United States Department of the Interior
Bureau of Land Management

Environmental Assessment
DOI-BLM-UT-Y010-2015-0190-EA

August, 2016

Moab Field Office Programmatic Invasive Species Management Plan

Location: Bureau of Land Management, Within Moab Field Office Boundary

Moab Field Office
82 E. Dogwood Ave.
Moab, Utah 84532
Phone: (435)259-2100
Fax: (435)259-2106

BLM

(This page intentionally left blank)

Moab Field Office Programmatic Invasive Species Management Plan

DOI-BLM-UT-Y010-2015-0190-EA

Contents

1.0 PURPOSE & NEED 1

1.1 Introduction 1

1.2 Background 1

1.3 Need for the Proposed Action 2

1.4 Purpose(s) of the Proposed Action 2

1.5 Conformance with BLM Land Use Plan(s) 2

1.6 Relationship to Statutes, Regulations, or Other Plans 4

1.7 Identification of Issues 9

1.7.1 Fish and Wildlife 10

1.7.2 Floodplains 10

1.7.3 Fuels/Fire Management 10

1.7.4 Hydrologic Conditions 10

1.7.5 Invasive Species/Noxious Weeds 11

1.7.6 Lands with Wilderness Characteristics 11

1.7.7 Soils 11

1.7.8 Threatened, Endangered or Candidate Plant Species and Utah BLM Sensitive Plant Species 11

1.7.9 Vegetation Excluding USFW Designated Species 11

1.7.10 Visual Resources 11

1.7.11 Water Resources/Quality 11

1.7.12 Wetlands/Riparian Zones 11

1.8 Issues Considered but Eliminated from Further Analysis 12

1.9 Summary 12

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION 12

2.1 Introduction 12

2.2 Alternative A – Proposed Action 13

2.3 Alternative B – No Action 25

3.0 AFFECTED ENVIRONMENT 25
3.1 Introduction 25
3.2 General Setting 25
3.3 Resources/Issues Brought Forward for Analysis 26
3.3.1 Fish and Wildlife Including USFW Designated Species 26
3.3.2 Floodplains 47
3.3.3 Fuels/Fire Management 47
3.3.4 Hydrologic Conditions 49
3.3.5 Invasive Species/Noxious Weeds 49
3.3.6 Lands with Wilderness Characteristics 51
3.3.7 Soils 51
3.3.8 Threatened, Endangered or Candidate Plant Species and Utah BLM Sensitive Plant Species 52
3.3.9 Vegetation Excluding USFW Designated Species 58
3.3.10 Visual Resources 59
3.3.11 Water Resources/Quality 59
3.3.12 Wetlands/Riparian Zones 59
4.0 ENVIRONMENTAL IMPACTS 62
4.1 Introduction 62
4.2 General Analysis Assumptions and Guidelines 62
4.3 Direct and Indirect Impacts 63
4.3.1 Alternative A – Proposed Action 64
4.3.1.1 Fish and Wildlife Including State Special Status Wildlife Species and USFWS Designated Species 64
4.3.1.2 Floodplains 81
4.3.1.3 Fuels/Fire Management 81
4.3.1.4 Hydrologic Conditions 83
4.3.1.5 Invasive Species/Noxious Weeds 84
4.3.1.6 Lands with Wilderness Characteristics 85
4.3.1.7 Soils 86
4.3.1.8 Threatened, Endangered or Candidate Plant Species 86
4.3.1.9 Vegetation Excluding USFW Designated Species 89
4.3.1.10 Visual Resources 89
4.3.1.11 Water Resources/Quality 90
4.3.1.12 Wetlands/Riparian Zones 90

4.3.1.13 Mitigation Measures 91
4.3.1.14 Monitoring and/or Compliance 91
4.3.2. Alternative B – No Action 91
4.3.2.1 Fish and Wildlife Including USFW Designated Species 91
4.3.2.2 Floodplains 94
4.3.2.3 Fuels/Fire Management 95
4.3.2.4 Hydrologic Conditions 95
4.3.2.5 Invasive Species/Noxious Weeds 95
4.3.2.6 Lands with Wilderness Characteristics 96
4.3.2.7 Soils 96
4.3.2.8 Threatened, Endangered or Candidate Plant Species 96
4.3.2.9 Vegetation Excluding USFW Designated Species 96
4.3.2.10 Visual Resources 97
4.3.2.11 Water Resources/Quality 97
4.3.2.12 Wetlands/Riparian Zones 97
4.4 Cumulative Impacts Analysis 97
4.4.1 Fish and Wildlife Excluding USFW Designated Species 97
4.4.1.1 Cumulative Impact Area 97
4.4.1.2 Past and Present Actions 98
4.4.1.3 Reasonable Foreseeable Action Scenario 99
4.4.1.4 Cumulative Impact Analysis 100
4.4.2 Floodplain 100
4.4.2.1 Cumulative Impact Area 100
4.4.2.2 Past and Present Actions 101
4.4.2.3 Reasonable Foreseeable Action Scenario 101
4.4.2.4 Cumulative Impact Analysis 101
4.4.3 Fuels/Fire Management 101
4.4.3.1 Cumulative Impact Area 101
4.4.3.2 Past and Present Actions 101
4.4.3.3 Reasonable Foreseeable Action Scenario 102
4.4.3.4 Cumulative Impact Analysis 102
4.4.4 Hydrologic Conditions 102
4.4.4.1 Cumulative Impact Area 102
4.4.4.2 Past and Present Actions 103

4.4.4.3 Reasonable Foreseeable Action Scenario 103
4.4.4.4 Cumulative Impact Analysis 103
4.4.5 Invasive Species/Noxious Weeds 103
4.4.5.1 Cumulative Impact Area 103
4.4.5.2 Past and Present Actions 103
4.4.5.3 Reasonable Foreseeable Action Scenario 104
4.4.5.4 Cumulative Impact Analysis 104
4.4.6 Lands with Wilderness Characteristics 104
4.4.6.1 Cumulative Impact Area 104
4.4.6.2 Past and Present Actions 104
4.4.6.3 Reasonable Foreseeable Action Scenario 104
4.4.6.4 Cumulative Impact Analysis 104
4.4.7 Soils 105
4.4.7.1 Cumulative Impact Area 105
4.4.7.2 Past and Present Actions 105
4.4.7.3 Reasonable Foreseeable Action Scenario 105
4.4.7.4 Cumulative Impact Analysis 105
4.4.8 Threatened, Endangered or Candidate Plant Species and Utah BLM Sensitive Plant Species 105
4.4.8.1 Cumulative Impact Area 105
4.4.8.2 Past and Present Actions 105
4.4.8.3 Reasonable Foreseeable Action Scenario 105
4.4.8.4 Cumulative Impact Analysis 106
4.4.9 Vegetation Excluding USFW Designated Species 106
4.4.9.1 Cumulative Impact Area 106
4.4.9.2 Past and Present Actions 106
4.4.9.3 Reasonable Foreseeable Action Scenario 106
4.4.9.4 Cumulative Impact Analysis 107
4.4.10 Visual Resources 107
4.4.10.1 Cumulative Impact Area 107
4.4.10.2 Past and Present Actions 107
4.4.10.3 Reasonable Foreseeable Action Scenario 107
4.4.10.4 Cumulative Impact Analysis 107
4.4.11 Water Resources/Quality 107
4.4.11.1 Cumulative Impact Area 107

4.4.11.2 Past and Present Actions 107
4.4.11.3 Reasonable Foreseeable Action Scenario 107
4.4.11.4 Cumulative Impact Analysis 108
4.4.12 Wetlands/Riparian Zones 108
4.4.12.1 Cumulative Impact Area 108
4.4.12.2 Past and Present Actions 108
4.4.12.3 Reasonable Foreseeable Action Scenario 108
4.4.12.4 Cumulative Impact Analysis 108
5.0 CONSULTATION AND COORDINATION 108
5.1 Introduction 109
5.2 Persons, Groups, and Agencies Consulted: 109
5.3 Summary of Public Participation 110
5.3.1 Comment Analysis 110
5.3.2 List of Commenters 110
5.4 List of Preparers 110
6.0 REFERENCES, GLOSSARY AND ACRONYMS 111
6.1 References Cited 111
6.2 Glossary of Terms: 116
6.3 List of Acronyms 116
APPENDICES 119
APPENDIX A: Interdisciplinary Team Checklist 119
APPENDIX B: Planning Area Map 124
APPENDIX C: Current and Future Weed Distribution 125
APPENDIX D: Cumulative Projects Within Analysis Area 126
APPENDIX E: Species List 127
APPENDIX F: Standard Operating Procedures and Best Management Practices for Fuels Management Activities. 128
APPENDIX G: Weed Prevention Measures and Standard Operating Procedures for Applying Pesticides 132
APPENDIX H: Fire Management Units 144
APPENDIX I: Vegetation Condition Class 145
APPENDIX J: Fire History 146
APPENDIX K: Visual Resource Management Designations 147
APPENDIX L: Wilderness, WSA's and LWC's 148
APPENDIX M: Cumulative Impacts Completed Projects 149

APPENDIX N: Cumulative Impacts Future Projects 150

LIST OF TABLES AND FIGURES

Table 1-1: Federal Authorities and Responsibilities..... 4
Table 3-1: Big Game Crucial Habitats Distribution in the MFO..... 30
Table 3-2: Moab UPIF & FWS BCC Species 2008 (Regions 16) Found in the Project Area ... 34
Table 3-3: Raptor Species with the Potential to Occur in the Project Area and USFWS Spatial and Seasonal Buffers..... 35
Table 3-4: BLM Sensitive Species Potentially Occurring in the Project Area..... 38
Table 3-5: State Sensitive Species Potential Habitats..... 41
Table 3-6: U.S. Fish and Wildlife Service Threatened, Endangered, and Candidate Animal..... 42
Wildlife Species within the Project Area..... 42
Table 3-7: Threatened and Endangered Animal Species Potential Habitats 45
Table 3-8: VCC Classes..... 48
Figure 3-1: Fire History 49
Table 3-9: U.S. Fish and Wildlife Service Threatened, Endangered and Candidate Plant Species within the Project Area 52
Table 3-10: BLM State Sensitive Plant Species for the Moab Field Office (2011 list) 53
Table 3-11: SW ReGAP Cover Type..... 58
Table 4-1: Percent of Project Area by Community that offers Medium to High Potential Habitat for Jones Cycladenia..... 88
Table 4-2: Past and present projects within the PISMP CIA..... 101
Table 5-1: List of all Persons, Agencies and Organizations Consulted for Purposes of this EA. 109
Table 5.2: List of Preparers..... 110

Moab Field Office Programmatic Invasive Species Management Plan

DOI-BLM-UT-Y010-2015-0190-EA

1.0 PURPOSE & NEED

1.1 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Moab Field Office (MFO) Programmatic Invasive Species Management Plan (PISMP) as proposed by the Bureau of Land Management (BLM) Canyon Country Fire Zone (CYFZ) and Moab Field Office. The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or no-action alternative. The EA assists the BLM in project planning, 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, an EIS would be prepared for the project. If not, a Decision Record may be signed for the EA approving the selected alternative, whether the proposed action or another alternative. A Decision Record (DR), including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects) beyond those already addressed in the BLM Moab Field Office Resource Management Plan (RMP), October, 2008.

1.2 Background

The Moab Planning Area (MPA) comprises approximately 2,856,082 acres of land.

For the purposes of this document, "noxious weeds" are those listed by the State of Utah (Appendix E) because they constitute a threat to the "continuous economic and environmental value of lands of the state" (CDA 2003). Invasive plants are defined in Executive Order 13112 as "non-native plants whose introduction does or is likely to cause economic or environmental harm or harm to human health." "Invasive weeds" are those that are not listed by the State but considered by BLM as problematic in terms of habitat degradation and interference with reclamation. Noxious and invasive weeds contribute to a downward trend in the health of native plant communities. Weeds reduce the quality and quantity of habitat and forage for wildlife and livestock, alter soil productivity, increase the potential for soil erosion, adversely impact water quality, cause a loss of riparian area function, and degrade the recreation experience. By evaluating the impacts of weed treatment methods individually or in combination, long-term weed control strategies can be devised to meet different management objectives in different situations.

In 2007, the MFO began requiring oil and gas operators to conduct weed inventories and treatments on all lands disturbed by oil and gas development within the MFO (BLM 2007c).

The focus of surveys is the inventory and mapping of noxious weed species that are considered the most harmful or pose the greatest threat of spreading into new areas. There are several "nuisance" species of weeds that are not cataloged, but may be managed for (e.g. annual mustards, tumbleweeds, etc.). Since 1994, Moab BLM has treated approximately 36,016 acres of infestations of weeds by biological, manual, mechanical, and chemical means (Appendix M). More sites have been treated than the original survey because treatment crews always uncover more weeds as they move into a treatment area. Invasive weeds on lands disturbed by oil and gas activities are controlled by the oil and gas operators and other project proponents, and some additional weed treatments may be performed by operators as mitigation for unavoidable adverse impacts to wildlife.

Noxious weeds known to occur within the area are noted in Appendix E. The three weed categories (A, B, and C) indicated in Appendix E correspond to three lists of species as classified by the State of Utah.

1.3 Need for the Proposed Action

The proposed PISMP for MFO is needed to reduce the adverse impacts associated with noxious and invasive weeds on BLM-administered lands within the office boundaries. The proposed PISMP also provides a mechanism for evaluating a range of treatment options or combination of options to eradicate, control, contain, or prevent weed infestations. The PISMP would be implemented in accordance with Federal and State laws, regulations, policies, and the MFO land use plan.

1.4 Purpose(s) of the Proposed Action

The purpose of this PISMP is to use an integrated pest management approach to eradicate, contain, control, and prevent targeted weeds within the MFO. The desired goal is to contain or control the spread of invasive species, and eradicate species that pose the greatest threat to the biological diversity within the MFO, and prevent any new weeds from becoming established by utilizing a wide range of treatment options (i.e. mechanical, manual, herbicide, etc.). The resulting pro-active management of these plants would promote the areas ecosystem health and promote diverse native communities by maintaining and improving native forbs and grass species, increasing the regeneration of native cottonwoods and willows in riparian corridors, and ultimately preventing the loss of wildlife habitat, species diversity, and wildfire risk.

1.5 Conformance with BLM Land Use Plan(s)

The Proposed Action would be in conformance with the Moab Field Office Resource Management Plan (RMP), October 2008 (Moab RMP). The project would be in conformance with Moab RMP decisions:

Page 58, FIRE-4: Hazardous fuels reduction treatments would be used to restore ecosystems; protect human, natural and cultural resources; and reduce the threat of wildfire to communities.

Page 59, FIRE-9: The BLM would work together with partners and other affected groups and individuals to reduce risks to communities and to restore ecosystems.

Page 60, FIRE-14: Fuels management activities outline in the FMP would be consistent with the resource goals and objectives contained in the RMP. To reduce hazards and to restore ecosystems, authorized fuels management actions include wildland fire use, prescribed fire, and mechanical, manual, chemical, biological, and seeding treatments.

Page 82, REC-10: Provide public information concerning the prevention of the spread of invasive and exotic weeds, and about wildlife species and their habitats especially in riparian areas.

Page 99, RIP-1: Manage riparian resources for PFC, which is described as the presence of adequate vegetation, landforms, or large woody debris, in accordance with the Utah Standards for Public Rangeland Health and Guidelines for Recreation Management for BLM Lands in Utah and with the Grazing Guidelines for Grazing Management.

Page 100, RIP-3: Mitigation to reduce impacts to floodplains and riparian areas include (from Standards for Public Land Health and Guidelines for Recreation Management for BLM Lands in Utah and BLM Riparian Manual 1737): … implement weed management stipulations and education to reduce spread of noxious weeds along stream corridors.

Page 100, RIP-5: Limit activities in riparian areas, as necessary, to achieve and maintain PFC.

Page 100, RIP-9: Continue to apply integrated species management to accomplish riparian restoration through biological, chemical, mechanical, and manual methods (e.g., tamarisk control, willow plantings).

Page 101, RIP-16: Management strategies would be implemented to restore degraded riparian communities, protect natural flow requirements, protect water quality, and manage for year round flow.

Page 102, SOL-WAT-5: Allow no surface occupancy and preclude surface-disturbing activities (see Appendix A) within 100-year floodplains, within 100 meters of a natural spring, or within public water reserves.

Page 103, SOL-WAT-16: Manages uses to minimize and mitigate damage to soils.

Page 103, SOL-WAT-17: Maintain and/or restore overall watershed health and reduce erosion, stream sedimentation, and salinization of water.

Page 132, VEG-7: Utilize the techniques and methods for vegetation treatments identified in the Utah ROD for Vegetation Treatments using Herbicides on Bureau of Land Management Lands in Seventeen Western States (2007).

Page 132, VEG-8: Control noxious weed species and prevent the infestation and spread of invasive species. Develop cooperating agreements with other Federal, State, local and private organizations to control invasive and noxious weed species.

Page 132, VEG-9: Reduce Tamarisk and Russian olive where appropriate using allowable vegetation treatments. Restore riparian habitat to native willow and cottonwood communities.

Page 137, WL-7: Prioritize the maintenance and/or improvement of lowland riparian, wetlands, and low and high desert scrub communities which are the four most important and used habitats types by migratory birds in the Moab Planning Area.

Page 137, WL-8: Migratory Birds: Prevent the spread of invasive and non-native plants, especially cheatgrass, tamarisk, and Russian olive. Strive for a dense under story of native species in riparian areas with a reduction in tamarisk and improvement of cottonwood and willow regeneration.

1.6 Relationship to Statutes, Regulations, or Other Plans

This EA was prepared in conformance with the NEPA and with all applicable regulations and policies subsequently implemented, including the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), the BLM National Environmental Policy Act Handbook H-1790-1, and the U.S. Department of the Interior Department Manual 516, Environmental Quality.

Tiering allows this EA to capitalize on work and analysis already conducted in the MFO RMP EIS and PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands (USDI, 2007). Thereby, it allows the ability to narrow the scope of the EA to the unresolved issues, focus directly on site specific issues and effects, and avoids repetitious analysis. This EA is tiered to the Vegetation Treatment PEIS (USDI, 2007), Vegetation Treatment PEIS (USDI 2016) and the MFO RMP and Final EIS (Final EIS, 2008).

The BLM regulations and general requirements for the control of invasive species and noxious weeds is contained in 43 CFR and would be applied to the Proposed Action as applicable to provide standard procedures and environmental protection measures. A number of federal, state, and local governmental agencies may have authority over invasive species and noxious weed removal and are listed in Table 1-1.

Table 1-1: Federal Authorities and Responsibilities	
Land Management and Use	
Federal Land Policy and Management Act of 1976, Section 201(a) (PL 94-579; 43 USC 1701 et seq.)	Directs the BLM to manage public lands "in a manner that would protect the quality of scientific, scenic, historic, ecological, environmental, air and atmospheric, water resources and archeological values" and to develop resource management plans (RMPs) consistent with those of state and local governments to the extent that BLM programs also comply with federal laws and regulations.
National Environmental Policy Act of 1969 (PL	Evaluation of impacts to environmental

Table 1-1: Federal Authorities and Responsibilities	
91-190; 42 USC 4321); 40 CFR Parts 1500-1508 CEQ implementation of NEPA; BLM Handbook H-1790-1; U.S. Department of the Interior Department Manual 516, Environmental Quality	resources that may result from a proposed action prior to its implementation.
Vegetation	
Executive Order 13112, Invasive Species	Directs federal agencies to prevent the introduction of invasive species and provide for their control, and to minimize the economic, ecological, and human health impacts that invasive species cause.
Federal Noxious Weed Act of 1974 (7 U.S.C. §§ 2801-2814, January 3, 1975, as amended 1988, 1990 and 1994); Noxious Weed Control and Eradication Act of 2004 (7 U.S.C. 7781- 7786)	Monitoring and treatment of weed infestations including performance of corrective actions. Provides assistance through states to eligible weed management entities to control or eradicate harmful and non-native weeds on public and private lands.
Public Rangelands Improvement Act of 1978 (43 U.S.C. §§ 1901-1908, October 25, 1978)	Requires the BLM to manage, maintain, and improve the condition of the public rangelands so they become as productive as feasible.
National Fire Plan and Healthy Forests Restoration Act of 2003 (P.L. 108-148)	The President and Congress have directed the DOI and BLM, through implementation of the National Fire Plan and Healthy Forests Restoration Act of 2003, to take more aggressive actions to reduce catastrophic wildfire risk on public lands. Actions should be taken to manage vegetation in a manner that provides for long-term economic sustainability of local communities by improving the health of the nation's forests and the habitat for fish and wildlife.
Salt Cedar and Russian Olive Control Demonstration Act H.R. 2720 (2006)	Assess the extent of salt cedar and Russian olive infestation and demonstrate strategic solutions and long term management of both species.
Noxious Weed Control Act of 2004	Established a program to provide assistance through states to eligible weed management entities to control or eradicate harmful, nonnative weeds on public and private lands.
Partners Against Weeds (BLM 1996a)	Outlines the actions BLM would take to develop and implement a comprehensive integrated weed management program

Table 1-1: Federal Authorities and Responsibilities	
Pulling Together: National Strategy for Invasive Plant Management (BLM 1998a)	Illustrates the goals and objectives of a National invasive plant management plan (prevention, control and eradication)
The **Carson-Foley Act** of 1968 (P.L. 90-583, 43 U.S.C. § 1241)	Directs federal agencies to enter upon lands under their jurisdiction that have noxious plants (i.e., noxious weeds), and destroy noxious plants growing on such lands.
Plant Protection Act of 2000 (Public Law 106-224; includes the management of undesirable plants on federal lands).	Authorize the BLM to manage noxious weeds and to coordinate with other federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any noxious weeds on federal lands.
BLM Utah Riparian Management Policy, Instructional Memorandum IM No. UT 2005-091, September 2005	Provides specific guidance to Utah BLM riparian lands while supporting all BLM national guidance directives (BLM Manual 1737 – Riparian-Wetland Area Management, Riparian-Wetland Initiative, and others).
Executive Order 13112 of 1999 for Invasive Species	The express purpose of preventing the introduction of invasive species, providing for their control and minimizing the economic, ecological, and human health impacts that invasive species cause.
Wildlife	
Endangered Species Act of 1973 (PL. 85-624; 16 USC 661, 664 1008)	Coordination, consultation and impact review regarding federally listed threatened and endangered species.
Migratory Bird Conservation Act of 1929, as amended,	Makes it unlawful to directly, or indirectly, harm migratory birds. If the USFWS determines that migratory birds could be harmed by BLM vegetation treatment actions, the two agencies would develop a site-specific assessment and mitigation to prevent harm to these birds.
Migratory Bird Treaty Act of 1918 (16 USC 703-712, as amended); EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds; BLM MOU WO-230-2010-04 To Promote the Conservation of Migratory Birds	Migratory bird impact coordination and protection of nesting migratory birds.
Fish and Wildlife Coordination Act	This Act authorizes the preparation of plans to protect wildlife resources and in most cases requires consultation with the Fish and Wildlife Service.

Table 1-1: Federal Authorities and Responsibilities	
Other Federal Laws that Govern Activities on Public Lands	
Clean Air Act, as revised in 1990	Primarily governs prescribed fire smoke emissions, and requires the United States Environmental Protection Agency (USEPA) and states to carry out programs to assure attainment of the National Ambient Air Quality Standards.
Safe Drinking Water Act, as amended in 1986 and in 1996	Is designed to protect the quality of public drinking water and its sources.
The Clean Water Act, as revised in 1981 and in 1987	Regulates discharges into waters of the United States, including wetlands. As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States.
Wilderness Act of 1974	Provides management directions to protect wilderness values and guides activities and permitted uses within these areas
USEPA regulates pesticides under two major federal statutes. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)	Establishes procedures for the registration, classification, and regulation of all pesticides. Before any pesticide may be sold legally, the USEPA must register it. The USEPA may classify a pesticide for general use if it determines that the pesticide is not likely to cause unreasonable adverse effects to applicators, or the environment, or for restricted use if the pesticide must be applied by a certified applicator and in accordance with other restrictions. All the herbicides evaluated for use in this PISMP, are registered with the USEPA.
State of Utah Authorities and Responsibilities	
Vegetation	
Utah Administrative Code R68-9 (Utah's Noxious Weed Act)	Establishes the designation of noxious and invasive weeds, and provides methods to prevent their spread. Establishes County reporting on noxious and invasive weed status.
Cultural Resources	
Section 106 of National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.) and	Utah State Historic Preservation Office consultation on cultural resource survey,

Table 1-1: Federal Authorities and Responsibilities	
Advisory Council Regulations on the Protection of Historic and Cultural Properties, as amended (36 CFR. Part 800)	evaluation, and mitigation.
Wildlife	
UDWR Rules and Regulations, Rule 657 series; UAC Title 23, Wildlife Resources of Utah. Utah Division of Wildlife Resources	Coordination on wildlife and state-sensitive species; management of big game and wildlife.
Grand County Authorities and Responsibilities	
County codes	Road use agreements/oversize trip permits, access permits, and road crossings; noxious weed control.
Grand County Plan (2012)	3.2 Vision: Reduce invasive weeds and allow native species to thrive.
Grand County Scenic Byways Corridor Management Plan	Section 9.3.11 Recommends collaboration with partners to restore the structure and function of ecosystems within byway corridors that have been damaged by tamarisk and Russian olive infestations.

The Final Programmatic Environmental Impact Statement, Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement 17 States Herbicide PEIS (BLM 2007a), analyzes the potential direct, indirect, and cumulative impacts associated with the Bureau of Land Management's use of herbicides on the human and natural environment. The accompanying Final Programmatic Environmental Report, Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report 17 States Vegetation PER (BLM 2007b), discloses the potential impacts to vegetation and the environment from utilization of non-herbicide treatment techniques, including, but not limited to, fire, mechanical, manual, and biological control methods.

The proposed action is directly tiered to, influenced and supported by these programmatic environmental documents prepared for the assessment of vegetation treatments and activities including herbicides on public lands. These environmental documents support the use of a variety of fire and non-fire treatment methods to reduce hazardous fuels, control unwanted vegetation, and improve habitat and resource conditions in 17 of the western states and Alaska. This analysis contained in these documents consists of two parts: the 17 States Vegetation PER (BLM 2007b & BLM 2016), which evaluates the effects of vegetation treatments such as manual, mechanical, and biological activities (non-herbicide); and the 17 States Herbicide PEIS (BLM 2007a & BLM 2016), which analyzes the impacts of using herbicides on public lands. The scope of these analyses is to provide BLM field offices with information to: (1) assess and reduce the risk of catastrophic wildfires on public lands; (2) slow the spread of invasive plant species, noxious weeds, and other unwanted, undesirable, or competing vegetation; (3) improve ecosystem health by restoring fire-adapted ecosystems; (4) identify and implement best management practices; and (5) understand the potential cumulative effects of fuel treatment activities (17 States Vegetation PER (BLM 2007b), page 1-3, 2007).

The Healthy Lands Initiative (HLI) was launched by the Secretary of the Interior in 2007 to improve the health of public lands in the western United States by accelerating land restoration and increasing productivity. The 2009 federal budget increased dollars for HLI and directed funding toward landscape-level restoration efforts in Utah and other western states. A portion of Utah's HLI funding was allocated for the restoration of sagebrush habitat through the Utah Partners for Conservation and Development (UPCD), while additional funds were directed toward Utah's Watershed Restoration Initiative (WRI). The WRI is also a UPCD-sponsored initiative that encourages collaboration among landowners, private organizations, state agencies, and federal agencies such as the BLM. WRI goals include a focus on the restoration and management of ecosystems to enhance wildlife and biological diversity, to improve watersheds by increasing water quality and yield, and to provide opportunities for sustainable land use. Of primary focus for the proposed action is the Utah WRI approach to ecosystem restoration through vegetation management and seeding. The BLM has submitted requests for collaborative funding to augment the budget for this restoration project.

1.7 Identification of Issues

In addition to internal scoping, two public meetings were held on July 8, 2015 to address any public concerns and solicit input for the project need and design. In addition to press releases, emails were sent out to approximately thirty people soliciting them to attend the scoping meeting or give comments via email. Approximately 20 people attended the meetings and four comment letters were received.

During internal and external scoping meetings, it was determined that the PISMP should not be so specific or complicated that it is no longer useful. The document also should not be so restrictive that it prevents site-specific invasive/noxious plant management actions from being implemented on a case-by-case basis. In general, it is agreed that this plan should:

- Include common treatment methods currently used by the BLM, as well as any methods that could be used in the foreseeable future.
- Allow treatments to cross administrative boundaries in cooperation with other management agencies.
- Account for any activities (such as various application methods) associated with each treatment method.
- Be flexible to allow for treatment of additional invasive/noxious plants in the future (including invasive/noxious plants that currently do not occur in the MFO or are currently not being managed).
- Mitigate potential impacts to resources.
- Be both integrated and adaptive.
- Be general (broad) enough to address invasive/noxious plant management actions without becoming too restrictive, and
- Be flexible enough to allow for future use of treatment actions that are not currently being used by resource managers.

The scope of this PISMP is to develop a long-term management plan that would reduce the impacts of (or threats from) invasive/noxious plants to native plant communities and other

natural and cultural resources, including cultural landscapes, within the MFO boundary. Because this project involves a large area, the approach is to develop a general plan that provides resource managers with multiple treatment options for invasive/noxious plant management. Resource managers can select the most appropriate treatment option or combination of treatments included in the PISMP to minimize potential impacts and maximize overall management success. Issues identified through internal and external scoping can be found below.

1.7.1 Fish and Wildlife

- What would be the long term and short term impacts to General Wildlife?
- What would be the long term and short term impacts to Big Game species?
- What would be the long term and short term impacts to migratory birds and raptors?
- Would herbicide applications in riparian habitats have either short-term or long-term impacts on fish, amphibians, and aquatic invertebrates?
- How would changes in riparian habitat parameters resulting from vegetation treatments influence long-term population trends of fish and amphibians?
- How would reductions in the root biomass and canopy cover of invasive plants in riparian habitats impact aquatic invertebrates, fish, and amphibians?
- What would be the long term and short term impacts to terrestrial Threatened, Endangered or Candidate Animal Species?
- What would be the long term and short term impacts to the Endangered Colorado River Basin Fish?
- What would be the long term and short term impacts to terrestrial BLM Sensitive Species?
- What would be the short-term and long-term impacts of vegetation treatments on sensitive species of fish and amphibians?

1.7.2 Floodplains

- Would short-term and long-term changes in the composition and cover of vegetation resulting from the proposed action alter abiotic conditions, such as moisture levels and soil stability, in floodplains?
- Would the proposed action lead to changes in rates of sediment transport and deposition in floodplains, and how might these changes influence riparian and aquatic ecosystems?
- Would the proposed action influence floodplain connectivity with stream channels?
- In what ways might floodplain size and morphology change over time in response to changes in stream channel morphology that can result from reductions in the density and biomass of invasive riparian plants?

1.7.3 Fuels/Fire Management

- Does the proposed project decrease chances of extreme fire moving through the area?
- How would the proposed action increase the safety for firefighters and public within the MFO Boundary?
- In what ways would the proposed action convert FRCC 2/3 lands to FRCC 1/2?

1.7.4 Hydrologic Conditions

- Would implementation of the proposed action result in changes in the composition and biomass of riparian vegetation that are substantial enough to facilitate changes in stream channel morphology, flow patterns, and fluvial processes?
- What is the potential that changes in the cover and composition of floodplain vegetation resulting from implementation of the proposed action would influence shallow groundwater levels?

1.7.5 Invasive Species/Noxious Weeds

- What would be the long term and short term impacts to Threatened, Endangered or Candidate Plant Species?
- What would be the long term and short term impacts to Utah BLM Sensitive Plant Species?

1.7.6 Lands with Wilderness Characteristics

- How would proposed treatments affect attributes contributing to wilderness characteristics in those lands identified to possess such?

1.7.7 Soils

- How would the proposed project affect soils?

1.7.8 Threatened, Endangered or Candidate Plant Species and Utah BLM Sensitive Plant Species

- What are the potential impacts to Threatened, Endangered or Candidate Plant Species and Utah BLM Sensitive Plant species through implementation of the Proposed Action?

1.7.9 Vegetation Excluding USFW Designated Species

- During treatment activities non-targeted vegetation could potentially be impacted by the treatment method.
- Potential to impact the vegetation communities by reducing the competitive advantage of noxious and invasive plants through targeted treatments.

1.7.10 Visual Resources

- How would proposed treatments affect the highly valued visual resources of the area, in both the long and the short term?

1.7.11 Water Resources/Quality

- What is the potential that changes in the cover and composition of riparian vegetative resulting from implementation of the proposed action would influence water quality?
- Would short-term reductions in the cover and biomass of riparian vegetation resulting from implementation of the proposed action alter turbidity levels in streams and rivers?

1.7.12 Wetlands/Riparian Zones

- How would the distribution and abundance of native plants that are obligate or facultative wetland species change in response to the implementation of the proposed action?

- How would the integrity, complexity, and diversity of riparian ecosystems change over time in response to the implementation of the proposed action?
- Would implementation of the proposed action influence levels of connectivity between patches of native riparian vegetation?

1.8 Issues Considered but Eliminated from Further Analysis

Issues considered but eliminated from further analysis are provided in the BLM's interdisciplinary team review (see Interdisciplinary Team Checklist, Appendix A). This checklist provides rational why the pertinent resources are not impacted to a degree that detailed analysis is required and identifies resources that are not present.

1.9 Summary

This chapter has presented the purpose and need of the proposed project, as well as the relevant issues, i.e., those elements of the human environment that could be affected by the implementation of the proposed project. In order to meet the purpose and need of the proposed project in a way that resolves the issues, the BLM has considered and/or developed a range of action alternatives. These alternatives are presented in Chapter 2. The potential environmental impacts or consequences resulting from the implementation of each alternative considered in detail are analyzed in Chapter 4 for each of the identified issues.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Introduction

This Environmental Assessment (EA) has been prepared to analyze the treatment of invasive and undesired species treatments within the MFO. The EA is a site-specific analysis of potential impacts that could result in the implementation of the proposed action or alternatives to the proposed action.

The No Action alternative is considered and analyzed to provide a baseline for comparison of the impacts of the proposed action. No potential impacts have been identified therefore there are no issues to resolve through additional mitigation or other action alternatives.

The EA assists the BLM in project planning and ensures 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). A Decision Record (DR), which includes a FONSI statement, is a document that briefly presents the reasons why implementation of the proposed action would not result in "significant" environmental impacts (effects) beyond those already addressed in the Moab Field Office RMP, approved October 31, 2008.

If the decision maker determines that this project has "significant" impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA approving the alternative selected.

2.2 Alternative A – Proposed Action

This EA is tiered to the Vegetation Treatment PEIS (USDI, 2007), Vegetation Treatment PEIS (USDI 2016) and the MFO RMP and Final EIS (Final EIS, 2008).

The Fuels Program for the Bureau of Land Management (BLM) Canyon Country Fire Zone (CYFZ) and Moab Field Office (MFO) propose to implement a Programmatic Invasive Species Management Plan (PISMP) within approximately 2,856,082 acres of land within the Moab Field Office Boundary (Appendix B). In this effort the BLM and partners, including private landowners, county, state, and federal agencies, are working collaboratively at a landscape level on invasive/noxious plant control measures. This includes sharing expertise, providing assistance, coordinating partnership efforts, and identifying priorities. The proposed action would assist in this partnership endeavor for weed management, as the BLM administers the largest land mass in the county.

The Good Neighbor Authority (GNA) and the FY 2012 Appropriations Act (Wildland Fire Management) clarify the use of federal appropriated funds and provides legislative authority for the Secretary of Interior to enter into procurement contracts, Stewardship contracts, grants, and cooperative agreements for hazardous fuels reduction activities on Federal and adjacent non-Federal lands for activities that benefit resources on Federal Land.

Targeted noxious weeds, invasive species and undesirable species (Appendix E) would be controlled by implementing an integrated invasive plant management plan (combined use of preventative, mechanical, chemical, manual, prescribed fire, and biological measures). Invasive plant control would be accomplished by implementing a long-term integrated invasive plant control along major rivers, drainages, roads, and uplands within the MFO to reduce invasive plant spread, decrease infestations, and control populations; thereby enabling greater function of ecological processes. This would be accomplished following guidance in BLM Manual 9015 – *Integrated Weed Management* (USDI, 1992).

