotment in 2013. Average utilization was 16% for this allotment, classifying it as “slight to none” utilization. This percentage is well within the parameters of less than 50% utilization.

## Health Assessment Summary for the Virgin Allotment

Based on the results of the health assessment, actual use, rain gauge information and the trend studies, BLM concluded the upland ecosystem is functioning and the allotment is in conformance with the Standards for Rangeland Health under the current livestock grazing schedule. No changes in current livestock management appear to be needed

### 3.4.5 Lindell Allotment Health Monitoring Results

The Rangeland Health Assessment was conducted in fall of 2015. This allotment was rated as “none to slight departure” from the expected conditions for the seventeen indicators. Two indicators were noted to have a departure different than that of slight to moderate. The invasive plants indicator was deemed “moderate to extreme” because of scotch thistle and cheat grass presence. Functional/structural groups were deemed as “moderate” due to lack of cool season grasses, reduction of cool season grasses is possibly occurring as a result of climate change. However, it was determined that neither of these issues would be improved by the elimination of grazing.

The ecosystem within the Lindell Allotment is functioning properly according to the 2015 rangeland health assessments. The allotment met the standards and guidelines for rangeland health for upland soils, native and threatened and endangered species. The guidelines for grazing management are being conformed to within the allotment.

The Lindell Allotment used the old 3 x 3 plot method to determine trend. The method identified the plants and the change in plant structure and growth over time within a small 3x3 plot but did little to determent the overall trend of a particular species on the allotment.

A new trend plot was established in 2013 using the new Utah protocol for monitoring rangeland health. This long term trend site will be continued to be monitored every 7-10 years per the “C” Category Allotment justification.



**Photo 3-11.** Rangeland Health Assessment Lindell Allotment

## Soil Cover and % Bare Ground By Transect

Site Class: BLM - Utah || Color Country District || St George Field Office || Lindell Allotment

Date: 8/14/2013

Site ID: Lindell Trend 2013

Examiner(s): MP AF

Cover (Point-Intercept)												
Species	Transect (#Hits)											% Cover*
	1	2	3	4	5	6	7	8	9	10	Total	
Bare Ground	37	37	53	52	37	20	34	39	50	31	390	48.75
Embedded Litter		1							1		2	0.25
Other Litter	19	15	15	14	10	21	11	10	19	13	147	18.38
Woody Litter >5mm			1			7			2	2	12	1.50
Lichens							1				1	0.13
Rock >5mm			1	1	2					2	6	0.75
Artemisia filifolia	8	10	1	4	9	2	2	8	1	6	51	6.38
Atriplex canescens	1										1	0.13
Bromus tectorum	1		1	2							4	0.50
Chrysothamnus viscidiflorus						7	3	6		1	17	2.13
Gutierrezia sarothrae	5	11	6	4	16	16	27	13	4	20	122	15.25
Lycium pallidum	2	1		1							4	0.50
Prunus fasciculata									1		1	0.13
Salsola tragus		1			1						2	0.25
Unknown 6 - SHRUB						1					1	0.13

\* Number of decimal places does not imply level of precision

**Figure 3-21** presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 7-10 year intervals

## Frequency Summary

Site Class: BLM - Utah || Color Country District || St George Field Office || Lindell Allotment

Date: 8/14/2013

Site ID: Lindell Trend 2013

Examiner(s): MP AF

% Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.
Artemisia filifolia	17	8	22	11	32	16	40	20
Aristida purpurea					1		1	
Atriplex canescens					1		1	
Bromus rubens			1		4	2	6	3
Bromus tectorum	20	10	49	24	63	32	87	44
Opuntia							1	
Chrysothamnus viscidiflorus	5	2	6	3	8	4	10	5
Gutierrezia sarothrae	54	27	77	38	96	48	114	57
Lycium pallidum	6	3	6	3	11	6	14	7
Prunus fasciculata					1		1	
Salsola tragus	11	6	15	8	17	8	24	12
Sporobolus-GRASS			3	2	3	2	7	4
Unknown 4-FORB			1		1		3	2
Unknown 6-SHRUB	1		1		1		1	
Vulpia octoflora	2	1	7	4	8	4	14	7

**Figure 3-22.** Results of the Frequency Study conducted on the Lindell Allotment

### Actual Use Data on the Lindell Allotment

The Lindell Allotment is licensed for one head of cattle to be grazed year-long, from March 1 to January 28 for a total of twelve AUMs. The average permitted use for the past 10 years is 100% of permitted use.

**Table 3-11.** Lindell Allotment Actual Use

Year	AUM's Used	% Used of Permitted AUM's
2015	12	100%
2014	12	100%
2013	12	100%
2012	12	100%
2011	12	100%
2010	12	100%
2009	12	100%
2008	12	100%
2007	12	100%
2006	12	100%
2005	12	100%

## Health Assessment Summary for the Lindell Allotment

Based on the results of the health assessment, actual use, rain gauge information and the trend studies, BLM concluded the upland ecosystem is functioning and the Allotment is in conformance with the Standards for Rangeland Health under the current livestock grazing schedule. No changes in current livestock management appear to be needed

### 3.4.6 Cave Allotment Health Monitoring Results

The Rangeland Health Assessment was completed in fall 2015. The Rangeland health Evaluation Summary Worksheet for the Cave Allotment met the “none to slight departure” from the expected conditions for the seventeen indicators. Five indicators were noted to have a departure different than that of none to slight. Plant community composition and distributions relative to infiltration and runoff, functional/structural groups, litter amount, annual production, and invasive plants were all deemed “slight to moderate”. It would be expected to see more perennial than annual grasses, there was a strong presence of cheatgrass (*B. tectorum*) in the allotment. Results from a study conducted in 2014 showed an 88% frequency of cheatgrass. However, it was determined that neither of these issues would be improved by the elimination of grazing.

The ecosystem within the Cave Allotment is functioning properly according to the 2015 rangeland health assessments. The allotment met the standards and guidelines for rangeland health for upland soils, native and threatened and endangered species. The guidelines for grazing management are being conformed to within the allotment.

The Cave Allotment used the old 3 x 3 plot method to determine trend. The method identified the plants and the change in plant structure and growth over time within a small 3x3 plot but did little to determine the overall trend of a particular species on the allotment.

A new trend plot was established in 2014 using the new Utah protocol for monitoring rangeland health. This long term trend site will be continued to be monitored every 7-10 years per the “C” Category Allotment justification.



**Photo 3-12.** Rangeland Health Assessment Cave Allotment



**Photo 3-13.** Cave New Trend Plot 2014

## Soil Cover and % Bare Ground By Transect

Site Class: BLM - Utah || Color Country District || St George Field Office || Cave Allotment

Date: 10/30/2014

Site ID: TREND SITE

Examiner(s): BLACKMORE AND KISSEE

Cover (Point-Intercept)												
Species	Transect (#Hits)											% Cover*
	1	2	3	4	5	6	7	8	9	10	Total	
Bare Ground	2	13	10	5	3	9	11	11	3	7	74	9.25
Embedded Litter	1	4	2		2	2	5	1	1		18	2.25
Other Litter	12	26	21	18	9	19	16	24	23	13	181	22.63
Woody Litter >5mm		2	3			4	5	2	1	3	20	2.50
Lichens	9	3	3			1		1			17	2.13
Moss									1		1	0.13
Rock >5mm	7		1	1	1	9	5	2	11	4	41	5.13
Amelanchier utahensis	33	22	33	42	51	13	19	22	28	40	303	37.88
Artemisia tridentata		2		11	4	9	9	7	1	6	49	6.13
Gutierrezia sarothrae	8	4	1	3	2	11	6	2	2	2	41	5.13
Poa								1			1	0.13
Purshia tridentata			4					5	2		11	1.38
Sitanion hystrix			1		1			1			3	0.38

\* Number of decimal places does not imply level of precision

**Figure 3-23** presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 7-10 year intervals

## Frequency Summary

Site Class: BLM - Utah || Color Country District || St George Field Office || Cave Allotment

Date: 10/30/2014

Site ID: TREND SITE

Examiner(s): BLACKMORE AND KISSEE

% Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.
Annual forb(s)	51	26	65	32	72	36	87	44
Annual forb	16	8	35	18	49	24	64	32
Annual forb	2	1	2	1	5	2	6	3
Amelanchier utahensis	88	44	96	48	103	52	115	58
Arabis puberula	2	1	2	1	2	1	3	2
Artemisia tridentata	16	8	28	14	39	20	44	22
Bouteloua					1		2	1
Bromus tectorum	133	66	158	79	171	86	175	88
Erodium cicutarium	1		3	2	4	2	4	2
Erigeron	2	1	4	2	7	4	9	4
Gutierrezia sarothrae	33	16	45	22	54	27	62	31
Poa	10	5	19	10	23	12	31	16
Purshia tridentata	4	2	5	2	6	3	6	3
Sitanion hystrix	2	1	2	1	7	4	10	5

**Figure 3-24** Results of the Frequency Study conducted on the Cave Allotment

### Actual Use Data on the Cave Allotment

In the Cave Allotment two head of cattle are licensed to graze from June 1 to September 15 for a total of 7 AUMs. The average percentage of AUMs used over the past ten years has been 27% of the permitted use.

**Table 3-12.** Actual use reported on the Cave Allotment

Year	AUM's Used	% Used of Permitted AUM's
2015	7	100%
2014	Non-use	0%
2013	Non-use	0%
2012	7	100%
2011	Non-use	0%
2010	Non-use	0%
2009	Non-use	0%
2008	2	71%
2007	Non-use	0%
2006	Non-use	0%
2005	Non-use	0%

## **Utilization Studies on the Cave Allotment**

Utilization studies of key forage species were done for the Cave Allotment in 2015. Average utilization was 9.17% for this allotment, classifying it as “slight to none” utilization. This percentage is well within the parameters of less than 50% utilization. Utilization on this allotment is mainly by deer and small wildlife.

## **Health Assessment Summary for the Cave Allotment**

Based on the results of the health assessment, actual use, rain gauge information and the trend studies, BLM concluded the upland ecosystem is functioning and the allotment is in conformance with the Standards for Rangeland Health under the current livestock grazing schedule. No changes in current livestock management appear to be needed.

### **3.4.7 Lambs Knoll Allotment Health Monitoring Results**

The Rangeland Health Assessment was completed in fall 2015. The Rangeland health Evaluation Summary Worksheet for the Lambs Knoll Allotment met the “none to slight departure” from the expected conditions for the seventeen indicators. Seven indicators were noted to have a departure different than that of none to slight. Bare ground, soil surface resistance to erosion, soil surface loss or degradation, functional/structural groups, and plant mortality and decadence were all deemed “slight to moderate”. Open areas of bare ground saw moderate to heavy grazing on exposed cool season grasses while shrub islands protected some grasses. There is noticeable soil disturbance and movement as well as a moderate amount of dead pinion, juniper and sagebrush scattered throughout area. Litter amount and invasive plants were deemed “moderate” due to cheatgrass and scotch thistle presence. It would be expected to see more perennial than annual grasses. Results from a study conducted in 2014 showed a 53% frequency of cheatgrass. Cattle located on the adjacent state land tend to congregate nearer the highway in a seeded field; however, there is no fence between state and federal lands to restrict cattle movement onto federal land. It was determined that neither of these issues would be improved by the elimination of grazing.