Treatment of invasive species would only be conducted in Wilderness Study Areas (WSAs) to correct unnatural conditions, such as weed infestations, resulting from human influence. Control efforts in WSAs would be for the management of vegetation directed toward retaining the natural character of the environment. Tools and equipment may be used for vegetation management when they are the minimum amount necessary for the protection of the wilderness resource. The primary goals in WSAs are to manage them so as to not impair their wilderness value and to maintain their suitability for preservation as wilderness until Congress makes a determination on their future (USDI, 2007).

Treatment of invasive species in VRM Class I areas would only be conducted to correct unnatural conditions, such as weed infestations, resulting from human influence. Control efforts in VRM Class I areas would be for the management of vegetation directed toward retaining the natural character of the environment. Tools and equipment may be used when they are the minimum necessary for the protection of the Class I viewshed.

Standard Operating Procedures, Best Management Practices for Fuels Management Activities, and Vegetation PER and the Herbicide PEIS SOP's are attached (Appendix F & G) and

incorporated into this proposed action along with Best Management Practices for Raptors and their Associated Habitats in Utah (MFO RMP Appendix R-1). Conservation measures for the Final Biological Assessment for the Vegetation Treatments on BLM Lands in the 17 Western States would be followed and have been tiered to through the Vegetation Treatment PEIS (USDI, 2007).

Future proposed treatments would be located within the analysis area. Future treatments within the analysis area would provide treatment type and location information as it becomes available and additional NEPA compliance would be completed prior to implementation by completing a Decision of NEPA adequacy (DNA) document. This information would be added to the ePlanning website and administrative record to ensure the public is kept informed and records are kept for all projects tiering to this programmatic EA.

A literature search would be completed for every undertaking. Survey may or may not be conducted based on the findings, if no survey is recommended then 106 consultation would be undertaken with U-SHPO for concurrence of findings and recommendations. If no survey is conducted prior to the undertaking then an archaeologist would be present during implementation. In areas where mechanical treatment would take place an Archaeological Report (Class III) would be prepared, and information documenting the archaeological inventory and compliance with the National Historic Preservation Act (NHPA) of 1966, as amended, would be on file in the Canyon Country Fire Zone office. Sites identified and determined to be eligible for the National Register of Historic Places (NRHP) would likely be avoided during the mechanical treatment portion of the project, unless treatment options are such that it would be beneficial to the archaeological resource to treat the vegetation on site. Tribal groups have been requested to identify traditional cultural properties or any other areas of traditional cultural importance to be considered within the analysis area.

The goals of the proposed action are:

- Aid in the reduction of vegetative degradation that results from accelerated establishment of noxious and invasive species.
- Make progress towards attainment and maintenance with Utah's Rangeland Health Standards.
- Protection, enhancement and restoration of ecological conditions, biological diversity, ecological stability and overall resilience.
- Manage landscapes for biotic integrity and enhanced competitive interactions against undesired invasive plants.
- Manage for plant communities that provide a sustainable forage base.
- Manage riparian communities in a properly functioning condition (PFC) state with attributes capable of withstanding high stream flow events.
- Maintain adequate habitat at an appropriate level for the site and desired species involved.
- Protect important wildlife habitats such as sagebrush and blackbrush communities.
- Maintain desired plant species at a level appropriate for the site and species involved.
- Improve the visual aesthetics of designated scenic byways, wild and scenic rivers and WSA's.
- Protection of the health and safety of the public and firefighters.
- Protection of the wildland urban interface (WUI) including infrastructure and developments.

- Minimize the potential for stand-replacement wildfires.
- Protect/Restore the health and productivity of watersheds.
- Protection of cultural resources.
- Provide fuel wood opportunities for the public.

Treatment objectives include:

- Treatment of invasive species to promote native plant regeneration.
- Seed/plant in selected treatment areas with native and beneficial non-native species to encourage the growth of grasses, forbs, trees and shrubs in order to promote a more diverse vegetation community and improve watershed health and wildlife habitat.

In order to successfully meet objectives for the project a number of treatment options may be utilized based upon which treatment is deemed to have the greatest success.
Activities may include, but are not limited to:

Manual Treatment
Manual thinning is typically used in areas not suitable for mechanical treatment such as steep, rocky slopes and areas that require mitigation such as cultural or riparian. Manual treatments within the analysis area would be treated by BLM, BLM partners, contract/agreement crews or through the use of Stewardship contracts. Manual control involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Treatments include cutting undesired plants above ground level; pulling, grubbing, or digging out root systems of undesired plants to prevent sprouting and regrowth; cutting at the ground level or removing competing plants around desired species; or placing mulch around desired vegetation to limit weed germination and growth (BLM 1991b). Hand tools include a handsaw, axe, shovel, rake, machete, grubbing hoe, mattock, Pulaski, brush hook, hand clippers, motorized chainsaw, weed whacker, and power brush saw.

Mechanical Treatment
Mechanical control methods involve the use of machinery to control weed infestations. Mowing, disking, grinding, soil raking and mechanical extraction are example methods. Mechanical weed management includes backhoes/excavators with a mechanical claw for extracting large woody species, large mowers or rotating drums to mow/grind/mulch woody species, mowers to cut weeds before seed-set, disks to remove plants, and dozers to remove large woody species. Mechanical treatments would require close coordination with all resource specialists to ensure appropriate surveys are conducted and mitigation measures are in place prior to work. Units targeted for mechanical treatment and treatment design would be determined through coordination between the fuels staff and Moab Field Office resource staff.

Prescribed Fire
Fire as a tool for weed management involves the use of prescribed fire, where the character of the fire is dictated by environmental and climatic conditions (the fire prescription). Within the analysis area, the most likely scenarios for using fire are biomass removal (e.g. burning piles of tamarisk cuttings), and stubble removal in preparation of another treatment method (e.g. burning dormant cheatgrass before herbicide application. Fire is rarely used as an exclusive treatment method, as it can lead to conditions which favor weeds.

Broadcast burning and/or pile burning follow-up treatments would be planned for late fall, winter, or spring periods when fuel and site moisture conditions were high, to avoid fire damage to adjacent vegetation. A detailed burn plan would delineate weather and fuel moisture conditions required to meet fuels reduction and resource objectives. Ignition of the burn would be conducted by hand (drip torches using a diesel/gasoline mixture), aerial ignition, or by truck-mounted terra torch (utilizing a gasoline/alumagel mixture). Aerial ignition would include Plastic Sphere Dispenser (PSD) and/or helitorch operations. Helitorches can produce more heat and are useful when weather conditions are moist and cool or when burning damp fuels. PSD burning is more efficient under drier, warmer conditions. A combination of both methods can be used if there are widely varying fuel and moisture conditions throughout the units.

During the burning of debris, natural and man-made barriers (i.e. hand line or mechanically constructed) and/or an established wetline could be used as control lines. Smoke management would consist of burning when clearing indices comply with Utah Smoke Management Plan guidelines, in order to reduce localized haze and smoke inversion and to provide for maximum smoke uplift and dispersal. To prevent cumulative air quality impacts from simultaneous treatment projects or wildland fires, any portion of the proposed project involving burning would undergo interagency cooperation and consultation prior to implementation.

Biological Control

Biological controls involve the intentional use of insects, nematodes, mites, or pathogens (agents such as bacteria or fungi) that weaken or destroy vegetation. Biological control agents such as insects, nematodes, mites, or pathogens that are approved by the BLM have undergone rigorous testing by the USDA Agricultural Research Service to ensure they are host specific and would feed only on the target plants and not on crops, native flora, or endangered or threatened plant species. Before releasing a new agent, an environmental analysis is prepared by APHIS (Agricultural Plant Health Inspection Service). Once approved, a biological control can be released only in states covered by the environmental assessment. Moab BLM would use only those biological controls approved by APHIS for release in Utah. Biological control agents would be used in accordance with BLM Manual Section 9014 (BLM1990). When releasing biological agents on BLM lands, the following process would be followed:

- A Biological Control Agent Release Proposal (BCARP) is an internal BLM document that includes the type of biological control agent, collection origin, number of specimens planned for release, planned release date, number of releases, target pest species, and estimated treatment acres. A BCARP also includes a discussion of sensitive aspects and precautions and mitigations to minimize impacts to non-target vegetation. A BCARP requires review and approval by the Originator, Field Office Manager, State Office Pest Management Specialist, and Deputy State Director.
- A Biological Control Agent Release Record (BCARR) must be completed within 24 hours after release of the biological control. These records must be kept for 10 years. Information on the BCARR includes location of release, actual area (acres) of release, weather conditions, and weed species treated.

Chemical

Chemical control involves the use of herbicides to kill or suppress target plants and products applied with the herbicides that improve their efficacy ("adjuvants"). BLM approved adjuvants include surfactants, crop and seed oils, buffering agents, colorants, suspension agents, deposition aids, defoaming agents, and diluents. MFO's applications include the herbicide(s), a non-ionic surfactant, and a dye. Herbicides can be used selectively to control specific vegetation types or non-selectively to clear all vegetation in a particular area (e.g., bare-ground treatments on oil and gas pads, control weeds around wildlife development). Broad spectrum residual herbicides used for bare ground treatments do not sterilize the soil, but work on growing plants. Manual (i.e., spot) applications are effective for small infestations, areas inaccessible by vehicle, or areas where minimizing potential impacts to non-target plants is desired. Manual applications include spraying from a backpack unit or spray bottle or wiping (wicking) directly onto the foliar tissue. In remote areas and areas where mechanized equipment is not appropriate (e.g., wilderness areas and wilderness study areas), herbicides may be carried and applied using pack animals. Larger weed infestations in highly disturbed areas with good accessibility can be treated by sprayers mounted on ATVs or trucks. Oil and gas pads, pipeline corridors, and roadsides can be effectively treated in this manner. Herbicides could be applied aerially with helicopters or fixed-wing aircraft for large infestations of weeds in areas where it's not economically and/or physically feasible to treat on the ground (e.g., areas burned in wildfires, cheatgrass treatments, wildlife habitat treatments).

Precautions: Applications in T&E plant locations would be limited to spot treatments avoid potential harm to plants by drift and/or runoff.

All herbicides applied to BLM are those approved for use by BLM via the Programmatic EIS.

When applying herbicides on BLM lands, the following process is followed:

- Applicator must present current certified pesticide applicator's license.
- A Pesticide Use Proposal (PUP) must be approved by the BLM State Office. (A PUP is an internal document that includes the type of herbicide, application rate, application dates, number of applications, and estimated treatment acres. A PUP also includes a discussion of sensitive aspects and precautions and mitigations that would be taken to minimize impacts to non-target vegetation.) A PUP requires review and approval by the Certified Pesticide Applicator, Field Office Weed Coordinator, Field Office Manager, State Office PUP Coordinator, and Deputy State Director. A PUP is valid for 3 years and requires renewal after that time.
- The pesticide applicator would fill out a Pesticide Application Record (PAR) within 24 hours of applying herbicides on BLM lands. The pesticide applicator must keep these records for 10 years according to State law. Information on the PAR includes location of application, which and how much herbicide was applied, weather conditions, equipment used, weed species treated, and number of acres treated. Applicators are required to turn in these records to Moab BLM at the end of each year.
- The MFO would prepare an annual Pesticide Use Report (PUR) which would be submitted to the BLM State Office. This report includes a total of all pesticides applied on MFO BLM.

Seeding/Planting

Project areas may be seeded following or prior to treatment with both native and selected non-native grasses, forbs, shrubs, trees and browse species. Seed selection would be determined through collaboration with resource specialists and from monitoring results in similar vegetative communities. Seed selection would also be based upon the most current data regarding the establishment of species likely to promote successional changes toward the desired vegetative community.

Seeding would be accomplished by hand, with a broadcast spreader or harrow dragged behind an ATV, tractor or dozer, through the use of a rangeland drill, or by aerial methods. Soil surface could be scarified to prepare a favorable seedbed for germination (USDA 2008). Seeded portions of the treatment area would be rested from grazing for a minimum of two growing seasons following seeding (Rangeland Health Standards and Guidelines Appendix D pg.4 #13 Moab RMP). Livestock would be kept out of pastures with the use of existing pasture barriers (fences and topographic barriers) in most areas, or new fencing could be required to create pastures in some areas. In the event a single pasture contained several seeded units the pasture could be closed for use entirely until treatment goals were achieved. Treatments would be scheduled over several years to avoid cumulative impacts to grazing permittees. Cattle could be allowed in the area of the proposed action sporadically during the treatment timeframe.

Plantings would be accomplished by hand or with mechanical planters. Planting stock may include nursery stock, site collected plant material that may be replanted or site collected seed/plant material that is then grown and planted on site. Plantings may require future watering that may be accomplished by water hauling, hand watering or developing a local drip or primitive irrigation type system.

Kiosk Installation

Disseminating information to the public on project intentions, goals, objectives and successes is a vital part of healthy ecosystem education. One of the major ways to present this information is by using Kiosks located in or around the project area. Kiosk size depends on the amount of space needed to convey the treatment message. Kiosks generally measure approximately 8' tall x 4' wide. Installation requires digging two post holes (2-3' deep) using an auger and cementing two 4" x 4" posts permanently into place.

Fuel Wood Collection Areas

Before project implementation standing timber in selected areas may be made available for wood harvest. In select areas, slash and debris from project activities along designated roads or other accessible areas may be made available to the public by permit for wood harvest. Permits and maps with available wood harvest areas would be available through the Moab BLM Field Office (Moab RMP pg.144 FOR-1, 2 & 3). Fuel wood gathering is prohibited in riparian areas, unless stacked or piled for public use by the BLM or affiliated partner (Moab RMP pg.144 FOR-4).

Monitoring

Monitoring is a key aspect in an integrated invasive plant management plan, and would be typically conducted by the BLM. BLM monitoring methodologies contained in BLM Technical References would be adhered to, such as BLM Technical Reference: Measuring and Monitoring Plant Populations (USDI, 1998b). Also, the monitoring framework would be in accordance with the Record of Decision, Appendix D (Monitoring) of the PEIS (USDI, 2007). This framework describes the monitoring needed to assure the desired future condition and treatment strategies are achieved. The framework includes implementation / compliance and effectiveness monitoring components. Some components of the framework are outlined below.

Implementation / compliance monitoring would be done to ensure contracts and agreements include appropriate prescriptions, and that herbicide ingredients and application rates meet label requirements. This would be a requirement included in the Pesticide Use Proposals (PUPs) and documented by the applicator in the Pesticide Application Records (PAR), which would be submitted to the BLM. The PAR would be completed within 24 hours of applying herbicides on public lands. The PAR includes such information as date of application, location, herbicide used, rate of application, weather, method of application, treatment area, and primary invasive plant species involved.

Effectiveness monitoring on post treatments would be conducted through such methods as photograph points, noted observations, riparian assessments, GPS mapping, and/or long-term trend monitoring. This would be done to help determine whether treatments were or not effective, if integrated invasive plant management activities occurred as expected, detect whether Standard Operating Procedures (SOPs) were appropriately applied, and to help ensure the goals and objectives outlined in Section 2.1 are achieved. Long-term vegetative trend monitoring of established studies would be conducted every 3-5 years by the BLM, as funding and workloads allows, insuring soils, upland sites, riparian, and resource objectives are documented. Trend studies consist of recording the frequency of occurrence for plant species, including invasive plants, vegetative composition, and percent ground cover.

Monitoring would be utilized as a tool in determining the effectiveness of integrated invasive plant management strategies, size of infestations, and rate of control. This information would be used to adjust treatment options, if needed, to make efficient and effective use of time and resources in controlling invasive plants.

Monitoring would be conducted prior to, during and after completion of the project, and follow-up maintenance would be scheduled contingent upon monitoring results. Treatment methods, design and implementation would adhere to CYFZ fuels programs Standard Operation Procedures (SOP's), Best Management Practices (BMP's) and/or the MFO Resource Management Plan (RMP)

Conservation Measures

Raptor Species and Migratory Birds

- Mechanical treatments, manual treatments and prescribed fire that would remove nesting structure or herbicide treatments that would interfere with nesting birds would be avoided

during the migratory bird and raptor nesting season, typically May 1st through July 31st for migratory birds and March 1st through August 31st for most raptors.

- An exception would be granted to migratory birds nesting season restrictions if habitat evaluations determine that the area is not suitable for migratory bird nesting due to beetle defoliation, lack of vegetative cover and structure, previous surface disturbances, human impacts or other situations that remove nesting opportunity.
- An exception would be granted for raptor nesting season restrictions if habitat evaluations determine that the area is not suitable for raptor nesting or in suitable habitats, breeding season raptor survey indicates no nesting raptors within FWS recommended distance from the proposed treatment.

Jones cycladenia

Within potential Jones cycladenia habitat, BLM will determine habitat suitability within treatment areas and a 300 foot buffer of proposed treatment area. Within suitable and occupied Jones cycladenia habitats the following apply:

- In suitable habitat, occupancy will be determined. To determine occupancy, a qualified individual(s) will conduct Jones cycladenia inventories prior to initiation of project activities and within the same growing season at a time when the plant can be detected (usually April 15th to June 5th or when the nearest known population is in flower). Surveys are valid for one year.
- Occupied habitat is defined as sites that are currently or were historically occupied by the taxon. In occupied habitat, current year occupancy will be determined and then combined with historic plant location data for that particular site to delineate the outer boundary of occupied habitat. The 300 foot avoidance buffer will then be applied to the outer boundary of occupied habitat for that site. Treatment will not occur within 300 feet of these populations. Survey results will be provided to the Service and the Utah Natural Heritage Program no later than December 31st of the same calendar year. Current year occupancy surveys are valid for one year.
- If weed control is needed in or within 300 feet of Jones Cycladenia occupied habitat, the Moab BLM FO will reinitiate section 7 consultation with the Service.

Southwestern willow flycatcher (SWFL)

Within suitable SWFL nesting habitats the following apply:

- Adjust spatial and temporal scales of treatments so that not all suitable SWFL nesting habitats are affected in any given year. Treatments that remove nesting structure will be planned so that a minimum of 70 % of suitable habitats in a HUC 12 watershed remains intact at all times. Once the 30% level of treatments that remove nesting structure has been reached, no new treatments that remove nesting structure would commence until a minimum of 3 years has passed to allow for adequate willow regeneration before commencing additional treatments within that HUC 12. In HUC 12s that contain only small, isolated patches of suitable SWFL nesting habitats, ensure that the nearest adjacent HUC 12 follows above protocol. Mosaic treatment polygons throughout the watershed will be the preferred method.
- Mechanical treatments, manual treatments and prescribed fire that would remove nesting

structure or herbicide treatments that would interfere with nesting or migrant SWFL would not occur from April 15th through August 15th within 0.25 of suitable SWFL nesting habitats and 0.5 miles for prescribed burns, unless SWFL breeding season surveys have been completed and it is determined that no SWFL occupancy is occurring following the third survey period (2 surveys to be completed during this period June 24-July 17) in the treatment area that year.

- Within 0.5 miles of SWFL nesting habitats, do not conduct prescribed burns during nesting season unless nesting season surveys have been completed and it is determined that no SWFL occupancy is occurring following the third survey period (2 surveys to be completed during this period June 24-July 17) in the treatment area that year.
- In previously identified suitable SWFL habitats where beetle defoliation has resulted in a permanent loss of more than 30% of tamarisk cover, habitats may need to be re-evaluated for SWFL habitat suitability.
    - In areas where native regeneration is *not* occurring and vegetative structure, density and complexity fails to meet SWFL habitat needs, these areas should be removed from suitable designation and managed accordingly.
    - Areas removed from suitable nesting designation should be prioritized for treatment; treatment plan should include active re-vegetation as part of the restoration plan. .
    - Areas removed from suitable nesting designation where active and passive post treatment re-vegetation is occurring should be re-evaluated for SWFL habitat suitability within 5 year of treatment and managed accordingly to suitability determination. Periodic re-evaluation may be needed.
- Within suitable SWFL nesting habitats, treatment areas where nesting structure has been removed will be planted and/or seeded with native species, if needed, to recover nesting structure.
- Suitable SWFL nesting habitat where 30% of the nesting structure has been removed will be prioritized for re-treatment and secondary weed treatments as needed in the first 3 years following initial treatment.
- Herbicide Treatments: Herbicides or insecticides with the potential to kill SWFL prey base (insects) will not be applied within 0.25 mile buffer of suitable breeding, nesting or foraging habitat.
- Follow applicable Conservation Measures in Appendix B.

Western yellow-billed cuckoo

Mature cottonwood galleries or other mature broad leafed trees that form a large gallery with a woody vegetative understory that is at least 12 acres in size and the riparian width is greater than 328 feet may offer suitable cuckoo breeding and nesting habitats. Riparian patches that have an overstory canopy only and are within 300 meters (m) of the edge of suitable breeding and nesting habitat may comprise suitable foraging habitat for western yellow-billed cuckoo (USFWS, Utah Field Office, 2015). Prior to treatment activities in these areas, the area will be assessed for cuckoo nesting and foraging suitability using the Service's *2015 Guidelines for the identification of suitable habitat for WYBCU in Utah*. If suitable nesting and foraging habitats exist, the following apply:

- Mechanical treatments, manual treatments and prescribed fire or herbicide treatments will not occur in suitable nesting or foraging habitat between June 1st through August 31.

Treatments in suitable habitat may begin after August 15 if protocol level surveys are conducted and survey results are negative.

- Within 0.5 miles of cuckoo suitable nesting and foraging habitats, prescribed burns will not occur between June 1 – August 31; within 0.25 mile of suitable nesting and foraging habitat, manual or mechanical treatments will not occur between June 1 – August 31. Treatments within these spatial buffers may begin after August 15 if protocol level surveys are conducted and survey results are negative.
- Adjust spatial and temporal scales of treatments so that not all vegetation within one nesting/breeding/foraging patch is affected in any given year. Treatments that remove nesting structure will be planned so that 70 % of the understory structure remains intact at all times within in each suitable patch. Once the 30% level of treatments that remove nesting structure has been reached, no new treatments that remove nesting structure, understory or foraging habitat would commence within the suitable patch until a) efforts, as needed, to re-vegetate with native shrub and tree species have occurred; and, b) a minimum of 3 years has passed to allow for adequate understory regeneration before commencing additional treatments within suitable habitat.
- Treatment areas where suitable habitat has been removed will be planted and/or seeded with native species, if needed, to recover nesting structure and foraging habitat.
- Where suitable habitat has been removed, the area will be prioritized for re-treatment and secondary weed treatments as needed in the first 3 years following initial treatment.
- Herbicide Treatments: Herbicides with the potential to kill cuckoo prey base (large insects) will not be applied within 0.25 mile buffer of suitable breeding, nesting or foraging habitat.

Mexican spotted owl (MSO)

Within suitable MSO habitat the following apply:

- Mechanical treatments, manual treatments, prescribed fire and herbicide treatments that could impact nesting MSO or suitable habitats would require two years of U.S. Fish and Wildlife Service (Service) protocol surveys ending the breeding season prior to treatment.
- In occupied habitats:
    - Within 0.5 miles of nesting territory or a PAC, activities will not occur during the nesting MSO nesting season March 1 through August 31.
    - Mechanical treatments, manual treatments and prescribed fire that will alter the Primary Constituent Elements of MSO habitats will not occur within 0.5 miles of a nesting territory or PAC or within critical habitat.
    - Ensure that nesting territories and PACs are at least 1 mile from downwind smoke effects during the nesting period.
- Within suitable MSO habitat, retain woody ground debris following mechanical or manual treatments that remove larger trees to provide prey base habitats for MSO by not removing, mulching or pile burning downed trees.
- Follow applicable Conservation Measures in Appendix B.

Additional Conservation Measures for Herbicide Application in Sensitive Habitats

- Closely follow all application instructions and use restrictions on herbicide labels; in wetland habitats use only those herbicides that are approved for use in wetlands.
- Do not use 2,4-D in western yellow-billed cuckoo and southwestern flycatcher habitats

during nesting season useless surveys as discussed above indicate the area in not occupied;

- Do not broadcast spray 2,4-D within ¼ mile of occupied western yellow-billed cuckoo habitats and southwestern flycatcher habitats during nesting season useless surveys as discussed above indicate the area in not occupied.
- Where feasible, avoid use of the following herbicides in western yellow-billed cuckoo habitat and southwestern willow flycatcher during nesting season: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr.
- Do not broadcast spray clopyralid, diquat, diuron, glyphosate, hexazinone, picloram, or triclopyr in western yellow-billed cuckoo and southwestern willow flycatcher habitat; do not broadcast spray these herbicides in areas adjacent to western yellow-billed cuckoo (0.5 miles) and southwestern willow flycatcher habitat (0.25 miles) under conditions when spray drift onto the habitat is likely.
- If broadcast spraying imazapyr or metsulfuron methyl in or adjacent to western yellow-billed cuckoo and southwestern willow flycatcher habitat, apply at the typical rate for the targeted plant species, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation western yellow-billed cuckoo and southwestern flycatcher habitats, utilize the typical rate for the targeted plant species, rather than the maximum, application rate.

Endangered Colorado River Fish

Critical Habitats for the Endangered Colorado River Fishes within the MFO is the 100 year floodplain of the Colorado and Green River. Annual inundations of these 100 year floodplains of the Colorado and Green Rivers during the spring may increase the likelihood for herbicides to be transported to the adjacent aquatic habitats were Critical Habitats for the Endangered Colorado River Fishes exists. Though most of these chemical have a relatively short half-life, they may remain toxic to fish if they enter the water prematurely.

Proposed Use in Critical Habitats for the Endangered Colorado River Fishes	
Herbicide	**Typical Treatment Plan**
Glyphosate	There is a need to treat weeds using this formulation in this area.
Imazapyr	The use of this would be onto the cut surface of noxious tree species and not to the point of runoff. There is a need to treat weeds using this formulation here.
Metsulfuron Methyl	There is no plan in using this below the mean high water mark on the rivers; however there may be instance where it would potentially be used in this area.
2,4-D	There is no plan in using this below the mean high water mark on the rivers as it is toxic to fish and other invertebrates; however there may be instance where it would potentially be used in this area.
Triclopry BEE (butoxyethyl ester)	This herbicide would not be used within the mean high water mark. It would be used to treat noxious tree species. It would be applied to the cambium layer of a freshly cut surface or applied as a basil bark treatment on the smaller stems of targeted plants. There is a need to treat weeds using this formulation within this area.
Bromicil	There is no need to use these formulations within the Critical Habitats for the Endangered Colorado River Fishes
Clopyralid	
Diuron	
Picloram	
Tebuthiuron	
Diquat	

Fluridone	
Hexazinone	

Additionally, much of the potential western yellow-billed cuckoo and suitable southwestern willow flycatcher habitat is found in this same area, therefore additional and more specific Conservation Measure for herbicide applications within the 100 year floodplain of the Colorado and Green River have been developed. The use of aerial application is not expected to occur in the vicinity if the 100 year floodplain or other large bodies of water unless additional planning and consultation is completed.

Above is a table that lists herbicides that may be used in the MFO, what herbicide would be used in the 100 year floodplain of the Colorado and Green River and their typical application. Treatment of aquatic weed species is not a proposed action in this plan. Herbicide treatment within the 100 floodplain will most often be spot treatments.

Conservation Measures

- To reduce or eliminate the potential for herbicides toxic to fish to enter the river prematurely no broadcast application or large scale treatment of herbicides will occur within Critical Habitats for the Endangered Colorado River Fishes from May 1st through July 15th.

Endangered Colorado River Fish

Endangered larval fish are very small (<0.5 inches total length) and incapable of directed swimming from the time of hatching through the first 2-4 wks of their life. Depending on the water year, larval fish may be present in the Green and Colorado Rivers from as early as April 1 to as late as August 31 (earlier in dry years; later in wet years). Young of the year endangered fish are the most susceptible to entrainment.

- Within habitat for the Endangered Colorado River Fish the following Conservation Measures will apply:
  - The best method to avoid entrainment is to pump from an off-channel location – one that does not connect to the river during high spring flows. An infiltration gallery constructed in a Service approved location is best.
  - If the pump head is located in the river channel the following stipulations apply:
    - ✓ do not situate the pump in a low-flow or no-flow area as these habitats tend to concentrate larval fishes.
    - ✓ limit the amount of pumping, to the greatest extent possible, during that period of the year when larval fish may be present (see above).
    - ✓ limit the amount of pumping, to the greatest extent possible, during the midnight hours (10pm to 2 am), as larval drift studies indicate that this is a period of greatest daily activity. Dusk and the afternoon are the preferred pumping times, as larval drift abundance is lowest during this time.
  - Screen all pump intakes with 3/32" mesh material.
  - Approach velocities for intake structures should follow the National Marine Fisheries Service's document "Fish Screening Criteria for Anadromous Salmonids". For projects with an in-stream intake that operate in stream reaches where larval fish may be present, the approach velocity should not exceed 0.33 feet per second (ft/s).

- Report any fish impinged on the intake screen or entrained into irrigation canals to the Service (801.975.3330) or the Utah Division of Wildlife Resources:
  Southeastern Region
  475 West Price River Drive, Suite C, Price, UT 84501
  Phone: (435) 636-0260
  Outside of Critical Fish Habitat have a fisheries biologist determine whether streams may offer suitable habitats for the Endangered Colorado River Fish species. If pumping activity could impact fish follow all Conservation Measures developed to protect the Endangered Colorado River Fish species. Fishery biologist will be BLM, UDWR or USWF personnel or an outside fisheries biologist that BLM and/ or the Service have prior approval for work on project.

Kit Fox

- Within kit fox habitats surface disturbing treatment, prescribed fire and herbicide application would not occur from March 1st through July 31. An exception would be granted if denning season surveys have been completed and it is determined that no active natal kit fox dens are in the treatment area.

Prairie Dog

- Within active prairie dog habitats surface disturbing treatment that could collapse burrows, prescribed fire and herbicide application would not occur from April 1st through June 15th.

2.3 Alternative B – No Action

The current management direction for the MFO is through a noxious weed control plan that was previously prepared and approved for the treatment of invasive plants. Due to changes in BLM procedures, decisions, and regulations since the development of the plan, it may be no longer applicable for the approved treatment of invasive plants on BLM lands in the MFO. Thereby, under the No Action Alternative, no efforts would be made to control invasive plant species on public lands administered by the BLM in the MFO since no current comprehensive weed management plan is in place for approval of the actions. Populations of plant species listed in Appendix E would go uncontrolled and further propagation and establishment of these invasive plants would occur as natural conditions warrant and outside influencing factors allow.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area as identified in the Interdisciplinary Team Checklist found in Appendix A and presented in Chapter 1 of this assessment. This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4.

3.2 General Setting

The MFO is situated in the canyon, plateau, and desert areas of the Colorado Plateau physiographic province. It is located in southeastern Utah and includes all of Grand County and

the northern third of San Juan County. Geographically, the MFO is bounded by the Book Cliffs to the north, the Utah-Colorado state line to the east, Harts Point and Lisbon Valley to the south, and the Green River to the west. Major waterways within the MFO include the Colorado River, the Dolores River, and the Green River. Elevations within the MFO range from approximately 13,000 feet above mean sea level in the La Sal Mountains to approximately 3,900 feet above mean sea level at Mineral Bottom along the Green River. Precipitation is variable from year to year, however, averages range from 8 to 12 inches per year. Most of the precipitation occurs as a result of convection thunderstorms. Average daytime temperatures range from the mid-teens in the winter to the upper 90's in the summer (Western Regional Climate Center, 2016).

The MFO boundary encompasses Arches National Park, Dead Horse Point State Park, the La Sal Mountains of the Manti-La Sal National Forest, and abuts the Uintah/Ouray Indian Reservation. The MFO shares boundaries with lands administered by the BLM Richfield, Vernal, Monticello, Grand Junction, Uncompahgre, Dolores, and Price Field Offices, as well as with Canyonlands National Park.

The MFO comprises approximately 2,856,082 acres of land, of which approximately 1,822,562 acres is public land administered by the BLM.

Also contained within the MFO area are several communities, diverse terrain, and scenic landscapes that figure prominently in the settlement, history, culture, and recreational enjoyment of southern Utah. Many occupational pursuits historically associated with this region of the Intermountain West-including farming, ranching, mining, tourism, retail trade, transportation, and construction are still practiced by residents within the MFO boundary. Major communities in the MFO are Moab, La Sal, Castle Valley, Thompson, Crescent Junction, and Elgin. Major transportation routes include: Interstate 70 (I-70), U.S. Highway 191, and State Routes 279 (Potash State Scenic Byway), 128 (Colorado River State Scenic Byway), and 313 (Dead Horse Mesa State Scenic Byway).

3.3 Resources/Issues Brought Forward for Analysis

3.3.1 Fish and Wildlife Including USFW Designated Species

General Wildlife

The MFO is in the heart of the Colorado Plateau and has a great amount of landscape diversity and unique combination of landforms and habitat types the result in diversity of terrestrial and aquatic species. General wildlife species in the MFO include small mammals such as raccoons, ringtail cats, skunks, badgers, beavers, otters, multiple species of rodents, rabbits and hares, small reptiles and amphibians, native and non-native fish species and larger predators such as fox, coyote, bobcats, mountain lions and black bear. Most of these species are found throughout the MFO and occupy a wide range of habitats. Big game species found within the MFO such as mule deer, Rocky Mountain elk, pronghorn antelope, desert and Rocky Mountain bighorn sheep would be discussed below. Federally Listed Species, State Sensitive Animal Species, and Migratory Birds and Raptors and wildlife are also discussed in detail below.

Based on Table 3-5, vegetation in the MFO is divided into 9 native vegetation types and 3 other classifications including invasive. The distribution of vegetation types in the project area is

primarily influenced by soil type, elevation, precipitation, and topography (Moab EIS, 2008) and can be linked to habitat types for wildlife found within the MFO.

Vegetation communities vary based on precipitation, elevation, topography, slope, aspect, geology, soils, and other environmental variables. Habitat type is further distinguished by site-specific attributes such as vegetation cover, composition, and structure. Vegetation community composition and distribution across the MFO are described in detail in Section 3.3.1.0, Vegetation. Below is a summary of vegetation groups that support various types of wildlife habitats.

Pinion Juniper Woodlands(P/J)
Pinion juniper woodlands make up 39 percent of the vegetative communities within the MFO and support wildlife species such as mule deer, elk, pronghorn, bighorn sheep, mountain lions, Neotropical migrant birds such as the black throated gray warbler, grey vireo, juniper titmouse, pinion jay, upland birds and a variety of reptiles and snakes can also be found in pinion juniper woodlands. Pinion juniper woodlands also provides thermal cover for ungulates during harsh winter storms, with over 50 percent of the deer & elk winter ranges and Rocky Mountain bighorn ranges located within P/J woodlands. The Hatch pronghorn and the desert bighorn habitats are also highly dependent on these woodlands.

Typical treatments that occur on pinion juniper woodlands do not focus on weed or invasive species reduction but rather the removal of old growth and dense pinion and juniper trees that diminish understory value. The proposed Programmatic Invasive Species Management Plan *would not* have application in pinion juniper woodlands for restoration or habitat improvement purposes.

Salt Desert Scrub Communities
Wildlife is generally not found in great densities within the salt desert scrub communities, which encompasses almost 23 percent of the MFO but these comminutes provide for diverse population of species, including four State sensitive species, the burrowing owl, ferruginous hawk, kit fox and the white-tailed prairie dog. Lizards are the most diverse and abundant assemblage of species and serve as prey for various raptors and medium sized mammals.

This key habitat supports pronghorn in the Cisco Desert and offers some habitat overlap with Rocky Mountain bighorn habitats. Raptors that nest in or near the salt desert scrub communities, include golden eagles, and sensitive raptors species, such as the ferruginous hawk and the burrowing owl. Wintering bald eagles and other raptors frequent the salt desert scrub communities throughout the Cisco Desert during their winter migrations. Also, many species move between salt desert scrub and adjacent habitats for various life requirements such as foraging and nesting. For instance, kit fox use the sandy soils for denning in salt desert scrub habitat but also forage for prey in sagebrush plant communities.

Typical treatment in salt desert scrub communities would focus on the reduction of cheatgrass and other annual grasses and weeds that diminish understory value or in areas were wildfire has removed native vegetation resulting in weedy annuals eliminating the potential for native species to re-establish and further threatening intact communities. The proposed Programmatic Invasive

Species Management Plan would have application in salt desert scrub communities for the reduction of cheatgrass and invasive weeds through the use of prescribed fire, herbicide applications and seeding. Limited rainfall in these areas often reduces the need for prescribed fire as duff layers are minimal and often surface fuels are insufficient to carry the fire.

Sagebrush

Sagebrush communities encompasses approximately 11.7 percent of BLM-managed lands and provides important habitat for mule deer, elk and pronghorn in the Hatch Point area, and other sagebrush dependent species such as the sage sparrow and Brewer's sparrow. It also provides thermal cover for ungulates during harsh winter storms. Much of the MFO elk and deer winter ranges interface with these sagebrush communities.

Typical restoration and habitat improvement needs in sagebrush communities would focus on sagebrush regeneration, promoting sagebrush age class diversity, improvement in understory diversity and the reduction on cheatgrass and other annual grasses and the weeds that diminish understory value, and habitat restoration were wildfire has removed native vegetation resulting in weedy annuals eliminating the potential for native species to re-establish.

The Programmatic Invasive Species Management Plan *would not* have application in sagebrush communities for typical sagebrush restoration methods that encouraging the regeneration of sagebrush by mastication or crushing methods to promote new growth. Post treatment weed control and seeding may be needed after mastication or crushing type treatments occur but these activities would be included in site specific plans developed for these types of treatments and *would not* be applicable to the proposed Programmatic Invasive Species Management Plan. The proposed Programmatic Invasive Species Management Plan *would not* facilitate sagebrush regeneration treatments or post treatment weed control and seeding.

The proposed Programmatic Invasive Species Management Plan would have application in projects solely developed to facilitate the reduction in cheatgrass and other annual grasses and the weeds with herbicide control and to increase understory diversity with seeding and plantings. In fire scars or disturbed areas within or adjacent to sagebrush communities or in the development of fuel breaks to protect sagebrush communities, herbicide control of weeds, facilitating native vegetation diversity with seeding and plantings and the use of prescribed fire in areas where duff layers prohibit herbicide and seed effectiveness *would be* applicable.

Blackbrush and Grasslands Communities

Blackbrush communities (9percent) and grasslands (2 percent) habitats often found in the red rock canyons offering key habitats for supports golden eagles, red tailed hawks, and prairie, along with many other bird species. These areas also provide important habitats and foraging areas for large mammals such as desert bighorn sheep, mountain lions, and bobcats, and for small mammals such as ground squirrels, rabbits, and marmots. Numerous bat species roost, hibernate, and reproduce in rock crevices, caves, and mines across the MFO.

Minimal treatments in blackbrush communities and grasslands are needed. Blackbrush is difficult to establish and grows at a very slow rate, therefore protection of these communities is key. The proposed Programmatic Invasive Species Management Plan would have application in

the reduction in cheatgrass and other annual grasses and weeds and in the development of fuel breaks to protect these communities. In areas where wildfire has removed native blackbrush stands, eliminating the potential for weed infestation that may threaten nearby intact blackbrush stands in important. The proposed Programmatic Invasive Species Management Plan would have application in blackbrush communities and grasslands by protecting and reducing the potential of cheatgrass and invasive weeds within the understory through the use of herbicide applications and seeding. Prescribed fire in areas where duff layers prohibit herbicide and seed effectiveness would also be applicable.

Conifer Communities

Mixed conifer (6.1percent) and mountain shrub (5.6 percent) interspersed with ponderosa pine communities (0.7prcent) offer much of the MFOs fawning and summer habitats for elk and mule deer, some winter habitats for elk and some year-round habitats for Rocky Mountain bighorn along with mountain lion, black bear, Neotropical migrant birds such as Graces' warbler, grey vireo, Lewis' woodpecker, flammulated owl, upland birds and a variety of reptiles and snakes. These communities also provide thermal cover for ungulates during harsh winter storms and hot periods in the summer.

Typical treatments that occur in mixed conifer, mountain shrub and ponderosa pine communities (conifer communities) do not focus on weed or invasive species reduction but rather the removal of old growth and dense trees that diminish understory value. The proposed Programmatic Invasive Species Management Plan would *not have* application in conifer communities for restoration or habitat improvement purposes nor would the Programmatic Invasive Species Management Plan facilitate post treatment weed control and seeding.

Riparian and Wetland Habitats

Riparian and wetland habitats make up approximately 1.8 percent of the lands within the MFO yet the role of riparian habitat in the landscape is substantial. Within Utah, 66–75percent of all bird species use riparian habitats during some portion of their life history. Typically, diversity and abundance of birds dramatically increases in western riparian habitat compared with other habitat types, and numerous avian species are now considered as riparian obligates (UDWR 2005). Depending on the vegetation structure, various species of birds, fish, raptors, amphibians, and aquatic invertebrates can be supported in riparian areas. Healthy riparian corridors are crucial to many species in Utah and are the hub of species diversity on the larger landscape.

As discussed in 3.3.4 Invasive Species/Noxious Weeds, the greatest impact of invasive plants in the MFO is typically along the upland terraces and benches of the Colorado River and tributaries where tamarisk, Russian olive, knapweed and other weedy infestations have resulted in large scale native vegetation alteration. The proposed Programmatic Invasive Species Management Plan would have the greatest application in these areas.

The cover types that do not have significant native vegetation (water, urban, barren and agriculture) are presented in the Table 3-5, but not discussed in relationship to terrestrial wildlife habitats.

Big Game
The UDWR periodically reviews these habitat areas through coordination with the various land management agencies and updates these files as needed. The BLM works closely with the UDWR to ensure that big game habitats identified by the UDWR receive the needed management prescriptions. Within the MFO, much of the deer and elk habitat overlaps and management prescriptions are often the same for both species.

Big game species in the MFO include mule deer, pronghorn, Rocky Mountain and two subspecies of bighorn sheep and pronghorn antelope. Table 3-1 provides information on the vegetative communities that comprise various big game crucial habitats within the MFO.

Table 3-1: Big Game Crucial Habitats Distribution in the MFO

	Pinion Juniper woodland	***Salt Desert Scrub***	***Sagebrush***	***Blackbrush/ Grasslands***	***Conifer, communities***	***Riparian***	***Invasive species***
Calving/Fawning							
Elk	6.0%	0.0%	16.0%	0.0%	72.0%	0.1%	0.0%
Deer	19.9%	0.0%	1.4%	0.0%	72.7%	0.2%	0.0%
Winter Range							
Elk	54.0%	4.0%	17.0%	2.0%	17.0%	0.5%	0.4%
Deer	69.4%	6.7%	12.1%	2.8%	4.9%	0.3%	0.5%
Pronghorn Antelope Year-round							
Hatch Area	44.9%	7.6%	34.1%	10.9%	0.0%	0.4%	0.2%
Cisco Desert	8.4%	69.4%	2.7%	12.5%	0.0%	0.0%	3.3%
Bighorn sheep Year-round							
Desert	38.1%	17.0%	2.1%	34.4%	0.0%	0.1%	1.7%
Rocky Mountain	55.9%	5.8%	8.6%	0.5%	26.9%	0.7%	0.4%

Mule Deer
Mule deer occupy most ecosystems in Utah but likely attain their greatest densities in shrublands on areas characterized by rough, broken terrain and abundant browse and cover. Winter range habitat primarily consists of shrub-covered, south-facing slopes and often coincides with areas of concentrated human use and occupation. Winter range is often considered a limiting factor for mule deer in the Intermountain West. Because of learned behavioral use patterns passed on from one generation to the next, deer migrate for the winter into the same areas every year, regardless of forage availability or condition. These generally are areas with shallow snow depth, which allow easier movement, with pinion-juniper and sagebrush vegetation types. These vegetation types provide deer with both escape and thermal cover. Sagebrush is their primary forage during the winter season.

According to the UDWR GIS Database (UDWR, 2016) the MFO contains a total of 1,363,500 acres of mule deer habitat of which 762,200 acres is managed by the MFO BLM. Of this habitat approximately 637,300 acres has been identified as crucial winter range and 97,900 acres as

crucial fawning grounds and is managed by the BLM with seasonal restrictions to protect winter use and fawning. The two mule deer herds within the MFO are the Book Cliffs herd and the La Sal herd.

Rocky Mountain Elk

The Rocky Mountain elk is considered a generalist feeder with grasses and shrubs composing most of the winter diet, with the former being of primary importance in the spring months. Forbs become increasingly important in late spring and summer, and grasses again dominate in the fall. These feeding relationships may change somewhat, depending on location. Associated with seasonal changes in diet are seasonal changes in habitat. The season and function of use of these habitats help distinguish various types of winter ranges, production areas (calving grounds), and/or summer range.

Winter range is often considered a limiting factor for Rocky Mountain elk in the Intermountain West. Typical Rocky Mountain elk winter range occurs between 5,500 and 7,500 feet elevation and comprises mountain shrub and sagebrush habitats. Crucial winter range is considered to be the part of the local deer and/or elk range where approximately 90 percent of the local population is located. Production or calving areas are used from mid-May through June and typically occupy higher elevation sites than winter range.

According to the UDWR GIS Database (UDWR, 2016) the MFO contains a total of 1,180,800 acres of elk habitat of which 584,200 acres is managed by the MFO Of this habitat approximately 142,600 acres has been identified as crucial winter range and 10,100 acres as calving grounds and is managed by the BLM with season restrictions to protect winter use and calving. The two elk herds within the Moab Field Office are the Bookcliffs herd and the La Sal herd. The middle and higher elevations of the Moab Field Office sustain several large Rocky Mountain elk populations.

A majority of the elk in the La Sal wildlife management unit stay on private and USFS lands year-round; however, BLM lands do provide some winter range; these BLM lands include Hatch Point and portions of the Bookcliffs. Rocky Mountain elk population trends for the past seven years have been relatively stable. Although there has been variability between years overall the population is stable and near UDWR population objectives.

Pronghorn Antelope

Pronghorn can be found throughout the western United States, Canada, and northern Mexico. They are generally associated with open plains where they feed mainly on forbs and grasses. Pronghorn prefer to occupy areas with large tracts of flat to rolling open terrain where they rely on keen eyesight and swift movement to avoid predators. They also rely on vegetation within the shrub and grassland plant communities for food. Pronghorn are often found in small groups and are usually most active during the day.

According to the UDWR GIS Database (UDWR, 2016) the MFO contains a total of 791,400 acres of pronghorn habitat of which 627,000 acres are managed by the. The two pronghorn herds within the MFO are the San Juan Hatch Point herd and the La Sal South Cisco Desert herd.

Desert Bighorn Sheep

Desert bighorn sheep are uniquely adapted to inhabit some of the most remote and rugged parts of the Planning Area. Desert bighorns are sometimes referred to as a wilderness species because of the steep rocky areas they occupy for escape and safety. Habitat is characterized by rugged terrain including canyons, gulches, talus cliffs, steep slopes, mountaintops, and river benches (Shakleton et al. 1999). Desert bighorn generally occur in Southern Utah and do not migrate.

According to the UDWR (UDWR, 2016) the MFO contains a total of 472,000 acres of desert bighorn sheep habitat of which the MFO manages approximately 370,000 acres. Three separate herd units within the La Sal Herd Management Unit span this acreage, the Professor Valley herd, the Dolores Triangle herd and the Potash Unit The Potash Unit is the only viable herd currently and the Potash herds unit along with the adjacent Canyonlands National Park bighorn, is one of the only remaining native (not transplanted or reintroduced) desert bighorn herds in Utah. This herd supports a viable population and is often used for reintroductions and augmentations throughout the Western United States.

Data collected from 2002 through 2011 on the Potash Herd during three 2-year GPS collaring projects and over two years of collaboration between the Moab BLM biologist, UDWR and Canyonlands National Park biologist, additional modeling and closer examination of the six years of GPS data have resulted in the development of a more accurate lambing and rutting grounds habitat delineation within the MFO that is now housed on the UDWR Conservation Data Center. The MFO contains a total of 122,200 acres of desert bighorn sheep lambing and rutting habitat of which the MFO BLM manages approximately 111,500 acres.

Rocky Mountain Bighorn Sheep

Rocky Mountain bighorn sheep can be found in small herds in northern and central Utah. Rocky Mountain bighorn sheep experienced significant declines in numbers in the early 1900s. Utah has been involved in an aggressive program for the past 30 years to restore bighorn sheep to their native habitat. Most Rocky Mountain bighorn sheep have seasonal migrations.

Rocky Mountain bighorn sheep were reintroduced into the Uintah-Ouray Indian Reservation in the early 1970s. A viable population has become established along the eastern portion of the Green River corridor. Rocky Mountain bighorn currently occupy the rugged Bookcliffs terrain, south from the Indian Reservation and eastward to Thompson Springs, Utah.

The MFO area contains 775,700 acres of suitable Rocky Mountain bighorn sheep habitat as identified by the DWR. The DWR recognizes and manages approximately 479,000 as occupied and the remaining 297,000 in the eastern Bookcliffs as unoccupied. Due to domestic sheep grazing in the eastern portion of this range, the DWR current eliminates any bighorn sheep populations that move into this eastern area.

One herd area for Rocky Mountain bighorn sheep is found in the Moab Field Office and they are located in the Bookcliffs. This is called the Bookcliffs Rattlesnake herd. The MFO directly manages 424,859 acres in this herd area.

Fish and Amphibians and Aquatic Invertebrates

The MFO encompasses a variety of riparian areas associated with ephemeral, intermittent, and perennial aquatic habitats important to fish, amphibians, and aquatic invertebrates. Backwater and ephemeral aquatic habitats in riparian areas are particularly important as spawning and juvenile habitats for many of the region's native fishes and amphibians. Fishes occurring in streams, rivers, and reservoirs in the project area include 11 native species, at least 14 species of nonnative sportfish, and approximately 20 additional introduced species (Valdez and Muth 2005). Native amphibian species known to inhabit portions of the project area include the tiger salamander (*Ambystoma tigrinum*), Mexican spadefoot (*Spea multiplicata*), Great Basin spadefoot (*Spea intermontana*), Great Plains toad (*Anaxyrus cognatus*), Red-spotted toad (*Anaxyrus punctatus*), Woodhouse's toad (*Anaxyrus woodhousii*), northern leopard frog (*Rana pipiens*), and canyon treefrog (*Hyla arenicolor*).

Migratory Birds

There are a wide variety of songbirds and neo-tropical migrants which spend at least part of the year within the MFO and variety of migratory bird species use habitats within the Project Area for breeding, nesting, and foraging. Migratory birds may nest on tree limbs, on the ground, or in/on rock outcrops. The nesting season for migratory birds is generally May 1st through July 31st.

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA). The MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. Some birds are also protected by the Endangered Species Act, the Bald and Golden Eagle Protection Act, and/or are included in the State of Utah/BLM Sensitive Species Lists. To further the purposes of these protective acts, Memorandum of Understanding (MOU) WO-230-2010- 04, *To Promote the Conservation of Migratory Birds*, was issued in 2010 by the BLM and the USFWS. Identifying species of concern, priority habitats, and key risk factors includes identifying species listed on the USFWS Birds of Conservation Concern (BCC) that are most likely to be present in the project area and evaluating and considering management objectives and recommendations for migratory birds resulting from comprehensive planning efforts, such Utah Partners in Flight (PIF) American Landbird Conservation Plan.

The Utah PIF Working Group completed a statewide avian conservation strategy identifying "priority species" for conservation due to declining abundance distribution, or vulnerability to various local and/or range-wide risk factors. One application of the strategy and priority list is to give these birds specific consideration when analyzing effects of proposed management actions and to implement recommended conservation measures where appropriate. The Utah PIF Priority Species List, the BCC list for Region 16 (Colorado Plateau), and the Utah Conservation Data Center database were used to identify potential habitat for priority species that could utilize habitats within the Planning Area and be impacted by the proposed project. Table 3-2 lists the BCC and PIF species that may occur within the Project Area.

Table 3-2: Moab UPIF & FWS BCC Species 2008 (Regions 16) Found in the Project Area						
Species	**BCC§**	**UPIF‡**	**DWR Habitats†**	**1st Breeding Habitat‡**	**2nd Breeding Habitat‡**	**Winter Habitat‡**
Bald Eagle	x		Winter	Lowland Riparian	Agriculture	Lowland Riparian
Band-tailed Pigeon			Critical/ Substantial	Ponderosa pine	Mixed conifer	Migrant
Black Rosy-finch	x	x	Substantial-Winter	Alpine	Alpine	Grassland
Black-throated Gray Warbler		x	Prime Breeding	Pinion-Juniper	Mountain Scrub	Migrant
Bobolink		x	Winter	Wet Meadow	Agriculture	Migrant
Brewer's Sparrow	x	x	Critical/High	Shrubsteppe	High Desert Scrub	Migrant
Broad-tailed Hummingbird		x	Critical/ Substantial	Lowland Riparian	Mountain Riparian	Migrant
Burrowing Owl	x		Primary Breeding	High Desert Scrub	Grassland	Migrant
Cassin's Finch	x		Critical/Substantial	Aspen	Sub-Alpine conifer	Lowland Riparian
Ferruginous Hawk	x	x	Prime Breeding	Pinyon-Juniper	Shrubsteppe	Grassland
Flammulated Owl	x		Critical	Ponderosa pine	Sub-Alpine conifer	Migrant
Gambel's Quail		x	High	Low Desert Scrub	Lowland Riparian	Low Desert Scrub
Golden Eagle	x		Critical/High	Cliff	High Desert Scrub	High Desert Scrub
Grace's Warbler	x		Critical	Ponderosa pine	Mixed conifer	Migrant
Gray Vireo	x	x	Prime Breeding/Winter	Pinyon-Juniper	Oak	Migrant
*Gunnison Sage-grouse**	x		Historical/Potential	Shrubsteppe	Shrubsteppe	Shrubsteppe
Juniper Titmouse	x		Critical/High	Pinyon-Juniper	Pinyon-Juniper	Pinyon-Juniper
Lewis's Woodpecker	x	x	Prime Breeding	Ponderosa pine	Lowland Riparian	Oak
Long-billed Curlew	x	x	Substantial/Prime Breeding	Grassland	Agriculture	Migrant
Peregrine Falcon	x		Prime Breeding	Cliff	Lowland Riparian	Wetlands
Pinyon Jay	x		Critical/High	Pinyon-Juniper	Ponderosa pine	Pinyon-Juniper
Prairie Falcon	x		Critical/High	Cliff	High Desert Scrub	Agriculture
Sage Sparrow		x	Critical	Shrubsteppe	High Desert Scrub	Low Desert Scrub
*Southwestern Willow Flycatcher**	x		Migrant			
Snowy Plover	x		Critical	Playa	Playa	Migrant
Three-toed Woodpecker		x	Winter	Sub-Alpine Conifer	Lodge-pole pine	Sub-Alpine Conifer
Veery	x		High	Lowland Riparian	Lowland Riparian	Migrant
Virginia's Warbler		x	Prime Breeding/Winter	Oak	Pinyon-Juniper	Migrant
Willow Fly-catcher	x		Migrant	Lowland Riparian	Mountain Riparian	Migrant
*Yellow-billed Cuckoo**	x	x	Not Known	Lowland Riparian	Agriculture	Migrant

Table 3-2: Moab UPIF & FWS BCC Species 2008 (Regions 16) Found in the Project Area						
Species	**BCC§**	**UPIF‡**	**DWR Habitats†**	**1st Breeding Habitat‡**	**2nd Breeding Habitat‡**	**Winter Habitat‡**

‡Utah Partners in Flight Avian Conservation Strategy Version 2.0 (Parrish et al., 2002), §Birds of Conservation Concern 2008 (USFWS, 2008)
†Utah Conservation Data Center (http://dwrcdc.nr.utah.gov/ucdc/)
*=Federally List,
Italic=Utah Sensitive Species

Most bird species (especially neo-tropical) are decreasing in numbers throughout their ranges. According to Parrish et al. (2002), riparian habitats are used as either breeding or wintering habitat by Utah's birds almost twice as much as any other habitat type. Within Utah, 66 to 75 percent of all bird species use riparian habitats during some portion of their life cycle.

Shrublands, forest, and additional habitat groups (e.g. water, rock, playa, agriculture, urban, and cliff) all are about equal and second to riparian when considering their importance to bird species. To prevent further population declines for bird species, the protection and improvement of these habitat types, especially riparian are crucial. Certain species can be followed more closely as indicators of overall ecosystem health.

Raptors and Eagles

Raptors and eagles typically use the same nest site year after year. Nesting and fledgling seasons for raptors vary but typically extend from March 1st through August 31st with eagles often beginning their nesting season in January. The MFO area also offers suitable wintering and migration habitats for non-nesting raptor species. The U.S. Fish and Wildlife Service (USFWS) issued guidelines for the protection of raptors that includes species-specific timing limitations and spatial offsets to active nests (Romin and Muck 2002). These guidelines have been incorporated into the Moab RMP. Table 3-3 provides a summary of raptor habitats and species-specific timing limitations and spatial offsets to active nests.

Additionally, the Bald and Golden Eagle Protection Act, which initially protected only bald eagles, was amended in 1962 to include the golden eagle because of its dwindling populations and similar appearance to bald eagles when both eagles are young. The act prohibits anyone from "taking" eagles, including their parts, nests, or eggs without a permit issued by the Secretary of the Interior. A taking also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

Table 3-3: Raptor Species with the Potential to Occur in the Project Area and USFWS Spatial and Seasonal Buffers				
Common Name	**Scientific Name**	**USFWS Spatial Buffer**	**USFWS Season Buffer**	**General Habitat and Potential in Project Area**
American Kestrel	*Falco sparverius*	N/A	N/A	High potential to forage in open habitats, such as prairies, deserts, wooded streams, and farmlands and nests in natural holes in trees, abandoned woodpecker holes, cliffs, and nest-boxes. Moderate potential to nest on cliffs and ledges. Moderate potential to forage from cliffs and

Table 3-3: Raptor Species with the Potential to Occur in the Project Area and USFWS Spatial and Seasonal Buffers				
Common Name	**Scientific Name**	**USFWS Spatial Buffer**	**USFWS Season Buffer**	**General Habitat and Potential in Project Area**
				ledges, and low potential in desert shrub and pinyon-juniper woodland.
Bald Eagle	*Haliaeetus leucocephalus*	1 mile	1/1-8/31	Nests are almost always in tall trees and commonly near bodies of water where fish and waterfowl prey are available. Wintering areas are commonly associated with open water. Nest in the MFO occurs between the State line and the confluence with the Dolores River.
Burrowing Owl	*Athene cunicularia hypugaea*	0.25 miles	3/1-8/31	High potential to nest and forage in prairie dog colonies. Low potential to nest and forage from cliffs and ledges and pinyon-juniper woodland and high potential in desert shrub.
Cooper's Hawk	*Accipiter cooperii*	0.5 miles	3/15-8/31	High potential to nest and forage in woodland areas and riparian zones.
Ferruginous Hawk	***Buteo regalis***	0.5 miles	3/1-8/1	High potential to nest and forage in flat and rolling terrain, grassland, sagebrush/saltbush/greasewood shrub lands, and at the periphery of pinyon-juniper forests. The Cisco Desert has the greatest concentration in the MFO. Low potential to utilize high elevations, forests, and narrow canyons.
Golden Eagle	*Aquila chrysaetos*	0.5 miles	1/1-8/31	Commonly nests on cliff ledges and rock outcrops. Moderate potential to forage in desert shrub and pinyon-juniper woodlands.
Great-horned Owl	*Bubo virginianus*	0.25 miles	12/1-9/31	High potential to occur in a variety of habitat throughout the MFO. Nests occur on cliff ledges, pinyon-juniper, or nests of other species. Moderate potential to forage in desert shrub and pinyon-juniper woodlands.
Long-eared Owl	*Asio otus*	0.25 miles	2/1-8/15	High potential to forage and nest in areas where woodlands are bordered by open habitats. Low potential to nest in pinyon-juniper woodlands. Moderate potential to forage in desert shrub and pinyon-juniper woodlands.
Northern Harrier	*Circus cyaneus*	0.5 miles	4/1-8/15	Moderate potential to forage and nest in sagebrush/ grassland vegetative community and desert scrublands. Low potential to nest in pinyon-juniper woodlands. Utilizes open habitats such as marshes, fields, and grasslands.
Peregrine Falcon	*Falco peregrinus*	1 mile	2/1-8/31	Utilize habitats containing cliffs and almost always nest near water.
Prairie Falcon	*Falco mexicanus*	0.25 miles	4/1-8/31	High potential to nest on cliffs and ledges. Moderate potential to forage in desert shrub moderate in pinyon-juniper woodland.

Table 3-3: Raptor Species with the Potential to Occur in the Project Area and USFWS Spatial and Seasonal Buffers				
Common Name	**Scientific Name**	**USFWS Spatial Buffer**	**USFWS Season Buffer**	**General Habitat and Potential in Project Area**
Red-tailed Hawk	*Buteo jamaicensis*	0.5 miles	3/15-8/15	High potential to nest and forage in open country where scattered trees or other elevated perches are available. Moderate potential to nest on cliffs and low potential to nest in pinyon-juniper woodlands. High potential to forage in desert shrub and pinyon-juniper woodlands.
Sharp-shinned Hawk	*Accipiter striatus*	0.5 miles	3/15-8/31	High potential to forage in forest and woodland habitats, often nesting in tall coniferous trees. In arid area and pinyon-juniper woodlands nest are found in riparian zones along streams and desert washes. Moderate potential to nest in pinyon-juniper woodlands.
Swainson's Hawk	*Buteo swainsoni*	0.5 miles	3/1-8/31	Not likely to nest in the MFO. Low potential to forage in desert shrub and pinyon-juniper woodlands.

State Sensitive Animal Species

Special Status Species Management Policy 6840 requires the BLM to manage State Sensitive Animal Species to prevent the need for future listing under the ESA.

The Utah BLM maintains a list of sensitive species that may occur on BLM managed lands. These species are found on the Utah State director's Sensitive Species List. This list includes those species that are federally listed, species identified by the Utah BLM and species listed on State sensitive by the State of Utah. The Utah state sensitive wildlife species (not including federally listed species) that have some potential to occur and be impacted by the Proposed Action are listed in Table 3-4. These species are either on the BLM Utah State director's Sensitive Species List or the UDWR's State Sensitive Species List.

A total of 18 Utah State Sensitive Animal Species animals (not including federally listed species) are either known to occur or the habitat is present for the species to potentially occur within the MFO (UDWR, 2015), though eight would not be impacted by the Proposed Action and would not be discussed further within this EA

A brief description for wildlife species that would be further analyzed are identified in the table below.

Table 3-4: BLM Sensitive Species Potentially Occurring in the Project Area				
Common Name *(Scientific Name)*	**Habitat**	**Area of Potential and/or Known Occurrence**	**Species with Habitat Within the Project Area that may be impacted Project Activities**	**Further Analysis (Yes/No)**
Mammals				
Allen's big-eared bat (*Idionycteris phyllotis*)	Rocky and riparian areas in woodland and scrubland regions, roosts in caves or rock crevices.	Throughout southern Utah.	Species may occur within the MFO. Vegetative would occur during the day when bats are roosting, therefore no direct impacts would occur to bats that forage in the project area. Minimum site specific habitat alteration may occur but are not expected to reduce insect forage base. No impacts expected during roosting or to roosts.	No
Big free-tailed bat *(Nyctinomops macrotis)*	Rocky and woodland habitats, roosts in caves, mines, old buildings, and rock crevices.	Throughout southern Utah.		No
Fringed myotis *(Myotis thysanodes)*	Desert and woodland areas, roosts in caves, mines, and buildings.	Throughout southern Utah.		No
Spotted bat *(Euderma maculatum*)	Found in a variety of habitats, ranging from deserts to forested mountains; roost and hibernate in caves and rock crevices.	Throughout Utah.		No
Townsend's big-eared bat *(Corynorhinus townsendii*)	Occur in many types of habitat, but is often found near forested areas; roosts and hibernates in caves, mines, and buildings.	Throughout Utah.		No
Gunnison's prairie dog *(Cynomys gunnisoni)*	Grasslands, semidesert and montane shrublands	Throughout southeastern Utah	Known occupancy and suitable habitat; minimal potential for treatment activities in habitat.	Yes
Kit fox *(Vulpes macrotis)*	Open prairie, plains, and desert habitats	Throughout southeastern Utah	Known occupancy and suitable habitat; minimal potential for treatment activities in habitat.	Yes
White-tailed prairie dog *(Cynomys leucurus)*	Semi desert grasslands and open shrublands	Throughout north-central Utah.	Known occupancy and suitable habitat; minimal potential for treatment activities in habitat.	Yes
Birds				

Table 3-4: BLM Sensitive Species Potentially Occurring in the Project Area				
Common Name ***(Scientific Name)***	**Habitat**	**Area of Potential and/or Known Occurrence**	**Species with Habitat Within the Project Area that may be impacted Project Activities**	**Further Analysis (Yes/No)**
Bald Eagle *(Haliaeetus leucocephalus)*	Roosts and nests in tall trees near bodies of water.	Throughout Utah.	Known occupancy and suitable habitat; high potential for treatment activities in nesting/summer habitat. RMP disallows activities with 1 miles know nest sites.	Yes
Bobolink (*Dolichonyx oryzivorus)*	Riparian or wetland areas.	Throughout Utah.	Rare migrant on BLM lands	No
Burrowing owl *(Athene cunicularia)*	Open grassland and prairies.	Throughout Utah.	Known occupancy and suitable habitat; minimal potential for treatment activities in habitat.	Yes
Ferruginous hawk (*Buteo regalis)*	Flat and rolling terrain in grassland or shrub steppe; nests on elevated cliffs, buttes, or creek banks.	Throughout Utah.	Known occupancy and suitable habitat; minimal potential for treatment activities in habitat.	Yes
Long-billed curlew *(Numenius americanus)*	Grassland/ herbaceous-nesting in mixed fields with adequate, but not tall, grass cover and fields with elevated points	Throughout Utah.	Minimum habitat and occurrence in the MFO.	No
Short-eared owl *(Asio flammeus)*	Grasslands, shrublands, and other open habitats.	Throughout Utah.	Occasional winter resident, nesting does not occur in the MFO.	No
Fish				
Bluehead sucker *(Catostomus discobolus)*	Fast flowing water in high gradient reaches of mountain rivers	Tributaries of the Colorado and Green rivers Mainstream and tributaries of the	Known occupancy and suitable habitat; high potential for treatment activities in habitat.	Yes
Roundtail chub *(Gila robusta)*	Large rivers, and is most often found in murky pools near strong currents			Yes

Table 3-4: BLM Sensitive Species Potentially Occurring in the Project Area				
Common Name ***(Scientific Name)***	**Habitat**	**Area of Potential and/or Known Occurrence**	**Species with Habitat Within the Project Area that may be impacted Project Activities**	**Further Analysis (Yes/No)**
Flannelmouth sucker *(Catostomus latipinnis)*	Large rivers, where they are often found in deep pools of slow-flowing, low gradient reaches	Colorado and Green rivers Mainstream and tributaries of the Colorado and Green rivers		Yes
Amphibians				
Great Plains toad (*Anaxyrus cognatus*)	Not restricted to aquatic/ riparian habitats, breed in standing water; riparian and ephemeral upland pools.	Distribution in southeastern Utah is poorly documented	Potential for treatment activities in habitat.	Yes

Gunnison's prairie dog

The Gunnison's prairie dog is listed as a BLM Sensitive Species. This species is highly susceptible to sylvatic plague and has a low ability to repopulate once the plague has decimated a colony. Mortality from plague frequently exceeds over 99 percent within colonies. Additional threats include poisoning, agricultural conversion, and urbanization and development.

Kit fox

The kit fox is listed as a BLM Sensitive Species. It opportunistically eats small mammals (primarily rabbits and hares), small birds, invertebrates, and plant matter. The species is primarily nocturnal, but individuals may be found outside of their dens during the day. The kit fox mates in late winter, with a litter of four to seven pups being born about two months later. Young first leave the den about one month after birth, in late spring or early summer. The species most often occurs in open prairie, plains, and desert habitats.

White-tailed Prairie Dog

The white-tailed prairie dog is listed as a BLM Sensitive Species. This species has declined by an estimated 84 percent in southern Utah. The decline can be attributed to this species' high susceptibility to sylvatic plague. Population numbers rarely rebound to previous numbers and occupied acreage once the plague has decimated a colony. Additional threats include poisoning, grazing, fire suppression, agricultural conversion, urbanization, and oil and gas development.

Bald Eagle

Utah's wintering bald eagle population is typically found near rivers, lakes, and marshes where unfrozen, open waters offer the opportunity to prey on fish and waterfowl. The Colorado and Green River corridors are used frequently by Utah's wintering bald eagles. The eagles begin to arrive in November and head north by March. Utah also hosts a small population of desert bald eagles that can be found in desert valleys, far from any water. These eagles feed primarily on

carrion. There are four active nests which occur on the Colorado River within the MFO. Nesting bald eagles return to their nesting territories in early spring. Egg laying and incubation occurs from February through May with eaglets hatching during May and early June, and fledging by early July. The bald eagle continues to be protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection

Burrowing owl

The burrowing owl is listed as a BLM Sensitive Species due to recent decreases in population size. Burrowing owls are neo-tropical migrants, nest underground in burrows, and are typically found in open desert grassland and shrubland areas that are level and well drained. They depend on burrowing mammals for nest sites and are often associated with prairie dog colonies. The decline of the owl's population across its range appears to be due primarily to agricultural practices, use of pesticides, and the decline of prairie dog colonies.

Ferruginous hawk

The ferruginous hawk, a BLM Sensitive Species, is the largest of the North American buteos. It is a neo-tropical migrant breeding from southwestern Canada to central Arizona, New Mexico, and northern Texas and wintering in California to northern Mexico. It is a year-round resident from Nevada through western and southern Utah, northern Arizona, and New Mexico to eastern Colorado and South Dakota. In Utah, the ferruginous hawk nests at the edge of juniper habitats and open, desert and grassland habitats in the western, northeastern, and southeastern portions of the State. Within the Planning Area they are found through the Cisco Desert, and along the Colorado and the Green Rivers. Ferruginous hawks are highly sensitive to human disturbance and are also threatened by habitat loss from surface disturbance, agricultural practices, and urban encroachment. They have experienced decline across much of their range and have been extirpated from some of their former breeding grounds in Utah.

Table 3-5 summarizes potential habitats within the MFO for the five most common terrestrial State Sensitive Species.

Table 3-5: State Sensitive Species Potential Habitats

	Pinion Juniper woodlands	***Salt Desert Scrub***	***Sagebrush***	***Blackbrush/ Grasslands***	***Conifer communities***	***Riparian***	***Invasive***
White-tailed Prairie Dog	1.2%	84.5%	0.5%	7.8%	0.1%	0.09%	3.6%
Gunnison Prairie Dog	4.4%	14.0%	50.0%	28.7%	0.0%	0.04%	1.4%
Burrowing owl	1.4%	61.6%	1.0%	28.3%	0.1%	0.02%	2.9%
Ferruginous Hawk	5.0%	79.7%	1.3%	8.1%	0.0%	0.09%	3.9%
Kit Fox	5.0%	64.8%	2.6%	13.3%	0.0%	0.02%	3.9%

Fish and Amphibians

Sensitive species of fish within the project area include the roundtail chub (*Gila robusta*), bluehead sucker (*Catostomus discobolus)*, and flannelmouth sucker (*Catostomus latipinnis*), which are collectively managed as "the three species" under a range-wide conservation agreement (Utah Division of Wildlife Resources 2006). Each of the three species was historically widely distributed in rivers and lower elevation perennial streams in the upper Colorado River basin, but declined in abundance and contracted in distribution to 45-55% of their historic ranges following widespread habitat alterations and introductions of nonnative fishes (Bezzerides and Bestgen 2002). Recent surveys conducted by the Utah Division of Wildlife Resources (Walker and Birdsey 2005; Keller and Hart 2013, 2014) indicate that all three of these species are found within the project area in the Green River, Colorado River, Dolores River, and the lower portion of Mill Creek (near its confluence with the Colorado River in Moab). Bluehead suckers and flannelmouth suckers are also known to co-occur in Castle Creek, a perennial tributary to the Colorado River, and in two perennial tributaries to the Dolores River, Fisher Creek, and Granite Creek. Flannelmouth suckers are likely the most widespread of the three species within the project area. They have been detected recently in Negro Bill Canyon Creek and Onion Creek, and are likely to inhabit several other reaches of perennial and intermittent streams that have not yet been thoroughly surveyed. Recent population trends for the three sensitive fish species in the project area are unknown because survey sites have not been visited repeatedly over multiple years.