The ecosystem within the Lambs Knoll Allotment is functioning properly according to the 2015 rangeland health assessments. The allotment met the standards and guidelines for rangeland health for upland soils, native and threatened and endangered species. The guidelines for grazing management are being conformed to within the allotment.

The Lambs Knoll Allotment used the old 3 x 3 plot method to determine trend. The method identified the plants and the change in plant structure and growth over time within a small 3x3 plot but did little to determent the overall trend of a particular species on the allotment.

A new trend plot was established in 2014 using the new Utah protocol for monitoring rangeland health. This long term trend site will be continued to be monitored every 7-10 years per the “C” Category Allotment justification.



**Photo 3-14.** Rangeland Health Assessment Lambs Knoll Allotment



**Photo 3-15.** Lambs Knoll New Trend Plot 2014

## Soil Cover and % Bare Ground By Transect

**Site Class:** BLM - Utah || Color Country District || St George Field Office || Lambs Knoll Allotment

**Date:** 10/1/2014

**Site ID:** trend site

**Examiner(s):** KISSEE AND BLACKMORE

Cover (Point-Intercept)												
Species	Transect (#Hits)											% Cover*
	1	2	3	4	5	6	7	8	9	10	Total	
Bare Ground	11	6	41	36	14	17	18	28	23	15	209	26.13
Embedded Litter	5	1	8	2	5		5	1	6	6	39	4.88
Other Litter	9	5	8	7	4	6	19	17	13	12	100	12.50
Woody Litter >5mm	3	3	1		3		1	2	3	1	17	2.13
Lichens	1	1						1			3	0.38
Moss	3	2	1	1		1	2		1	1	12	1.50
Rock >5mm	13	7	5	16	20		1			2	64	8.00
Amelanchier utahensis	18	21	5	1	3	35	14	2	18	29	146	18.25
Artemisia tridentata	1	4	1	2		1	15	13	5	9	51	6.38
Gutierrezia sarothrae	4					1			1	1	7	0.88
Hilaria jamesii	1						2	1			4	0.50
Juniperus utahensis	4	7	2	13	18	13		4			61	7.63
Pinus edulis var. fallax	4	20	8	2	12	2		4	4	2	58	7.25
Poa		1						1			2	0.25
Purshia tridentata	1						3	5	3	1	13	1.63

\* Number of decimal places does not imply level of precision

**Figure 3-25** presents the summary of the new cover and frequency data collected using the new method identified to determine trend in the Utah protocol for monitoring rangeland health. Trend data on this allotment will be collected on 7-10 year intervals

## Frequency Summary

**Site Class:** BLM - Utah || Color Country District || St George Field Office || Lambs Knoll Allotment

**Date:** 10/1/2014

**Site ID:** trend site

**Examiner(s):** KISSEE AND BLACKMORE

% Frequency								
Species	6x6 in		12x12 in		24x12 in		24x24 in	
	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.	#Hits	% Freq.
Annual forb			1		3	2	3	2
Amelanchier utahensis	44	22	56	28	60	30	61	30
Aristida			1		1		1	
Artemisia tridentata	25	12	38	19	58	29	71	36
Bromus tectorum	52	26	82	41	100	50	106	53
Chamaesyce mathewsii	3	2	4	2	6	3	7	4
Eriogonum					1		1	
Gutierrezia sarothrae	11	6	20	10	26	13	40	20
Hilaria jamesii	6	3	13	6	15	8	19	10
Juniperus utahensis	17	8	19	10	20	10	24	12
Pinus	14	7	19	10	24	12	29	14
Poa	2	1	11	6	21	10	31	16
Purshia tridentata	5	2	10	5	11	6	13	6
Sitanion hystrix	3	2	4	2	6	3	16	8

**Figure 3-26.** Results of the Frequency Study conducted on the Lambs Knoll Allotment

### Actual Use Data on the Lambs Knoll Allotment

In the Lambs Knoll Allotment two head of cattle are licensed to graze from June 1 to September 15 for a total of 7 AUMs. The average percentage of AUMs used over the past ten years has been 27% of the permitted use.

**Table 3-13.** Actual use reported on the Lambs Knoll Allotment

Year	AUM's Used	% Used of Permitted AUM's
2015	10	100%
2014	10	100%
2013	10	100%
2012	10	100%
2011	10	100%
2010	Non-use	0%
2009	10	100%
2008	10	100%
2007	10	100%

2006	10	100%
2005	10	100%

**Utilization Studies on the Lambs Knoll Allotment**

Utilization studies of key forage species were done for the Lambs Knoll Allotment in 2015. Average utilization was 25.95% for this allotment, classifying it as “moderate” utilization. This percentage is well within the parameters of less than 50% utilization.

**Health Assessment Summary for the Lambs Knoll Allotment**

Based on the results of the health assessment, recent use on public land may be in excess of that authorized, however due to the fact the allotment has been a C category allotment very little monitoring data has been collect to verify the impact of livestock use. It is recommended that trend and utilization data be collect on the allotment every year for the next three years to determine if livestock are having an impact. If determined through monitoring that livestock are impacting the allotment an adjustment in livestock use will be implemented.

## **4.0 CHAPTER 4—ENVIRONMENTAL IMPACTS**

---

### **4.1 INTRODUCTION**

The potential consequences or effects of each alternative are discussed in this chapter. The intent is to provide a basis for comparison of the effects of each alternative on the resources described in Chapter 3. All known mitigation measures have been included in the Proposed Action alternative; therefore consequences described below are minor in most cases. It is assumed that the alternatives will be implemented as described, using accepted grazing management guidelines, and that the permittees will meet the terms and conditions specified in the description of the alternatives.

The analysis period for this assessment is 10 years, the renewal period of the term grazing permit. The condition and trend of the Allotments over the next 10 years is expected to remain static.

### **4.2 GENERAL ANALYSIS ASSUMPTIONS**

#### **4.2.1 Rangeland Health Conditions**

The following assumptions of direct and indirect impacts were based on the collection of monitoring data gathered over a period of time, as well as the Rangeland Health Assessments completed in 2008 and again in 2015. The monitoring data consists of trend, utilization, actual use information and precipitation data.

### **4.3 4.2 ALTERNATIVE A - PROPOSED ACTION**

Direct effects are those caused by the action and occur at the same time and place. Indirect effects are those that are reasonably foreseeable consequences of the action but are later in time or further removed in distance from direct effects. Both of these types of effects are discussed in this section.

#### **4.3.1 Cultural Resources**

Factors of site condition and ongoing impacts were considered prior to making a Determination of Effect finding related to any impacts to NRHP eligible properties that could be directly related to livestock grazing on these four allotments. The following thresholds were used as the basis for a Determination of Adverse Effect, should one be warranted:

1. Indications of actively ongoing erosion that is caused by, or exacerbated by, livestock use of the site area.
2. Indications of direct impacts due to livestock, where it is apparent that the livestock are impacting portions of the site or features in the site that were not previously impacted by earlier use of the site area by livestock.
3. Indications of direct impacts by livestock, where it is apparent that the levels of adverse impacts are beyond those previously suffered by the site (or portion of the site) and intact areas are now losing integrity and research potential.

The BLM cultural resource specialists who completed this evaluation have recommended that a finding of “No Adverse Effects” is warranted for the SGFO’s proposal to renew the ten-year term grazing permits on the Grafton, North Grafton, Boot Springs, Cave, Lindell, Lambs Knoll, and Virgin Allotments. This finding is based on a Class I literature review, and monitoring sites within the allotments that are eligible for the NRHP. None of the thresholds for a Determination of Adverse Effects were triggered, based on the site condition assessments.

The overall finding of the site condition assessments was that implementation of the Proposed Action to renew term grazing permits for the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lamb Allotment would have “No Adverse Effect” on the NRHP -eligible properties. This determination was submitted to the Utah State Historic Preservation Officer (SHPO) during Section 106 consultations under the National Historic Preservation. The Utah SHPO concurred with this determination of effect.

#### **4.3.2 Vegetation**

The Proposed Action would maintain the same livestock grazing programs in each of the allotments and would therefore, be expected to continue to sustain the health and productivity of the vegetation communities on approximately 17,800 acres of public land. Vegetation cover, plant community composition, litter production, plant biomass production, and seed production all were within acceptable ranges based on the ecological site descriptions for these allotments and climatic conditions during the previous ten years. Drought increased plant mortality at some sites and is likely the primary cause in the shift from cool season to warm season perennial grasses and in some cases to non-native invasive species. Studies did not identify impacts to vegetation as a result of livestock grazing activities that raised concerns in any of the allotments. For example, while some impacts to vegetation and soils were noted in areas immediately surrounding water source, these impacts did not extend beyond the immediate area.

#### ***Invasive, Non-Native Species***

With such a low stocking level of cattle on each allotment, a very minor impact, if any, would be seen relating to invasive species. If cattle do help spread weeds, there is the possibility of increasing the amount of weeds in the allotments which may out-compete native vegetation. Or cattle may be able to keep the number of invasive weeds at a low level by grazing on them. Or cattle may have no effect at all. Cheatgrass was observed on almost all rangeland health assessment sites and silver leaf nightshade was observed at several sites. Overgrazing can encourage the spread of these non-native species, especially since native grasses and forbs are preferred forage over cheatgrass and silver leaf nightshade.

However, the assessment team determined that the presence and extent of the two invasive, non-native species was not attributable to livestock grazing under the current management programs. The period of drought between the late 1990’s and the mid 2000’s is thought to be a major contributor of the increase in density of cheatgrass. The Proposed Action would not alter the existing grazing management programs for any of the allotments.

While continued livestock grazing activities would not reduce the populations of these invasive, non-native species, the Proposed Action would not be expected to increase the abundance or spread of these species in either the short-term or long-term.

### **4.3.3 Riparian Resources**

Renewal of the term grazing permits for those allotments with riparian area would not negatively affect the health or function of these areas. Riparian areas on public lands occur along the Virgin River within the Grafton, Lindell, and Virgin Allotments. Range fencing, thick vegetation, and steep cliffs prevent livestock from accessing most reaches of the river. Some access points do allow small numbers of livestock to graze along the river channel in these.

Grazing related impacts include some trampling of stream channel vegetation and the erosion of sediments to the river. Assessments of riparian function in each of the three allotments were completed in 2015 and each was found to be functioning properly. All of the stream channel morphological characteristics for proper functioning condition were present, as were those for vegetation composition and diversity. Livestock grazing at current numbers and seasons of use in the three allotments has not impacted the riparian areas

### **4.3.4 Water Quality**

Water quality data from the Virgin River has been collected downstream of the River Pasture of the Virgin Allotment. These data indicates that all Utah standards, except phosphorous levels, are being met in this reach of the river. Phosphorous levels in the Virgin River are generally attributed to natural geologic sources, specifically the gypsum-rich rock units of the Moenavi Formation.

Livestock grazing at current numbers and seasons of use in three allotments through which the Virgin River flows does not appear to be contributing to the elevated phosphorous levels. Range fencing, thick vegetation and steep cliffs prevent livestock from accessing most reaches of the river. Some access points do allow small numbers of livestock to graze along the river channel. Grazing related impacts could include trampling of stream channel vegetation and accelerated erosion of sediments to the river.