One sensitive amphibian species, the Great Plains toad (*Anaxyrus cognatus*) is potentially present in the project area, but its distribution in southeastern Utah is poorly documented. Great Plains toads spend much of their time underground, and are not restricted to aquatic or riparian habitats, but depend on standing water for reproduction. They would breed in stream pools, flooded depressions in riparian habitats, and ephemeral pools in upland habitats.

Threatened and Endangered Animal Species

Species listed as threatened or endangered are afforded protection under the Endangered Species Act (ESA). The BLM is required to consult with the U.S. Fish and Wildlife Service (USFWS) on potential impacts to Federally listed species and their habitats if they occur within the project footprint. A total of eight Federally listed species were identified as having the potential to occur within the Project Area and be impacted by project activities. These species are noted in Table 3-6 and would be analyzed. These include four terrestrial species and four aquatic species. Discussions of each species follow:

Table 3-6: U.S. Fish and Wildlife Service Threatened, Endangered, and Candidate Animal Wildlife Species within the Project Area

Common Name (*Scientific Name*)	Habitat	Status	Designated Critical Habitat in Project Area	Potential for Occupancy in Project Area	Further Analysis (Yes/No)
California Condor (*Gymnogyps californianus*)	Roosts and nests in cliff habitat. Forages in open areas.	Endangered, Experimental	None	Very low-migrant only-no analysis would be presented	No

Table 3-6: U.S. Fish and Wildlife Service Threatened, Endangered, and Candidate Animal Wildlife Species within the Project Area					
Common Name (*Scientific Name*)	**Habitat**	**Status**	**Designated Critical Habitat in Project Area**	**Potential for Occupancy in Project Area**	**Further Analysis (Yes/No)**
Gunnison Sage-grouse *(Centrocercus minimus)*	Prefers sagebrush and sagebrush/grassland habitats.	Threatened	Yes (Proposed)	No Occupancy	Yes
Mexican spotted owl (*Strix occidentalis lucida*)	Steep rocky canyons.	Threatened	No	Potential for nesting	Yes
Southwestern Willow flycatcher (*Empidonax traillii extimus*)	Low scrub, thickets, or groves of small trees, often near watercourses.	Endangered	No	Low-migrant only, no nesting occurs in the area.	Yes
Western yellowbilled cuckoo (*Coccyzus americanus occidentalis*)	Riparian Areas	Threatened	None	Unknown	Yes
Bonytail (*Gila elegans*)	Eddies, pools, and backwaters near swift current in large rivers	Endangered	Yes	Very low	Yes
Colorado pikeminnow *(Ptychochelius lucius*)	Adults can be found in habitats ranging from deep turbid rapids to flooded lowlands. Young prefer slow-moving backwaters	Endangered	Yes	Known occupancy	Yes
Humpback chub (*Gila cypha*)	Fast, deep, whitewater areas	Endangered	Yes	Low-stocked fish	Yes
Razorback sucker (*Xyrauchen texanus*)	Slow backwater habitats and impoundments	Endangered	Yes	Known occupancy	Yes

Gunnison Sage-grouse

Gunnison sage-grouse require a variety of habitats found in large expanses of communities below 9,800 feet, with a diversity of grasses and forbs and healthy riparian ecosystems. Their habitat requirements differ both seasonally and for sex and age classes. The presence of each habitat type in healthy condition in close proximity to winter, lek, nest, and brood-rearing habitat is essential. A large percent of each seasonal habitat must be in later seral stage ecological condition to meet the requirements of the grouse. Population declines are attributed to several

factors, including habitat loss and fragmentation resulting from increased roads, housing developments, uranium mill tailings remedial action, power lines, and loss of riparian areas. Other issues decreasing habitat quality are livestock grazing, drought, land treatments, increased elk and deer populations, and herbicides.

The MFO area contains designated critical habitat for this species and has had documented populations through the mid-1990s. No sightings have been reported by the UDWR in the past twenty years and therefore these habitats are considered unoccupied. The MFO contains 5,380 acres of proposed designated critical habitat on federal lands currently proposed by the Service in the Dolores Triangle area and another 12,625 acres of federal lands in the La Sal area that is identified by the UDWR as vacant/unknown habitats.

Mexican Spotted Owl

Steep slopes and canyons with rocky cliffs characterize much of the Mexican spotted owl (MSO) habitat in Utah. Within the Colorado Plateau, MSO are known to nest in steep-walled canyon complexes and rocky canyon habitat within desert scrub vegetation. Nesting and breeding begins in March, and eggs are laid in late March or early April and incubated for approximately 30 days. The eggs usually hatch in early May. Nesting MSO fledge from early to mid-June and disperse out of the natal area in the fall. The MSO exists in small isolated subpopulations and is threatened by habitat loss and disturbance from recreation, improper grazing practices, road development, catastrophic fire, timber harvest, and mineral development.

The MFO contains 55,600 acres of designated critical habitat on federal lands in the Shafer Basin area and below Hatch Point but no trailing would occur within this habitat. According to the Spotskey-Wouldey MSO habitat model (Wouldey and Spotskey 1997) roughly 1,502,600 acres of potential habitat are found on federal lands found within the MFO. Within the MFO there are currently three active MSO nesting territories.

Yellow-Billed Cuckoo (Western)

The Western Yellow-billed cuckoo (YBCU) is associated with cottonwoods and riparian cover, which provides nesting and brood-rearing habitat. YBCU cuckoos are obligate riparian nesters and are restricted to more mesic habitat along rivers, streams, and other wetlands. The YBCU has been recently listed (November 2014) due to loss of riparian habitat from agricultural use, water use, road development and urban development. The MFO contains approximately 860 acres of designated critical habitat of which 230 acres are located on federal lands currently proposed by the Service along the Colorado River. No known nesting population of this species exists at present within the Project Area, but limited surveys for this species have identified several detections over the past ten years.

Southwestern Willow Flycatcher

The Southwestern willow flycatcher (SWFL) utilizes and breeds in patchy to dense riparian habitats along streams and wetlands near or adjacent to surface water or saturated soils. These dense patches are often interspersed with small openings, open water, and/or shorter/sparser vegetation, creating a mosaic habitat pattern. Population declines are attributed to numerous, complex, and interrelated factors such as habitat loss and modification, invasion of exotic plants into breeding habitat, brood parasitism by cowbirds, vulnerability of small population numbers,

and winter and migration stress. Currently all of the riparian habitats in the MFO other than the upper Bookcliffs area has been assessed and surveyed for SWFL presence. There have been approximately 11,200 areas of riparian areas identified that offer some level of SWFL migratory and breeding habitats, with over 9,000 acres potential suitable for nesting use. No nesting birds have ever been detected and are not expected to nest in the MFO. All SWFL detections have indicated early season migration use in only the most suitable habitats along the Green, Colorado and Dolores Rivers.

Table 3-7 Summarizes potential habitats within the MFO of four terrestrial Threatened and Endangered Animal Species

Table 3-7: Threatened and Endangered Animal Species Potential Habitats

	Pinion Juniper woodland	***Salt Desert Scrub***	***Sagebrush***	***Blackbrush/ Grasslands***	***Conifer communities***	***Riparian***	***Invasive Weeds***
GUSG Critical Habitat	51.2%	7.0%	34.7%	1.4%	0.0%	0.48%	1.6%
GUSG Vacant Habitat	16.0%	0.2%	76.8%	0.0%	0.0%	0.08%	0.1%
MSO Suitable Habitats	65.5%	4.8%	4.5%	11.7%	9.7%	0.50%	1.3%
SWFL & potential YBCU habitats	21.6%	14.0%	2.7%	2.3%	4.2%	7.90%	46.6%

Colorado River Basin Endangered Fish

The project area encompasses critical habitat for four endangered fish species that are endemic to the Colorado River basin: bonytail (*Gila elegans*), humpback chub (*Gila cypha*), Colorado pikeminnow (*Ptychocheilus lucius*), and razorback sucker (*Xyrauchen texanus*). Within the boundaries of the BLM Moab Field Office, critical habitat for these four species has been designated along all segments of the Green and Colorado rivers, inclusive of the 100-year floodplain and confluences with perennial tributaries (U.S. Fish and Wildlife Service 1994). Bonytail, humpback chub, and Colorado pikeminnow are relatively large-bodied members of the minnow family (Cyprinidae) adapted to the swift and turbid waters, seasonally warm water, and periodic flooding characteristic of the Colorado River and its major tributaries. The razorback sucker is one of three native members of the sucker family (Catostomidae) that occur in the project area and, like the three endangered minnow species, is adapted to habitats that historically had swift and turbid water and experienced seasonal flooding during periods of peak mountain snowmelt. Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) are also present in the region, but inhabit high elevation streams and have not been detected on BLM land.

Bonytail

Bonytail are large (up to 55 cm total length) long-lived fish that were once common in the upper Colorado River basin, but experienced a rapid and widespread decline, beginning in about 1950, that was associated with habitat alterations caused by construction of main-stem dams and

introductions of nonnative fishes (Miller 1961; Valdez and Muth 2005). Available information suggests that bonytail prefer pools and eddies near swift current in rocky canyons. A few remnant populations, consisting of older adults, persist in reaches and major tributaries of the Green River and Colorado River outside of the project area, but no natural reproduction has been documented in the upper Colorado River basin since 1961. The species was listed as endangered in 1980 and is now considered functionally extinct in the wild by the U.S. Fish and Wildlife Service. Broodstock for captive propagation of bonytail are maintained at the Dexter National Fish Hatchery and Technology Center in New Mexico, and captive propagated of bonytail occurs at the J. W. Mumma Native Aquatic Species Restoration Facility in Alamosa, Colorado and at the Wahweap State Fish Hatchery in Big Springs, Utah. Hatchery-reared bonytail are stocked in the Colorado and Green rivers and in associated riparian wetlands. Hatchery-reared bonytail implanted with Passive Integrated Transponders (PIT tags) have been captured or detected recently within the project area in the Dolores River (Keller and Hart 2013, 2014).

Humpback Chub

Humpback chub are moderately large (up to 48 cm in length) long-lived fish adapted to turbid and seasonally warm water and variable hydrological conditions. Populations of Humpback chub have been negatively impacted by altered flow regimes and introductions of nonnative fishes, and the species was listed as endangered in 1967 and given full protection under the Endangered Species Act in 1973. Five viable populations persist in the upper Colorado River basin, one of which occupies reaches of the Colorado River in Westwater Canyon within the project area. Small numbers of Humpback Chub have been reported as far downstream as the Moab area (Taba et al. 1965; Valdez and Clemmer 1982). Humpback chub tend to inhabit pools and deep eddies along rocky shorelines and have stronger site fidelity than the other endangered fishes of the upper Colorado River basin, rarely migrating long distances. Seasonally flooded riparian areas are important for reproduction, and sheltered shoreline habitats are favored by young juveniles (Valdez and Muth 2005).

Colorado Pikeminnow

The Colorado pikeminnow is the largest minnow in North America (reaching lengths of up to 6 feet, or 1.8 m) and was historically the apex predator in the Colorado River and its major tributaries. Populations of Colorado pikeminnow were negatively impacted by habitat fragmentation caused by dam construction, by altered flow regimes downstream from dams, and by introductions of nonnative fishes. The average lifespan for Colorado pikeminnow is 47-55 years, and most populations are now dominated by old adults. The species was listed as endangered in 1967 and received full protection under the Endangered Species Act in 1973. Viable populations of Colorado pikeminnow remain, but occupy only about 25% of the historic range of the species in the upper Colorado River basin. Adult Colorado pikeminnow migrate long distances to spawn and can be found, on at least a seasonal basis, in virtually all reaches of the Green River and the Colorado River within the project area (Tyus 1991; Valdez and Muth 2005). Colorado pikeminnow also inhabit the Dolores River from the Colorado-Utah state line to the confluence with the Colorado River (Valdez et al. 1992). The species is adapted to a hydrological cycle characterized by spring flooding and relatively stable base flows during other periods of the year. Deep pools and runs are preferred habitats during much of the year, but flooded riparian and backwater habitats are used for spawning and as juvenile habitat during spring runoff (Tyus 1991; Osmundson et al. 1995).

Razorback Sucker

Razorback suckers were historically common to abundant in most warm water habitats in the upper Colorado River basin, but now occur at only low population densities in the Green River and the lower reaches of a few of its tributaries, in two disjunct segments of the Colorado River, and in the San Juan River. The species was listed as endangered in 1991. Most remaining populations consist primarily of old adults, which can live up to 44 years and reach lengths of up to 100 cm. The largest remaining population in the project area inhabits the middle and lower Green River, but it declined in abundance from approximately 1000 adults to less than half that number in less than 20 years (Valdez and Muth 2005). A 1979-1981 survey effort along a 465 km stretch of the Colorado River extending from Hite, Utah at the north end of Lake Powell upstream to Rifle, Colorado detected 52 old adults and no young adults or juveniles (Valdez et al. 1982). However, recent reproduction and juvenile recruitment has been documented in the Green River and portions of the Colorado River (Bestgen et al. 2012).

Razorback suckers inhabit pools, eddies, and backwater habitats, but migrate moderate distances to spawn in backwater habitats and seasonally inundated riparian habitats during mid-April through June. Larvae drift into shallow floodplain habitats, where productivity and levels of available food resources tend to be many times higher than in main channel habitats (Mabey and Shiozawa 1993). Widespread loss of these seasonally inundated floodplain habitats due to regulated flows downstream from dams is thought to be a major factor contributing to the decline of populations of razorback suckers (Valdez and Muth 2005).

3.3.2 Floodplains

Floodplains are relatively flat, periodically inundated areas bordering the channels of rivers and streams that are occasionally flooded during periods of rapid snowmelt or intense precipitation. Often, the area occupied by the floodplain is much larger than the channel itself. Virtually all of the rivers, perennial streams, and intermittent streams in the project area have associated floodplains. Floodplains function as ecotones between aquatic and upland habitats. Their alluvial soils tend to be nutrient rich, and are capable of absorbing, filtering, and retaining substantial amounts of water during flood events. Consequently, intact floodplains tend to dampen the severity of flood events and enhance water quality.

Floodplains are characterized by a gradient in soil moisture, soil properties, and vegetation that is correlated with the decreasing frequency of inundation from the edge of the stream channel to the outer periphery of the floodplain. The 100-year floodplain of a river or stream is defined as the region that is inundated during a 100-year flood event: a flood of such as magnitude that it has a 1% probability of occurring during any given year. The locations of these 100 year floodplains vary depending on topography, hydrological regime, stream gradient, and channel profile.

3.3.3 Fuels/Fire Management

Livestock grazing management practices combined with an aggressive fire suppression program, several continuous years of drought and the tamarisk beetle have influenced the natural fire regime within the proposed project area.

Presently, the dominant invasive species in the area are cheatgrass, tamarisk, Kochia and Russian olive. A successful treatment in this area would result in fire moving from the tree canopy to the ground through reduction of a continuous canopy. Fire would then spread through perennial grasses, forbs and shrubs, burning at a lower intensity and resulting in safer and more efficient fire control.

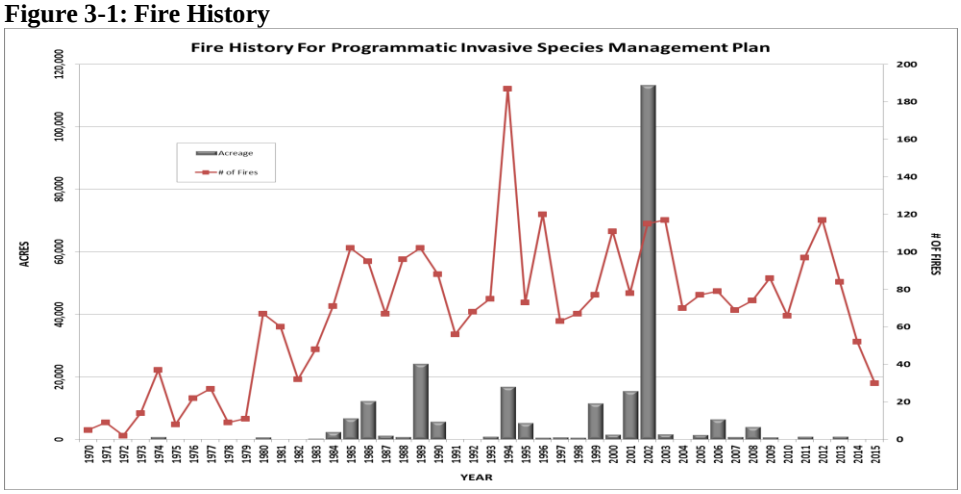
The proposed action falls within 16 FMU's (Appendix I). The BLM Fire and Fuels Program utilize several methods to develop a fuels project location. The PISMP design was delineated through ground assessment, wildfire burn probability modeling, fire history and vicinity of wildland urban interface property. Peer reviewed scientific data provided by Landfire to assess the Vegetation Condition Class (VCC) within the project area was also utilized (Appendix J). VCC categorizes departure of vegetation into three classes using methodologies from remote sensing, ecosystem simulation, vegetation and disturbance ecology, predictive landscape mapping, landscape simulation, and fire behavior and effects modeling (www.landfire.gov).

Table 3-8: VCC Classes

VCC Class	Description	Acres
Vegetation Condition Class I.B	Low to Moderate, Vegetation Departure 17-33%	1,764,510
Vegetation Condition Class II.A	Moderate to Low, Vegetation Departure 34-50%	562,536
Vegetation Condition Class II.B	Moderate to High, Vegetation Departure 51-66%	290,143
Vegetation Condition Class III.A	High, Vegetation Departure 67-83%	34,671
Water	Water	10,748
Non burnable Urban	Non burnable Urban	11,607
Burnable Urban	Burnable Urban	15,328
Barren	Barren	135,878
Sparsely Vegetated	Sparsely Vegetated	22,092
Non burnable Agriculture	Non burnable Agriculture	4,000
Burnable Agriculture	Burnable Agriculture	4,556

The FMP recommends fuels management strategies such as prescribed fire and mechanical and/or other types of treatment to reduce hazardous fuel conditions (Canyon Country Fire Zone FMP, page 83). Wildland fire can be utilized by fire management to remove undesirable vegetation. The PISMP area has experienced an increase of fire activity. Since 1970 the analysis area has had 3080 documented fires burning a total of 242,331 acres (Appendix K).

Figure 3-1: Fire History



3.3.4 Hydrologic Conditions

In general, flow regimes and floodplain dynamics on the rivers and several of the streams within the boundaries of the MFO have been highly altered during the past 60-70 years by the construction of dams and diversions. However, hydrologic conditions vary by watershed and by area. There is no comprehensive assessment of current hydrologic conditions in the project area. A recent assessment of the chemical, physical, and biological condition of wadeable streams on BLM land in Utah included only 10 sites in the Canyon Country District: a sample size that was too small to permit general conclusions (Miller et al., 2014). Conditions can be assessed on a site by site basis by examining watershed features, including water quality parameters and the characteristics of floodplain soils. On a statewide level, hydrologic conditions on BLM land in many watersheds are impaired due to a variety of activities, particularly stream diversions and effluent from agricultural activities on adjacent land and impacts from oil and gas wells. Streambank instability also appears to be a recurrent problem associated with degraded hydrologic conditions (Miller et al., 2014). A variety of land use practices and resource issues can have far-reaching impacts on hydrologic conditions in a watershed. When multiple resources in the watershed are impaired, compound or synergistic effects on hydrologic conditions can occur.

3.3.5 Invasive Species/Noxious Weeds

One of the MFO's highest priorities is to promote ecosystem health, and one of the greatest obstacles to achieving this goal is rapid expansion of invasive plants across public lands. See Appendix E for a list of invasive plants of concern.

The State of Utah's Weed Control Association has a total of 27 weeds on the noxious weed list that are prioritized for treatment into three levels: A, B, and C. These invasive plants would be focused for treatment were found, along with other invasive plants of concern, as shown in Appendix E.

- "Class A" weeds have a relatively low population size within the State and are of highest priority being an Early Detection Rapid Response (EDRR) weed.
- "Class B" weeds have a moderate population throughout the State and generally are thought to be controllable in most areas.
- "Class C" weeds are found extensively in the State and are thought to be beyond control. Statewide efforts would generally be towards containment of smaller infestations.

The BLM considers an invasive plant as one that interferes with management objectives for a given area of land at a given point in time (Moab EIS, 2008). A noxious weed is a plant designated by a federal, state, or county government to be damaging to public health, agriculture, recreation, wildlife, or any public or private property (Sheley, Petroff, 2003).

Invasive plants typically have no natural competition or enemies to limit their propagation and spread (Westbrooks, 1998). In most cases, noxious weeds are also non-native species (USDI, 1991). They are capable of invading plant communities and replacing native species, particularly following a disturbance. If invasive plants are not controlled, there presence negatively influences the biotic integrity of the site and hinders rangeland health standards.

There are a number of causes for invasive plant infestations, such as human activities, livestock, wildlife, water, wind, disturbances, fire, and climatic fluctuations. Roads can provide a vector for the establishment and spread of noxious weeds, and control efforts are conducted along road right-of-ways.

The greatest impact of invasive plants in the project area is typically along the upland terraces and benches of the Colorado River. Tamarisk and Russian olive infestations are located along the river and other drainages, and have resulted in vegetation composition altered from their natural state. Russian knapweed has also reached high densities along the river corridor and corresponding side drainages. Invasive species aggressively out-compete native species within a plant community and often alter the physical and biotic components enough to change the entire ecological community (Moab EIS, 2008).

Invasive plants often displace native desired plant species. Vegetation communities infested with invasive plants have landscapes whose structure, organization, and/or functions have been altered (Sheley, Petroff, 2003). This modifies the native plant species diversity, plant composition, relative abundance of desired vegetation, reduces forage production, and hinders the biotic integrity of a site. Many invasive species have transformed both the structure and function of landscapes by influencing nutrient cycling or disturbance regimes.

The ownership pattern along the Colorado River adds complexity to control efforts, as it is composed of BLM, NPS, State of Utah, and private lands. Past control efforts have focused integrated invasive plant management strategies along this river corridor.

Another increasing issue is cheatgrass infestation especially in native sagebrush, desert salt scrub, and blackbrush grasslands communities. Cheatgrass, a non-native annual grass that has become a problem on many western rangelands including Utah. Cheatgrass can reduce the productivity and diversity of sagebrush, desert salt scrub and native grass communities. It is a prolific seed producer which gives it a competitive advantage over native vegetation. Cheatgrass is able to germinate in the fall and spring (Martens et al. 1994) before native grasses, which also

makes it very competitive with native plant species. It is tolerant of grazing and increases with fire (Klemmedson and Smith 1964).

Cheatgrass is very flammable and when abundant can increase the fire frequency of ecosystems. Historically the return interval for wildfires in western shrublands was long-term and generally ranged from 50 to 150 years or more. The wildfire return intervals in rangelands infested with cheatgrass have been greatly reduced. Pellant (1990) found the wildfire return intervals in some southern Idaho rangelands infested with cheatgrass are now less than five years.

Controlling invasive plant species is a priority and is a challenging task for the MFO, as it is a difficult and important issue as it relates to proper vegetation management. Typically, the MFO contracts with Grand County to treat weeds on BLM lands utilizing integrated pest management strategies (combined use of mechanical, chemical, manual, biological, and prevention measures).

3.3.6 Lands with Wilderness Characteristics

The planning area contains 289,692 acres of lands identified as possessing the wilderness characteristics of size, naturalness and outstanding opportunities for solitude and/or primitive and unconfined recreation (Appendix L). Of this acreage, MFO Natural Areas comprise 51,637 acres, which are managed to protect, preserve and maintain these wilderness characteristics. The MFO 2008 RMP chose to manage the remaining acreage for resources other than wilderness characteristics, although efforts would be made to minimize damage to this resource where possible.

3.3.7 Soils

Soil types vary within the Moab Field Office based on natural factors such as slope, aspect, elevation and presence of water. Soils vary in salinity levels, wind and water erodibility, and percent organic material. Surface disturbing uses may affect these conditions and decrease overall soil health for a period of time. The larger, more extensive disturbances would cause larger, longer term impacts.

Indicators of degraded soil conditions include increased water and wind erosion rates, loss of soil stability, decreased floodplain stability, increased gullying, increased compaction levels, decreased infiltration rates, reduced biological soil crust development, and decreased or loss of soil productivity, Accelerated erosion causes the formation of rills and gullies, and can contribute to excess sedimentation in streams and reservoirs.

The Moab RMP identifies sensitive soils as soils with characteristics that make them extremely susceptible to impacts or more difficult to restore or reclaim after disturbance (page 3-125). This sensitive soils designation refers to highly erodible soils, saline soils, drought intolerant soils, biotic soil crusts and steep slopes. Once sensitive soils are disturbed, the impact is usually long-lasting (BLM 2008 page 3-125). These soils need special management to protect resources at risk (BLM 2008 page 3-126).

3.3.8 Threatened, Endangered or Candidate Plant Species and Utah BLM Sensitive Plant Species

Species listed as threatened or endangered are afforded protection under the Endangered Species Act (ESA). The BLM is required to consult with the U.S. Fish and Wildlife Service (USFWS) on potential impacts to Federally listed species. A total of two Federally listed species were identified as having the potential to occur within the Project Area and may be impacted by project activities. There are no designated critical habitats for Jones Cycladenia or Navajo Sedge within the project area. These species are noted in Table 3-9 and would be analyzed.

Table 3-9: U.S. Fish and Wildlife Service Threatened, Endangered and Candidate Plant Species within the Project Area.

Common Name *(Scientific Name)*	**Habitat**	**Status**	**Potential for Occupancy in Project Area**	**Further Analysis (Yes/No)**
Jones cycladenia *(Cycladenia humilis* var. *jonesii)*	Jones cycladenia has exacting soil requirements, growing only on the gypsiferous, saline soils of the Cutler, Summerville, and Chinle formations. It occurs in plant communities of mixed desert scrub, juniper, or wild buckwheat and Mormon tea.	Threatened	The Jones cycladenia model show ranges from very low (0%) to highest (38%) potential for occupancy in the MFO. There are known populations within the MFO. The populations are found in Castle Valley, Professor Valley, the cliffs above Onion Creek, below Dead Horse Point and along the north side of the Colorado River within the Professor Valley Area. The populations are located in the Potash, North River, Professor Valley, Castle Valley, Fisher Valley and Ida Gulch grazing allotments.	Yes
Navajo Sedge *(Carex specuicola)*	Navajo sedge is usually found within pinyon-juniper woodlands and is restricted to Navajo Sandstone seeps and springs pockets or hanging gardens.	Threatened	There are no known populations within the project area and no treatments would occur in pinyon-juniper woodlands therefore this species would not be discussed.	No

Jones cycladenia *(Cycladenia humilis* var. *jonesii)*

Currently, Jones cycladenia occurrs in four known areas in the Canyonlands region of southwestern Utah and northern Arizona. It is endemic to Emery, Garfield, Grand, and Kane Counties in Utah and Coconino County, Arizona. The populations are disjunct, occurring at least 100 miles apart. Jones cycladenia has exacting soil requirements, growing only on the

gypsiferous, saline soils of the Culter, Summerville, and Chinle formations. It occurs in plant communities of mixed desert scrub, juniper, or wild buckwheat and Mormon tea at elevation between 4,390 to 6,000 feet. Jones cycladenia flowers in mid-May through June.

It is listed as imperiled in Utah and critically imperiled in Arizona. Jones cycladenia is threatened by off-road vehicles, exploration for oil, gas, and minerals, and livestock grazing. Jones cycladenia may be poorly adapted to the present climate and is threatened by future climate change. The ecosystem where the plant grows is thought to be fragile, easily degraded, and slow to recover. No critical habitat was designated for this species, because of the fear that naming the location of the plants would attract collectors.

All known populations of Jones cycladenia found in the MFO are located on very steep slopes inaccessible to cattle.

BLM State Sensitive Plant

Sensitive plants are those species that do not occur on Federal or state lists, but which are designated by the BLM State Director for special management consideration. BLM manages for the conservation of special status plants and their associated habitats and to ensure that actions authorized, funded, or carried out does not contribute to the need to list any species as threatened or endangered. There are thirteen known sensitive plant species which occur in a variety of vegetation cover types in the MFO and Table 3-10 contains the most current BLM sensitive plant list (2011).

Complete inventories do not exist for the majority of the listed sensitive plant species in Table 3-10, although some populations (e.g. Desolation canyon columbine, Isely milkvetch, Stage station milkvetch, Cisco milkvetch, Trotter's oreoxis, Shultz blazing star, Alcove rock daisy, and Canyonland lomatium) have been inventoried in the past. Most sensitive plant species are difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown.

A brief description of these BLM sensitive plants species would? be further analyzed in the following sections.

Table 3-10: BLM State Sensitive Plant Species for the Moab Field Office (2011 list)

Scientific Name	Common Name	Status*
Aquilegia desolaticola	Desolation Canyon columbine	BLM SSS
Astragalus iselyi	Isely milkvetch	BLM SSS
Astragalus pubentissimus var. *peabodianus*	Peabody's milkvetch	BLM SSS
Astragalus sabulosus var. *vehiculus*	Stage station milkvetch	BLM SSS
Astragalus sabulosus var. *sobulosus*	Cisco milkvetch	BLM SSS
Lomatium latilobum	Canyonlands lomatium	BLM SSS
Lygodesmia doloresensis	Dolores rushpink	BLM SSS
Lygodesmia entrada	Entrada rushpink	BLM SSS
Mentzelia shultziorum	Shultz blazing star	BLM SSS
Oreoxis trotter	Trotter's oreoxis	BLM SSS
Perityle specuicola	Alcove rock daisy	BLM SSS

Scientific Name	Common Name	Status*
Sphaeralcea janease	Jane's globemallow	BLM SSS
Shaeralcea psoraloides	Psoralea globemallow	BLM SSS

*BLM SSS – BLM special status plant species

Desolation Canyon Columbine

Desolation Canyon columbine inhabits seeps and adjacent moist sandy soil in the Teriary Price River formation along the Green River in canyons tributary to Desolation Canyon, at elevations of 4,400 to 4,800 feet. Flowering occurs in April through May. The distribution is narrowly restricted in Utah and endemic in Grand and Uintah Counties.

Desolation Canyon columbine is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Populations of plants were found along the Green River in canyons tributary to Desolation Canyon in T.18S., R.17E., Section 32 on May 10, 1999, and along the Green River in Desolation Canyon below Coal Creek, and Gray Canyon in T.18S., R.17E., Section 29 on May 10, 1999.

Isely's Milkvetch

Isely's milkvetch grows in pinyon-juniper and desert shrub communities on seleniferous and gypsiferous sandy to gravelly clay slopes of the uranium-rich Morrison and Mancos formations between 5,000 to 6,600 feet in elevation. Flowering occurs in March through May. The distribution is narrowly restricted in Utah and endemic to Grand and San Juan Counties.

Locations have been verified from a field survey for Isely's milkvetch in the spring of 2012. These locations are grazed by cattle and Isely's milkvetch is not palatable but could be affected by the trampling of livestock, though no evidence of it has been seen. Threats to Isely's milkvetch are off-road vehicle use and mining activities.

Designated roads, power line, and gravel parking lot were located within the habitat, and there were Isely's milkvetch growing underneath the power line in the disturbed soil, plants were also growing in one disturbed area of a recreational parking lot and on a designated dirt road the plants were growing in the road and along the disturbed area next to the road.

Isely's milkvetch is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Populations of plants were found at the junction of Pack Creek road and the La Sal Loop road as well as along a designated road northeast of Amasa Back recreation area?

Peabody's Milkvetch

Peabody's milkvetch grows in pinyon-juniper and mixed desert shrub communities at 4,300 to 5,800 feet in elevations. Peabody's milkvetch is endemic to Utah in northeast Emery County and northwest Grand County. Flowering occurs in May through early June.

This milkvetch is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown.

This area is grazed by cattle and Peabody's milkvetch is not palatable but could be affected by the trampling of livestock. Threats to Peabody's milkvetch are OHV and mining activities.

Stage Station Milkvetch

The Stage milkvetch grows in shadscale, woody-aster, and galleta grass community on the Morrison Formation between 4,480 to 4,800 feet elevation. Flowering occurs in late March through May. Stage Station milkvetch considered geographically isolated from *Astraglus sabulosus* var. *sabulosus* (Cisco milkvetch). Stage station milkvetch is a narrow endemic to Utah in Grand County.

Locations have been verified from a field survey for Stage Station milkvetch in the spring of 2012, field survey and monitoring of Cisco milkvetch in April 1999 and Sensitive Plant Inventory Project Moab District (BLM) (Target Species: *Astragalus sabulosus)* in October 1988.

The habitat for this species is located in a popular recreation area, though little off-road use has been observed around current populations. However, plants have been observed growing in disturbed soils around a recreational parking lot. Plants have also been observed growing in disturbed soils underneath power lines that intersect portions of desirable habitat. Portions of Stage station milkvetch habitat are also grazed by cattle, and although this species is not palatable forage, populations could be impacted by trampling, though effects of this have not been observed.

This milkvetch is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Populations of plants were found in the area around the Stage Station, Mill Canyon and northeast of Courthouse Rock which is a high recreational area of MFO.

Cisco Milkvetch

Cisco milkvetch grows in salt desert shrub communities on the Mancos Shale formation (Cisco Desert) at 4,250 to 5,250 feet in elevation. Flowering occurs in late March through May. Cisco milkvetch is endemic to the Grand River Valley (Cisco Desert) in Grand County, Utah.

This milkvetch is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Populations of plants have been verified from a field survey for Cisco milkvetch, in the spring of 2012, Habitat Conservation Assessment done in February 1996 on the Cisco milkvetch, field survey and monitoring of Cisco milkvetch in April 1999, and Sensitive Plant Inventory Project Moab District (BLM) (Target Species: *Astragalus sabulosus*) in October 1988. On April 8, 2015 three new populations of Cisco milkvetch was found in Salt Wash in T.22S., R.17E., Section 30 SWNE within the Ruby Ranch Grazing Allotment, within the right away of Highway 191 on Utah State lands in T.22S., R.19E., Section 15 NWSW, and on Utah State lands in T.18S., R.25E., Section 2 NWSE within the San Arroyo Grazing Allotment. Cisco milkvetch often grows in locations where oil and gas activity (roads, drill sites, wells, storage tanks and pipelines) is occurring. . The recreational use is increasing in the Cisco Desert due to off-road vehicle use on BLM legal motorcycle trails and illegal motorcycle trails. The Cisco Desert is

grazed by sheep and cattle. Cisco milkvetch is not palatable but could be affected by the trampling of livestock, though no evidence of it has been seen.

Canyonlands Lomatium

Canyonlands lomatium grows in rock crevices and sandy deposits of Entrada and Navajo sandstone often in slot canyons and between fins, in Utah mainly in pinyon-juniper and desert shrub communities. Flowering occurs in April to June. It also found in Navajo sandstone formation that weathers like Entrada sandstone formation in Sand Flats and Mill Creek areas. Canyonlands lomatium is found at the elevation between 4,800 to 6,855 feet. This species of plant is found in southeastern Utah in Grand and San Juan Counties.

Canyonlands lomatium is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Populations of plants have been verified from a field survey for Lomatium latilobum in MFO in June 1996. All these populations are found in slot canyons and/or on very steep slope and is inaccessible to cattle. Grazing was not an observed threat to any of the known populations of plants. The national and international awareness of this resource, both its scenic and recreational value, has resulted in an escalation of the demands upon it. This demand has entered into the habitat of Canyonlands lomatium and is likely the greatest threat to its survival.

Dolores Rushpink

Dolores rushpink grows in Juniper, sagebrush, rabbitbrush, and blackbrush communities in reddish alluvial soils, at 4,600 to 4,700 feet in elevation. Flowering occurs in June. Dolores rushpink is endemic to Utah in Grand County and Colorado in Mesa County.

Dolores rushpink is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Threats to Dolores rushpink are OHV, exploration for oil, gas and mining activities and livestock grazing.

Entrada Rushpink

Entrada rushpink grows in mixed desert shrub and juniper communities between 4,400 to 4,800 feet in elevation. Flowering occurs in June. Entrada rushpink is endemic to Utah in Emery, Grand and Sand Juan Counties.

Entrada rushpink is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Threats to Entrada rushpink are OHV, exploration for oil, gas and mining activities and livestock grazing.

Shultz Blazing Star

Shultz blazing star grows in shadscale, eriogonum, and ephedra communities on the Cutler Formation along Onion Creek at 4,160 to 5,200 feet in elevation. Flowering occurs in July through August. Shultz blazing star is found in Grand County, Utah and is endemic to Colorado Plateau.

Shultz blazing star is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Populations of plants have been verified from a Status Report for Mentzelia shultziorum in April 1998 and July 2004. All of these populations are found on very steep slopes and are inaccessible to cattle. Most populations are in areas that are easily accessible to recreation and other uses. However, due to the steep slopes on which the plants reside, it is unlikely that recreation would have a major effect on these plants or their habitat. There was no evidence of foraging of the plants, nor was there any evidence of disease. Most of the plants appeared to be healthy and vigorous.

Trotter's Oreoxis

Trotter's oreoxis grows in warm desert shrub and mixed juniper communities. The Trotter's oreoxis is found on slickrock or Main Body Entrada sandstone on eastern slope of Courthouse Rock and Navajo sandstone below on the flats. The most abundant population is found on Moab Tongue white sandstone of Entrada. Less frequently it is located in alcoves, hanging gardens and along cliff bases that are moist and shaded. Plants occur at the elevation of 4,750 to 5,000 feet. Flowering occurs in late April through mid-June. Trotter's oreoxis is endemic to Utah in Grand County.

Trotter's oreoxis is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Populations of plants have been verified from a report for Sensitive Plant Inventory Project (Target Species is Trotter's oreoxis). Due to its isolated location, the majority of the habitat is inaccessible to recreation vehicles and grazing activity. There are some populations of plants that are close to recreation activity and there is a presence of at least one mining claim.

Alcove Rock Daisy

Alcove rock daisy grows in desert shrub and wet hanging garden communities in narrow, protected canyons, alcoves, and at cliff bases in Navajo sandstone. It is also found on Navajo and Windgate sandstone and Rico formations, but is not substrate specific. Plants are found at elevation of 3,700 to 4,200 feet. Flowering occurs in mid-July through late September. Alcove rock daisy is endemic to Garfield, Grand and Sand Juan Counties in Utah.

Alcove rock daisy plant populations have been verified via field surveys for the Canyonlands lomatium completed in June 1996 and a report in April 1992 for both the Alcove rock daisy and Alcove bog orchid. Threats from livestock grazing or trampling are minimal due to the habitat preference of this species.

Jane's Globemallow

Jane's globemallow grows in sandy soils of weathered White Rim and Organ Rock members of the Cutler formation. Warm desert and salt desert shrub communities between 4,000 to 4,600 feet in elevation. Flowering occurs in May through July. Jane's globemallow is endemic to Utah in Grand, San Juan and Wayne Counties.

Jane's globemallow is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely

unknown. Threats to Jane's globemallow are OHV use, oil exploration, gas and mining activities and livestock grazing.

Psoralea Globemallow

Psoralea globemallow grows in zuckia-ephedra, shadscale, eriogonum, and lepidium and pinyon-juniper communities on saline and gypsiferous Mancos Shale, Buckhorn Conglomerate, Curtis sandstone, Entrada siltstone, Carmel, and Kaibab limestone at 4,000 to 6,300 feet in elevation. Flowering occurs in mid-May through July. Psoralea globemallow is endemic to Utah in Emery, Wayne, Sand Juan and western Grand Counties.

Psoralea globemallow is difficult to inventory because their numbers and reproductive success can vary widely from year to year; therefore their population status and distribution are largely unknown. Threats to Psoralea globemallow are OHV, exploration for oil, gas and mining activities and livestock grazing.

3.3.9 Vegetation Excluding USFW Designated Species

The affected environment for vegetation was identified and analyzed in the Moab RMP EIS and Vegetation Treatments Using Herbicides PEIS, which this EA tiers. Thereby, broad scale analysis of the affected environment is covered by these documents. The affected environment section below is site specific as it relates to the alternatives.

Vegetation functions to offer wildlife cover, browse, nesting habitat, and functions in the hydrological cycle to be an interface between the soil and atmosphere. The vegetation intercepts precipitation, retards overland flow, retains soil water and nutrients through root adsorption, and transports water and nutrients, back to the atmosphere through their stems and leaves in a process called evapotranspiration (Moab EIS, 2008).

Variations in vegetation composition reflect the ecological diversity across the planning area identified in Appendix I. The composition of plant communities is influenced by factors such as soils, elevation, aspect, slope, topography, and precipitation (USDI, 2007). Vegetation can be further divided using Utah SWReGap Analysis data (USGS, 2004). The table shows acres by cover type using the SWReGap Analysis data set for the project area (see Table 3-5).

Table 3-11: SW ReGAP Cover Type

Cover Type	Acres	Percent of Project Area
Blackbrush	254,509.061	8.9
Disturbed Areas	6,730.741	0.2
Dunes	28,021.641	1
Grassland	61,087.014	2.1
Invasives	43,299.614	1.5
Mixed Conifer	173,168.808	6.1
Mountain Shrub	159,291.607	5.6
Not Classified	71,067.165	2.5
Pinyon and Juniper Woodlands	1,111,114.17	38.9
Ponderosa Pine	20,347.275	0.7
Riparian Wetland	6,737.454	0.2
Sagebrush	273,242.098	9.6
Salt Desert Scrub	648,816.758	22.7

Cover Type	Acres	Percent of Project Area
Totals:	2,857,433.41	**100%**

There are 2,857,433.41 acres with 13 vegetation types identified within and near the project area. The distribution of vegetation types in the project area is primarily influenced by soil type, elevation, precipitation, and topography (Moab EIS, 2008).

3.3.10 Visual Resources

Visual resources within the planning area include highly iconic landscapes that visitors come from all over the world to see. Visual resources are managed according to the BLM's VRM management classes and range from VRM Class I to VRM Class IV (Appendix K). About 360,988 acres of BLM land designated as VRM Class I are closed or managed with a no surface occupancy stipulation for all surface disturbing activities. The objectives in VRM Class I areas is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.

VRM Class II areas total 402,291 acres (the highest classification possible outside an area with a Special Designation). The objective in VRM Class II areas is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. That is, activities on these lands cannot attract the attention of the casual observer. Many of the most highly visited areas in the Moab Field Office are classified as VRM Class II.

VRM Class III areas total 813,120 acres. The objective in VRM Class III areas is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.

VRM Class IV areas total 268,440 acres. The objective in VRM Clas IV areas is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

3.3.11 Water Resources/Quality

Lentic (still water) bodies of water on BLM land within the boundaries of the MFO include 12 lakes and reservoirs, many stock ponds and small impounded bodies of water, and numerous ephemeral pools. Lotic (flowing water) systems include portions of the upper Colorado, lower Green, and lower Dolores rivers, at least 25 perennial and intermittent streams, numerous ephemeral streams, and many springs and seeps. Shallow groundwater resources can be found in association with these rivers, streams, springs, and seeps. Often groundwater is stored in the banks along rivers and streams, and is referred to as bank storage. These reserves of shallow groundwater are important for riparian and wetland plants, especially during dry periods.

3.3.12 Wetlands/Riparian Zones

The boundaries of the MFO encompass approximately 35,000 acres of wetland and riparian resources within Grand and San Juan Counties. These lands are managed with a goal of healthy and productive ecological conditions for maximum long-term benefits in order to provide

watershed protection while still preserving quality riparian habitats for aquatic and terrestrial species that depend on them (BLM IM UT-2005-091, Utah Riparian Policy). As a means of achieving this goal, the current Moab BLM Resource Management Plan (2008) limits certain activities in riparian areas, imposes restrictions on surface disturbing activities, and calls for restoration of degraded riparian habitats.

Most healthy riparian areas contain adequate vegetation, large woody debris, and landform features to provide the following watershed functions:

- dissipate energy associated with periods of high stream discharge, thereby reducing erosion and improving water quality;
- filter sediment, capture bedload, and aid floodplain development;
- enhance floodwater retention and groundwater recharge;
- develop root masses that stabilize stream banks against cutting and erosion;
- create diverse ponding and channel characteristics to provide habitat with the necessary water depth, duration, and temperature to support fish production, waterfowl breeding, and other uses; and
- support a relatively high level of biodiversity.

Wetland resources in the MFO are often found in small and isolated areas near spring and seep complexes where soils are saturated during most of the year or on a permanent basis. They can be located in either valley bottoms or upland settings and can range in size from less than 5 acres to 25 acres.

The riparian areas in the MFO often consist of narrow corridors bordering intermittent and perennial streams, or of bands of consistently moist soil and hydrophilic vegetation located along seeps and springs. The larger rivers, such as the Colorado River and the Dolores River have wide riparian corridors – up to several hundred feet wide in the tributary bottom areas. Smaller streams, such as Mill Creek and Kane Creek, tend to have relatively narrow riparian corridors, which may be less than 20′ wide in places.

Wetlands and riparian zones tend to be resilient to impacts from floods and catastrophic wildfire events, particularly if they are comprised of diverse assemblages of native plants. Diverse and native plant communities are also relatively resilient to impacts associated with climate change, including drier precipitation regimes, reduced stream flows, and warmer air temperatures (Peterson, 2011). Diverse wetland and riparian plant communities comprised of native plant species play particularly important roles in ecosystem functions that dampen effects of environmental fluctuations and disturbance.

Invasive plant species:
Many of the riparian areas within the MFO contain both woody and non-woody invasive plant species (see Appendix E), either in dense stands or scattered in the riparian corridor. The species richness, diversity, and density of native plants tend to decline as invasive plant species invade and begin to dominate the plant community. Tamarisk and Russian olive trees are the most prominent of the woody invasive plants. Tamarisk most commonly grow in the transition zone between wetland- riparian areas and the drier upland areas, whereas Russian olive trees are more

restricted to moist riparian areas. Nonwoody invasive plants that have been the focus of recent treatments in riparian areas include ravenna grass (*Saccharum ravennae*), kochia (*Kochia scoparia*), and Russian knapweed (*Rhaponticum repens*). Ravenna grass is non-native perennial grass that is becoming an emerging threat, quickly displacing native plants in several watersheds near Moab, including the Mill Creek Watershed. Ravenna grass grows directly on stream banks and produces many easily dispersed seeds. Kochia is a non-native annual plant that grows in the drier portions of the riparian zone. It is capable of spreading rapidly following surface disturbances that result in loss of vegetative cover. Russian knapweed is an unpalatable non-native forb that is strongly associated with tamarisk stands in the transition zone between the riparian corridor and upland habitat, but can become dominant in riparian areas following disturbance.

Status of Recently Treated Riparian Areas

There have been a variety of riparian restoration projects emphasizing tamarisk removal undertaken in the project area since 1999. These projects have involved the use of multiple techniques and types of equipment. In addition, tamarisk beetles (*Diorhabda* spp.) were released as a biocontrol agent specific to tamarisk (both tamarisk and tamarisk beetles are native to Eurasia) by the Grand County Weed Department in 2004, resulting in repeated defoliation and varying degrees of mortality of tamarisk in some riparian areas. Monitoring efforts implemented to document riparian conditions as a result of these treatments have ranged from periodic photo-documentation of visually evident changes at designated stations to rigorous monitoring along established vegetation transects over multiple years.

Large-scale riparian habitat restoration activities emphasizing tamarisk removal and fuels reduction were implemented on Moab BLM land along the Colorado River and Dolores River, beginning in 2007 and 2010, respectively. These projects successfully reduced fire hazards in the vicinity of BLM recreational areas, but post-treatment monitoring documented that weedy invasive species, such as cheat grass (*Bromus tectorum*) and Russian knapweed tended to be the dominant species among the plants that colonized treated areas. Consequently, follow-up weed treatments, sometimes in combination with active revegetation, are an ongoing component of riparian restoration activities; and multiple treatments are often required before native vegetation becomes well established (USDI 2011).

A variety of strategies can facilitate the restoration of native plant communities in treated riparian areas, including mosaic treatments that involve leaving strips of nonnative shrubs and trees intact to provide partial shade and help retain soil moisture for native plants as they germinate and grow. This approach can be effectively used in combination with active revegetation efforts and phased removal of the strips of nonnative vegetation to bring about a gradual transition from a plant community dominated by a small number of nonnative species to a diverse native plant community without substantial alterations to soil moisture, temperature, and stability. Tamarisk beetles are expected to play an important role in this transition in riparian areas that are currently dominated by tamarisk (Nissen et al. 2009).

4.0 ENVIRONMENTAL IMPACTS

4.1 Introduction

Chapter 4 addresses direct, indirect and cumulative impacts of Alternatives A and B for each affected resource. Temporary impacts would last less than one year. Short-term impacts would last from 1 to 5 years. Long-term impacts would last more than five years. A small impact means that the environmental effect is not detectable, or is so minor that it will neither destabilize, nor noticeably alter, any important attribute of the resource. A moderate impact means that the environmental effect is sufficient to alter noticeably, but not to destabilize, important attributes of the resource. A large impact means that the environmental effect is clearly noticeable and sufficient to destabilize important attributes of the resource.

The impact analyses presented in this chapter incorporate the trail design features outlined in Chapter 2.0 for Alternatives A and B. For the analysis, BLM staff used existing data, science, current methodologies, professional judgments, levels of use, and projected actions.

4.2 General Analysis Assumptions and Guidelines

As discussed in Chapter 1.6, the Proposed Action is directly connected to the programmatic documents prepared for the assessment of vegetation treatments and herbicide activities on public lands. The Proposed Action assumes that all Standard Operating Procedures (SOPs) identified in these reports that are applicable to this project would be followed. These two documents, Herbicide PEIS (BLM, 2007b), and the Vegetation PER (BLM, 2007a) and supporting reports assess the potential impacts and effects of the proposed treatment methods that would be utilized in the Proposed Action. These documents (Herbicide PEIS, Vegetation PER) also analyze the impacts of the No Action alternative. The Herbicide PEIS and Vegetation PER describe the effects of all vegetation treatment methods on air quality, soil resources, water quality and quantity, wetlands and riparian areas, fish and other aquatic organisms, wildlife resources, livestock, wild horse and burrow, paleontological and cultural resources, visual resources, wilderness and special areas, recreation, social and economic values, human health and safety, resources, and human health and the ecological risks associated with the use of the herbicides. Analytical assumptions are also provided in these documents, including the geographic and temporal scope and the baseline for analysis. The Final Biological Assessment (Final BA) (BLM, 2007d), analyses the effects of all herbicide use and vegetation treatment methods on Federally listed species and developed further Conservation Measures to insure all treatments *would not adversely affect* listed species. These Conservation Measures are incorporated into the Programmatic Invasive Species Management Plan.

To maintain and improve the effectiveness of its vegetation management practices, the Vegetation PER and Herbicide PEIS support the BLM's intent to continue to use, and increase the use of, a variety of fire and non-fire treatment methods to reduce hazardous fuels, control unwanted vegetation, and improve habitat and resource conditions. These actions would be accomplished primarily through the proactive use of herbicides, prescribed fire, wildland fire for resource benefit, manual and mechanical methods, and biological controls that have been approved for use on public lands through previous EISs addressing vegetation control.

The analyses in the documents mentioned above have provided the Moab BLM the information to: (1) assess and reduce the risk of catastrophic wildfires on public lands; (2) slow the spread of

invasive plant species, noxious weeds, and other unwanted, undesirable, or competing vegetation; (3) improve ecosystem health by restoring fire-adapted ecosystems; (4) identify and implement best management practices; and (5) understand the potential cumulative effects of fuel treatment activities.

The Herbicide PEIS identifies potential impacts to the natural and human environment from the use of herbicides, incorporates standard operating procedures and mitigation measures to ensure the protection of resources, and approves specific herbicide active ingredients for use on western BLM lands. This specific use of herbicide active ingredients and formulations on BLM lands in Utah was authorized by the Herbicide PEIS (BLM 2007a) in 2007.

The Vegetation PER analyzes potential effects of vegetation treatment methods (fire, mechanical, manual, and biological), considers reasonably foreseeable hazardous fuels reduction activities, and provides a cumulative impact analysis for the use of herbicides in conjunction with other vegetation treatment activities.

Potential impacts to the resources of concern identified in the analysis and planning stage of the proposed project and the treatment methods discussed in the proposed action have been analyzed in the above mentioned documents. A general discussion of the impacts and any additional site specific analysis that was not provided in these documents would be provided in this chapter.

Current baseline vegetative conditions within the MFO have been addressed in the 2008 RMP and in 3.3.5 Invasive Species/Noxious Weeds and 3.3.9 Vegetation Excluding USFW Designated Species sections in this document.

This analysis assumes that there would be an overall decrease in tamarisk, Russian Olive, knapweed, kochia, cheatgrass and other identified weedy species as a results of the implementation of the proposed Programmatic Invasive Species Management Plan over the next decade, provided that needed herbicide treatments and seedings are implemented as needed and monitoring results that dictates additional treatments needed are also implemented. The analysis also assumes that there would be overall increases in diverse native vegetation within treated areas. Assuming treatments proposed by the Programmatic Invasive Species Management Plan are completed in the next ten to fifteen years, weather conditions during treatment implementation and for two to four years following treatment implementation were fairly normal; this would dictate a moderate success rate of the any seeding and planting efforts.

Chapter 4 does not assume the occurrences of natural catastrophic events such as large wildland fires, extreme drought, excessive insect plagues, plant diseases or other unexpected natural events. More specific impact conclusions would be drawn from these assumptions unless otherwise stated.

4.3 Direct and Indirect Impacts

Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

4.3.1 Alternative A – Proposed Action

4.3.1.1 Fish and Wildlife Including State Special Status Wildlife Species and USFWS Designated Species

The Vegetation PER (BLM, 2007a, pages 4-74 through 4-94) discusses Wildlife Resources including Federally Listed and State Special Status Wildlife Species, the SOPs to reduce impacts from mechanical and manual treatments, seeding, prescribed fire, biological treatments, chemical and herbicide use on wildlife resources, and also analyzes impacts from the use of these treatments on wildlife resources in Temperate Desert Eco-regions. Also analyzed are the impacts of herbicide treatment and the potential long-term benefits to wildlife resources from vegetation treatments. The document analyzes and discusses the potential long-term benefits to wildlife resources from mechanical and manual vegetation treatments including seeding, biological treatments and prescribed fire. In addition, the document analyzes the long-term benefits from chemical controls and herbicide use on wildlife resources

The Herbicide PEIS (BLM, 2007, pages 4-96 through 4-124) discusses Wildlife Resources and Federally Listed and State Special Status Wildlife Species; the SOPs developed to reduce impacts from herbicide use on wildlife resources, and also analyzes the general impacts of herbicides on wildlife and wildlife habitats in the Temperate Desert Eco-regions.

This effects summary of the document is adapted from the Vegetation PER and the Herbicide PEIS which is hereby incorporated by reference in its entirety (BLM 2007a, BLM 2007b). This effects summary assumes that the SOPs and the Conservation Measures for Federally listed Species in found in tiered documents would be used to reduce potential unintended effects to non-target vegetation and to minimize adverse effects to wildlife and listed species.

The extent of effects to wildlife would vary by the extent and type of treatment, as discussed in the sections below. In general, treatments that reduce the spread and occurrence of noxious and invasive weeds, and restore native vegetation in degraded areas would benefit wildlife and their habitat. Spread of weeds has caused habitat fragmentation and the loss of connectivity between habitats. Fragmentation can isolate animals and reduce their ability to disperse. Treatments that restore native vegetation would reduce fragmentation and restore connectivity between habitats. In the long-term, proposed treatments are expected to improve native plant diversity, abundance, and connectivity therefore benefiting wildlife and their habitats.

Impacts Common to all Fish and Wildlife Including USFW Designated Species and their Habitats

As discussed in the Invasive Species/Noxious Weeds Section (Section 3.3.4) the greatest infestations of invasive plants is typically along the upland terraces and benches of the Colorado River were Tamarisk and Russian olive infestations are located along the rivers and other drainages, resulting in vegetation composition altered from their natural state. Here other invasive weed species have also become established. Wildlife habitats that interface with these areas may see extensive treatments activities as a result of this Programmatic Invasive Species Management Plan.

Also discussed in the Invasive Species/Noxious Weeds Section (Section 3.3.4) is the increasing issue of cheatgrass infestation especially in native sagebrush, desert salt scrub, blackbrush and grasslands communities. Wildlife habitats that interface or contain native sagebrush, desert salt scrub, blackbrush and grasslands communities may also see extensive treatments activities from herbicide use and seeding as a result of this Programmatic Invasive Species Management Plan.

Not covered by this Programmatic Invasive Species Management Plan is active removal of dense stands of pinion, juniper, conifers or other non-desirable native woody species encroachment into sagebrush, blackbrush, salt desert scrub or grasslands communities nor the active manipulation and mastication of sagebrush or any other native woody or brush species.

Effects from Mechanical Treatments

Direct Effects

Mechanical treatments would injure or kill plants by removing some or all of the plant material on the treatment site. These plants would generally be the target plants (invasive, non-native plants and noxious weeds), but some minimal amount of non-target vegetation used by wildlife species could also be injured or killed. Damage to non-target plants is expected to be minor and most cut stems and leaves would likely regrow. Mechanical techniques used to control aquatic vegetation can spread aquatic vegetation to new areas, disturb sediment, and remove fish and other aquatic organisms with harvested material. Mechanical methods are effective in restoring wildlife habitat and are the primary means of reseeding a site. However, disturbances associated with mechanical treatments (e.g., noise, presence of workers, trucks/ATVs, other equipment) could be substantial, though short in duration. Disturbance may alter animal behavior or cause wildlife to leave an area temporarily during the disturbance period. These effects would be short-term and not likely have substantial effect on the long-term health and habitat use of wildlife in the treatment area. Vehicles used for treatments could collide with or crush a variety of wildlife, especially slower moving species; burrowing species; and ground nesting birds, resulting in direct mortality or injury.

Activities occurring during the spring would have the greatest impacts to reproducing mammalian and avian species. Many mammal species occupy dens or territories to birth and raise their young. Altricial species, such as most rodents and carnivores, are helpless at birth and most remain in their den or parent's territory for several weeks or months before they are capable of moving into new areas. Activities that disturb or destroy these birthing territories or dens could cause mortality to young animals from direct contact, exposure, abandonment and predation. Precocial species, such as most ungulates and hare species, may be less impacted by disturbances in the spring as their young are mobile at or shortly after birth and can readily move away from any disturbances, although this may make them more susceptible to predation. Impacts would not be expected to reproducing mammalian and avian species if Mechanical Treatments occurred late summer through winter.

Mechanical treatments are particularly effective in sensitive areas, such as wetland and riparian habitat, where greater, more precise control over treatment effects is required or effects to non-target species are a concern. Mechanical treatments are effective where the risks to aquatic organisms from the use of herbicides are high.

Indirect Effects
Overall, treatments would facilitate the long-term establishment of native trees, shrubs, perennial grasses and forbs, encourage the reduction of weeds and tamarisk/Russian olive infestations. Improved cover, increased vegetative diversity, greater edge or transitional habitat, and structural diversity throughout the entire area would increase habitat for mammals, birds and reptiles, therefore improving foraging opportunities for raptors and other predator species. By increasing both the understory density and diversity while reducing the potential for other weedy invasion, the vegetative community resilience to adverse environmental stress would be improved.

Effects from Manual Treatments

Direct Effects
Manual treatments can be expensive and time consuming, but they allow for more precise, selective vegetation control than other methods and are often suitable in areas with sensitive wildlife species such as aquatic organisms. The presence of workers, trucks/ATVs, and hand-held equipment, including chainsaws, creates noise that can disturb animals and cause them to flee or alter their behavior or habitat use temporarily during the disturbance period. These effects would be short-term and not likely have much effect on the long-term health and habitat use of wildlife in the treatment area.

As discussed in the Mechanical Treatments section, Manual Treatments occurring during the spring would have the greatest impacts to reproducing mammalian and avian species. Impacts would not be expected to reproducing mammalian and avian species if Mechanical Treatments occurred late summer through winter.

Manual treatments are particularly effective in sensitive areas, such as wetland and riparian habitat, where greater, more precise control over treatment effects is required or effects to non-target species are a concern. Manual treatments, which tend to be very selective and involve smaller treatment areas, are particularly effective where there are concerns about aquatic organisms.

Indirect Effects
Overall, treatments would facilitate the long-term establishment of native trees, shrubs, perennial grasses and forbs, encourage the reduction of weeds and tamarisk/Russian olive infestations. Improved cover, increased vegetative diversity, greater edge or transitional habitat, and structural diversity throughout the entire area would increase habitat for mammals, birds and reptiles, therefore improving foraging opportunities for raptors and other predator species. By increasing both the understory density and diversity while reducing the potential for other weedy invasions, the vegetative community resilience to adverse environmental stress would be improved

Effects from Prescribed Fire Treatments

Direct Effects
Fire is rarely used as an exclusive treatment method, as it can lead to conditions which favor weeds. Prescribed Fire Treatments would always be followed up with addition revegetation plans.

Prescribed fire can kill and injure animals. Animals with limited mobility that live above ground are most vulnerable. Fire may threaten a population if it is limited in size, range. The time of year of prescribed fire is an important variable in wildlife mortality. The eggs and young of birds are susceptible to fire, especially ground-nesting birds. The nesting season often coincides with the active period of plant growth, when moisture conditions are too wet to sustain prescribed fires. If a fire burns in a mosaic pattern, leaving some areas of vegetation relatively unscathed, some young may survive. The young of small mammals that build dens or nests near the ground, such as small rodents and hares, are susceptible to fire. Small mammals can often escape fire by going into burrows or hiding in rock crevices, under stumps or roots, or in large dead wood. Broadcast burning and pile burning follow-up treatments typically occur in the fall, therefore no impacts to reproducing mammalian and avian species would be expected.

Using fire for biomass removal (e.g. burning piles of tamarisk cuttings), and stubble removal in preparation of another treatment method (e.g burning dormant and dead cheatgrass before herbicide application) would have minimal direct impacts on wildlife inhabitants as individuals can readily move away from the burning activities into nearby habitats. Fire activities such as burning piles of tamarisk cuttings would create minimal habitats loss and wildlife could move back into the areas once the burning activities were completed. Large scale prescribes burns my render the habitat unusable for a period of time and wildlife may be relocated into nearby habitats.

The fire regime and microsite characteristics can influence wildlife mortality from fire. Many desert and semi-desert habitats burned infrequently in the past because of sparse fuels. In these areas, patchy fire spread may have provided areas of unburned habitat where reptiles and small mammals could escape fire. Some amphibians and reptiles, in addition to small mammals, escape fire by burrowing into the soil or hiding under moist duff or leaves that burn less readily than drier forest or rangeland materials.

Wildlife that leaves an area due to prescribed fire may return soon thereafter if food or cover is available in unburned areas, or even in burned areas. For example, scavengers and predators would often return to a burned area to feed upon insects or other dead or dying animals harmed by fire. Other wildlife may emigrate until more suitable conditions return.

Indirect Effects

Prescribed fire can create a mosaic of different kinds of vegetation, with variability in size, composition, and structure of patches, as well as connectivity among patches. Within a large fire, there can be substantial variation in fire severity and many patches of vegetation may not burn, resulting in variation in plant mortality and perpetuation of the mosaic nature of the landscape. Some areas would burn more intensely than others, influencing the nature of the vegetation that remains. When fire increases the heterogeneity of the landscape, some species of wildlife benefit from having increased opportunities to select from a variety of habitat conditions and successional stages.

Prescribed fire would facilitate the removal unwanted weeds, facilitate herbicide control and provide seeding and planting treatments reduced competition from invasive and unwanted

species. This would help facilitate the long term establishment of shrubs, trees, perennial grasses and forbs and encourage the reduction of cheatgrass and other annual weed species. The establishment of native and desirable plant communities would improve wildlife habitats, cover and forage availability.

Effects from Biological Treatments

Direct Effects

The effects of biological treatment using insects and pathogens would be minor. In most cases, the target plants would remain standing, although weakened or unable to reproduce. Insects are often used to control weeds because many species exhibit high host-specificity. Strict controls would be used to ensure that insects and pathogens used in treatments area specific to the target vegetation and do not harm non-target species. However, the success of biological control programs often depends on the presence of a more desirable plant community that can fill in the spaces opened by the removal of the weeds or the successful use of seeding and planting. Thus, biological control would not be effective where large stands of annual grasses, such as downy brome, are present and have displaced native vegetation unless aggressive seeding efforts also occurred. If the weed is controlled, the space is often filled by another weed, or the plant community reverts to the weed annual grass understory. Because control using biological agents would take time, wildlife might be better able to respond to changes in habitat than after treatments that modify habitat over a short period of time, such as herbicide application.

Indirect Effects

The use of biological treatment would facilitate the removal unwanted weeds and provide seeding and planting treatments reduced competition from invasive and unwanted species. This would help facilitate the long term establishment of shrubs, trees, perennial grasses and forbs and encourage the reduction of cheatgrass and other annual weed species. The establishment of native and desirable plant communities would improve wildlife habitats, cover and forage availability.

Effects from Chemical and Herbicide Treatments

Direct Effects

While some field studies suggest that appropriate herbicide use is not likely to directly affect wildlife, herbicides (used properly or improperly) can potentially harm wildlife individuals, populations, or species. Harm at the population or species level is unlikely for most general wildlife species because of the size and distribution of treatment areas relative to the dispersal of wildlife populations and the foraging area and behavior of individual animals.

Possible adverse direct effects to individual animals include death, damage to vital organs, change in body weight, decrease in healthy offspring, and increased susceptibility to predation. Adverse indirect effects include reduction in plant species diversity and consequent availability of preferred food, habitat, and breeding areas; decrease in wildlife population densities within the first year following application as a result of limited regeneration; habitat and range disruption, resulting in changes to territorial boundaries and breeding and nesting behaviors; and increase in predation of small mammals due to loss of ground cover.

The effects of herbicide use on wildlife would depend directly on the sensitivity of each species to the particular herbicides used (and the pathway by which the individual animal was exposed to the herbicide), and indirectly on the degree to which a species or individual was positively or negatively affected by changes in habitat. Species that reside in an area year round and have a small home range (e.g., amphibians, small mammals), would have a greater chance of being directly adversely affected if their home range was partially or completely sprayed because they would have greater exposure to herbicides—either via direct contact upon application or indirect contact as a result of touching or ingesting treated vegetation.

The PEIS Risk Assessments suggested several common effects of herbicides to wildlife including fish and other aquatic organisms (BLM 2007a). Birds or mammals that eat grass that has been sprayed with herbicides have relatively greater risk for harm than animals that eat other vegetation or seeds, because herbicide residue is higher on grass; this phenomenon is apparent in risks predicted for large mammalian herbivores by the Risk Assessments. Grass foragers might include deer, elk, rabbit, chukar, quail, and geese. However, harmful doses of herbicide are not likely unless the animal forages exclusively within the treatment area for an entire day. In addition, insect foragers (e.g., bats, shrews, and numerous bird species) would be at risk from herbicide applications because of the small size of insects and their correspondingly large surface area (BLM 2007a).

The extent of disturbance to fish and other aquatic populations caused by herbicide treatments would vary by the extent and method of treatment and chemical used. Herbicides could come into contact with and affect fish and aquatic invertebrates through direct application (of herbicides approved for use in these habitats), drift, runoff, wind transport, or accidental spills or spraying. At low concentrations, herbicides would typically have little or no effect on aquatic organisms. At moderate concentrations, herbicides may not kill fish or other aquatic organisms, but could be detrimental to the survival, growth, reproduction, or behavior of certain organisms. At high concentrations, herbicides can be lethal to aquatic organisms. Potential effects include mortality, reduced productivity, abnormal growth, and alteration of habitat.

Indirect Effects

In the absence of prominent direct effects, the main risk to wildlife from herbicide use is habitat modification. The extent of direct and indirect effects to wildlife from modifying habitat would vary by the effectiveness of herbicide treatments in controlling target plants and promoting the growth of native vegetation, as well as by the extent and method of treatment (e.g., aerial vs. ground) and chemical used (e.g., toxic vs. non-toxic; selective vs. non-selective), the physical features of the terrain (e.g., soil type, slope), and weather conditions (e.g., wind speed) at the time of application. Injury and mortality would largely occur to target plants (noxious and invasive weeds), but some non-target vegetation used by wildlife species could also be injured or killed.

In addition, species feeding on animals that have been exposed to high levels of herbicide would be more likely to be affected, particularly if the herbicide bio-accumulated in their systems. Although these scenarios were not modeled for the PEIS, wildlife could also experience greater effects in systems where herbicide transport is more likely, such as areas where herbicides are aerially sprayed, dry areas with high winds, or areas where rainfall is high and soils are porous.

Wildlife that inhabit subsurface areas (e.g., insects, burrowing mammals) may also be at higher risk if soils are non-porous and herbicides have high soil-residence times. The degree of vegetation interception, which depends on site and application characteristics, would also affect direct spray effects. The effects of herbicide use on wildlife would be site- and application-specific, and as such, site assessments would have to be performed, using available information to determine an herbicide-use strategy that would minimize impacts to wildlife
Herbicides are an effective means of controlling weeds and other invasive vegetation. Herbicide treatments may be the only effective way to control large areas of annual weeds and are also effective for rhizomatous invasive plants that require repeated cutting or pulling for control, or are located in remote areas where other treatment methods are not feasible.

Successful herbicide control would facilitate the removal unwanted weeds and provide seeding and planting treatments reduced competition from invasive and unwanted species. This would help facilitate the long term establishment of shrubs, trees, perennial grasses and forbs and encourage the reduction of cheatgrass and other annual weed species. The establishment of native and desirable plant communities would improve wildlife habitats, cover and forage availability.

Big Game

Pinion Juniper Woodlands

The proposed Programmatic Invasive Species Management Plan would *not have* application in pinion juniper woodlands for restoration or habitat improvement purposes. Therefore no impacts are expected to 54 percent of elk and 69 percent of deer winter ranges, 6 percent of elk calving and 19 percent of deer fawning areas, 45 percent of Hatch area pronghorn habitats and 8 percent of the Cisco pronghorn habitats, 38 percent of the desert bighorn habitats and 60 percent of the Rocky Mountain bighorn habitats. Animals residing in these pinion juniper woodlands would not be impacted.

Salt Desert Scrub Communities

The proposed Programmatic Invasive Species Management Plan would have application in salt desert scrub communities for the use of prescribed fire and herbicide applications where weedy invasive species such as cheat grass where a problem and seeding. Limited rainfall in these areas often reduces the need for prescribed fire. As discussed in the Impacts Common to All section above, impacts are expected to 4 percent of elk and 7 percent of deer winter ranges, 8 percent of Hatch area pronghorn habitats and 70 percent of the Cisco pronghorn habitats, 17 percent of the desert bighorn habitats and 6 percent of the Rocky Mountain bighorn habitats. Animals residing in these salt desert scrub communities would also be impacted as discussed in the Impacts Common to All section above. No impacts would occur to elk and deer during calving/fawning periods as desert scrub communities do not support calving/fawning grounds.

Sagebrush Communities

The proposed Programmatic Invasive Species Management Plan would have minimal application in sagebrush communities for the reduction of cheatgrass and invasive weeds within the understory or in old fire scars through the use of herbicide applications, seeding and prescribed fire. As discussed in the Impacts Common to All section above, impacts are expected to 17 percent of elk and 12 percent of deer winter ranges, 16 percent of elk calving and 1 percent of

deer fawning areas, 34 percent of Hatch area pronghorn habitats and 3 percent of the Cisco pronghorn habitats, 2 percent of the desert bighorn habitats and 9 percent of the Rocky Mountain bighorn habitats. Animals residing in these sagebrush communities would also impacted as discussed in the Impacts Common to All section above.

Blackbrush and Grasslands Communities

The proposed Programmatic Invasive Species Management Plan would have minimal application in blackbrush communities and grasslands habitats. Possible applications may include use of herbicide applications and seeding application the reduction in cheatgrass, other annual grasses, and weeds and development of fuel breaks to protect these communities. In areas where wildfire has removed native blackbrush stands prescribed fire facilitate herbicide and seed effectiveness. As discussed in the Impacts Common to All section above, impacts may occur in 2 percent of elk and 3 percent of deer winter ranges, 11 percent of Hatch area pronghorn habitats and 13 percent of the Cisco pronghorn habitats, 34 percent of the desert bighorn habitats and less than 1 percent of the Rocky Mountain bighorn habitats. Animals residing in these salt desert scrub communities would also impacted as discussed in the Impacts Common to All section above. No impacts would occur to elk and deer calving/fawning grounds or the animals residing on their calving/fawning grounds as blackbrush communities and grasslands habitats do not occur in these habitats.