### **4.3.5 Migratory Birds and Species of Conservation Concern**

Under the Proposed Action, potential impacts associated with grazing would be negligible to minor and short-term for migratory birds and Species of Conservation Concern.

A number of migratory birds species use these grazing allotments yearlong, or for a portion of the year. Within Washington County, the nesting season can be divided into 2 major timeframes: (1) Early Nesting Season: February 1–April 01, e.g., raptors (owls, falcons, hawks, and eagles; note: Golden eagles can nest in Jan.); and (2) Primary Nesting Season: April 01–August 15, e.g., songbirds, flycatchers, cuckoos and the majority of species. No special nesting or roosting areas have been identified in these grazing allotments.

Recent rangeland health assessments (2008, 2015) determined that all sites were functioning properly (see health assessment summary). It was also determined that the ecosystem met the

Utah Rangeland Standards and conformed to all Grazing Management Guidelines. Vegetative cover, plant community composition, litter production, plant biomass and seed production all were within acceptable ranges based on the ecological site descriptions for these allotments and the precipitation averages for the past decade.

Therefore, over the long-term, implementation of term permit renewals under the Proposed Action should maintain healthy, functional riparian areas and rangelands. These areas would continue to provide adequate cover, suitable foraging, breeding, and roosting opportunities, and support an adequate prey base, for migratory birds and Species of Conservation Concern. The maintenance of fences, waters, and other livestock operations should not cause significant disturbances to migratory bird species/Species of Conservation Concern and their habitat. The overall impact to migratory birds and Species of Conservation Concern as a result of the proposed action is expected to be negligible to minor.

#### **4.3.6 Threatened and Endangered Species and BLM Sensitive Species**

Federally-listed threatened, endangered, and candidate species that may be present within or near the allotments include: California condor; Mexican spotted owl; Southwestern willow flycatcher; and Western yellow-billed cuckoo. Grazing and maintenance of fences, waters, and other livestock operations can cause short-term disturbances to T&E and BLM Sensitive Species and could impact vegetation that may provide food and habitat for the species. However, grazing should not cause significant short-term disturbances to T&E and BLM Sensitive species and their habitat.

Recent rangeland health assessments (2008, 2015) determined that all sites (riparian, aquatic, and upland) were functioning properly, and the vegetative cover, plant community composition, litter production, plant biomass and seed production all were within acceptable ranges based on the ecological site descriptions for these allotments. Hydrology and erosion deposition criteria are also all being met. Over the long-term, implementation of term permit renewals under the Proposed Action should maintain healthy, functional rangelands, and not cause significant long-term disturbances to T&E and BLM Sensitive species and their habitat.

Therefore, the environmental impacts to T&E and BLM Sensitive Species as a result of the Proposed Action is expected to be negligible to minor. The 10-year permit renewal in these allotments, may affect, but not likely to adversely affect T&E and BLM Sensitive Species.

#### **4.3.7 General Wildlife**

Under the proposed action, the BLM would continue to monitor and assess rangeland conditions during the life of the term permits to ensure that conditions continue to meet Utah Standards and Guidelines for Rangeland Health. By following the allotment management plans the vegetation within these allotments should be properly utilized by livestock and the habitat maintained in good condition for all wildlife species (Refer to section 3.3.7 of this EA for list of general wildlife species that occur within these 7 allotments). The maintenance of fences, waters, and

other livestock operations are not anticipated to cause significant disturbances to general wildlife and their habitat.

#### **4.3.8 Range/Livestock Grazing Management**

Utah Standards and Guidelines for Rangeland Health, and data from related monitoring and assessment programs, have been employed to determine if the public lands within the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave and Lambs Knoll Allotments are meeting these standards and functioning properly under present conditions.

The Proposed Action would authorize livestock grazing for 10 years with the same licensed use (e.g. number and class of livestock, and season of use) as the current permit. The utilization rate on key species is established at 50% and will be tracked through utilization monitoring. BLM would also continue to perform trend, actual use, precipitation and compliance monitoring and assess rangeland conditions during the life of the term permit to ensure conditions make progress toward meeting or continue to meet Utah Standards and Guidelines for Rangeland Health.

The proposed action would have a positive effect on the livestock grazing permittees on the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave and Lambs Knoll Allotments by renewing each term grazing permit. The proposed action would maintain the current level of livestock grazing authorized for the permittees, while continuing to meet the Utah Standards and Guidelines for Rangeland Health. This would provide a substantial degree of stability for the permittees' livestock operation.

#### **4.3.9 Mitigation Measures**

No mitigation measures beyond those included in the Proposed Action have been identified

#### **4.3.10 Monitoring**

As stipulated in the Livestock Grazing Management Decision (GZ-01) in the St. George RMP (page 2.32), BLM would continue to monitor rangeland health standards in allotments to determine if standards are being met.

BLM would continue to conduct the following monitoring studies on a regular basis:

- Rangeland health assessments,
- Trend studies,
- Utilization studies
- Riparian assessments, and
- Water quality monitoring

Where monitoring indicates livestock grazing activities are wholly or partly responsible for an Allotment not meeting Standards for Rangeland Health or specific objectives for resources identified in the St. George RMP, BLM would work with affected partners to determine why standards are not being achieved. In consultation with affected operators, BLM would prescribe actions to take that would return the allotment to compliance.

#### **4.4 ALTERNATIVE B - NO ACTION**

In the short term, the No Action Alternative would renew the term grazing permits for the 7 allotments considered in this EA under the authority of the legislative "rider" attached to the Appropriations Act, under the current Terms and Condition of the each permit (**Figure 2.1**). Since the current Term and Conditions are the same as those contained in the Proposed Action, the direct and indirect impacts on the following resources would be the same as those disclosed for the Proposed Action: Cultural Resources, Invasive, Non-Native Species, Migratory Birds and Species of Conservation Concern, Threatened and Endangered Species and BLM Sensitive Species, Riparian Resources, Water Quality and vegetation.

Longer term, should Congress no longer continue the legislative rider authority for term grazing permit renewals, each permit would have to be renewed, following the NEPA process requirements and in compliance with all other federal legal mandates.

##### **4.4.1 Cultural Resources**

In the short term, the No Action Alternative would renew the term grazing permits for the 7 allotments considered in this EA under the authority of the legislative "rider" attached to the Appropriations Act, under the current Terms and Condition of the each permit (**Figure 2.1**). Since the current Term and Conditions are the same as those contained in the Proposed Action, the direct and indirect impacts on Cultural Resources would be the same as those disclosed for the Proposed Action.

Longer term, should Congress no longer continue the legislative rider authority for term grazing permit renewals, each permit would have to be renewed, following the NEPA process requirements and in compliance with all other federal legal mandates.

##### **4.4.2 Riparian Resources**

Impacts on the riparian resources of the Virgin River under the No Action Alternative would be similar in scope and intensity to those described under the Proposed Action. Livestock grazing under the terms and conditions of the current term grazing permit has not been shown to be adversely affecting the riparian vegetation established along the Virgin River.

##### **4.4.3 Water Quality**

The No Action Alternative would be expected to have the same effects on the water quality of surface flows in the Virgin River as those described for the Proposed Action.

##### **4.4.4 Vegetation**

Impacts on the vegetative communities, within these 7 allotments would be similar in scope and intensity to those described under the Proposed Action. Livestock grazing under the terms and conditions of the current term grazing permit has not been shown to be not adversely affecting the upland and riparian vegetative communities, based on Rangeland Health and Riparian assessments conducted 2015.

#### **4.4.5 Migratory Birds and Species of Conservation Concern**

No changes to impacts on migratory birds and Species of Conservation Concern would occur under Alternative B as compared to existing conditions.

#### **4.4.6 Threatened and Endangered Species and BLM Sensitive Species**

No changes to impacts on Threatened and Endangered Species and BLM Sensitive Species would occur under Alternative B as compared to existing conditions.

#### **4.4.7 General Wildlife**

No changes to impacts on general wildlife would occur under Alternative B as compared to existing conditions.

#### **4.4.8 Range/Livestock Grazing**

Under the No Action Alternative, livestock grazing would continue due to the legislative rider under the same terms and conditions as the Proposed Action.

#### **4.4.9 Mitigation Measures**

No measures other than those currently incorporated into grazing management practices have been identified.

#### **4.4.10 Monitoring**

Grazing monitoring schedules would remain the same as at present. No additional monitoring or studies would occur under the No Action alternative and the allotments would remain in their management category.

### **4.5 CUMULATIVE IMPACTS**

"Cumulative impacts" are those impacts resulting from the incremental impact of an action when added to other past, present, or reasonably foreseeable actions regardless of what agency or person undertakes such other actions (see 40CFR 1508.7).

#### **4.5.1 Cumulative Impact Area:**

The Cumulative Effects Area was defined as the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave and Lambs Knoll Allotments, which is comprised of federal lands managed by BLM, St. George Field Office.

#### **4.5.2 Past and Present Actions:**

Past or ongoing actions that affect the same components of the environment as the proposed action have included the construction of livestock management facilities, including pasture fencing, water sources, and corrals. A small number of unimproved roads have developed over time throughout the 7 allotments. These are used by the livestock permittees, hunters and other recreational users.

Communities in Washington County experienced dramatic population growth over the last 20 years (e.g., 84 percent growth between 1990 and 2000; OPB 2002). With this growth has come increased numbers of people using the public lands within the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave and Lambs Knoll Allotments for such recreational activities as mountain biking, hunting, OHV riding, rock climbing, hiking, and equestrian trail riding. Although OHV activities are limited to existing roads and trails through the St. George RMP, unauthorized cross-country riding does occur with regularity.

Large catastrophic wild land fires have increased in frequency and severity on public lands in western and central Washington County during the past decade, resulting in the loss of native vegetation on thousands of acres of public rangeland. These fires have been fueled by periods of drought followed by higher than average winter precipitation that supported dense stands of invasive, warm season grasses, such as cheat grass. The grasses have carried fire in ecosystems that were never adapted to annual fire regimes, including the Mojave Desert and eastern Great Basin of Washington County. This trend is expected to continue under current models of climate change.

Livestock grazing on public rangelands has been ongoing in Washington County since the 1850s. Cattle, sheep, and goats were grazed in large numbers year-long. This level of intensive and largely uncontrolled grazing did cause physical damage to the vegetation communities and riparian areas throughout much of the arid West. Invasive, non-native species, such as cheatgrass, were introduced by domestic livestock and eventually replaced many native grasses. The proliferation of nonnative species also altered the natural fire regime of this area, creating a burn reburn cycle that has further impacted the ecosystem of the Colorado Plateau.

#### **4.5.3 Reasonably Foreseeable Action (RFAS)**

The following reasonably foreseeable action scenario (RFAS) identifies the future actions that have the potential to cumulatively affect the same resources as the Proposed Action and No Action Alternatives.