Conifer Communities

The proposed Programmatic Invasive Species Management Plan would *not have* application in conifer communities for restoration or habitat improvement purposes. Therefore no impacts are expected to 17 percent of elk and 5 percent of deer winter ranges, 72 percent of elk calving and 73 percent of deer fawning areas, and 27 percent of the Rocky Mountain bighorn habitats. Animals residing in conifer communities would not be impacted. No impacts would occur to pronghorn or desert bighorn habitats or the animals residing on these year-round habitats as conifer communities do not occur in these habitats.

Riparian and Wetland Habitats

Less than 1 percent of all big game crucial habitats are found within riparian and wetland areas where the proposed Programmatic Invasive Species Management Plan would have the great breath of application, therefore impacts discussed in the Impacts Common to All section above are expected to be minimal and short term when animals are utilizing riparian areas to obtain water. Big game species typically spend minimal time in riparian areas due to the presents of densely vegetated habitats that offer predatory species a hunting advantage.

Summary of Big Game Impacts

Much of the big game habitats are found in pinion juniper woodlands and conifer communities where Programmatic Invasive Species Management Plan would not have application, therefore no impacts to big game species would occur. The bulk of the remaining habitats are found in blackbrush communities and grasslands, sagebrush and salt desert scrub where application of treatment proposed in the Programmatic Invasive Species Management Plan would be limited to herbicide applications, seeding and possibly some prescribed burns. Within these shrub brush type communities any targeted treatments would only occur in areas where cheatgrass and other weedy species were threatening the integrity of the native scrub communities and grasslands or

were fire or some other disturbances had removed the native communities and cheatgrass and other invasive species were dominating the area. The proposed Programmatic Invasive Species Management Plan would have the great breath of application in riparian and wetland habitats where less than 1 percent of these big game species persist.

Overall the proposed Programmatic Invasive Species Management Plan would create minimal impacts to big game species.

Fish, Amphibians, and Aquatic Invertebrates

Amphibians, which have moist permeable skin used in water uptake and respiration, are highly sensitive to environmental moisture, salinity, and cover (Shoemaker et al. 1992; Grover 2000). Any potential reductions in soil moisture, canopy cover, or the availability of woody debris resulting from removal or treatment of invasive vegetation could potentially have localized short-term impacts on amphibian populations. However, amphibian populations are expected to increase in abundance over the long-term due to improved habitat conditions and expansion of suitable breeding habitat resulting from vegetation treatments. Several of the invasive plants in the project area form dense stands or monocultures that alter soil moisture levels and salinity, reduce habitat diversity, and restrict dynamic ecosystem processes in floodplain habitats. For example, dense stands of tamarisk (*Tamarix* spp.) tend to reduce soil moisture in areas with sparse phreaophytic vegetation, increase soil salinity and eliminate other plants by accumulating and shedding salt in their foliage, and reduce the habitat complexity of stream ecosystems by forming dense root masses that restrict the lateral mobility of stream channels. Tamarisk removal is expected to enhance soil moisture levels, reduce soil salinity, and improve the complexity of riparian habitats to the benefit of amphibian populations. In addition, tamarisk removal can restore natural hydrological processes in a manner that increases habitat complexity in both floodplain and channel habitats, which benefits populations of native fishes and is likely to benefit amphibians as well (Keller et al. 2014; Laub et al. 2015).

Short-term impacts to fish populations could potentially occur if significant reductions in riparian vegetation reduced canopy coverage and increased sunlight penetration to the point of altering stream temperature and productivity. Such impacts can potentially be either positive or negative (Tonkin et al. 2013). Initial impacts to main channels of riverine systems would be minimal to nonexistent because the relatively large volume of water and high discharge rates of these systems tends to buffer them from minor localized environmental changes. However, the long-term dynamics of large river systems are responsive to riparian vegetation, and river channels are less likely to re-occupy abandoned channels in riparian habitats where mature vegetation is well established (Konrad 2012). In addition, side-channel, backwater, and floodplain habitats are expected to become more diverse and dynamic in response to reductions in dense stands of invasive plants. Relatively small stream ecosystems are likely to exhibit very positive responses to vegetation treatments as native vegetation increases in abundance, creating more diverse stream bank and canopy coverage and enhancing nutrient cycling and productivity, and more natural hydrological processes are restored to channel and floodplain habitats in response to reductions in dense monocultures of invasive plants (Grimm 1987; Laub et al. 2015).

Fish and amphibians can be particularly sensitive to herbicides due to their permeable skin and habitat associations. Some herbicides that are commonly used in riparian treatments, such as Clopyralid and Triclopyr, are only slightly toxic or practically nontoxic to fish and amphibians;

whereas others, such as Glyphosate, can cause high mortality and alter developmental processes in larvae and juveniles even at low concentrations (Smith 2001; Relyea 2005; Cauble and Wagner 2005). The toxicity of glyphosate to amphibians appears to vary considerably depending on the surfactant mixture, but glyphosate alone is still capable of causing developmental problems and high mortality in larval and juvenile amphibians (Vincent and Davidson 2015). Herbicide applications are unlikely to have any direct short-term or long-term impacts to fish or amphibians in the project areas because spraying would not occur near water, approved BLM protocols would be strictly followed, and glyphosate would be used selectively, primarily in upland habitats. Additionally, Conservation Measures that restrict broadcast applications and large scale treatment of herbicides within the 100-year floodplains of the Colorado and the Green Rivers from May 1st through July 15th would further reduce potential impacts to fish and amphibians during period when the river water may rise.

Migratory Birds

The proposed Programmatic Invasive Species Management Plan has developed a Conservation Measures to ensure mechanical treatments, hand treatments and prescribed fire that would remove nesting structure or herbicide treatments that would interfere with nesting birds and raptors would be avoided during the nesting season unless the areas is not suitable for migratory bird or raptor nesting or raptor survey indicates no nesting raptors occur within the FWS recommended distance (Table 3-3) from the proposed treatment.

This Conservation Measure would ensure there would be no direct impacts to all nesting migratory birds and raptors within all vegetation types.

Pinion Juniper Woodlands

The proposed Programmatic Invasive Species Management Plan would *not have* application in pinion juniper woodlands for restoration or habitat improvement purposes therefore no impacts are expected to migratory birds and raptor that nest, forage or winter in pinion juniper woodlands.

Salt Desert Scrub Communities

The proposed Programmatic Invasive Species Management Plan would have limited application in salt desert scrub communities for the use of prescribed fire, herbicide applications and seeding though limited rainfall in these areas often reduces the need for prescribed fire. Additional to the Impacts Common to All section above, impacts to migratory birds and raptors in desert scrub communities from seeding activities as well as the initial herbicide application is expected to be a short term and transient disturbance to non-nesting individuals foraging or wintering in the area and would have minimal to no impacts to birds as they could utilize nearby habitats for foraging and roosting. Limited use of prescribe fire and herbicides may incur a decrease or loss of vegetative. Depending on the extent of vegetation lost this loss may diminish or eliminating the area from use and following years nesting by bird and raptors species until vegetation reestablishes. Successful treatments would result in improved vegetative structure that would improve migratory bird habitat and nesting potential.

Non-nesting raptors that nest and roost in trees would not be impacted directly impacted. Indirect impact could include some short-term loss of foraging opportunely in burned areas due to reduced prey base forage and cover. Successful treatments would result in improved vegetative structure that would improve prey base forage and cover.

Sagebrush Communities
The proposed Programmatic Invasive Species Management Plan would have minimal application in sagebrush communities for the reduction of cheatgrass and invasive weeds within the understory or in old fire scars through the use of herbicide applications, seeding and prescribed fire.. Additional to the Impacts Common to All section above, direct impacts to non-nesting migratory birds and raptors in sagebrush communities from implementation of all potential activities is expected to be a short term and transient disturbance to non-nesting individuals foraging or wintering in the area and would have minimal to no impacts to birds as they could utilize nearby habitats for foraging and roosting.

Indirect impacts from mastication or crushing, prescribed burns and to some extent, herbicide treatments would include an alteration, reduction or loss of cover that may reduce nesting structure, foraging opportunities and cover. Depending on the extent of this loss, treatment areas may not offer suitable nesting, foraging or cover habitats for several months to several years post treatment. Seeding would help facilitate understory cover establishment. Weather regimes often directly affect restoration time and success rate. Successful treatments would result in improved vegetative structure that would improve migratory bird habitat and nesting potential.

Non-nesting raptors that nest and roost in trees would not be impacted directly impacted. Indirect impact could include some short-term loss of foraging opportunely in burned or herbicide treated areas due to reduced prey base forage and cover. Successful treatments would result in improved vegetative structure that would improve prey base forage and cover.

Blackbrush and Grasslands Communities
The proposed Programmatic Invasive Species Management Plan would have limited application in in blackbrush communities and grasslands habitats for the use of prescribed fire, herbicide applications and seeding though limited rainfall in these areas often reduces the need for prescribed fire. Any addition to the Impacts Common to All section above to migratory birds and raptors are expected to be very similar to impacts described in salt desert scrub communities' discussion above.

Conifer Communities
The proposed Programmatic Invasive Species Management Plan would *not have* application in conifer communities for restoration or habitat improvement purposes therefore no impacts are expected to migratory birds and raptor that nest, forage or winter in conifer communities.

Riparian and Wetland Habitats
Although riparian and wetland habitats make up only 1.8 percent of the lands within the MFO, riparian habitat within Utah typically provided 66–75% of all bird species habitats during some portion of their life history with numerous bird species considered as riparian obligates. The proposed Programmatic Invasive Species Management Plan would have the great breath of application in riparian and wetland habitats; therefore all impacts discussed in the Impacts

Common to All section and vegetation sections above are expected to occur to a large number of individuals with the exception of direct impacts to nesting, migratory and resident birds during the nesting season due to Conservation Measures that would be in place precluding activities during the sensitive time.

Indirect impacts from all types of treatments would include an alteration, reduction or loss of cover that may reduce nesting structure, foraging opportunities and cover. Depending on the extent and size of this loss, treatment areas may not offer suitable nesting, foraging or cover habitats for several months to several years post treatment. Seeding and plantings would help facilitate understory cover establishment. Weather regimes often directly affect restoration time and success rate. Successful treatments would result in improved vegetative structure that would improve migratory bird habitat and nesting potential into the future.

Non-nesting raptors that nest and roost in trees would not be impacted directly impacted. Indirect impact could include permanent loss of nesting and roosting structure from mechanical or manual removal of larger trees. Short-term loss of foraging opportunely may occur in treated areas due to reduced prey base forage and cover. Successful treatments would result in improved vegetative structure that would improve prey base forage and cover.

Summary of Migratory Bird Impacts

The proposed Programmatic Invasive Species Management Plan would have the great breath of application in riparian and wetland habitats where 66–75% of all bird species occur during some portion of their life history. Overall the proposed Programmatic Invasive Species Management Plan could create extensive habitat alterations that may cause direct and indirect impacts migratory birds and raptors. Though nesting birds would not be impacted the year of the treatment, direct and indirect impacts from vegetation removal would create short to moderate term loss in cover, forage availability and nesting structure but would facilitate long term habitat improvements by reducing invasive dominance and resorting native cover and nesting structure. The size of the treatment and the completeness of vegetation removal would directly influence the size and severity of the impact to migratory birds and raptors.

State Sensitive Animal Species

The proposed Programmatic Invasive Species Management Plan has developed Conservation Measures to ensure mechanical treatments, hand treatments and prescribed fire that would remove nesting structure or herbicide treatments that would interfere with nesting birds and raptors would be avoided during the nesting season unless the areas is not suitable for migratory bird or raptor nesting or raptor survey indicates no nesting raptors occur within the FWS recommended distance (Table 3-3) from the proposed treatment.

The proposed Programmatic Invasive Species Management Plan has also developed Conservation Measures Within kit fox habitats to ensure surface disturbing treatments, prescribed fire and herbicide application would not occur from March 1st through July 31 unless it is determined that no active natal kit fox dens are in the treatment area and within prairie dog habitats to ensure no surface disturbing treatment that could collapse burrows, prescribed fire and herbicide application would not occur from April 1st through June 15th unless it is determined that no active colonies are in the area.

These Conservation Measures would ensure there would be no direct impacts to nesting ferruginous hawks, burrowing owls, natal kit fox dens and active prairie dog colonies during the nesting/pupping season when all these species are most vulnerable and least likely to be able to disperse into other suitable habitats. The 2008 RMP disallows activities with a mile of active bald eagle nests, thus ensure no direct impacts would occur to nesting bald eagles.

Additional to the Impacts Common to All section above, impacts to ferruginous hawks would be the same as discussed in the migratory bird section above.

Pinion Juniper Woodlands
Pinion juniper woodlands provide 5 percent or less of the habitats for all terrestrial State sensitive species. The proposed Programmatic Invasive Species Management Plan would *not have* application in pinion juniper woodlands for restoration or habitat improvement purposes therefore no impacts are expected to State sensitive animal species.

Salt Desert Scrub Communities
Salt desert scrub communities provide the greatest number of State sensitive animal species suitable habitats. Approximately 62 percent of burrowing owl habitat, 80 percent of ferruginous hawk habitat, 85 percent of white-tailed and 14 percent of Gunnison prairie dog habitats and 65 percent of kit fox habitat along with migrant wintering bald eagles all utilize salt desert scrub communities during a portion or all of their habitat needs.

The proposed Programmatic Invasive Species Management Plan would have limited application in salt desert scrub communities as discussed in sections above. Surface disturbing treatments, and seeding activities as well as the initial herbicide application and prescribed fire is expected to incur short term and transient disturbance to non-pupping kit fox and whited prairie dogs and non-nesting burrowing owls utilizing desert scrub communities as they could move into nearby habitats. Limited use of prescribe fire and herbicides may incur a decrease or loss of vegetative. Depending on the extent of vegetation lost this decrease may diminish or eliminating the area from use until vegetation reestablishes.

Successful treatments would result in improved vegetative structure that would improve forage and cover habitats.

Sagebrush Communities
Sagebrush communities provide 50 percent of the habitats for Gunnison prairie dog, kit fox and wintering bald eagles.

The proposed Programmatic Invasive Species Management Plan would have minimal application in sagebrush communities for the reduction of cheatgrass and invasive weeds within the understory or in old fire scars through the use of herbicide applications, seeding and prescribed fire. Additional to the Impacts Common to All section above, direct impacts to non-pupping Gunnison prairie dog from implementation of all potential activities is expected to be a short term and transient disturbance and would have minimal to no impacts as these species could utilize nearby habitats for foraging, cover and roosting.

Indirect impacts from prescribed burns and to some extent, herbicide treatments would include an alteration, reduction or loss of cover that may reduce foraging opportunities and cover habitat. Depending on the extent of this loss, treatment areas may not offer suitable nesting, foraging or cover habitats for several months to several years post treatment. Seeding would help facilitate understory and desirable cover establishment. Weather regimes often directly affect restoration time and success rate.

Successful treatments would result in improved vegetative structure that would improve forage and cover habitats.

Blackbrush and Grasslands Communities
Blackbrush communities and grasslands habitats provide 29 percent of the Gunnison prairie dog habitats, 28 percent if the burrowing owl habitats, 13 percent of kit fox habitats an less than 10 percent of white-railed prairie dog and ferruginous hawk habitats.

The proposed Programmatic Invasive Species Management Plan would have limited application in in blackbrush communities and grasslands habitats for the use of prescribed fire, herbicide applications as discussed above. Additional to the Impacts Common to All section above, direct impacts to non-pupping prairie dog and kit fox and non-nesting burrowing owl and ferruginous hawk in blackbrush communities and grasslands habitats from implementation of all potential activities is expected to be a short term and transient disturbance and would have minimal to no impacts as these species could utilize nearby habitats.

Indirect impacts from prescribed burns and to some extent, herbicide treatments would include an alteration, reduction or loss of cover that may reduce foraging opportunities and cover habitat in future years. Depending on the extent of this loss, treatment areas may not offer suitable nesting, foraging or cover habitats for several months to several years post treatment. Seeding would help facilitate understory and desirable cover establishment. Weather regimes often directly affect restoration time and success rate.

Successful treatments would result in improved vegetative structure that would improve forage and cover habitats.

Conifer Communities
Conifer communities provide less than 1 percent of the habitats for all terrestrial State sensitive species. The proposed Programmatic Invasive Species Management Plan would *not have* application in conifer communities for restoration or habitat improvement purposes therefore no impacts are expected to State sensitive animal species, forage or winter in conifer communities.

Riparian and Wetland Habitats
Less than 1 percent of riparian and wetland areas comprise terrestrial State sensitive species habitats. These State sensitive species obtain much of their needed water from the foods that they ingest therefore dependency on free water in minimal. The proposed Programmatic Invasive Species Management Plan would have the great breath of application in riparian and wetland habitats; therefore all impacts discussed in the Impacts Common to All section and vegetation

sections above are expected to not have minimal to no impacts on the white-tailed and Gunnison prairie dog, burrowing owl, ferruginous hawk and the kit fox.

Summary of Terrestrial State Sensitive Animal Species Impacts
Approximately 62 to 85 percent of four State sensitive species habitats (white-tailed prairie dog, burrowing owl, ferruginous hawk, kit fox) are found in salt desert scrub communities and 50 percent of Gunnison prairie dog habitat in sagebrush habitats, with the bulk of the remaining habitats in blackbrush communities and grasslands remaining where there would be a limited application of treatment proposed in the Programmatic Invasive Species Management Plan. Within these shrub brush type communities any targeted treatments would only occur in areas where cheatgrass and other weedy species were threatening the integrity of the native scrub communities and grasslands or were fire or some other disturbances had removed the native communities and cheatgrass and other invasive species were dominating the area. The proposed Programmatic Invasive Species Management Plan would have the great breath of application in riparian and wetland habitats where less than 1 percent of these State sensitive species persist. Overall the proposed Programmatic Invasive Species Management Plan would create minimal impacts to State Sensitive Species.

State Sensitive Species of Fish and Amphibians
The three sensitive species of fish within the project area (roundtail chub, bluehead sucker, and flannelmouth sucker) inhabit a variety of habitats, from large main-stem river habitats to small streams, some of which are already the subject of ongoing habitat restoration work focusing on invasive plant treatments in the project area. Vegetation treatments can be an important component in habitat restoration efforts aimed at improving habitat suitability for these fishes in the upper Colorado River basin (Bestgen et al. 2011; Laub et al. 2015). Treatment of invasive plant species would be an emphasis of future management efforts aimed at restoring and enhancing habitats of the "three species."

Populations of Great Plains toads, if present in areas subject to vegetation treatments, could potentially be impacted by short-term alterations in vegetative cover near breeding areas in riparian habitats, but reductions in densities of tamarisk and other invasive plants that tend to simplify floodplain habitats and alter soil moisture and salinity levels are expected to improve long-term habitat conditions for Great plains toads and other amphibians.

Threatened and Endangered Animal Species
The proposed Programmatic Invasive Species Management Plan has developed Conservation Measures to ensure mechanical treatments, hand treatments and prescribed fire that would remove nesting structure or herbicide treatments that would interfere with nesting birds would be avoided during the SWFL, YBCU and MSO nesting season unless the areas is not suitable for SWFL, YBCU or MSO nesting or SWFL, YBCU or MSO surveys indicates no nesting SWFL, YBCU or MSO occur within the FWS recommended spatial buffer from the proposed treatment during FWS. These Conservation Measures along with Conservation Measures developed in the Final BA and all Standard SOPs would ensure there would be no direct impacts to nesting SWFL, YBCU and MSO.

Additional to the Impacts Common to All section above, impacts to SWFL, YBCU or MSO would be the same as discussed in the migratory bird section above. Additionally Conservation

Measures have been developed to ensure there are adequate suitable habitats available within each watershed to facilitate SWFL and YBCU needs and treated suitable habitats are prioritized for restoration efforts and weed post-weed management as applicable to ensure ample suitable habitats are readily available.

Pinion Juniper Woodlands
The proposed Programmatic Invasive Species Management Plan would *not have* application in pinion juniper woodlands for restoration or habitat improvement purposes therefore no direct or indirect impacts are expected to any Federally listed species.

Salt Desert Scrub Communities
Salt desert scrub communities offer no habitats for any of the Federally listed species except for the Gunnison sage grouse. Less than 7 percent of the vacant Gunnison sage grouse habitats outside of the critical habitats are comprised of salt desert scrub communities. If treatment were to occur on this limited amount of salt desert scrub in unoccupied non-critical habitat impacts are not expected due to the absents of Gunnison sage grouse.

Sagebrush Communities
Within USFWS Designated Critical and vacant Gunnison sage grouse habitats 77 percent and 35 percent respectfully, are comprised of sagebrush communities. Though Programmatic Invasive Species Management Plan would have minimal application in sagebrush communities for the reduction of cheatgrass and invasive weeds within the understory or in old fire scars through the use of herbicide applications, seeding and prescribed fire, these action could create short term and transient disturbance but there would be no direct impacts to Gunnison sage grouse as there is no occupancy currently. Successful treatments would result in improved future condition of vegetative structure that would improve forage and cover habitats in Gunnison sage grouse habitats.

Sagebrush communities make up less than 5 percent of all other federally listed species, therefore no impacts are expected.

Blackbrush and Grasslands Communities
Blackbrush communities and grasslands habitats provide 11 percent of the MSO habitats and less than 3 percent of habitats for all other Federally listed species therefore no direct impacts are expected to any Federally listed species. Successful treatments would result in improved future condition of vegetative structure that would improve forage and cover habitats for prey base habitats for MSO.

Conifer Communities
Conifer communities provide 10 percent of the MSO habitats and less than 1 percent of habitats for all other Federally listed species. The proposed Programmatic Invasive Species Management Plan would *not have* application in conifer communities for restoration or habitat improvement purposes therefore no direct or indirect impacts are expected to any Federally listed species.

Riparian and Wetland Habitats
Less than 2 percent of riparian and wetland areas habitats for MSO and Gunnison sage grouse, but both species require a mesic quality in their habitats, making riparian and wetlands a small

but important component to the overall habitat structure. Both the SWFL and YBCU are riparian obligate species, therefore healthy and functioning riparian and wetland habitats are essential to their survival. All potential impacts have been discussed in the Impacts Common to All section above and the migratory bird section above. Standard SOPs, Final BA and Developed Conservation Measures would also ensure do direct impacts to Federally listed nesting birds would occur.

Summary of Terrestrial Threatened and Endangered Animal Species Summary

The proposed Programmatic Invasive Species Management Plan would have the great breath of application in riparian and wetland habitats where all Federally listed bird species may occur during some portion of their life history, with the SWFL and YBCU being riparian obligates. Overall the proposed Programmatic Invasive Species Management Plan could create extensive habitat alterations that may cause short term direct and long term indirect impacts especially to the SWFL and YBCU. Though nesting birds would not be impacted the year of the treatment, direct and indirect impacts from vegetation removal would create short to moderate term loss in cover, forage availability and nesting structure within the treatment areas but would facilitate long term habitat improvements by reducing invasive dominance and resorting native cover and nesting structure. The size of the treatment and the completeness of vegetation removal would directly influence the size and severity of the impact to Federally listed bird species and Conservation Measures limiting the spatial extent of treatment would ensure adequate habitats would remain available.

Endangered Fishes

The four endangered fishes in the project area occupy main-stem river habitats that are unlikely to experience significant short-term impacts resulting from vegetation treatments. Over the long-term, vegetation treatments have the potential to increase channel and floodplain dynamics in a manner that is expected to improve habitat conditions for populations of these species within the project area. Each of the four streamlined and large-bodied endangered fishes of the Colorado River system is adapted to habitats that historically had swift and turbid water and experienced seasonal flooding during periods of peak mountain snowmelt. Dam construction and flow regulation have altered and eliminated these habitat conditions in much of the upper Colorado River basin. Loss of suitable spawning and juvenile habitat has been especially significant, and has decreased or eliminated juvenile recruitment in most populations of the four endangered fishes of the upper Colorado River basin. Reductions in root biomass associated with dense stands and monocultures of invasive trees and shrubs is expected to reduce entrainment of side-channel habitats, improve channel complexity, and potentially improve the likelihood of seasonal inundation of riparian habitats. These changes could contribute to restoration of suitable spawning and juvenile habitat and help to offset the negative impacts of reduced springtime discharge resulting from dams and diversions (Laub et al. 2015).

Additionally, Conservation Measures that restrict broadcast applications and large scale treatment of herbicides within the 100-year floodplains of the Colorado and the Green Rivers from May 1st through July 15th would further reduce potential impacts from herbicide to the four endangered fishes during period when the river water may rise.

4.3.1.2 Floodplains

Short-term impacts caused by decreased vegetative cover following removal of nonnative plants in floodplains can lead to destabilization of soil due to a reduction in root biomass, an increase in soil temperature and decrease in soil moisture due to increased sunlight penetration, and changes in patterns and rates of soil erosion and deposition. The severity of these impacts would vary according to the nature of the treatment and local conditions. Impacts would tend to become less severe over time as native vegetation becomes established. Treatment protocols and management strategies are adaptable to specific environmental conditions and are designed to minimize the potential for negative impacts resulting from loss of vegetative cover, respond to any negative impacts that might occur, and create a situation that ultimately leads to the establishment of healthy native plant communities in floodplains.

Short-term changes in rates and patterns of sediment transport and deposition in floodplain and aquatic ecosystems following invasive plant removal can result in both positive and negative impacts. For example, the establishment and spread of tamarisk in the Colorado River Drainage has led to the formation of dense root masses along stream and river channels, which have simplified channel morphology and decreased floodplain complexity by creating very stable and ditch-like channels and reducing floodplain connectivity to these channels. Loss of tamarisk cover leads to a certain degree of destabilization of channel and floodplain sediments, but this is necessary to restore complex morphological features to the channels of rivers and streams, such as braided channels and deep pools, and to reconnect floodplains to channels. These changes would ultimately lead to increases in floodplain moisture levels and improve the integrity of riparian wetlands. Over the long term, transitions from nonnative plant assemblages consisting of a small number of species to diverse native assemblages of plants would be necessary component of management efforts seeking to restore the balance between transport and deposition of alluvial sediments in a manner that improves the integrity and dynamics of floodplain environments (Birken and Cooper 2006).

Altered flow regimes along rivers and streams in the project area, in combination with the establishment of nonnative vegetation with dense root masses, has resulted in diminished peak discharge rates and decreased connectivity between channels and floodplains. Consequently, there has been a trend toward restriction of floodplain processes to increasingly limited areas during recent decades. Periodically inundated floodplain habitats can be especially important to animals that depend on them for reproduction, such as native fish and amphibians. Efforts to reduce the density of nonnative trees and shrubs, such as Russian olives and tamarisk, feature prominently in management strategies designed to expand and improve floodplain habitats to the benefit of populations of native species that depend on them for reproduction and juvenile recruitment (Laub et al. 2015).

4.3.1.3 Fuels/Fire Management

According to accumulated research results, the most effective strategy in fuel management is thinning of vegetation followed by prescribed fire, piling and burning, and/or mechanical treatment. These activities reduce canopy, ladder and surface fuels and can reduce both the intensity and severity of wildland fire (RMRS-GTR-120, page 27). The proposed action would result in the reduction of invasive species throughout the MFO. A successful project would reduce the potential for high-intensity wildland fire while restoring natural ecological processes.

A subsequent increase in vegetative diversity and woodland productivity would be expected, with greater availability of soil moisture and lower evaporation rates over the long term from a gradual increase in vegetative understory species. The production of understory grasses and forbs is known to decline as crown cover increases in areas with invasive species expansion.

While scattered fuels retain the surface fuel load necessary for future prescribed fire maintenance, the immediate fire threat is reduced because potential flame height and rate of spread are both inhibited by the dispersion of fuels. Piling of hand-cut slash for future follow-up burning similarly reduces the immediate fire threat through redistribution of the fuel load.

Fuels/Fire Management Collective Treatment Area

Manual Treatment

While scattered fuels retain the surface fuel load necessary for future prescribed fire maintenance, the immediate fire threat is reduced because potential flame height and rate of spread are both inhibited by the dispersion of fuels. Piling of hand-cut slash for future follow-up burning similarly reduces the immediate fire threat through redistribution of the fuel load.

Mechanical Treatment

Mechanical mastication treatments do little to affect surface fuels with the exception of compacting and crushing vegetation, and may have the potential to increase surface fire spread and fireline intensity due to fine-wood surface loading from the mulch (Raymond and Peterson, 2005). Spread and intensity can present fire-control issues in the event of a wildland fire following treatment, and high temperature surface fires have the potential to damage soils and new vegetation. The potential to increase surface fire is decreased when mechanical treatment is followed by prescribed fire to remove the resulting fine fuels. However, even if a wildland fire occurs in a mechanically-thinned area, research shows that the fire would be easier to control than a crown fire in an untreated area (Resh et al., 2007). Consequently, overall impacts from a wildland fire following mechanical treatment may be lower in spite of higher surface fuels because less acreage would be expected to burn than in a crown fire situation.

The reduction of closed-canopy tamarisk from this project would decrease the potential for a crown fire, causing fire to move from the tree canopy to the ground through reduction of a continuous canopy. Fire would then spread through perennial grasses, forbs and shrubs, burning at a lower intensity and resulting in safer and more efficient fire control.

Prescribed Fire Treatment

The benefits of altering fuel structure and wildfire behavior through prescribed fire have been observed and reported for many years (Weaver 1955, 1957, Cooper 1960, Biswell et al. 1973, Fernandes and Botelho, 2003; RMRS-GTR-120, page 24). Because prescribed fire is not utilized to precisely modify stand structure and composition as in mechanical thinning, there is generally less predictability of post-treatment stand structure. However, prescribed fire does influence multiple fuelbed characteristics including the reduction of fine fuels, large woody fuels and other live surface fuels, which can decrease both the spread rate and intensity of wildland fire by changing the continuity of fuels. Decreasing the horizontal fuel continuity can also limit fires to lower intensities and reduce spot fire ignitions. A prescribed fire of low to moderate severity

would be expected to benefit most plant communities in the general vegetative communities found in the proposed project area by facilitating the recovery of desired species.

There are inherent risks associated with the use of prescribed fire including the possibility of promoting the spread of invasive annuals. The monitoring segment of the proposed action would instigate follow-up action if monitoring plots showed a high invasive component. Risks of prescribed fire could also involve fire escaping the established perimeter of the burn and related economic and resource damage. However, compared to the large number of prescribed fires successfully completed over the years by BLM crews in the Canyon Country Fire Zone and other state and federal agencies, escaped fires are rare (RMRS-GTR-120, 2004).

Herbicide/Biological Treatment

Accidental spill or drift from treatments could have a potential negative effect on non-target vegetation in the short term, although SOPs are in place to prevent non-target impacts to adjacent vegetation. The long-term beneficial effects of reducing non-native invasive species, understory shrub components and their hazardous fuel component would outweigh the short-term negative effects.

4.3.1.4 Hydrologic Conditions

Reduction in vegetative cover following treatments of invasive vegetation can potentially alter hydrologic conditions by destabilizing streambank and floodplain sediments. In addition, increased sunlight penetration following a reduction in canopy coverage can lead to decreases in soil moisture and an accompanying decline in bank storage and shallow groundwater levels in floodplain environments. As discussed previously (see 4.3.1.2 Floodplains), short-term negative impacts would diminish over time as the density and canopy coverage of native vegetation increases. Positive impacts include a reversal of some of the processes that created the current trend of increasingly channelized streams and rivers and disconnected floodplains. Over the long term, this is expected to improve hydrologic conditions by increasing the complexity of channels and the level of connectivity between channels and floodplains.

Any significant loss of vegetative cover and accompanying decline in deposition of dead organic material is likely to have short-term impacts on soil moisture in environments where moisture is limiting. Decreases in soil moisture levels, in turn, can lead to declines in shallow groundwater levels. Alternatively, variation in shallow groundwater levels is often negatively correlated with evapotranspiration rates, creating the potential for the removal of a significant amount of invasive vegetation in the local area to increase shallow groundwater levels. The direction of any change in shallow groundwater resulting from a loss of vegetation cover is context specific and depends on interactions between multiple factors. Similarly, the long-term impact on shallow groundwater levels that results from the replacement of invasive plant species by desirable native species tends to be either minimal or context specific. Native riparian plants often use similar amounts of water as ecologically similar nonnative invasive plants, but invasive plants can use significantly more water than native vegetation in environments where they are ecologically dissimilar to the native species (Nagler et al. 2009). For example, increases in shallow groundwater levels tend to occur almost immediately after Russian olives are removed from wetland habitats that previously lacked woody vegetation because Russian olives remove substantially more shallow groundwater than the native rushes and sedges common to marshes

and other wetland habitats that lacked woody vegetation prior to the establishment of nonnative woody plants.

Mechanical removal of invasive vegetation can cause surface disturbances that impact hydrologic conditions to varying degrees, depending on the location, soil type, surface hydrology, type of surface disturbance, and the time of year. These factors are considered when planning treatments. Mitigation measures that may lessen short-term impacts to hydrologic conditions include minimizing surface disturbance in sensitive soils, leaving vegetated buffers in key locations, and using a phased approach when removing dense stands of vegetation.

4.3.1.5 Invasive Species/Noxious Weeds

The environmental impacts to the affected environment for invasive species / noxious weeds were considered and analyzed in the Vegetation sections of the Vegetation Treatments Using Herbicides PEIS, 2007 and in the Moab EIS, to which this EA tiers. Thereby, broad scale analysis of the impacts is covered by these documents. The environmental impact section below is site specific as it relates to the Proposed Action alternative.

The implementation of the Proposed Action would enable control of targeted populations of invasive plants (Appendix E) in the MFO. It is estimated that 43,299.614 acres are dominated by invasive species/ noxious weeds within the project area. The Proposed Action is to reduce and control invasive and noxious weeds on approximately 2,856,082 acres. It is estimated that 1000 acres would be treated annually with a large percentage of these acres being re-treatment of areas from previous years. Priority is given to early detection of invasive species and rapid control response to prevent further infestations and spread (Sheley, Petroff, 2003), which are typically limited in scale (0.1-5 acres).

Invasive plant species have caused a decline in ecological condition, site stability, and biotic integrity through replacement or reduction of the native plant communities within the project area. Stopping the progression of these impacts is the objective of the implementation of the Proposed Action.

Mechanical control efforts can be useful to remove excess biomass either through mowing of the vegetation or cutting of excess aboveground biomass. The cutting of invasive species/noxious weeds is meant to reduce the health of the plants or to make it easier for the plants to absorb a pesticide. These efforts focus impacts directly to the targeted invasive plant species, which sometimes limits impacts to adjacent native non-target plant communities. Thereby, this level of activity controls invasive species, limits further spread, and allows native species to re-colonize treated areas.

Chemical (i.e. herbicides) control strategies are used to target sites infested with invasive plants where nonchemical methods are not feasible. The successfulness of herbicide application in controlling target plants and the extent of disturbance to native plant communities varies by method of application (e.g. backpack, ground, A.T.V, etc.), chemical used (e.g. selective vs. non-selective), plant communities present, site features (e.g. soils, slope), and weather conditions. Chemical application to sites would likely affect plant species composition and diversity, which contribute to ecological functions (USDI, 2007). A desired reduction or eradication of invasive

plant dominance in an area through chemical use would allow for greater native plant expression and enhanced diversity.

Targeted invasive plants that come into contact with herbicides through spraying would be killed. Chemical use offers an effective means for treating and managing invasive plant species. Past herbicide use in the MFO has shown to be effective in controlling infestations and rate of spread of Russian knapweed, miscellaneous non-native thistles, hoarycress, puncturevine, and jointed goatgrass. The use of chemicals would benefit plant communities with invasive species and noxious weed infestations by decreasing the growth, seed production, and competitiveness of treated plants.

The impact of the individual active ingredients of the proposed herbicides (see Table 2-1) has been analyzed in the tiered PIES (USDI, 2007). Thereby, potential environmental consequences to the affected environment to the various resources would not be analyzed further in this document.

The impact of burning slash created during the mechanical treatment could potentially create a negative impact. The heat created can potentially sterilize the soil of desirable plant seed and create a disturbance for the establishment of non-desirable plant species. The follow-up treatment in subsequent years should be able to treat and track non-desirable vegetation on the pile burned areas.

Biological control on targeted weed species is limited in the successfulness and availability of the agent. The use of plant pests goes through a vigorous assessment to allow for the pests to be released in the United States. The pests are plant specific and attack only the targeted plant species.