A private buyer is in the process of purchasing the state land that is located on the Lambs Knoll Allotment. South of the state land, a popular recreational climbing area exists on the BLM portion of the allotment. An easement for a “right of way” access to the trailhead has been agreed upon to allow continued use of the area. The remaining BLM available acreage, which only allows for two cows (10 AUMs), is rugged and much of it is inaccessible to cattle. Both the state and BLM managed lands are leased by the same permittee. It is foreseen that the cattle will be removed from grazing on the state lands after the private owner buys the land. There lies the possibility of removing grazing from the BLM managed section on the allotment as well.

#### **4.5.4 Cumulative Impacts Analysis**

No federal projects or actions are reasonable foreseeable within the 7 allotments that would result in cumulative adverse impacts on the human environment. Domestic livestock (both sheep and cattle) have grazed on federally-managed lands in Washington County for more than 150 years. Since enactment of the Taylor Grazing Act in 1934 and other related grazing management laws, management controls and restrictions on livestock grazing have been developed, to achieve

balanced and sustainable use of public land resources. The grazing of sheep is no longer authorized on BLM-administered public lands in Washington County. Water quality monitoring and riparian assessments show that livestock grazing at current levels is not causing degradation of water quality or adversely affecting native or sport fisheries.

Mid-19<sup>th</sup> century livestock grazing practices introduced non-native warm season grasses, e.g., cheatgrass and red brome, to the public lands, altering the natural fire cycle of these areas. Large areas of public land in Washington County are now susceptible to catastrophic burn-re-burn fire regimes that damage native vegetative communities and impact soils. The annual fire cycle will likely continue, as cheatgrass and red brome flourish within previously burned sites. Current grazing levels and management strategies do not contribute to the spread of the non-native species and may minimally help to reduce the volume of light fuels, as livestock will graze on cheatgrass.

Overall, the economic viability of livestock operations dependent on public lands in Washington County have been, and will continue to be, affected by periodic droughts, loss of forage to wildfires, restriction on grazing during wildfire rehabilitation projects, urban growth and the loss of open space, market fluctuations, and management constraints imposed for the protection of threatened or endangered species and other sensitive resources. The St. George RMP retains public lands in homogenous blocks within the western portion of the administrative unit, which includes the 7 allotments, and maintains more than 90 percent of the AUMs on public land available for livestock grazing, providing some stability for existing operators.

For a more complete analysis of cumulative impacts from actions proposed to occur on public lands in Washington County, including livestock grazing, refer to the Dixie Resource Area Proposed Resource Management /Final EIS (1998, pages 3.59-3.69) and the St. George RMP (1999).

Livestock grazing is occurring at levels and seasons of use that have been adjusted in the past to eliminate conflicts with other resources. Monitoring of multiple use practices in the project area has been employed in the past and would continue to be used to help maintain the balance among livestock grazing and species management.

#### **4.5.4.1 Cultural Resources**

Factors of site condition and ongoing impacts were considered prior to making a Determination of Effect finding related to any impacts to NRHP eligible properties that could be directly related to livestock grazing on these 7 allotments. The BLM cultural resource specialists who completed this evaluation have recommended that a finding of "No Adverse Effects" is warranted for the SGFO's proposal to renew the ten-year term grazing permits on the Grafton, North Grafton, Boot Springs, Cave, Lindell, Lambs Knoll, and Virgin Allotments. This finding is based on a Class I literature review, and monitoring sites within the allotments that are eligible for the NRHP. None of the thresholds for a Determination of Adverse Effects were triggered, based on the site condition assessments.

The overall finding of the site condition assessments was that implementation of the Proposed Action to renew term grazing permits for the Grafton, North Grafton, Boot Spring, Virgin, Lindell, Cave, and Lamb Allotment would have “No Adverse Effect” on the NRHP -eligible properties. This determination was submitted to the Utah State Historic Preservation Officer (SHPO) during Section 106 consultations under the National Historic Preservation. The Utah SHPO concurred with this determination of effect.

#### ***4.5.4.2 Migratory Birds and Species of Conservation Concern***

Grazing can occur during the breeding and nesting season for migratory birds or other birds that are considered to be Species of Conservation Concern by the USFWS. Grazing and maintenance of fences, waters, and other livestock operations can cause short-term disturbances to these birds and could impact vegetation that may provide habitat for these species. However, grazing should not cause significant short-term disturbances to migratory birds/Species of Conservation Concern and their habitat.

Recent rangeland health assessments (2008, and 2015) determined that all sites were functioning properly, met the Utah Rangeland Standards, conformed to all Grazing Management Guidelines, and the vegetative cover, plant community composition, litter production, plant biomass and seed production all were within acceptable ranges based on the ecological site descriptions for these allotments. Hydrology and erosion deposition criteria are also all being met. Over the long-term, implementation of term permit renewals under the Proposed Action should maintain healthy, functional rangelands. These areas would continue to provide adequate cover, suitable foraging, breeding, and roosting opportunities, and support an adequate prey base, for migratory birds and Species of Conservation Concern. The maintenance of fences, waters, and other livestock operations should not cause significant disturbances to migratory bird species/Species of Conservation Concern and their habitat.

Therefore, the cumulative impacts to migratory birds and Species of Conservation Concern as a result of the Proposed Action is expected to be negligible to minor.

#### ***4.5.4.3 Threatened and Endangered Species and BLM Sensitive Species***

Federally-listed threatened, endangered, and candidate species that may be present within or near the allotments include: California condor; Mexican spotted owl; Southwestern willow flycatcher; and Western yellow-billed cuckoo. Grazing and maintenance of fences, waters, and other livestock operations can cause short-term disturbances to T&E and BLM Sensitive Species and could impact vegetation that may provide food and habitat for the species. However, grazing should not cause significant short-term disturbances to T&E and BLM Sensitive species and their habitat.

Recent rangeland health assessments (2008, 2015) determined that all sites (riparian, aquatic, and upland) were functioning properly, and the vegetative cover, plant community composition, litter production, plant biomass and seed production all were within acceptable ranges based on the ecological site descriptions for these allotments. Hydrology and erosion deposition criteria are also all being met. Over the long-term, implementation of term permit renewals under the

Proposed Action should maintain healthy, functional rangelands, and not cause significant long-term disturbances to T&E and BLM Sensitive species and their habitat.

Therefore, the cumulative impacts to tortoises as a result of the Proposed Action is expected to be negligible to minor. The 10-year permit renewal in these allotments, may affect, but not likely to adversely affect T&E and BLM Sensitive Species.

#### **4.5.4.4 General Wildlife**

Livestock may consume some forage that might otherwise be available to the general wildlife and over time, some unexpected impacts may occur.

Recent rangeland health assessments (2008, and 2015) determined that all sites were functioning properly, met the Utah Rangeland Standards, conformed to all Grazing Management Guidelines, and the vegetative cover, plant community composition, litter production, plant biomass and seed production all were within acceptable ranges based on the ecological site descriptions for these allotments. Hydrology and erosion deposition criteria are also all being met. Over the long-term, implementation of term permit renewals under the Proposed Action should maintain healthy, functional rangelands. These areas would continue to provide suitable foraging and adequate cover for general wildlife.

The cumulative impacts to general wildlife as a result of the Proposed Action is expected to be negligible to minor. The 10-year permit renewal in these allotments, may affect, but not likely to adversely affect general wildlife.

#### **4.5.4.5 Range/Livestock Grazing**

Although the allotments were found to be in proper functioning condition, it is well known that livestock use does have some impact on the environment, either through competition for forage with wildlife, the consumption of vegetation that would otherwise be left in place and or the increase nitrogen levels in the streams. Though difficult to measure there is likely a cumulative impact. These impacts are not necessarily negative, wildlife tend to seek after the fresh tender regrowth after livestock have grazed an area. Proper grazing will stimulate regrowth and plant vigor, resulting in healthier more productive plants.

#### **4.5.4.6 Riparian**

See 4.5.4.5 Range/Livestock Grazing

#### **4.5.4.7 Water Quality**

See 4.5.4.5 Range/Livestock Grazing

#### **4.5.4.8 Vegetation**

See 4.5.4.5 Range/Livestock Grazing

#### **4.5.5 Irreversible and/or Irretrievable Commitments of Resources**

Irreversible commitments are those that cannot be reversed, except in the extreme long-term, and irretrievable commitments are those that are lost for a period of time. There would not be any irreversible or irretrievable commitments of resources from implementation of the Proposed Action or No Action alternatives. Energy requirements and conservation measurements would not be affected.

## 5.0 CHAPTER 5—PERSONS, GROUPS, AND AGENCIES CONSULTED

### 5.1 PERSONS, GROUPS, AND AGENCIES CONSULTED

Table 1: Persons, Agencies, and Organizations Consulted

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
US Fish and Wildlife Service	Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	
Utah State Historic Preservation Office	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	
Livestock operator on Grafton, North Grafton, Lambs Knoll, Boot Spring	Development of Proposed Action and alternatives	
Livestock operator on Cave and Virgin	Development of Proposed Action and alternatives	
Livestock operator on Lindell	Development of Proposed Action and alternatives	

### 5.2 LIST OF EA PREPARERS

Appendix A contains the Interdisciplinary (ID) Team Checklist for reference.

Table 2: BLM EA Preparers

Name	Title	Responsible for Preparation or Review of the Following Section(s) of this EA
Dave Corry	Natural Resource Specialist	Wildlife, Soils, Air Quality, Water Quality, Watershed, Water Rights, Wetlands/Riparian Zones, Farmlands, Floodplains
DaShell Burnham	Rangeland Technician	EA Preparation, Range/Livestock Grazing, Vegetation, Weeds
Ryan Reese	Rangeland Management Specialist	Range/Livestock Grazing, Vegetation, Weeds
Dave Corry	Natural Resource Specialist	Wildlife, Soils, Air Quality, Water Quality, Watershed, Water Rights, Wetlands/Riparian Zones, Farmlands, Floodplains
Robert Douglas	Wildlife Biologist	Special Status Plants and Wildlife Species,
John Kellam	Wildlife Biologist	T&E Wildlife Species, Migratory birds
		Wilderness, Wild and Scenic Rivers, National

Name	Title	Responsible for Preparation or Review of the Following Section(s) of this EA
Kyle Voyles	Recreation Planner	Recreational Trails, Wilderness/WSA
Dave Kiel	Recreation Planner	Areas of Critical Environmental Concern, National Conservation Areas, Lands with Wilderness Characteristics, National Historic Trails, Environmental Justice, Socio-Economics, Recreation, Visual Resources
Teresa Burke	Reality Specialist	Lands/Access, Rights-of-Way/Easements
Lori Hunsaker	Archeologist	Cultural Resource Site Condition Assessments, Native American Religious Concerns

## 6.0 LITERATURE CITED

---

- 16 USC 80. Neotropical Migratory Bird Conservation Act.
- 16 USC 668 et seq. Bald Eagle Protection Act of 1940, amended in 1963.
- 16 USC 703. 1918 Migratory Bird Treaty Act.
- Belsky, A.J., and J.L. Gelbard. 2000. Livestock Grazing and Weed Invasions in the Arid West. A Scientific Report Published by the Oregon Natural Desert Association.
- Belliston, N., R. Whitesides, S. Dewey, J. Merritt, and S. Burningham. 2010. Noxious Weed Field Guide for Utah. Uintah County Weed Department in cooperation with Utah State University Extension Service. [http://www.utahweed.org/PDF/FieldGuide\\_Ed4.pdf](http://www.utahweed.org/PDF/FieldGuide_Ed4.pdf)
- Cartron, J.E., S.H. Stoleson, P.L.L. Stoleson, and D.W. Shaw. 2000. Riparian Areas. Pp 281-328. In Jemison, R., and C. Raish (Eds.), *Livestock Management in the American Southwest: Ecology, Society, and Economics*. Elsevier Press.
- Chesser, R. Terry; Banks, Richard C.; Barker, F. Keith; Cicero, Carla; Dunn, Jon L.; Kratter, Andrew W.; Lovette, Irby J.; Rasmussen, Pamela C.; Remsen, Jr., J. V.; Rising, James D.; Stotz, Douglas F.; Winker, Kevin (July 2013). "Fifty-Fourth Supplement to the American Ornithologists' Union Checklist of North American Birds". *The Auk* 130 (3): 558–572. doi:10.1525/auk.2013.130.3.558.
- Ecosystem Restoration. 2006. Trout Creek Mountain Area Grazing Management Project. Lead Agency: BLM, Vale District Office. <http://ecorestoration.montana.edu/rangeland/histories/troutcreek/default.htm>
- Fridell, R., and K. Comella. 2007. Birds Protected By The Migratory Bird Treaty Act Occurring in Washington County, Utah. Utah Division of Wildlife Resources and Utah Division of Parks and Recreation, unpublished data.
- Correll, J.V., M.E. Andersen, K.D. Bunnell, M.F. Canning, A.G. Clark, D.E. Dolsen, and F.P. Howe. 2005. Utah Comprehensive Wildlife Conservation Strategy (CWCS). Utah Division of Wildlife Resources, Salt Lake City, Utah. 280 pp.
- Holechek, J. L., T. T. Baker, J. C. Boren, and D. Galt. 2006. Grazing Impacts on Rangeland Vegetation: What We Have Learned. *Society for Range Management*:7-13.
- Hughes, Janice M. 2015. Yellow-billed Cuckoo (*Coccyzus americanus*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/418>.
- Lentsh, Leo D., M. Jane Perkins, and Henry Maddux. 1995. Virgin Spinedace Conservation Agreement and Strategy, UDWR Publication 95-13.
- Loftin, S.R., C.E. Bock, J.H. Bock and S.L. Brantley. 2000. Desert Grasslands. Pp. 53-96. In Jemison, R., and C. Raish (eds.), *Livestock Management in the American Southwest: Ecology, Society, and Economics*. Elsevier Press.
- OPB. 2002. Utah Governor's Office of Planning and Budget (OPB). 2002. "Population Projections for Utah's Cities and Unincorporated Areas." Salt Lake City, Utah.
- Parrish, J. R., F. P. Howe, R. E. Norvell. 2002. Utah Partners in Flight Avian Conservation Strategy Version 2.0. Utah Partners in Flight Program, Utah Division of Wildlife Resources, Salt Lake City, UT.

- Sayre, N.F. 2000. Sonoran Desert Conservation Plan: Preserving Ranch Lands in Pima County. [http://www.pima.gov/cmo/sdcp/sdcp2/elements/ranch2/rnch\\_03.htm](http://www.pima.gov/cmo/sdcp/sdcp2/elements/ranch2/rnch_03.htm)
- \_\_\_\_ Sprinkle, J., et al. Dutchman Butte Revisited – Examining Paradigms for Livestock Grazing Exclusion. 2007. Society for Range Management:21-34.
- Rappole, J. H., and M. V. McDonald. 1994. Cause and Effect in Population Declines of Migratory Birds. *The Auk* 111(3):652-660
- SCS. 1977. United States Department of Agricultural Soil Conservation Service (SCS). Soil Survey of Washington County Area.
- USDI BLM. 1980. Final environmental impact statement of grazing management in the Kanab/Escalante Area, Utah /prepared by Bureau of Land Management, Department of the Interior.
- USDI BLM. 1999. St. George Field Office (Formerly the Dixie Resource Area) Record of Decision and Resource Management Plan. Utah State Office. March 1999.
- USDI BLM. 1998. Dixie Resource Area Proposed Resource Management Plan and Final Environmental Impact Statement. Cedar City District Office. September 1998.
- USDI BLM. 1997. Standards for Rangeland Health and Guidelines for Grazing Management.
- USDI BLM. 1987. BLM NEPA Handbook H-1790-1, Appendix 5, Critical Elements of the Human Environment.
- USDI BLM. 2000. Interpreting indicators of rangeland health, version 3. Technical Reference 1734-6. Denver, CO: U.S. Department of the Interior, Bureau of Land Management Service Center.
- USDI BLM. 1978. Final Hot Desert Grazing Management Environmental Statement.
- U.S. Fish and Wildlife Service. 1995. Recovery plan for the Mexican Spotted Owl. Albuquerque, NM.
- U.S. Fish and Wildlife Service. 2002. Southwestern Willow Flycatcher recovery plan. Albuquerque, NM. 210 pp.
- U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 85 pp. [Online version available at <<http://www.fws.gov/migratorybirds/>>]
- U.S. Fish and Wildlife Service. 2014. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*); Final Rule. Federal Register Vol. 79. No. 192. Oct 3, 2014.
- Utah Division of Wildlife Resources. 2002. Virgin Spinedace (*Lepidomeda mollispinis mollispinis*) Conservation Strategy. [https://wildlife.utah.gov/pdf/spinedace\\_strategy.pdf](https://wildlife.utah.gov/pdf/spinedace_strategy.pdf)
- Utah Division of Wildlife Resources. 2015. UDWR-Utah BLM Avian Sensitive Species List. [http://dwrcdc.nr.utah.gov/ucdc/ViewReports/SS\\_List.pdf](http://dwrcdc.nr.utah.gov/ucdc/ViewReports/SS_List.pdf).
- Washington County. 2010. Washington County General Plan, a guide for development in Washington County, Utah.
- WRCC. 2015. Western Regional Climate Center: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ut9717>.

# APPENDICES

## 6.1 APPENDIX A INTERDISCIPLINARY TEAM CHECKLIST

**Project Title:** Grafton Grazing Permit Renewal

**NEPA Log Number:** DOI-BLM-UT-C030-2016-0028-EA

**File/Serial Number:**

**Project Leader:** DaShell Burnham

**Project Description:** An EA is being prepared to analyze the effects to the human environment that could result from the renewal of 10-year term grazing permits for the Grafton, North Grafton, Virgin, Boot Springs, Lindell, Cave and Lambs Knoll Allotments. No new Range Improvements are being proposed. See map below checklist for allotment locations.

**DETERMINATION OF STAFF: (Choose one of the following abbreviated options for the left column)**

NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for relevant impact that need to be analyzed in detail in the EA

NC = (DNAs only) actions and impacts not changed from those disclosed in the existing NEPA documents cited in Section D of the DNA form. The Rationale column may include NI and NP discussions.

Determination	Resource	Rationale for Determination*	Signature	Date
<b>RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)</b>				
NI	Air Quality	Air quality standards would not be exceeded by this proposal. Particulates that may result from livestock trailing are generally minimal.	Dave Corry	11/4/15
NI	Greenhouse Gas Emissions**	The proposed action would not have any impact on Greenhouse Gas Emissions.	Dave Corry	11/4/15
NI	Wastes (hazardous or solid)	No known issues for the renewal of these grazing permits	Dave Corry	11/4/15
PI	Water Resources/Quality (drinking/surface/ground)	Livestock Grazing has the potential to impact the quality of water in the Virgin River and therefore should be addressed in this EA	Dave Corry	11/4/15
NP	Areas of Critical Environmental Concern	There are no ACEC's that would be affected by the proposed action.	D. Kiel	11/18/15
PI	Cultural Resources	To comply with Section 106, allotments will need to be analyzed in a manner consistent with Utah BLM guidance.	L. Hunsaker	2/8/16
PI	Native American Religious Concerns	Consultation with Native American Tribes who claim affiliation with the St. George Basin should be conducted on a project by project basis to ensure Native American Religious Concerns or Practices are not affected.	L. Hunsaker	2/8/16
NI	Paleontology	There is only one recorded location with paleontological resources within this grazing allotment. It is not anticipated that the proposed activity will have a negative effect on these resources.	K. Voyles	1/7/16
NP	Geology / Mineral Resources/Energy Production	There are no active mining claims or other mineral resources within his allotment.	K. Voyles	1/7/16

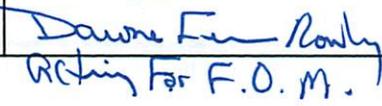
Determination	Resource	Rationale for Determination*	Signature	Date
NI	Environmental Justice	According to the EPA Region VIII, State of Utah, Environmental Justice Map, the region has been categorized as a minority population area of 10-20% and a poverty population area of 10-20%. 5-10% of the population speaks English "Less than Well". This data shows that low income and high minority populations are generally located in the St. George/Santa Clara/Washington areas in locations not adjacent to BLM managed lands. (see <a href="http://epamap14.epa.gov/ejmap/entry.html">http://epamap14.epa.gov/ejmap/entry.html</a> , 11/29/12).  No disproportionately high or adverse health or environmental effects would result to minority or low income populations as a result of implementing the Proposed Action	D. Kiel	11/16/15
NI	Socio-Economics	The proposed action would have no impact on socio-economic conditions in Washington County	D. Kiel	11/16/15
NI	Farmlands (Prime or Unique)	A review of Prime and Unique Farmlands for Washington County indicates that there are no farmlands in these grazing allotments.	D. Corry	11/4/15
NI	Soils	The proposed action should not negatively impact soil stability or productivity on these allotments.	D. Corry	11/4/15
NP	Floodplains		D. Corry	11/4/15
PI	Wetlands/Riparian Zones	Riparian vegetation is present along the Virgin River and has the potential to be impacted by Livestock Grazing and therefore should be addressed in this EA.	D. Corry	11/4/15
PI	Fish and Wildlife Excluding USFW Designated Species	The project area provides habitat for a variety of resident small mammals, birds, and reptiles. The more common would include: badgers ( <i>Taxidea taxus</i> ), antelope ground squirrels ( <i>Ammospermophilus leucurus</i> ), kangaroo rats ( <i>Dipodomys ordii</i> ), deer mice ( <i>Peromyscus maniculatus</i> ), desert wood rats ( <i>Neotoma lepida</i> ), Gambel's quail ( <i>Lophortyx gambelii</i> ), mourning doves ( <i>Zenaidura macroura</i> ), common ravens ( <i>Corvus corax</i> ), wrens ( <i>Catherpes mexicanus</i> , <i>Salpinctes obsoletus</i> ), house finches ( <i>Carpodacus mexicanus</i> ), side-blotched lizards ( <i>Uta stansburiana</i> ), and Western whiptail ( <i>Cnemidophorus tigris</i> ). Larger animals such as raptors, coyotes ( <i>Canis latrans</i> ), mule deer ( <i>Odocoileus hemionus</i> ), and gray fox ( <i>Urocyon cinereoargenteus</i> ) may use the area year-long or for a portion of the year. The following BLM Sensitive species may occur in the project area: burrowing owl ( <i>Athene cunicularia</i> , summer resident, uncommon), ferruginous hawk ( <i>Buteo regalis</i> , winter visitor, fairly common), Lewis's woodpecker ( <i>Melanerpes lewis</i> , winter use only, rare), Northern goshawk ( <i>Accipiter gentilis</i> , winter use only, rare), Allen's big-eared bat ( <i>Idionycteris phyllotis</i> , permanent resident, extremely rare), big free-tailed bat ( <i>Nyctinomops macrotis</i> , summer resident, rare), fringed myotis ( <i>Myotis thysanodes</i> , permanent resident, uncommon), kit fox ( <i>Vulpes macrotis</i> , permanent resident, uncommon), spotted bat ( <i>Euderma maculatum</i> , permanent resident, rare), Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> , permanent resident, fairly common), Western red bat ( <i>Lasiurus blossevillii</i> , permanent resident, extremely rare), Desert sucker ( <i>Catostomus clarki</i> , permanent resident in the Virgin River, fairly common), Flannel-mouth sucker ( <i>Catostomus latipinnis</i> , permanent resident in the Virgin River, fairly common), Virgin spinedace ( <i>Lepidomeda</i>	B. Douglas/ J. Kellam	11/19/15