Seeding of targeted treatment sites is another form of a biological treatment. The desired seed mix used to seed a site help in establishing desirable plant species. The desirable plants would be expected to grow and compete for resources in the natural environment. The seeding and subsequent follow up treatments on the targeted weedy species would potentially reduce the weedy population and promote desirable vegetation.

4.3.1.6 Lands with Wilderness Characteristics

Some of the proposed treatments could have a temporary impact on apparent naturalness. This would be most true of mechanical treatments and prescribed burns, depending on how extensive these treatments are. Very large treatments of these types could have a long-lasting impact on apparent naturalness, and could eliminate that quality within the treatment acreage. To the extent that a loss of apparent naturalness occurs, there is also the potential to reduce the unaffected acreage to less than the minimum size necessary for an area to possess wilderness characteristics.

Any impacts to outstanding opportunities for solitude and/or primitive and unconfined recreation would be temporary in nature. In the long run, there could be a benefit to lands with wilderness characteristics from invasive species removal, as it could return the system to a more naturally functioning condition.

4.3.1.7 Soils

The potential impacts from this proposal vary depending on the amount of surface disturbance at each site. The primary indicator of impacts to soil resources is the amount of surface disturbance, particularly surface disturbance that occurs in highly erodible, reclamation-limited or other sensitive soils. All soils in the Moab Field Office are susceptible to accelerated erosion, but sensitive soils are more susceptible to impacts (BLM 2008 page 4-281). Surface-disturbing activities could result in any of the following impacts: increased soil erosion and sedimentation and decreased soil productivity.

Mitigation measures that may minimize impacts to soil resources include leaving a 100 foot vegetated buffer on the edges of floodplains, minimize surface disturbance in sensitive soils.

4.3.1.8 Threatened, Endangered or Candidate Plant Species

As discussed in Chapter 3, public lands within the Moab Field Office support 2 plant species that have been given a threatened, endangered or candidate plant species designation and 11 BLM state sensitive plants. Many of these species are threatened by competition with non-native plants and other invasive species. The Moab Field Office PISMP provides a description of the distribution, life history and current threats of each federally listed plant species, as well as species proposed for listing. The potential risks to threatened, endangered or candidate plant species (special status plant species) from use of herbicides can be minimized by following certain SOPs. These SOPs were identified in the 2007 PEIS (Table 2-8, 4-71) and in Appendix G of this EA, and would continue to be implemented at the local level based on site conditions. These SOPs include:

- Survey for special status plant species, at a time they can be found and identified, before treating an area. Consider effects to special status species when designing herbicide treatment program.
- Use drift reduction agents to reduce the risk of drift hazard.
- Use a selective herbicide and a wick or backpack sprayer to minimize risks to special status plants.

The 2007 PEIS provides a general discussion of potential impacts (adverse and beneficial) to special status plant species from herbicide treatments (quote PEIS p 4-71 to 4-73). This discussion considers the vegetation treatments as a whole, and therefore would also be applicable to herbicide treatments discussed in the Moab Field Office PISMP. Herbicide use would be associated with risks to special status plant species, although treatments would be designed at the local level to avoid or minimize risks to these species. Regardless of measures to avoid sensitive plant populations, there would be some risk of accidental exposure to herbicides. As identified in the 2007 PEIS, active ingredients with the greatest risks for adverse effects to special status plants would be 2,4-D, bromacil, diquat, diuron, hexazinone, and sulfometuron methyl.

As many special status plant species are threatened by the spread of non-native plants, fuels reduction and control of competing vegetation are important components of management programs for special status plant species. Therefore, herbicide treatments conducted as part of these programs would be expected to benefit populations of special status plant species. Additionally, general program goals of restoring native communities and minimizing fire risk

would also benefit these species by improving habitat conditions and in some cases reducing the risk of extirpation as a result of fire.

All herbicides would have the potential to harm populations and individuals of special status plant species. At the local level, locations and risks to sensitive plant populations would be considered when designing treatment projects, and the appropriate precautions would be taken to avoid impacts to these species. In some cases, manual spot treatments of herbicides would be the only feasible option for avoiding impacts to listed species. In other cases, some level of short-term mortality may be acceptable for long-term habitat improvement and increase in population size.

Additional indirect effects to certain special status plant species could occur if populations of pollinators were harmed by herbicide spraying. However, according to risk assessments, risks to pollinators would be less than those associated with direct spray of the rare plants themselves. Management efforts to protect rare plants would also help prevent harm to insects in the vicinity. These management efforts include:

- Designating buffer zones around rare plants.
- Managing herbicide drift especially to nearby blooming plants.
- Using typical rather than maximum rates of herbicides in areas with rare plants.
- Choosing herbicide formulations that are not easily carried by social insects to hives, hills, nests, and other ”homes” in areas with rare plants.
- Choosing herbicides that degrade quickly in the environment when herbicides must be used in rare plant habitat.
- Timing the herbicide applications when pollinators are least active, such as in the evenings or after blooming has occurred in rare plant habitat, and if necessary dividing the rare plant habitat into several treatments rather than one large treatment to keep from treating all blooming species at one time.

Effects to pollinators would be short-term, and population-level effects are not anticipated when these types of management practices are incorporated into project design when rare plants are present.

Jones Cycladenia

In 2014 J.G. Management Systems, Inc. developed a model for Jones Cycladenia in Utah and Brian Elliott with Elliott Environmental Consulting (EEC) was sub-contracted to do the field work to verify the Jones cycladenia model housed at the Utah BLM State Office. A general assumption of the model appears to be that soils within approximately one mile from the Chinle, Cutler, and Summerville Formations are included as potential habitats coupled with topography to delineate habitat potential. EEC field works currently shows that all know population occur is areas modeled as medium low to highest potential with surveys completed in low to lowest potential areas having negative results. According to that model the MFO has approximately 456,290 acres of potential habitats for the Jones Cycladenia, of which 390,490 acres is rated with a highest to medium low potential within Grand County. All plants that have been located with the MFO have been within areas with high to medium low potential. Know occurrences of this species exist in Castle Valley and in Onion Creek.

The Final BA (BLM 2007d) gives the details of all potential impacts that may be expected from treatments and herbicides proposed in the PISMP.

Almost 50% of the potential habitats for Jones Cycladenia are found within pinion and juniper woodlands were no PISMP treatment would occur. Scrubland communities, where approximately 47% of the potential habitats occur would have '*no impacts'* to potential Jones Cycladenia habitats from Mechanical and Manual Treatment activities proposed in the PISMP. These habitats, including pinion/juniper communities make up over 96% of all potential Cycladenia habitats in the MFO.

Scrubland Communities
Scrubland communities may be subjected to prescribed fire, biological treatments, herbicide applications, seeding and plantings to control and eliminate invasive weed species such as cheatgrass. General impacts from these activities impacts from these activities have been discussed in the Effects of Vegetation Treatments on Plants section (pgs 4-98 through 4- 134).

Within scrubland communities herbicide treatments and seeding and planting activities would be the most expected PISMP activities. These activities may prove to be essential methods in controlling and eliminating cheatgrass and weed infestation that may compete with Jones Cycladenia in suitable habitats. Cheatgrass out competes native forbes and grass, competing for water and space resources needed for native plant recruitment. Long term cheatgrass infestations often lead to mono-culture stands of cheatgrass that eliminate native plane recruitment and increase fire risk. . PISMP activities are expected to benefit Jones Cycladenia suitable habitats.

Riparian Areas and Invasive Plant Communities
Less than 0.2% of a potential Jones cycladenia habitat contains riparian areas though riparian habitats not know to be a component of potential Jones Cycladenia habitats, therefore '*no impacts*' are expected to occur to potential Jones Cycladenia habitats from PISMP treatment implemented ion riparian areas. Less than 1.1% potential Jones Cycladenia habitats occur in mapped invasive plant species communities. Though a wide variety of PISMP treatment could occur in these areas, the potential for Jones Cycladenia populations would be high unlikely do to the degraded condition of these areas.

Final Vegetation Treatment EIS SOPs coupled with PISMP Conservation Measures would ensure know populations of Jones Cycladenia in suitable habitats are not impacted by PISMP treatments as habitat evaluations and inventories would identify any know populations in a proposed treatment area and ensure no treatment activities would occur within 300 feet of a known population.

Table 4-1: Percent of Project Area by Community that offers Medium to High Potential Habitat for Jones Cycladenia	
Pinion Juniper woodlands	49.4%
Salt Desert Scrub	14.7%
Sagebrush	7.2%
Blackbrush/Grasslands	25.3%

Conifer Communities	0.0%
Riparian	0.2%
Invasives	1.1%

4.3.1.9 Vegetation Excluding USFW Designated Species

Mechanical control efforts may trample non-targeted species and create a layer from cut aboveground biomass. An initial decrease in vegetation cover may occur immediately following a mechanical treatment. This debris from the treatment would have a stabilizing effect on soils and vegetative communities. It would provide a protective layer for seedling germination, retain moisture, and allow existing understory plants to recover post treatment. This strategy would not eliminate invasive plant species (estimated 43,299.614 acres infested), yet would target infestations where potential eradication is feasible.

The use of chemicals would benefit plant communities with invasive plant infestations by decreasing the growth, seed production, and competitiveness of treated plants. Thereby, releasing native plant populations from competitive pressures and assisting in the re-establishment of desired plants in treated areas.

Non-target vegetation could come into contact with herbicides through drift, run-off, wind, and direct spraying. These potential impacts include mortality, lower productivity, and irregular growth (USDI, 2007). This inadvertent impact would be offset by controlling the targeted invasive species and associated benefits mentioned above. Herbicide SOPs and mitigation measures outlined in Appendix G and tiered documents are designed to limit these impacts.

During pile burning non-target vegetation could potentially be scorched and damaged. The SOPs and BMPs for Fuel Management Activities found in Appendix F should prevent non-target damage to adjacent vegetation. There is potential for the burned areas to sterilize the soils preventing desirable vegetation from establishing on those sites. Over time through natural processes the soils should become stable to a point that desirable vegetation would colonize the sterilized soils where the pile burn occurred.

The use of plant pest on targeted plants would not have a direct impact on the desirable vegetation as the plant pests are selective toward the targeted pest. The use of a plant pest would likely reduce the competitive ability of the invasive species / noxious weed allowing desirable plants to potentially use the available resources.

The vegetation component would likely be changed as a result of a seeding giving the desired vegetation a boost by increasing the available seed in the system. The seeded vegetation is likely to grow and progress toward a more desirable plant community.

4.3.1.10 Visual Resources

Some of the proposed treatments, especially those involving mechanical treatments and prescribed fire, would have immediate impacts to visual resources. Although the long-term goal of these treatments is to restore the land to a more natural condition, visual scars would persist for many years and constitute a short-term impact to visual resources. This impact is particularly

acute in VRM Class II areas, which comprise the majority of the visual resources that visitors come to see. In the short term, the activity would attract the attention of the casual observer, although this impact is expected to diminish over time. Over the long run, the result of the treatments is expected to improve the visual resources of the area as it is returned to a more natural state.

Extensive mechanical treatments and prescribed burns could also impact VRM Class III areas, as the activity could pose more than a moderate change to the visual resources. Treatments could not impact VRM Class IV areas, as those areas are managed to allow for extensive alterations to their visual resources.

The restricted types of treatments allowed in WSAs and VRM Class I areas would largely protect the visual resources in most VRM Class I areas.

4.3.1.11 Water Resources/Quality

Impacts to water resources and water quality resulting from implementation of this proposal are expected to vary in site-specific manner depending on the treatment methods, amount of surface disturbance, overall decline in vegetative cover, and the environmental conditions at the time and location of the treatment. Sites with sensitive soils and sites subject to mechanical treatments have a greater potential to experience short-term impacts than other sites. Potential short-term impacts to water quality include increased turbidity (suspended sediments), higher sediment bedload, higher levels of dissolved solids, and higher water temperatures. Mitigation measures that may minimize impacts to water resources include minimizing surface disturbance to sensitive soils, leaving vegetated buffer zones in key locations, and using a phased approach to removal of dense monocultures of invasive vegetation.

Over the long term, a transition from plant communities dominated by invasive species to more diverse communities of native plants is expected to improve water quality. Some of the invasive plants that have become well established in the riparian zones and floodplains of the project area contribute to high levels of nitrogen fixation and accumulation of decay-resistant organic debris. Run-off containing high levels of nitrogen, combined with inputs of large amounts of organic debris into stream and rivers, tends to reduce water quality and alter stream ecosystems in a manner than can impede nutrient cycling and lead to further declines in water quality (Katz and Shafroth 2003; Mineau et al. 2012). Consequently, removal of invasive riparian vegetation is sometimes a necessary component of management efforts geared toward protection of water resources.

4.3.1.12 Wetlands/Riparian Zones

Removal of invasive trees and shrubs from wetlands and riparian corridors can lead to short-term environmental impacts associated with loss of canopy cover and root biomass, such as increased sunlight penetration, increased soil temperature, a brief release of nitrogen and other unused nutrients from dead plant material, and decreased soil stability. These conditions tend to favor the spread of invasive herbaceous plants rather than native vegetation. Relatively dry sites and sites with incised channels are more likely to be dominated by weedy invasive plants following removal of invasive trees and shrubs than are moist sites and sites with high connectivity between the channel and the floodplain (Gaddis and Sher 2012). For this reason, riparian

restoration projects that couple removal of invasive vegetation with efforts to reconnect incised channels with floodplains are more likely to promote the establishment of native riparian vegetation than are projects that fail to address needed improvements to channel morphology and floodplain connectivity.

Obligate wetland or riparian plant species tend to respond favorably to removal of invasive trees and shrubs from moist sites, but responses of facultative wetland/riparian plant species, which have the potential to occupy transitional and upland habitats, may vary with moisture level. Facultative wetland/riparian species are likely to be at a competitive disadvantage in relatively dry locations where secondary invasions of nonnative weedy plants have occurred (Gaddis and Sher 2012). Consequently, the long-term goal of restoring complex and diverse native plant communities would often require additional time and effort in the drier portions of riparian and wetland habitats. Over the long term, the implementation of the proposed actions in this project are expected to yield increases in the distribution and abundance of populations of native plants that have obligate or facultative associations with wetland/riparian habitats, to increase the health and complexity of riparian plant communities, and to increase the amount of connectivity between patches of native riparian vegetation.

A variety of strategies can facilitate the restoration of native plant communities in treated riparian areas, including mosaic treatments that involve leaving strips of nonnative shrubs and trees intact to provide partial shade and help retain soil moisture for native plants as they germinate and grow. This approach can be effectively used in combination with active revegetation efforts and phased removal of the strips of nonnative vegetation to bring about a gradual transition from a plant community dominated by a small number of nonnative species to a diverse native plant community without substantial alterations to soil moisture, temperature, and stability. Tamarisk beetles are expected to play an important role in this transition in riparian areas that are currently dominated by tamarisk (Nissen et al. 2009).

4.3.1.13 Mitigation Measures

Visual Resources: if treatments are proposed in VRM Class II or Class III areas, a visual contrast rating would be completed to ensure that the viewsheds from Key Observation Points would not be unduly impaired. If treatments are still required within viewsheds from Key Observation Points, signing to inform the public of the project would be installed. The signage would include the reasons for the treatment and the expected duration of the treatment's effects.

4.3.1.14 Monitoring and/or Compliance

Monitoring would be conducted prior to, during and after completion of the project, and follow-up maintenance would be scheduled contingent upon monitoring results. Treatment methods, design and implementation would adhere to CYFZ fuels programs Standard Operation Procedures (SOP's), Best Management Practices (BMP's) and/or the MFO Resource Management Plan (RMP).

4.3.2. Alternative B – No Action

4.3.2.1 Fish and Wildlife Including USFW Designated Species

Big Game
Much of the big game habitats are found in pinion juniper woodlands and conifer communities where treatments proposed under the action alternative would not occur, therefore the no action alternative would have the same impacts in these habitats to big game species and the proposed action alternative which is no impact.

In blackbrush communities and grasslands, sagebrush and salt desert scrub the no action alternative would not facilitate herbicide applications, seeding and some prescribed burns where cheatgrass and other weedy species were threatening the integrity of the native scrub communities and grasslands or were fire or other disturbances had removed the native communities and cheatgrass and other invasive species were dominating the area. This would result in the continuation of weed infestation and loss of important native plant communities that support many crucial big game ranges. Deterioration and loss of these crucial habitats would lead to a reduced carrying capacity that may result in reduced big game health and populations.

In riparian and wetland habitats less than 1 percent of these big game species persist therefore the no action alternative would have minimal impacts on big game due to the limited big game use.

Fish, Amphibians, and Aquatic Invertebrates
Short-term impacts resulting from vegetation treatments that could potentially affect stream temperature and productivity would not occur if no action is taken, but long-term trends toward entrainment and simplification of stream channels and degradation of floodplain habitats would likely continue. Reversal of these long-term trends is a critical component of fish habitat restoration work in the upper Colorado River basin (Laub et al. 2015). In addition, if no action is taken to reduce the density and spread of invasive plants in riparian habitats in the project area, the diversity of plant communities and the heterogeneity of the physical environmental in many of the riparian ecosystems would continue to decline, resulting in continued loss of habitat features favorable to supporting viable populations of native fishes and amphibians and an overall decline in species diversity. From a general perspective, the prevailing ecological pattern of a positive relationship between physical habitat diversity (e.g., number of vegetative layers in a multilevel riparian canopy) and species diversity indicates that continued simplification of riparian habitats through the spread of dense stands of invasive plants would result in a net loss in numbers of wildlife species in untreated riparian habitats over time (Rosenzweig 1996). In addition, changes to the physical environment in riparian habitats that have been impacted by certain invasive plant species, as previously outlined, have consequences that tend to negatively impact amphibians and simplify stream morphology in a manner that negatively impacts many of the native fishes of the upper Colorado River basin.

Migratory Bird
The no action alternative would not create any habitat alterations that would result in direct and indirect temporary impacts migratory birds and raptors from vegetation removal, loss in cover, forage availability or nesting structure. The no action alternative would not facilitate long term habitat improvements through the removal if invasive plant species and the restoration of native communities. Invasive plant dominance would continue to alter and reduce native cover, foraging opportunities and nesting structure. This would lead to loss of bird species diversity and

reduction in bird population numbers and in the long term these habitats may become unusable by many bird species.

Terrestrial State Sensitive Animal Species Impacts
Minimal habitats for State Sensitive Species are found in pinion juniper woodlands and conifer communities where treatments proposed under the action alternative would not occur, therefore the no action alternative would have no the same impacts to State Sensitive Species as the action alternative.

In blackbrush communities and grasslands, sagebrush and salt desert scrub the no action alternative would not facilitate herbicide applications, seeding and some prescribed burns where cheatgrass and other weedy species were threatening the integrity of the native scrub communities and grasslands or were fire or other disturbances had removed the native communities and cheatgrass and other invasive species were dominating the area. This would result in the continuation of weed infestation and loss of important native plant communities that support many crucial big game ranges. Deterioration and loss of these important habitats that support much of our State Sensitive Species would lead to a reduced carrying capacity that may result in reduced State Sensitive Species health and populations numbers.

In riparian and wetland habitats offer support less than1 percent of State Sensitive Species habitats. The no action alternative would have minimal impacts on State Sensitive Species and their habitats due to the lack of habitat in these areas.

Sensitive Species of Fish and Amphibians
Altered stream hydrology resulting from dams and diversions, in combination with entrainment of stream channels caused by the root masses of dense stands of invasive plants, such as tamarisk, has been implicated in the decline of populations of roundtail chub, bluehead sucker, and flannelmouth sucker in the upper Colorado River basin (Bestgen et al. 2011; Laub et al. 2015). Reductions in the complexity of stream and floodplain habitats have likely impacted amphibian populations as well. Under the no action alternative, simplification and entrainment of stream habitat would likely continue to occur where riparian habitats have been significantly impacted by invasive vegetation, and impacted areas would likely spread over time. The establishment of populations of the tamarisk beetle (*Diorhabda elongata*) has helped to reduce the density and spread of tamarisk in portions of the project area, but the level of control that would ultimately be achieved through the actions of tamarisk beetles is unknown, and effective biological control agents are not available for some of the most influential invasive riparian plants in the project area, such as Russian olive (*Eleagnathus angustifolia*). Consequently, increases in the density and distribution of invasive plants along streams inhabited by sensitive species of fish would likely continue in many areas if no actions are taken to reduce densities of invasive plants in riparian habitats.

Terrestrial Threatened and Endangered Animal Species
The action alternative has no application in conifer communities and pinion juniper woodlands where MSO GUSG habitats are found, therefore the no action alternative would have the same impacts in these habitats as proposed action alternative which is no impact.

In blackbrush communities and grasslands, sagebrush and salt desert scrub the no action alternative would not facilitate herbicide applications, seeding and some prescribed burns where cheatgrass and other weedy species were threatening the integrity of the native scrub communities and grasslands or were fire or other disturbances had removed the native communities and cheatgrass and other invasive species were dominating the area. This would result in the continuation of weed infestation and loss of important native plant communities that support many crucial big game ranges. Deterioration and loss of these important native habitats that support much of the MFO Gunnison sage grouse habitats and a portion of MSO habitats would lead to a reduced carrying capacity that may result in reduced health and populations numbers of MSO. No direct impacts are expect to GUSG individuals due to the lack of occupancy in the MFO.

Within riparian and wetland habitats all Federally listed bird species found in the MFO may occur during some portion of their life history, with the SWFL and YBCU being riparian obligates. The no action alternative would not create any habitat alterations that would result in direct and indirect temporary impacts to SWFL and YBCU from vegetation removal, loss in cover, forage availability or nesting structure. The no action alternative would not facilitate long term habitat improvements through the removal if invasive plant species and the restoration of native communities. Invasive plant dominance would continue to alter and reduce native cover, foraging opportunities and nesting structure. In the long term these habitats may become unusable by SWFL, YBCU and other Federally listed bird species

Endangered Species of Fish

The four endangered fishes in the project area have experienced significant declines in distribution and abundance within the project area and adjacent regions during recent decades. Habitat loss has been major factor in these declines. In particular, loss of suitable spawning and juvenile habitat, combined with introductions of nonnative fishes, has substantially reduced juvenile recruitment in all remaining populations of humpback chub and Colorado pikeminnow, appears to have entirely eliminated juvenile recruitment in all but one population (the middle Green River population) of razorback sucker, and has eliminated recruitment of juveniles in all remaining wild populations of bonytail. Ongoing and anticipated management activities aimed at reducing densities of nonnative fishes in critical habitats, combined with continued captive propagation and stocking, are expected to improve the likelihood of persistence of remaining populations of endangered fishes in the project area, but natural spawning and recruitment of wild juveniles is likely to remain minimal unless significant actions are taken to manage riparian vegetation in a manner that improves the quality of seasonally inundated floodplain habitats and enhances the complexity of side-channel and backwater habitats.

4.3.2.2 Floodplains

Under the no action alternative, there would be continued increases in the distribution and abundance of populations of invasive plant species in floodplains, with the exception of populations of beetle impacted tamarisk. Improvement in channel complexity and floodplain connectivity could occur in some locations in response to tamarisk mortality, but continued simplification and isolation of floodplains would likely continue in other areas. Without additional management actions, the general trend of declining diversity and complexity of native vegetation in floodplains impacted by invasive plants would continue. The well documented

pattern of facilitation of the establishment and spread of some species of invasive plants through environmental changes wrought by other invasive species, such as Russian olives, would likely result in the rapid and thorough replacement of native vegetation by undesirable invasive plants in many locations.

4.3.2.3 Fuels/Fire Management

With no treatment, the risk of an intensive stand-destroying fire would be high. Stand-destroying fires effectively eliminate existing forage and wildlife cover. A decline in vegetative diversity would continue into the future if invasive species regeneration and expansion were allowed to continue unabated. If no action were taken to reduce the hazardous fuels threat continued fuel loading would pose a greater wildfire hazard than currently exists. A combination of high temperatures, low relative humidity, winds, and/or continued drought conditions could create the potential for a destructive and hazardous fire, jeopardizing the health and safety of property owners and firefighters and posing a threat to public property.

4.3.2.4 Hydrologic Conditions

Under the no action alternative, there would be continued increases in the distribution and abundance of populations of many invasive plant species that influence hydrologic conditions. Spread of invasive plant species in relatively dry regions of floodplains can lead to increases in evapotranspiration rates and corresponding decreases in soil moisture and shallow groundwater levels. This outcome is context specific, but removal of invasive vegetation can be used as an effective management tool for improving hydrologic conditions and water quality (Nagler et al. 2009). Under the no action alternative, this tool would be unavailable.

4.3.2.5 Invasive Species/Noxious Weeds

Under the No Action Alternative, no effort would be taken to control invasive plant species within the project area. Thereby, invasive plants would propagate and infest the rangelands without constraint of intervention and control efforts. Natural ecological conditions and environments would limit the extent of invasive plant species populations.

Without implementation of the Proposed Actions control measures, invasive plants would continue to provide competitive effects on existing plants (USDA, 2004), and these weeds would further establish, propagate, and spread in dominance.

The 43,300 acres estimated to be dominated by noxious weeds and invasive plants would expand in extent. Current acres with limited invasive species/noxious weeds could potentially become dominated by weeds, and acres currently free of invasive species/noxious weeds could be infested.

These situations for non-control of listed noxious plants would not comply with the Utah Noxious Weed Act or Grand County ordinances, which state that it is the duty of every property owner to control and prevent the spread of noxious weeds on any land in their possession. Unabated Invasive species/noxious weeds on public lands would negatively influence adjacent private and State of Utah managed lands in Grand and San Juan Counties by providing a weed

source for continual infestations. Also, not controlling invasive plants would not adhere to the Moab RMP's management actions listed in Section 1.5 of this EA.

4.3.2.6 Lands with Wilderness Characteristics

There would be no direct and immediate impacts upon lands with wilderness characteristics as a result of vegetative treatments. There would be no temporary impacts to outstanding opportunities for solitude and/or primitive and unconfined recreation. In the long run, there would not be a benefit to lands with wilderness characteristics from invasive species removal, as it could return the system to a more naturally functioning condition.

4.3.2.7 Soils

Under the no action alternative soils salinity could continue to rise due to tamarisk expansion. Soils could be negatively impacted in areas where cheatgrass would continue to proliferate unabated creating an increased risk of large scale wildfires. Erosion rates would stay the same and streambanks would remain in the same condition.

4.3.2.8 Threatened, Endangered or Candidate Plant Species

There is potential for habitat degradation as a result of invasive species and noxious weed expansion. As weedy species become more prevalent they are consuming additional resources such as nutrients, water and space.

4.3.2.9 Vegetation Excluding USFW Designated Species

The analysis in section 4.3.1.10 Invasive Species/Noxious Weeds directly correlates into the vegetation community and is also part of the analysis listed in this section.

Without implementation of the Proposed Action, non-target plants would not be affected by control efforts through accidental spills, drift, and spraying. Without control measures, invasive species/noxious weeds would continue to provide competitive effects on existing plants (USDA, 2004), and these weeds would further establish, propagate, and spread in dominance.

Cover types listed in Table 3-11 most prone to invasive plant infestations are Blackbrush (254,509.061 acres), Dunes (28,021.641 acres), Grassland (61,087.014 acres), Invasives (43,299.614 acres), Mixed Conifer (173,168.808 acres), Mountain Shrub (159,291.607 acres), Pinyon and Juniper Woodlands (1,111,114.17 acres), Ponderosa Pine (20,347.275 acres), Riparian Wetland (6,737.454 acres), Sagebrush (273,242.098), and Salt Desert Scrub (115.011 acres).

There would be potential irreversible negative effects to public landscapes due to the highly competitive abilities of invasive species/noxious weeds over native vegetation. Landscapes would not be managed for biotic integrity and enhanced competitive interactions against undesired plants. These factors could cause vegetative degradation, altered plant composition and diversity, and reduction in the forage base from the accelerated establishment of invasive species/noxious weeds (Sheley, Petroff, 2003).

Under the No Action, isolated occurrences of invasive species/noxious weeds within the project area would not be treated, thereby enabling these small infestations to further spread across the rangelands and reduce biotic integrity of the desired vegetative communities (Sheley, Petroff, 2003).

Desired plant species would not be maintained at a level appropriate for the site in areas with dominance by invasive plants. Thereby, Rangeland Health Standard #3 would not be achieved, nor would there be an opportunity for progress towards achievement, in areas of invasive species/noxious weeds infestations without any type of treatment plan.

4.3.2.10 Visual Resources

There would be no direct and immediate impacts upon visual resources as a result of vegetative treatments. However, the unnatural state of the landscape as a result of weed infestation would continue unabated, leading to long term visual impacts upon natural resources.

4.3.2.11 Water Resources/Quality

Water quality and nutrient cycling in aquatic ecosystems have been greatly impacted by that establishment and spread of invasive nonnative vegetation. For example, the establishment of dense stands of Russian olive tree is often associated with substantial increases in soil nitrogen and in highly elevated inputs of organic material in adjacent aquatic ecosystems. These changes can alter floodplain and aquatic ecosystems in a manner that impairs water quality and favors the establishment of a variety of additional invasive plants and animals that have the potential to alter water quality, such as tamarisk and common carp (*Cyprinus carpio*). In severe cases, impacts of invasive plants can lead to changes in water quality and nutrient cycling that fundamentally alter aquatic processes (Katz and Shafroth 2003; Mineau et al. 2012). These threats would continue unabated under the no action alternative.

4.3.2.12 Wetlands/Riparian Zones

With the no action alternative, most invasive plant species would continue to increase in distribution and abundance within wetlands and riparian zones. An exception is tamarisk, which would continue to be impacted by tamarisk beetles, but would likely experience cyclic periods of expansion if no additional control measures are implemented (Nissen et al. 2009).

4.4 Cumulative Impacts Analysis

"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.

4.4.1 Fish and Wildlife Excluding USFW Designated Species

4.4.1.1 Cumulative Impact Area

<u>Terrestrial Species</u>
The cumulative impact area for terrestrial wildlife includes all identified habitats within the 2,856,082 acre project area, as well as associated adjacent habitats.

Fish, Amphibians, and Aquatic Invertebrates
The cumulative impact area for terrestrial wildlife includes all identified habitats within the 2,856,082 acre project area, as well as associated adjacent habitats.

The cumulative impact area for fish, amphibians, and other aquatic and semiaquatic organisms includes all of the ephemeral, intermittent, and perennial aquatic habitats and associated riparian habitats within the 2,856,082 acre project area, as well as adjacent upstream and downstream reaches of rivers and streams. The cumulative impact area for endangered fishes includes aquatic and riparian habitats within the project area that are associated with the Green, Colorado, and Dolores rivers, the confluences of major tributaries with these rivers, and adjacent upstream and downstream reaches of these rivers.

4.4.1.2 Past and Present Actions

Terrestrial Wildlife
Past and present actions occurring in the cumulative impact area for terrestrial wildlife species include water developments and structures for wildlife, livestock grazing and associated water and range developments including fences and water developments, past and current increased recreational uses (including OHVs, non-motorized recreation, etc) and the development of recreation facilities including campgrounds, parking lots, bathrooms, boat docks, hiking and biking trails, mineral exploration and development including pipeline and access roads installation and road upgrades, woodland harvest, and vegetation treatments including those for habitat restoration, wildlife habitat improvements and fire management.

In general, these actions other than wildlife water developments and structures and habitat improvements that facilitate wildlife, have had various cumulative adverse impacts on wildlife resources. Short term disturbances from increased increase human activities often lead to short term temporary displacement of individuals and populations into lesser quality habitats which may lead to increased stress and reduced fitness resulting in physiological degradation, reduced health and increased predation potential. Long term impacts from continual and increased human activity and surface disturbances within wildlife habitats result in alternations, fragmentation, and loss of habitats, often leading to reduced habitat quality and habitat abandonment. Many of these actions have also resulted in the widespread introduction of invasive weeds; especially cheat grass, which can affect wildlife habitats through decreased forage quality and availability and increased wildfire risk and intensity.

Fish, Amphibians, and Aquatic Invertebrates
Past and present actions occurring in the cumulative impact area for fish, amphibians, and aquatic invertebrates include diversion and impoundment of upstream water sources, oil and gas development, livestock grazing, agricultural activities (usually on upstream private land) affecting downstream water quality and sedimentation, vehicular travel over stream and riparian habitats, road construction, mining, and recreational activities such as angling and off-highway vehicle (OHV) use (Miller et al. 2014). All of these activities have impacted and altered aquatic and riparian resources to varying degrees. Efforts are made to manage and mitigate these impacts, but some, such as altered flow regimes caused by dams and diversions and introductions of nonnative fishes by anglers or in support of angling, have been extremely detrimental to endangered and sensitive species of fish and have proven very difficult to mitigate. Treatment of

invasive riparian vegetation is a frequent component of habitat restoration efforts that can be used to support mitigation activities addressing altered flow regimes and loss of key habitat features.

4.4.1.3 Reasonable Foreseeable Action Scenario

Terrestrial Wildlife

Reasonably foreseeable future actions in the MFO and on Federal, state, private, and other lands within and adjacent to the MFO that would affect terrestrial wildlife include the continued increases in recreational use and development of facilities, trails and activities, ongoing and additional mineral exploration, development, and production, ongoing grazing and additional range developments, additional vegetation treatment such as pinion/juniper reductions and maintenance of historical chaining that are not within the scope of this project and other wildlife water developments and habitat improvements along with fire management projects.

All of these actions would have short term adverse effect on wildlife in the vicinity of the action while the activity or construction is occurring. Beneficial impacts after short term activities have subsided would result from wildlife water developments and structures and habitat restoration and vegetative treatments that focus on habitat restoration. Long term negative impacts such as increased disturbances form human presents, habitat fragmentations, habitat alteration and loss, increase the potential for habitat abandonment would be expected from actions associated recreational use, mineral exploration, development, and production, grazing and range developments and some fire management projects. Associated actions may also increase the potential for additional cheat grass infestations, which can affect wildlife resources through decreased forage quality and availability and increased wildfire risk and intensity.

Fish, Amphibians, and Aquatic Invertebrates

Reasonably foreseeable actions occurring in the cumulative impact area for fish, amphibians, and aquatic invertebrates include continued impoundment and diversion of water sources on upstream land outside of the project area, livestock grazing, wildlife use, habitat management, wildfires, recreational activities, and a variety of activities on upstream or adjacent private lands, including agriculture, oil and gas development, and mining. The Resource Management Plan for the BLM Moab Field Office precludes surface-disturbing activities within 100-year floodplains and within 100 meters of riparian habitats, public water, and springs, and also calls for management strategies to restore degraded riparian communities and protect instream flow and water quality. In addition, anticipated habitat management activities would address anticipated impacts and potential threats to aquatic and riparian habitats. In particular, the encroachment of dense stands of invasive plants tends to increase the risk and severity of wildfires in and near riparian habitats, which has important implications for populations of fish, amphibians, and macroinvertebrates. Short-term impacts from intense wildfires to stream ecosystems can lead to substantial reductions or local extinctions of fish and macroinvertebrate populations, facilitate invasions by nonnative fishes, and result in amphibian declines through debris flow into breeding habitats and loss of cover (Rinne 1996; Dunham et al. 2003; Hossack and Pilliod 2011). Positive impacts of wildfire on populations of aquatic organisms have also been noted, but pre-fire management appears to be particularly important in minimizing the likelihood and severity of negative impacts (Dunham et al. 2003). Vegetation treatments in riparian habitats would be the emphasis of pre-fire riparian habitat management in the project area and are expected to improve

conditions in riparian and aquatic habitats to the benefit of fish, amphibian, and aquatic macroinvertebrate populations. Restoration of native riparian vegetation along reaches of the Dolores, Colorado, and Green rivers within the project area is an important component of management efforts aimed at enhancing the complexity of channel and floodplain habitats in a manner that has potential to improve breeding and juvenile habitats of sensitive and endangered species of fish.

4.4.1.4 Cumulative Impact Analysis

Terrestrial Wildlife

General impacts associated with the addition impacts of proposed treatment activities would include short term negative impacts to wildlife individuals and populations resulting from disturbances created by the presents of humans and temporary loss of vegetative cover to long term beneficial impacts from the reduction and control of invasive species and weed infestation resulting in improved habitat resilience and increased vegetative diversity, quality and quantity that would provide greater forage availability and vegetative cover.