Determination	Resource	Rationale for Determination*	Signature	Date
		mollispinis, permanent resident in the Virgin River, fairly common), and Arizona toad (Bufo microscaphus, permanent resident in the Virgin River, fairly common). No nests, dens, roosts, or other special use areas for these BLM Sensitive species have been identified in the project area. From the rangeland health assessment completed in these allotments, it was determined that all sites (both riparian and upland) were functioning properly (see health assessment summary). It was also determined that the ecosystem met the Utah Rangeland Standards and conformed to all the Grazing Management Guidelines. Under the proposed grazing schedule, the vegetation within these allotments should be properly utilized by livestock and the vegetation maintained in good condition, providing good habitat, and adequate prey species for BLM Sensitive species and general wildlife and their habitats. The maintenance of fences, waters, and other livestock operations should not cause significant disturbances to these sensitive and general wildlife species.		
PI	Migratory Birds	A number of migratory birds species use these grazing allotments yearlong, or for a portion of the year. Nesting by migratory bird species generally occurs in the spring and summer (April 1 to August 31). No special nesting or roosting areas have been identified in these grazing allotments. From the rangeland health assessment completed within these allotments, it was determined that all sites were functioning properly (see health assessment summary). It was also determined that the ecosystem met the Utah Rangeland Standards and conformed to all Grazing Management Guidelines. Under the proposed action, the vegetation in these allotments should be properly utilized by livestock and the habitat maintained in good condition for migratory bird species. The maintenance of fences, waters, and other livestock operations should not cause significant disturbances to migratory bird species and their habitat. No measurable impacts to migratory bird species are anticipated.	B. Douglas/J.Kellam	11/19/15
NP	Threatened, Endangered or Candidate Plant Species	No threatened, endangered or candidate plant species are known to occur in the project area.	B. Douglas/ J. Kellam	11/19/15
NI	Threatened, Endangered or Candidate Animal Species	The U.S. Fish and Wildlife Service (FWS) in the past have conducted telemetry studies on California condor (Gymnogyps californianus, federally listed) movement here in Washington County and all allotments in this group, have received fly-over use by California condors (condors). Presently, no nests, roosts, or other special use areas for condors have been identified in these allotments. Condors may use these allotments infrequently for hunting and foraging. From the rangeland health assessment completed in these allotments, it was determined that all sites (both riparian and upland) were functioning properly (see health assessment summary). It was also determined that the ecosystem met the Utah Rangeland Standards and conformed to all the Grazing Management Guidelines. Under the proposed grazing schedule, the vegetation within these allotments should be properly utilized by livestock and the vegetation maintained in good condition, providing good habitat, and adequate prey species for condors. The construction and maintenance of fences, waters, and other livestock operations should not cause significant disturbances to condors or their habitat. The proposed action may affect, but not likely to adversely affect	B. Douglas/ J. Kellam	11/19/15

Determination	Resource	Rationale for Determination*	Signature	Date
		condors.  Critical Habitat for Mexican spotted owls ( <i>Strix occidentalis lucida</i> , federally listed species) occurs in the Cave, Lambs Knoll, North Grafton and Virgin Allotments. These allotments are unsuitable for nesting, but may provide dispersal habitat for Mexican spotted owls. From the rangeland health assessment completed in these allotments, it was determined that all sites (both riparian and upland) were functioning properly (see health assessment summary). It was also determined that the ecosystem met the Utah Rangeland Standards and conformed to all the Grazing Management Guidelines. Under the proposed grazing schedule, the vegetation within these allotments should be properly utilized by livestock and the vegetation maintained in good condition, providing good habitat, and adequate prey species for Mexican spotted owls. The maintenance of fences, waters, and other livestock operations should not cause significant disturbances to these Mexican spotted owls. The proposed action may affect, but not likely to adversely affect Mexican spotted owls.		
NP	Vegetation Excluding USFW Designated Species	No BLM Sensitive plant species are known to occur in the project area.	Bob Douglas/Dave Corry	11/19/15
NI	Woodland / Forestry	Permit renewal would not impact the woodland resource or harvest of vegetative products	D. Corry	11/4/15
NI	Fuels/Fire Management	Permit renewal would not affect fire management. There currently are no fuels projects proposed for these allotments	D. Corry	11/4/15
NI	Invasive Species/Noxious Weeds (EO 13112)	Though livestock grazing can facilitate the spread of noxious and invasive species, there were only a handful of infestations recorded within the boundaries of these allotments. There is no evidence that livestock have played a role in the establishment of these infestations.	R. Reese	11/30/15
NI	Lands/Access	Renewal of grazing permits will not have any impact on current land use authorizations in the project area. There are no pending lands actions that would be affected by this proposal.	Teresa Burke	11/5/15
PI	Livestock Grazing	Permit renewal is required to authorize continued livestock grazing.	R. Reese	11/30/15
NI	Rangeland Health Standards	Allotment evaluations were conducted and these allotments were found to be meeting the Rangeland Health Standards.	R. Reese	11/30/15
NI	Recreation	Livestock seem to consider mountain bike singletrack to be their own private travel corridors, but other than annoying mountain bikers, recreation would not be affected by the proposed action	D. Kiel	11/18/15
NI	Visual Resources	Livestock grazing, in the amounts listed in the proposed action would have no impact on visual resources	D. Kiel	11/16/15
		<b>NLCS</b>		
NP	National Conservation Areas	There are no National Conservation Areas affected by the proposed action	D. Kiel	11/16/15
NP	National Historic Trails (Old Spanish Trail)	The Old Spanish Trail alignment is not within the area affected by the proposed action	D. Kiel	11/16/15

Determination	Resource	Rationale for Determination*	Signature	Date
NP	National Recreational Trails (Gooseberry)	The Gooseberry Mesa National Recreation Trail would not be affected by the proposed action	K. Voyles	11/18/15
NP	Wild and Scenic Rivers	There are no Wild and Scenic River segments, either eligible, suitable, or designated, that would be affected by the proposed action	K. Voyles	11/18/15
NP	Wilderness/WSA	There are no designated wilderness areas or wilderness study areas that would be affected by the proposed action	K. Voyles	11/18/15
NP	Lands with Wilderness Characteristics**	There are no inventoried lands with wilderness characteristics that would be affected by the proposed action	D. Kiel	11/18/15

**FINAL REVIEW:**

Reviewer Title	Signature	Date	Comments
Environmental Coordinator		5/16/16	—
Authorized Officer		5/16/2016	

## 6.2 APPENDIX B WASHINGTON COUNTY MIGRATORY BIRD SPECIES

A variety of migratory bird species ( $\geq 302$  spp.) have been documented using habitats within Washington County, Utah, for breeding, nesting, foraging, and migratory habitats. Appendix B contains a list of the birds protected by the Migratory Bird Treaty Act that occur in Washington County, Utah—compiled by Rick Fridell (Utah Division of Wildlife Resources, St. George, Utah), and Kristen Comella (Utah Division of Parks and Recreation, Snow Canyon Park, Ivins, Utah; Fridell and Comella 2007).

### Appendix B Birds Protected By The Migratory Bird Treaty Act Occurring in Washington County, Utah

Common Name	Scientific Name	Common Name	Scientific Name
Greater White-fronted Goose	<i>Anser albifrons</i>	Hammond's Flycatcher	<i>Empidonax hammondii</i>
Snow Goose	<i>Chen caerulescens</i>	Gray Flycatcher	<i>Empidonax wrightii</i>
Ross's Goose	<i>Chen rossii</i>	Dusky Flycatcher	<i>Empidonax oberholseri</i>
Canada Goose	<i>Branta canadensis</i>	Pacific-slope Flycatcher	<i>Empidonax difficilis</i>
Trumpeter Swan	<i>Cygnus buccinator</i>	Cordilleran Flycatcher	<i>Empidonax occidentalis</i>
Tundra Swan	<i>Cygnus columbianus</i>	Black Phoebe	<i>Sayornis nigricans</i>
Wood Duck	<i>Aix sponsa</i>	Eastern Phoebe	<i>Sayornis phoebe</i>
Gadwall	<i>Anas strepera</i>	Say's Phoebe	<i>Sayornis saya</i>
Eurasian Wigeon	<i>Anas penelope</i>	Vermilion Flycatcher	<i>Pyrocephalus rubinus</i>
American Wigeon	<i>Anas americana</i>	Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Mallard	<i>Anas platyrhynchos</i>	Brown-crested Flycatcher	<i>Myiarchus tyrannulus</i>
Blue-winged Teal	<i>Anas discors</i>	Cassin's Kingbird	<i>Tyrannus vociferans</i>
Cinnamon Teal	<i>Anas cyanoptera</i>	Western Kingbird	<i>Tyrannus verticalis</i>
Northern Shoveler	<i>Anas clypeata</i>	Eastern Kingbird	<i>Tyrannus tyrannus</i>
Northern Pintail	<i>Anas acuta</i>	Loggerhead Shrike	<i>Lanius ludovicianus</i>
Green-winged Teal	<i>Anas crecca</i>	Northern Shrike	<i>Lanius excubitor</i>
Canvasback	<i>Aythya valisineria</i>	Bell's Vireo	<i>Vireo bellii</i>
Redhead	<i>Aythya americana</i>	Gray Vireo	<i>Vireo vicinior</i>
Ring-necked Duck	<i>Aythya collaris</i>	Plumbeous Vireo	<i>Vireo plumbeus</i>
Greater Scaup	<i>Aythya marila</i>	Cassin's Vireo	<i>Vireo cassinii</i>
Lesser Scaup	<i>Aythya affinis</i>	Blue-headed Vireo	<i>Vireo solitarius</i>
Surf Scoter	<i>Melanitta perspicillata</i>	Warbling Vireo	<i>Vireo gilvus</i>
White-winged Scoter	<i>Melanitta fusca</i>	Philadelphia Vireo	<i>Vireo philadelphicus</i>
Black Scoter	<i>Melanitta nigra</i>	Red-eyed Vireo	<i>Vireo olivaceus</i>
Long-tailed Duck	<i>Clangula hyemalis</i>	Gray Jay	<i>Perisoreus canadensis</i>
Bufflehead	<i>Bucephala albeola</i>	Steller's Jay	<i>Cyanocitta stelleri</i>
Common Goldeneye	<i>Bucephala clangula</i>	Blue Jay	<i>Cyanocitta cristata</i>
Barrow's Goldeneye	<i>Bucephala islandica</i>	Western Scrub-Jay	<i>Aphelocoma californica</i>
Hooded Merganser	<i>Lophodytes cucullatus</i>	Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>
Common Merganser	<i>Mergus merganser</i>	Clark's Nutcracker	<i>Nucifraga columbiana</i>
Red-breasted Merganser	<i>Mergus serrator</i>	Black-billed Magpie	<i>Pica hudsonia</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>	American Crow	<i>Corvus brachyrhynchos</i>
Red-throated Loon	<i>Gavia stellata</i>	Common Raven	<i>Corvus corax</i>
Pacific Loon	<i>Gavia pacifica</i>	Horned Lark	<i>Eremophila alpestris</i>
Common Loon	<i>Gavia immer</i>	Purple Martin	<i>Progne subis</i>
Yellow-billed Loon	<i>Gavia adamsii</i>	Tree Swallow	<i>Tachycineta bicolor</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Violet-green Swallow	<i>Tachycineta thalassina</i>
Horned Grebe	<i>Podiceps auritus</i>	Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Red-necked Grebe	<i>Podiceps grisegena</i>	Bank Swallow	<i>Riparia riparia</i>
Eared Grebe	<i>Podiceps nigricollis</i>	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Western Grebe	<i>Aechmophorus occidentalis</i>	Barn Swallow	<i>Hirundo rustica</i>
Clark's Grebe	<i>Aechmophorus clarkii</i>	Black-capped Chickadee	<i>Poecile atricapillus</i>
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Mountain Chickadee	<i>Poecile gambeli</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Juniper Titmouse	<i>Baeolophus ridgwayi</i>

American Bittern	Botaurus lentiginosus	Verdin	Auriparus flaviceps
Least Bittern	Ixobrychus exilis	Bushtit	Psaltriparus minimus
Great Blue Heron	Ardea herodias	Red-breasted Nuthatch	Sitta canadensis
Great Egret	Ardea alba	White-breasted Nuthatch	Sitta carolinensis
Snowy Egret	Egretta thula	Pygmy Nuthatch	Sitta pygmaea
Reddish Egret	Egretta rufescens	Brown Creeper	Certhia americana
Cattle Egret	Bubulcus ibis	Cactus Wren	Campylorhynchus brunneicapillus
Green Heron	Butorides virescens	Rock Wren	Salpinctes obsoletus
Black-crowned Night-Heron	Nycticorax nycticorax	Canyon Wren	Catherpes mexicanus
White-faced Ibis	Plegadis chihi	Bewick's Wren	Thryomanes bewickii
Wood Stork	Mycteria americana	House Wren	Troglodytes aedon
Turkey Vulture	Cathartes aura	Winter Wren	Troglodytes troglodytes
California Condor	Gymnogyps californianus	Marsh Wren	Cistothorus palustris
Osprey	Pandion haliaetus	American Dipper	Cinclus mexicanus
White-tailed Kite	Elanus leucurus	Golden-crowned Kinglet	Regulus satrapa
Bald Eagle	Haliaeetus leucocephalus	Ruby-crowned Kinglet	Regulus calendula
Northern Harrier	Circus cyaneus	Blue-gray Gnatcatcher	Poliophtila caerulea
Sharp-shinned Hawk	Accipiter striatus	Black-tailed Gnatcatcher	Poliophtila melanura
Cooper's Hawk	Accipiter cooperii	Eastern Bluebird	Sialia sialis
Northern Goshawk	Accipiter gentilis	Western Bluebird	Sialia mexicana
Common Black-Hawk	Buteogallus anthracinus	Mountain Bluebird	Sialia currucoides
Red-shouldered Hawk	Buteo lineatus	Townsend's Solitaire	Myadestes townsendi
Broad-winged Hawk	Buteo platypterus	Veery	Catharus fuscescens
Swainson's Hawk	Buteo swainsoni	Swainson's Thrush	Catharus ustulatus
Zone-tailed Hawk	Buteo albonotatus	Hermit Thrush	Catharus guttatus
Red-tailed Hawk	Buteo jamaicensis	Rufous-backed Robin	Turdus rufopalliatu
Ferruginous Hawk	Buteo regalis	American Robin	Turdus migratorius
Rough-legged Hawk	Buteo lagopus	Varied Thrush	Ixoreus naevius
Golden Eagle	Aquila chrysaetos	Gray Catbird	Dumetella carolinensis
American Kestrel	Falco sparverius	Northern Mockingbird	Mimus polyglottos
Merlin	Falco columbarius	Sage Thrasher	Oreoscoptes montanus
Peregrine Falcon	Falco peregrinus	Brown Thrasher	Toxostoma rufum
Prairie Falcon	Falco mexicanus	Bendire's Thrasher	Toxostoma bendirei
Virginia Rail	Rallus limicola	Curve-billed Thrasher	Toxostoma curvirostre
Sora	Porzana carolina	Crissal Thrasher	Toxostoma crissale
Common Moorhen	Gallinula chloropus	Le Conte's Thrasher	Toxostoma lecontei
American Coot	Fulica americana	American Pipit	Anthus rubescens
Sandhill Crane	Grus canadensis	Bohemian Waxwing	Bombycilla garrulus
Black-bellied Plover	Pluvialis squatarola	Cedar Waxwing	Bombycilla cedrorum
American Golden-Plover	Pluvialis dominica	Phainopepla	Phainopepla nitens
Snowy Plover	Charadrius alexandrinus	Tennessee Warbler	Vermivora peregrina
Semipalmated Plover	Charadrius semipalmatus	Orange-crowned Warbler	Vermivora celata
Killdeer	Charadrius vociferus	Nashville Warbler	Vermivora ruficapilla
Mountain Plover	Charadrius montanus	Virginia's Warbler	Vermivora virginiae
Black-necked Stilt	Himantopus mexicanus	Lucy's Warbler	Vermivora luciae
American Avocet	Recurvirostra americana	Northern Parula	Parula americana
Spotted Sandpiper	Actitis macularius	Yellow Warbler	Dendroica petechia
Solitary Sandpiper	Tringa solitaria	Chestnut-sided Warbler	Dendroica pensylvanica
Wandering Tattler	Tringa incana	Magnolia Warbler	Dendroica magnolia
Greater Yellowlegs	Tringa melanoleuca	Black-throated Blue Warbler	Dendroica caerulescens
Willet	Tringa semipalmata	Yellow-rumped Warbler	Dendroica coronata
Lesser Yellowlegs	Tringa flavipes	Black-throated Gray Warbler	Dendroica nigrescens
Whimbrel	Numenius phaeopus	Townsend's Warbler	Dendroica townsendi
Long-billed Curlew	Numenius americanus	Hermit Warbler	Dendroica occidentalis
Marbled Godwit	Limosa fedoa	Yellow-throated Warbler	Dendroica dominica
Red Knot	Calidris canutus	Grace's Warbler	Dendroica graciae
Sanderling	Calidris alba	Prairie Warbler	Dendroica discolor
Semipalmated Sandpiper	Calidris pusilla	Palm Warbler	Dendroica palmarum
Western Sandpiper	Calidris mauri	Blackpoll Warbler	Dendroica striata
Least Sandpiper	Calidris minutilla	Black-and-white Warbler	Mniotilta varia
Baird's Sandpiper	Calidris bairdii	American Redstart	Setophaga ruticilla
Pectoral Sandpiper	Calidris melanotos	Prothonotary Warbler	Protonotaria citrea
Dunlin	Calidris alpina	Worm-eating Warbler	Helminthos vermivorum
Stilt Sandpiper	Calidris himantopus	Northern Waterthrush	Seiurus noveboracensis
Short-billed Dowitcher	Limnodromus griseus	Louisiana Waterthrush	Seiurus motacilla

Long-billed Dowitcher	Limnodromus scolopaceus	Kentucky Warbler	Oporornis formosus
Wilson's Snipe	Gallinago delicata	MacGillivray's Warbler	Oporornis tolmiei
Wilson's Phalarope	Phalaropus tricolor	Common Yellowthroat	Geothlypis trichas
Red-necked Phalarope	Phalaropus lobatus	Hooded Warbler	Wilsonia citrina
Red Phalarope	Phalaropus fulicarius	Wilson's Warbler	Wilsonia pusilla
Franklin's Gull	Larus pipixcan	Painted Redstart	Myioborus pictus
Bonaparte's Gull	Larus philadelphia	Yellow-breasted Chat	Icteria virens
Heermann's Gull	Larus heermanni	Summer Tanager	Piranga rubra
Ring-billed Gull	Larus delawarensis	Scarlet Tanager	Piranga olivacea
California Gull	Larus californicus	Western Tanager	Piranga ludoviciana
Herring Gull	Larus argentatus	Green-tailed Towhee	Pipilo chlorurus
Sabine's Gull	Xema sabini	Spotted Towhee	Pipilo maculatus
Black-legged Kittiwake	Rissa tridactyla	Abert's Towhee	Pipilo aberti
Least Tern	Sternula antillarum	Rufous-crowned Sparrow	Aimophila ruficeps
Caspian Tern	Hydroprogne caspia	American Tree Sparrow	Spizella arborea
Black Tern	Chlidonias niger	Chipping Sparrow	Spizella passerina
Common Tern	Sterna hirundo	Clay-colored Sparrow	Spizella pallida
Forster's Tern	Sterna forsteri	Brewer's Sparrow	Spizella breweri
Band-tailed Pigeon	Patagioenas fasciata	Black-chinned Sparrow	Spizella atrogularis
White-winged Dove	Zenaida asiatica	Vesper Sparrow	Poocetes gramineus
Mourning Dove	Zenaida macroura	Lark Sparrow	Chondestes grammacus
Inca Dove	Columbina inca	Black-throated Sparrow	Amphispiza bilineata
Common Ground-Dove	Columbina passerina	Sage Sparrow	Amphispiza belli
Ruddy Ground-Dove	Columbina talpacoti	Lark Bunting	Calamospiza melanocorys
Yellow-billed Cuckoo	Coccyzus americanus	Savannah Sparrow	Passerculus sandwichensis
Greater Roadrunner	Geococcyx californianus	Grasshopper Sparrow	Ammodramus savannarum
Barn Owl	Tyto alba	Fox Sparrow	Passerella iliaca
Flammulated Owl	Otus flammeolus	Song Sparrow	Melospiza melodia
Western Screech-Owl	Megascops kennicottii	Lincoln's Sparrow	Melospiza lincolni
Great Horned Owl	Bubo virginianus	Swamp Sparrow	Melospiza georgiana
Northern Pygmy-Owl	Glaucidium gnoma	White-throated Sparrow	Zonotrichia albicollis
Elf Owl	Micrathene whitneyi	Harris's Sparrow	Zonotrichia querula
Burrowing Owl	Athene cunicularia	White-crowned Sparrow	Zonotrichia leucophrys
Spotted Owl	Strix occidentalis	Golden-crowned Sparrow	Zonotrichia atricapilla
Long-eared Owl	Asio otus	Dark-eyed Junco	Junco hyemalis
Short-eared Owl	Asio flammeus	McCown's Longspur	Calcarius mccownii
Northern Saw-whet Owl	Aegolius acadicus	Lapland Longspur	Calcarius lapponicus
Lesser Nighthawk	Chordeiles acutipennis	Chestnut-collared Longspur	Calcarius ornatus
Common Nighthawk	Chordeiles minor	Snow Bunting	Plectrophenax nivalis
Common Poorwill	Phalaenoptilus nuttallii	Rose-breasted Grosbeak	Pheucticus ludovicianus
Black Swift	Cypseloides niger	Black-headed Grosbeak	Pheucticus melanocephalus
Chimney Swift	Chaetura pelagica	Blue Grosbeak	Passerina caerulea
Vaux's Swift	Chaetura vauxi	Lazuli Bunting	Passerina amoena
White-throated Swift	Aeronautes saxatalis	Indigo Bunting	Passerina cyanea
Broad-billed Hummingbird	Cynanthus latirostris	Dickcissel	Spiza americana
Blue-throated Hummingbird	Lampornis clemenciae	Bobolink	Dolichonyx oryzivorus
Magnificent Hummingbird	Eugenes fulgens	Red-winged Blackbird	Agelaius phoeniceus
Ruby-throated Hummingbird	Archilochus colubris	Western Meadowlark	Sturnella neglecta
Black-chinned Hummingbird	Archilochus alexandri	Yellow-headed Blackbird	Xanthocephalus
Anna's Hummingbird	Calypte anna	Rusty Blackbird	xanthocephalus
Costa's Hummingbird	Calypte costae	Brewer's Blackbird	Euphagus carolinus
Calliope Hummingbird	Stellula calliope	Common Grackle	Euphagus cyanocephalus
Broad-tailed Hummingbird	Selasphorus platycercus	Great-tailed Grackle	Quiscalus quiscula
Rufous Hummingbird	Selasphorus rufus	Bronzed Cowbird	Quiscalus mexicanus
Belted Kingfisher	Megaceryle alcyon	Brown-headed Cowbird	Molothrus aeneus
Lewis's Woodpecker	Melanerpes lewis	Orchard Oriole	Molothrus ater
Red-headed Woodpecker	Melanerpes erythrocephalus	Hooded Oriole	Icterus spurius
Acorn Woodpecker	Melanerpes formicivorus	Bullock's Oriole	Icterus cucullatus
Williamson's Sapsucker	Sphyrapicus thyroideus	Altamira Oriole	Icterus bullockii
Yellow-bellied Sapsucker	Sphyrapicus varius	Scott's Oriole	Icterus gularis
Red-naped Sapsucker	Sphyrapicus nuchalis	Gray-crowned Rosy-Finch	Icterus parisorum
Red-breasted Sapsucker	Sphyrapicus ruber	Black Rosy-Finch	Leucosticte tephrocotis
Ladder-backed Woodpecker	Picoides scalaris	Pine Grosbeak	Leucosticte atrata
Downy Woodpecker	Picoides pubescens	Cassin's Finch	Pinicola enucleator
Hairy Woodpecker	Picoides villosus	House Finch	Carpodacus cassinii
			Carpodacus mexicanus

American Three-toed Woodpecker	<i>Picoides dorsalis</i>	Red Crossbill	<i>Loxia curvirostra</i>
Northern Flicker	<i>Colaptes auratus</i>	Pine Siskin	<i>Carduelis pinus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Lesser Goldfinch	<i>Carduelis psaltria</i>
Western Wood-Pewee	<i>Contopus sordidulus</i>	Lawrence's Goldfinch	<i>Carduelis lawrencei</i>
Willow Flycatcher	<i>Empidonax traillii</i>	American Goldfinch	<i>Carduelis tristis</i>
Least Flycatcher	<i>Empidonax minimus</i>	Evening Grosbeak	<i>Coccothraustes vespertinus</i>

*Source: Birds Protected By the Migratory Bird Treaty Act (Code of Federal Regulations, Part 10, March 1, 2010); and Birds of Washington County, Utah, 2007, Compiled by Rick Fridell (Utah Division of Wildlife Resources, St. George, Utah), and Kristen Comella (Utah Division of Parks and Recreation, Snow Canyon Park, Ivins, Utah).*

### 6.3 APPENDIX C MIGRATORY BIRD SPECIES DOCUMENTED WITHIN WASHINGTON COUNTY, UTAH, THAT HAVE CONSERVATION STATUS (USFWS BIRDS OF CONSERVATION CONCERN, UTAH-BLM SENSITIVE SPECIES, UTAH-PIF HIGH-PRIORITY BIRD SPECIES), AND THEIR PRIMARY-SECONDARY BREEDING AND WINTERING HABITATS.

Common Name <sup>1,2</sup>	Scientific Name <sup>1,2</sup>	USFWS Birds of Conservation Concern <sup>3</sup>	Utah-BLM Sensitive Bird Species <sup>4</sup>	Utah-PIF High Priority Bird Species <sup>5</sup>	Primary Breeding <sup>4,5</sup>	Secondary Breeding <sup>4,5</sup>	Winter Habitat <sup>4,5</sup>
Horned grebe	<i>Podiceps auritus</i>	X			Marshes	Ponds	Migrant
American white pelican	<i>Pelecanus erythrorhynchos</i>		X	X	Lakes	Marshes	Migrant
American bittern	<i>Botaurus lentiginosus</i>	X			Freshwater Marshes	Freshwater Marshes	Migrant
Least bittern	<i>Ixobrychus exilis</i>	X			Freshwater Marshes	Brackish Marshes	Accidental
Northern goshawk	<i>Accipiter gentilis</i>		X		Conifer Forests	Mixed Forests	Forests
Ferruginous hawk	<i>Buteo regalis</i>	X	X	X	Tree-Snag	Cliff	Open Habitats
Golden eagle	<i>Aquila chrysaetos</i>	X			Cliff	Tree-Snag	Open Habitats
Bald eagle	<i>Haliaeetus leucocephalus</i>	X	X		Tree-Snag	Cliff	Migrant
Prairie falcon	<i>Falco mexicanus</i>	X			Cliff	Bank	Open Habitats
Peregrine falcon	<i>Falco peregrinus</i>	X			Cliff	Tree-Snag	Open Habitats
Gambel's quail	<i>Callipepla gambelii</i>			X	Desert Scrub	Lowland riparian	Desert Scrub
Snowy plover	<i>Charadrius nivosus</i>	X			Sand Beaches	Alkaline Flats	Migrant
Mountain plover	<i>Charadrius montanus</i>	X		X	Shortgrass Prairie	Sandy Deserts	Migrant
American avocet	<i>Recurvirostra americana</i>			X	Marshes	Lake Edges	Migrant
Black-necked stilt	<i>Himantopus mexicanus</i>			X	Marshes	Lake Edges	Migrant

Long-billed curlew	<i>Numenius americanus</i>	X	X	X	Grasslands	Agricultural Fields	Migrant
Marbled godwit	<i>Limosa fedoa</i>	X			Marshes	Shortgrass Prairie	Migrant
Short-billed dowitcher	<i>Limnodromus griseus</i>	X			Marshes	Lake Edges	Migrant
Yellow-billed cuckoo	<i>Coccyzus americanus</i>			X	Riparian Woodlands	Marshes	Migrant
Short-eared owl	<i>Asio flammeus</i>	X	X		Grasslands	Wetlands	Open Habitats
Burrowing owl	<i>Athene cunicularia</i>	X			Grasslands	High Desert Scrub	Migrant
Flammulated owl	<i>Psiloscoops flammeolus</i>	X			Ponderosa Pine	Sub-Alpine Conifer	Migrant
Black swift	<i>Cypseloides niger</i>		X	X	Mountain Cliffs	Mountain Waterfalls	Migrant
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>			X	Mountain Conifer	Mountain Riparian	Migrant
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	X			Open Woodlands	Orchards	Accidental
Lewis's woodpecker	<i>Melanerpes lewis</i>	X	X	X	Pine/Oak Woodlands	Lowland Riparian	Pine/Oak Woodlands
American three-toed woodpecker	<i>Picoides dorsalis</i>			X	Sub-Alpine Conifer	Lodgepole Pine	Sub-Alpine Conifer
Willow flycatcher	<i>Empidonax traillii</i>	X			Riparian Habitats	Marshes	Migrant
Loggerhead shrike	<i>Lanius ludovicianus</i>	X			High Desert Scrub	Pinyon-Juniper	Open Habitats
Gray vireo	<i>Vireo vicinior</i>	X		X	Pinyon-Juniper	Scrub Oak	Migrant
Bell's vireo	<i>Vireo bellii</i>	X		X	Scrublands	Riparian Woodlands	Migrant
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	X			Pinyon Pine	Juniper	Pinyon-Juniper
Bewick's wren	<i>Thryomanes bewickii</i>	X			Lowland Riparian	Pinyon-Juniper	Brush-Open Woodlands
Sage thrasher	<i>Oreoscoptes montanus</i>	X			Sagebrush	Pinyon-Juniper	Migrant
Virginia's warbler	<i>Oreothlypis virginiae</i>			X	Scrub Oak	Pinyon-Juniper	Migrant
Lucy's warbler	<i>Oreothlypis luciae</i>			X	Cottonwood-Mesquite	Dry Desert Washes	Migrant
Black-throated gray warbler	<i>Setophaga nigrescens</i>			X	Pinyon-Juniper	Dry Conifer	Migrant
Abert's towhee	<i>Melospiza aberti</i>			X	Shrublands	Riparian Woodlands	Shrub-Riparian
Sagebrush sparrow	<i>Artemisiospiza nevadensis</i>	X		X	Sagebrush	Desert Scrub	Deserts
Brewer's sparrow	<i>Spizella breweri</i>			X	Sagebrush	Pinyon-Juniper	Migrant

Grasshopper sparrow	<i>Ammodramus savannarum</i>	X			Grasslands	Prairies	Migrant
McCown's longspur	<i>Rhynchophanes mccownii</i>	X			Shortgrass Prairie	Grasslands	Migrant
Chestnut-collared longspur	<i>Calcarius ornatus</i>	X			Shortgrass Prairie	Grasslands	Migrant
Bobolink	<i>Dolichonyx oryzivorus</i>			X	Wet Meadow	Prairie	Migrant
Black rosy-finch	<i>Leucosticte atrata</i>	X		X	Alpine Cliffs	Alpine Habitats	Mountain Valleys
Cassin's finch	<i>Haemorhous cassinii</i>	X			Mountain Conifer	Pinyon-Juniper	Mountain Conifer
Source: <sup>1</sup> Chesser et al. 2013; <sup>2</sup> Fridell and Comella 2007; <sup>3</sup> USFWS 2008; <sup>4</sup> UDWR 2015; <sup>5</sup> Parrish et al. 2002.							

#### 6.4 APPENDIX D PRELIMINARY CONSTRUCTION DRAWINGS

The following preliminary construction drawings are not in their final form and are only a selection from the entire construction document package meant to best illustrate the proposed action.