Fish, Amphibians, and Aquatic Invertebrates

Cumulative impacts that are expected from the proposed project include reduction in the abundance and spread of invasive plants in riparian habitats within the project area and on adjacent lands, increases in the diversity and structural complexity of native vegetation (i.e., increases in perennial grasses, native forbs, and native shrubs and trees), increases in coarse woody debris in aquatic habitats and floodplains, and reduction in the frequency and severity of wildfires. Reduction in root masses of invasive plants would likely lead to short-term increases in bank erosion, sediment transport, and lateral movement of stream channels, but there has been a tendency for stream channels in the region to become entrained and simplified as a result of the combination of the proliferation of invasive plants and reductions in spring flooding due to dams and diversions. Treatment of dense stands of invasive vegetation should help to partially offset this trend and restore more natural hydrological processes. Consequently, the long-term changes to riparian and stream ecosystems are expected to increase the prevalence of habitats with features necessary for successful reproduction and juvenile recruitment in populations of native species of fish and other aquatic organisms. In addition, increased amounts of large woody debris associated with the reestablishment and spread of native cottonwood trees (*Populus fremontii*) would contribute to the enhancement of fish habitat by providing cover and promoting pool formation. Reductions in root masses of invasive plants can also improve fish habitats by altering sediment transport processes in a manner that promotes increased connectivity of main channel habitats to side-channels and floodplains and increasing the likelihood of reoccupation of abandoned channels.

4.4.2 Floodplain

4.4.2.1 Cumulative Impact Area

The cumulative impact area includes the floodplains of all of the ephemeral, intermittent, and perennial streams and rivers within the 2,856,082 acre project area, as well as the floodplains of upstream and downstream reaches of rivers and streams in adjacent areas.

4.4.2.2 Past and Present Actions

Past and present actions influencing floodplains in the project area include upstream dams and diversions of rivers and streams, off- highway vehicle travel, oil and mineral development, wildfires, periodic flooding, agricultural activities on adjacent private lands, and management activities dealing with the effects of erosion and the spread of invasive plants.

4.4.2.3 Reasonable Foreseeable Action Scenario

Reasonably foreseeable actions include continued altered flow regimes in rivers and streams, recreational activities, use and maintenance of roads and recreational facilities, livestock grazing, wildfires, periodic flooding, and floodplain habitat management and restoration work. Habitat management and restoration activities are expected to increase in scope and number as a management response to increased recreational use and the need to restore native vegetation to floodplains impacted by the spread of invasive plants.

4.4.2.4 Cumulative Impact Analysis

Implementation of the proposed action is expected to increase the cover and diversity of native vegetation, restore the balance between sediment transport and deposition in a manner that improves the complexity of stream and river channels, and increase floodplain connectivity. Cumulative impacts from these anticipated trends would enhance the integrity and functionality of floodplains in the project area and in connected downstream areas.

4.4.3 Fuels/Fire Management

4.4.3.1 Cumulative Impact Area

The Cumulative Impact Area (CIA) is 2,856,082 acres and is the same as the project analysis area (Appendix B).

4.4.3.2 Past and Present Actions

Fire history since 1974 comprises of 19 fires and a total of 459.8 acres burned.

Table 4-2: Past and present projects within the PISMP CIA

Agency / Year	Broadcast Burn	Chemical	Hand Pile	Hand Pile Burn	Mastication/ Mowing	Other	Seeding	Thinning	Grand Total
BLM	**7.406**	**26.768**	**52.021**	**52.021**	**18.140**	**19.248**	**31.802**	**52.021**	**259.427**
2007			41.597	1.194				41.597	84.389
2008		13.196	10.424	50.827	10.424	14.512		10.424	109.805
2009	7.406	3.563			7.717	4.737	31.802		55.224
2012		10.010							10.010
DOE								**36.429**	**36.429**
Year N/A								36.429	36.429
FFSL	**23.769**	**75.407**	**3.045**	**3.045**	**72.363**		**3.045**	**62.737**	**243.409**
2009							3.045		3.045
2011		6.005			6.005				12.010
2012		6.665			6.665				13.330
2014		59.693			59.693			59.693	179.078

Table 4-2: Past and present projects within the PISMP CIA									
Agency / Year	**Broadcast Burn**	**Chemical**	**Hand Pile**	**Hand Pile Burn**	**Mastication/ Mowing**	**Other**	**Seeding**	**Thinning**	**Grand Total**
Unknown	23.769	3.045	3.045	3.045				3.045	35.947
GRAND COUNTY		**3.195**	**3.195**	**3.195**				**3.195**	**12.778**
Unknown		3.195	3.195	3.195				3.195	12.778
TNC		**0.005**	**0.005**	**0.005**				**0.005**	**0.021**
Unknown		0.005	0.005	0.005				0.005	0.021
UDWR		**3.239**			**3.657**	**12.068**	**18.845**		**37.809**
2009					0.003				0.003
2011		3.239			3.239	0.684			7.163
Unknown					0.414	11.384	18.845		30.643
Grand Total	**31.175**	**108.614**	**58.265**	**58.265**	**94.160**	**31.317**	**53.691**	**154.387**	**589.874**

* Data above is calculated for number of treatments that occurred in a given area not necessary for the total treatment acres. Some of the treatment areas have been treated multiple times with multiple treatment methods.

Other past and present actions within the CIA include recreational activities, livestock grazing, wildlife use and habitat management, wildfires, activities on private land including agriculture, and associated traffic and continuing cooperative weed management efforts. The effects of these activities are impossible to quantify, but all may contribute to the issues brought forth in this EA.

4.4.3.3 Reasonable Foreseeable Action Scenario

Other reasonably foreseeable actions occurring within the project area include recreational activities, livestock grazing, wildlife use and habitat management, wildfires, activities on private land including agriculture, and wood gathering. The effects of these activities are impossible to quantify, but all may contribute to the issues brought forth in this EA.

4.4.3.4 Cumulative Impact Analysis

Cumulative impacts that can be expected from the proposed action would include increased ground cover (i.e. grass, forbs etc.), decreased erosion, and a lower fire potential. Current fuels within the project are classified primarily as a FRCC 3 and VCC 2. Post fuels treatments should convert most of the CIA area to a FRCC 2/1 and VCC 1 for the acres treated. This conversion should lower the risk of losing key ecosystem components and alter fire frequencies and size to more historic levels.

4.4.4 Hydrologic Conditions

4.4.4.1 Cumulative Impact Area

The cumulative impact area includes the watersheds and shallow groundwater reserves of the entire 2,856,082 acre project area, as well as reaches of rivers and streams and shallow groundwater reserves on adjacent lands.

4.4.4.2 Past and Present Actions

Past and present actions having measurable impacts on hydrologic conditions in the project area include upstream dams and diversions of rivers and streams, off- highway vehicle travel, road construction and maintenance, livestock grazing, groundwater withdrawals, periodic flooding, and land management activities designed to reduce soil erosion and the spread of invasive vegetation.

4.4.4.3 Reasonable Foreseeable Action Scenario

Past and present actions having measurable impacts on hydrologic conditions in the project area include upstream dams and diversions of rivers and streams, groundwater withdrawals, off-highway vehicle travel, road construction and maintenance, livestock grazing, periodic flooding, habitat enhancement activities geared toward improving the complexity of river and stream channels to benefit native fishes, and land management activities dealing with soil erosion and the spread of invasive vegetation.

4.4.4.4 Cumulative Impact Analysis

Implementation of the proposed action is expected to increase the abundance and diversity of native vegetation, improve the complexity of stream and river channels, increase floodplain connectivity, and reduce shallow groundwater losses at some locations. Cumulative impacts from these anticipated trends would enhance hydrologic conditions in the project area and adjacent lands.

4.4.5 Invasive Species/Noxious Weeds

4.4.5.1 Cumulative Impact Area

The cumulative impact area for the resource is the 2,856,082 acres identified as the project area found in Appendices M and N. Integrated invasive plant management strategies would occur annually on approximately 1,000 acres of BLM administered lands. The timeframe for analysis of cumulative impact for vegetation is 30 years because of BLM's long-term commitment and priority given to integrated management and control of invasive plants.

4.4.5.2 Past and Present Actions

Past, present, and reasonably foreseeable actions ongoing in the cumulative impact area for invasive species/noxious weeds are livestock grazing, wood gathering, mineral development, road maintenance and construction, vehicular travel, oil and gas development and recreational activities such as hunting, camping, hiking, and off-highway vehicle (OHV) use. Except for OHV use, most of these activities have been occurring over the past 80-100 years, and all activities would likely continue into the foreseeable future. All of these activities have had an impact on the invasive species/noxious weeds and can serve as vectors for weed establishment and spread. Project specific mitigations and prevention measures are typically designed and incorporated into these actions to help reduce the cumulative risk of new infestation and spread of invasive plants. These include restricting wood gathering and OHV use to designated roads, weed control plans with mineral development, Grand County Weed Department and UDOT providing invasive plant control along roadways, and BLM implementing invasive plant treatments at recreational sites.

4.4.5.3 Reasonable Foreseeable Action Scenario

Reasonably foreseeable actions occurring within the project area include recreational activities, livestock grazing, wildlife use and habitat management, wildfires, mineral development, activities on private land including agriculture, and wood gathering. The effects of these activities are impossible to quantify, but all may contribute to the issues brought forth in this EA.

4.4.5.4 Cumulative Impact Analysis

Not controlling invasive, non-native plants, as outlined in the No Action Alternative, would contribute to the cumulative effects of other activities on invasive species/noxious weeds, particularly along travel routes and with surface disturbing activities. These activities can allow a vector for invasive plant establishment and subsequent spread into native vegetation communities. When weeds are left uncontrolled they further infest the rangelands. The impacts of not implementing the Proposed Action on BLM administered lands would occur within Grand County and affect private, State of Utah and federal lands by providing an uncontrolled weed source on adjacent BLM lands.

4.4.6 Lands with Wilderness Characteristics

4.4.6.1 Cumulative Impact Area

The cumulative impact area for the resource is the 2,856,082 acres identified as the project area found in appendix B.

4.4.6.2 Past and Present Actions

Past and present actions ongoing in the cumulative impact area for lands with wilderness characteristics include livestock grazing, mineral development, vehicular travel, oil and gas development and recreational activities such as hunting, camping, hiking, and off-highway vehicle (OHV) use. Except for OHV use, most of these activities have been occurring over the past 80-100 years, and all activities would likely continue into the foreseeable future. OHV use has been generally unlimited until the recent past, at which time the Moab RMP (October, 2008) restricted motorized and mechanized travel to designated routes.

There are no current plans to manage these areas for maintaining, protecting and preserving the wilderness characteristics of naturalness, size and outstanding opportunities for primitive and unconfined recreation and/or outstanding opportunities for solitude.

4.4.6.3 Reasonable Foreseeable Action Scenario

Reasonably foreseeable actions occurring within the project area include recreational activities, livestock grazing, wildlife use and habitat management, wildfires, and mineral development.

4.4.6.4 Cumulative Impact Analysis

The activities described in Section 4.4.5.3 are expected to continue within the project area, and may contribute to the continuance or reintroduction of noxious vegetation.

4.4.7 Soils

4.4.7.1 Cumulative Impact Area

The cumulative impact area for the resource is the 2,856,082 acres identified as the project area found in appendix B.

4.4.7.2 Past and Present Actions

Past and present actions occurring within the CIA would include all activities that are associated with physical land use including recreation, livestock grazing, wildlife movements, activities in the management of private lands.

4.4.7.3 Reasonable Foreseeable Action Scenario

Reasonable foreseeable actions in the CIA include the continuation of recreational activities, livestock grazing, wildlife movements, and activities on adjacent private land.

4.4.7.4 Cumulative Impact Analysis

Impacts of the proposed action combined with other activities would minimally contribute to the CIA when combined with the past and present actions. After project completion, the soils resource would be improved due to a more diverse vegetative cover.

4.4.8 Threatened, Endangered or Candidate Plant Species and Utah BLM Sensitive Plant Species

4.4.8.1 Cumulative Impact Area

The cumulative impact area for Threatened, Endangered Species and BLM State Sensitive Species includes all identified habitats within the 2,856,082 acres project area, as well as associated adjacent habitats.

4.4.8.2 Past and Present Actions

Past, present and reasonably foreseeable action in the cumulative impact area for the Threatened, Endangered plant species and BLM State Sensitive plant species include increased recreation activity, mining and oil development, road use within the habitat of these plants species, which could increase the potential of impacting any given plants species within this area.

4.4.8.3 Reasonable Foreseeable Action Scenario

Reasonably foreseeable future actions in the MFO and on Federal, state, private, and other lands within and adjacent to the MFO that would affect threatened, endangered species and BLM State Sensitive Species include recreational use and development of facilities, ongoing mineral exploration, development, and production and ongoing grazing and range developments coupled with additional vegetative treatments that focus on habitat restoration, wildlife habitat improvement and fire management.

All of these actions would have short term and long term adverse effect on habitat of Threatened plant species and BLM State Sensitive Species. Beneficial impacts after short term activities

have subsided would result from vegetative treatments that focus on habitat restoration and improvement. Long term impact from additional recreational use and development of facilities, ongoing mineral exploration, development, and production and ongoing grazing and range developments and wildfire may lead to an increase habitat alteration and increased the potential for habitat lost.

4.4.8.4 Cumulative Impact Analysis

The cumulative effects to the threatened Jones cycladenia could be the loss of plants within treatment areas.

The cumulative effects to the BLM State Sensitive Plant Species could be the loss of plants due to invasive species expansion into populations.

Most of the species analyzed in this EA could be subject to cumulative impacts if vegetation and land health conditions deteriorated due increased invasive species expansion.

4.4.9 Vegetation Excluding USFW Designated Species

4.4.9.1 Cumulative Impact Area

The cumulative impact area for vegetative resources is the 2,856,082 acres identified in the Proposed Action. The Proposed Actions integrated invasive plant management strategies would occur annually on approximately 1000 acres of BLM administered lands. The timeframe for analysis of cumulative impact for vegetation is 30 years because of BLM's long-term commitment and priority given to integrated management and control of invasive plants.

4.4.9.2 Past and Present Actions

Past, present, and reasonably foreseeable actions ongoing in the cumulative impact area for vegetation are livestock grazing, road maintenance and construction, vehicular travel, and recreational activities such as hunting, camping, hiking, boating and off-highway vehicle (OHV) use. Except for OHV use, most of these activities have been occurring over the past 80-100 years, and all activities would likely continue into the foreseeable future. These activities can serve as vectors for weed establishment and spread. Project specific mitigations and prevention measures are typically designed and incorporated into these actions to help reduce the cumulative risk of new infestation and spread of invasive plants. These include managing livestock in adherence with the Standards and Guidelines for Health Rangelands, restricting wood gathering and OHV use to designated roads.

4.4.9.3 Reasonable Foreseeable Action Scenario

Reasonably foreseeable actions occurring within the project area include recreational activities, livestock grazing, wildlife use and habitat management, wildfires, mineral development, activities on private land including agriculture, and wood gathering. The effects of these activities are impossible to quantify, but all may contribute to the issues brought forth in this EA.

4.4.9.4 Cumulative Impact Analysis

Cumulative Impacts that can be expected from the proposed action would include increased ground cover (i.e. grass, forbs etc.), decreased erosion, and a lower fire potential. Current cover types identified in Table 3-11 could expect to see a shift in the relative dominance of Invasive plant cover decreasing and the desirable cover types of Blackbrush, Dunes, Grassland, Mixed Conifer, Mountain Shrub, Pinyon and Juniper Woodlands, Ponderosa Pine, Riparian Wetland, Sagebrush, and Salt Desert Scrub could be expected to increase in acerage.

4.4.10 Visual Resources

4.4.10.1 Cumulative Impact Area

The Cumulative Impact Area for Visual Resources are those lands within the Moab Field Office that are managed as VRM Class I, II and III (1,553,636 acres)

4.4.10.2 Past and Present Actions

Many past and present actions, including range improvements and mineral activities, have occurred, especially in VRM Class II and Class III areas (1,194,724 acres).

4.4.10.3 Reasonable Foreseeable Action Scenario

Minerals activities are expected to increase within VRM Class II and Class III areas. There are currently proposals to add up to 25 new oil and gas wells within these areas.

4.4.10.4 Cumulative Impact Analysis

Vegetative treatments could pose short term impacts to visual resources within VRM Class II and Class III areas. (Limitations on types of treatment would largely protect VRM Class I areas from cumulative impacts to their visual resources). However, the direct impacts of these treatments are not expected to be of long duration, such that the cumulative impacts of vegetation treatments on visual resources would be limited.

4.4.11 Water Resources/Quality

4.4.11.1 Cumulative Impact Area

The cumulative impact area for water resources includes all of the watersheds in the 2,856,082 acre project area, as well as adjacent lands with hydrological connections to the project area.

4.4.11.2 Past and Present Actions

Past and present actions having measurable impacts on water resources in the project area include upstream dams and diversions of rivers and streams, OHV travel, motorized recreational activities on bodies of water, livestock grazing, oil and mineral development, wildfires, periodic flooding, agricultural activities on adjacent private lands, and riparian restoration activities.

4.4.11.3 Reasonable Foreseeable Action Scenario

Reasonably foreseeable actions occurring within the project area include continued altered flow regimes in rivers and streams, recreational activities, livestock grazing, mining and oil

development, use and maintenance of roads, wildfires, periodic flooding, wildlife and riparian habitat management, and a variety of activities on adjacent private lands, including agriculture and wood gathering. Recreational use of watersheds in the project area is expected to continue to increase in the foreseeable future. Habitat management activities are also expected to increase in scope and number in response to impacts from the above activities and the need to restore habitats impacted by invasive vegetation.

4.4.11.4 Cumulative Impact Analysis

Implementation of the proposed action is expected to increase the cover and diversity of native vegetation, decrease soil erosion and rates of sedimentation in aquatic ecosystems, improve the complexity of stream and river channels, increase floodplain connectivity, reduce the potential for severe wildfires that impact vegetative cover and rates of erosion, and lead to localized reductions in amounts of shallow groundwater lost through evapotranspiration. Cumulative impacts from these anticipated trends would enhance water resources and lead to improved water quality.

4.4.12 Wetlands/Riparian Zones

4.4.12.1 Cumulative Impact Area

The cumulative impact area for this analysis is the wetland/ riparian areas within the MFO, about 35,000 acres. The impacts are not expected to extend out of this geographic area. The timeframe associated with this cumulative impacts assessment is ten years.

4.4.12.2 Past and Present Actions

Past and present actions in the cumulative impact area for wetlands/ riparian areas are livestock grazing and recreational activities such as hunting, camping and hiking. Although grazing has been ongoing for over 100 years, grazing is currently managed with fewer livestock numbers and shorter grazing seasons. Recreation uses have increased greatly in the MFO over the last 15 years, with increased impacts to wetlands and riparian areas.

4.4.12.3 Reasonable Foreseeable Action Scenario

Reasonably foreseeable actions occurring within the wetland/riparian zones in the project area include livestock grazing, recreational activities, wildlife use and habitat management, periodic flooding, and wildfires. It is reasonable to conclude that habitat restoration projects would continue to occur throughout this cumulative impact area, improving riparian conditions.

4.4.12.4 Cumulative Impact Analysis

Cumulative impacts would be positive in nature as a result of the Proposed Action, improving up to 35,000 acres of riparian resources within the cumulative impact area. Invasive species would be reduced and riparian conditions would improve with increased native plant diversity and improved ecological resilience.

5.0 CONSULTATION AND COORDINATION

5.1 Introduction

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. The ID Team Checklist provides the rationale for issues that were considered but not analyzed further. The issues were identified through the public and agency involvement process described in sections 5.2 and 5.3 below.

5.2 Persons, Groups, and Agencies Consulted:

Table 5-1: List of all Persons, Agencies and Organizations Consulted for Purposes of this EA.

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Utah State Historic Preservation Office (SHPO)	Consultation for undertakings, as required by the National Historic Preservation Act (NHPA) (16 USC 470)	Letter was sent to SHPO on January 26, 2016 inviting them to be involved in the planning process and solicit feedback. To date the CYFZ has not received feedback. All projects will adhear to the Small-Scale undertakings MOU as discussed in the IDT Checklist (appendix A).
Native American Tribes	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531) EO 13007	Letters sent on January 26, 2016. One letter received from Hopi tribe supporting the avoidance of sites. The Hopi requested the cultural resources survey report.
Utah State Division of Forestry, Fire and State Lands [Matt Jones, Southeastern Area Sovereign Lands Coordinator/ WUI Coordinator]	Collaboration and coordination to meet goals and objectives of Community Wildfire Protection Plan; coordination with BLM on potential adjacent private land treatments.	Continued collaboration
Grand County	Project Coordination	Tim Higgs from the Grand County weeds department attended and had input on the project during a scoping meeting conducted on July 8th, 2015.
Division of Wildlife Resources (DWR)	Project Coordination.	Continued collaboration.
United States Fish and Wildlife Service	Section 7 Consultation	It has been determined that the project "may affect, is not likely

(USFWS)		to adversely affect" because treatment activities would take place outside the nesting season for owls (March through August) and critical breeding and nesting times for the Southwestern willow flycatcher and yellow-billed cuckoo (May 1- August 15). USFWS concurred with BLM's determination on 7/20/2016.

5.3 Summary of Public Participation

Notification of the preparation, on-going progress and decision regarding this environmental assessment was posted on the ePlanning website located at: https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=48388&dctmId=0b0003e880869582 on July 2nd, 2015. Press releases for a public scoping meeting occurring on July 8th, 2015 were published in the Times Independent and Moab Sun News on July 2nd, 2015 to address any public concerns and solicit input for the project need and design. In addition to press releases, emails were sent out to approximately thirty people soliciting them to attend the scoping meeting. The EA was posted on the ePlanning website on April 4th, 2016 for 15 day public comment and review. When finalized, a copy of the EA would be available by link from the ePlanning website.

5.3.1 Comment Analysis

No comments received to date on EA.

5.3.2 List of Commenters

No comments received to date on EA.

5.3.3 Response to Public Comment

No comments received to date on EA.

5.4 List of Preparers

Table 5.2: List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Leigh Grench	Canyon Country Fire Zone Archeologist	Cultural Resources
Katie Stevens	Moab Field Office Outdoor Recreation Planner	ACECs, Wild and Scenic Rivers, Recreation, Visual Resources
Pam Riddle	Moab Field Office	Fish and Wildlife Excluding USFW Designated

	Wildlife Biologist	Species, Migratory Birds, Threatened, Endangered or Candidate Animal Species, Utah BLM Sensitive Species
Mark Grover	Canyon Country District Fish Biologist	Fish and Wildlife Excluding USFW Designated Species, Wetlands/Riparian Zones, Hydrologic Conditions, Water Resources/Quality, Floodplains.
Joshua Relph	NEPA Coordinator, Canyon Country Fire Zone	Resource team consultation, administrative record, data compilation, research, and analysis composition, Fire/Fuels.
Gabe Bissonette	GIS Specialist, Canyon Country Fire Zone	Project Boundary planning and coordination, map creation and consultation, monitoring development and standards.
Jordan Davis	Moab Field Office Rangeland Management Specialist	Invasive Species/Noxious Weeds, Vegetation Excluding USFW Designated Species
Lisa Bryant	Moab Assistant Field Office Manager	Soils
Bill Stevens	Moab Field Office Outdoor Recreation Planner	Lands with Wilderness Characteristics
David Williams	Moab Field Office Rangeland Management Specialist	Threatened, Endangered or Candidate Plant Species

6.0 REFERENCES, GLOSSARY AND ACRONYMS

6.1 References Cited

Bestgen, K. R., Budy, P. and W. J. Miller. 2011. Status and trends of flannelmouth sucker *Catostomus latipinnis*, bluehead sucker *Catostomus discobolus*, and roundtail chub *Gila robusta*, in the Dolores River, Colorado, and opportunities for population improvement: Phase II Report. Final report submitted to the Lower Dolores Plan Working Group-Legislative Committee. Larval Fish Laboratory Contribution 166 and Intermountain Center for River Rehabilitation and Restoration 2011: 1-55.

Bestgen, K. R., K. A. Zelasko, and G. C. White. 2012. Monitoring reproduction, recruitment, and populations status of razorback suckers in the Upper Colorado River Basin. Final report to the Upper Colorado River Endangered Fish Recovery Program, U.S. Fish and Wildlife Service, Denver, Colorado. Larval Fish Laboratory Contribution 170.

Bezzerides, N., and K. Bestgen. 2002. Status review of roundtail chub *Gila robusta*, flannel-mouth sucker *Catostomus latipinnis*, and bluehead sucker *Catostomus discobolus* in the Colorado River basin. Colorado State University Larval Fish Lab, Contribution 118, Fort Collins.

Birken, A. S., and D. J. Cooper. 2006. Processes of Tamarix invasion and floodplain development along the lower Green River, Utah. Ecological Applications 16:1103-1120.

Bureau of Land Management, Utah Record of Decision, Vegetation Treatment on BLM Lands in Thirteen Western States, July, 1991.

Bureau of Land Management, Canyon Country Fire Zone (Previously Moab Fire District), Fire Management Plan, UT-063-04-02, UT-060-2005-042, November, 2005

Bureau of Land Management, Utah Land Use Plan Amendment for Fire and Fuels Management, UT-USO-04-01, September, 2005.

Bureau of Land Management (BLM). 2007a. Record of Decision, Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Impact Statement (PEIS), September, 2007.

Bureau of Land Management (BLM). 2007b. Final Biological for the Assessment Vegetation Treatments on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Report (PER), June, 2007.

Bureau of Land Management (BLM). 2007c. Final Biological for the Assessment Vegetation Treatments on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Report (PER), June, 2007.

Bureau of Land Management (BLM). 2007d Final Biological for the Assessment Vegetation Treatments on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Report, June, 2007.

Bureau of Land Management (BLM). 2008a. Proposed Resource Management Plan and Final Environmental Impact Statement. Moab Field Office. Moab, Utah.

Bureau of Land Management (BLM). 2016. Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Impact Statement (PEIS), January, 2016.

Cauble, K. and R. S. Wagoner. 2005. Sublethal effects of the herbicide glyphosate on amphibians metamorphosis and development. Bulletin of Environmental Contamination and Toxicology 75:429-435.

Consolidated Appropriations Act (PL 113-76 Sec. 417), 2014

Dunham, J. B., M. K. Young, R. E. Gresswell, and B. E. Rieman. 2003. Effects of fire on fish populations: landscape perspectives on persistence of native fishes and nonnative fish invasions. Forest Ecology and Management 178:183-196.

Gaddis, M., and A. Sher. 2012. Russian olive (Elaeagnus angustifolia) removal in the western United States: multi-site findings and considerations for future research. Sustainability 2012:3346-3361.

Good Neighbor Authority (GNA) (PL 108-447 Sec. 336), 2004

Grimm, N. B. 1987. Nitrogen dynamics during succession in a desert stream. Ecology 68:1157-1170.

Grover, M. G. 2000. Determinants of salamander distributions along moisture gradients. Copeia 2000:156-168.

Hossack, B. R., and D. S. Pilliod. 2011. Amphibian responses to wildfire in the western United States: emerging patterns from short-term studies. Fire Ecology 7:129-144.

Katz, G. L., and P. B. Shafroth 2003. Biology, ecology, and management of *Elaeagnus angustifolia* L. (Russian olive) in western North America. Wetlands 23:763-777.

Keller, D. and J. Hart, 2013. Three Species conservation in Utah's Southeastern Region during 2013. Unpublished report. Utah Division of Wildlife Resources, Salt Lake City, Utah.

Keller, D. and J. Hart, 2014. Three Species conservation actions in the Southeast Region, 2014. Unpublished report. Utah Division of Wildlife Resources, Salt Lake City, Utah.

Keller, D. L., B. G. Laub, P. Birdsey, and D. J. Dean. 2014. Effects of flooding and tamarisk removal on habitat for sensitive fish species in the San Rafael River, Utah: implications for fish habitat enhancement and future restoration efforts. Environmental Management 54:465-478.

Konrad, C. P. 2012. Reoccupation of floodplains by rivers and its relation to the age structure of floodplain vegetation. Journal of Geophysical Research 117, doi:10.1029/2011JG001906.

Laub, B. G., J. Jimenez, and P. Budy. 2015. Application of science-based restoration planning to a desert river system. Environmental Management 55:1246-1261.

Mabey, L. W., and D. K. Shiozawa. 1993. Plankton and benthic microcrustaceans from floodplain and river habitats of the Ouray Refuge on the Green River, Utah. M.S. Thesis, Department of Zoology, Brigham Young University, Provo, Utah.

Miller, R. R. 1961. Man and the changing fish fauna of the American Southwest. Papers of the Academy of Sciences, Arts and Letters 46:365-404.

Miller, S. W., J. Jimenez, S. Judson, and J. Courtwright. 2014. An assessment of the chemical, physical, and biological condition of Utah BLM wadeable streams. U.S. Bureau of Land Management National Operations Center, Denver, Colorado

Mineau, M. M., C. V. Baxter, A. M. Marcerelli, and G. W. Minshall. 2012. An invasive riparian tree reduces stream ecosystem efficiency via a recalcitrant organic matter subsidy. Ecology 93:1501-1508.

Nagler, P. L., P. B. Shafroth, J. W. LeBaugh, K. A. Snyder, R. L. Scott, D. M. Merritt, and J. Ostertag. 2009. The potential for water savings through the control of saltcedar and Russian olive. Pages 35-47 *in* Shafroth, P. B., C. A. Brown, and D. M. Merritt (eds.). Saltcedar and Russian olive control demonstration act science assessment. U. S. Department of the Interior, U. S. Geological Survey. Scientific Investigations Report 2009-5247.

Nissen, S., A. Sher, and A Norton (eds.) 2009. Tamarisk: Best Management Practices in Colorado Watersheds. Colorado State University, Fort Collins, Colorado.

Osmundson, D. B., P. Nelson, K. Fenton, and D. W. Ryden. 1995. Relationship between flow and rare fish habitat in the "15-Mile Reach" of the upper Colorado River. Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.

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, 1594 West North Temple, Salt Lake City, UT 84116, UDWR Publication Number 02-27. i–xiv + 302 pp.

Peterson. D.L., et al. 2011. Responding to Climate Change on National Forests: A Guidebook for Developing Adaptation Options. U.S. Forest Service PNW-GTR-855

Proposed Resource Management Plan and Final Environmental Impact Statement (Moab EIS), August 2008.

Relyea, R. A. 2005. The lethal impact of Roundup on aquatic and terrestrial amphibians. Ecological Applications 15:1118-1124.

Rinne, J. N. 1996. Management briefs: short-term effects of wildfire on fishes and aquatic macroinvertebrates in the southwestern United States. North American Journal of Fisheries Management 16:653-658.

RMRS-GTR-42, Volume 4, "Wildland Fire in Ecosystems: Effects of Fire on Soil and Water," USDA Forest Service Rocky Mountain Research Station General Technical Report, Daniel G. Neary, Kevin C. Ryan, and Leonard F. DeBano, Editors, September, 2005.

RMRS-GTR-120, "Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity," USDA Forest Service Rocky Mountain Research Station General Technical Report, Drs. Russell T. Graham, Sarah McCaffrey and Theresa B. Jain, Editors, January, 2004.

RMRS-GTR-202, "Fire Ecology and Management of the Major Ecosystems of Southern Utah," USDA Forest Service Rocky Mountain Research Station General Technical Report, Sharon M. Hood and Melanie Miller, Editors, November, 2007.

Romin, Laura A. and James A. Muck. 2002. Utah field office guidelines for raptor protection from human and land use disturbances. U.S. Fish and Wildlife Service, Utah Field Office Salt Lake City

Rosenzweig, M. L. 2005. Species diversity in space and time. Cambridge University Press, Cambidge, UK.

Sheley, R., J. Petroff, 2003. Biology and Management of Noxious Rangeland Weeds. Oregon State University Press.

Sheley, R., J. Mangold, K. Goodwin, and J. Marks. 2008. Revegetation Guidelines for the Great Basin: Considering Invasive Weeds. ARS–168. U.S. Department of Agriculture, Agricultural Research Service, Washington, D.C., 60 pp.

Sher, Anna. 2010. Best Management Practices for Revegetation after Tamarisk Removal in the Upper Colorado River Basin. Denver Botanic Gardens

Sher, Anna. 2013. Tamarix: A Case Study of Ecological Change in the American West. Oxford University Press.

Shoemaker, V. H., S. D. Hillyard, D. G. Jackson, L. L. McClannahan, P. C. Withers, and M. L. Wygoda. 1992. Exchange of water, ions, and respiratory gases in terrestrial amphibians, Pages 125-150 *in* M. E. Feder and W. W. Burggren (eds.). Environmental Physiology of Amphibians. University of Chicago Press.

Smith, G. R. 2001. Effects of acute exposure to a commercial formulation of glyphosate on the tadpoles of two species of anurans. Bulletin of Environmental Contamination and Toxicology 67:483-488.

Taba, S. S., J. R. Murphy, and H. H. Frost. 1965. Notes on the fishes of the Colorado River near Moab, Utah. Utah Academy Proceedings 42:280-283.

Tonkin, J. D., R. G. Death, and K. J. Collier. 2013. Do productivity and disturbance interact to modulate macroinvertebrate diversity in streams? Hydrobiologia 701:159-172.

Tyus, H.M. 1991. Ecology and management of Colorado squawfish. Pages 379-402 in W. L. Minckley and J.E. Deacon (eds.). Battle against extinction: native fish management in the American west. The University of Arizona Press, Tucson.

United States Department of Interior (USDI), 1991. Bureau of Land Management. Final Environmental Impact Statement and Record of Decision (Utah) Vegetation Treatment on BLM Lands in Thirteen Western States..

U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; determination of critical habitat for the Colorado River endangered fishes: razorback sucker, Colorado squawfish, humpback chub, and bonytail chub. Federal Register 59: 13374-13399

Utah Division of Wildlife Resources (UDWR). 2006. Range-wide conservation agreement and strategy for roundtail chub (*Gila robusta*), bluehead sucker (*Catostomus discobolus*), and flannelmouth sucker (*Catostomus latipinnis*). Publication Number 06-18. Utah Division of Wildlife Resources, Salt Lake City, Utah.

Utah Division of Wildlife Resources (UDWR). 2016. Utah Division of Wildlife Resources Index of Available GIS Data. UDWR GIS Database: Big game habitats http://dwrcdc.nr.utah.gov/ucdc/DownloadGIS/disclaim.htm. Accessed 3/1/2016

Valdez, R.A., and G.C. Clemmer. 1982. Life-history and prospects for recovery of the humpback chub and bonytail chub. Pages 109-119 *in* W.H. Miller, H.M. Tyus, and C.A. Carlson (eds.). Fishes of the upper Colorado River system: present and future. Western Division, American Fisheries Society, Bethesda, Maryland.

Valdez, R.A., P. Mangan, R. Smith, and B. Nilson. 1982. Upper Colorado investigations (Rifle, Colorado to Lake Powell, Utah). Pages 100-279 *in* Colorado River Fishery Project, Final Report, Part 2: Field Investigations. U.S. Fish and Wildlife Service, Salt Lake City, Utah.

Valdez, R.A., W.J. Masslich, and A. Wasowicz. 1992. Dolores River native fish habitat suitability study. Final Report, Utah Division of Wildlife Resources, Salt Lake City, Utah.

Vincent, K. and C. Davidson. 2015. The toxicity of glyphosate alone and glyphosate-surfactant mixtures to western toad (*Anaxyrus boreas*) tadpoles. Environmental Toxicology and Chemistry 34:2791-2795.

Walker, C.A., and P. Birdsey. 2005. Surveys to determine the current distribution of roundtail chub, flannelmouth sucker, and bluehead sucker conducted during 2005. Unpublished report. Utah Division of Wildlife Resources, Salt Lake City, Utah.

Westbrooks, R. 1998. Invasive plants, changing the landscape of America: Fact book. Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW). Washington, DC.

Western Regional Climate Center, 2016, Moab, Utah period of Record Monthly Climate Summary. Accessed on March 24, 2016 from http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?utmoab

Wouldey, D. W., and D. Spotskey. 1997. GIS habitat model for Mexican spotted owl habitat in Utah. Utah Division of Wildlife Resources. Unpublished Final Report. Salt Lake City, UT.BLM 2007

6.2 Glossary of Terms:

6.3 List of Acronyms

APHIS – Animal and Plant Health Inspection Service

ATV – All Terrain Vehicle
BA – Biological Assessment
BCARP – Biological Control Agent Release Proposal
BCC – Birds of Conservation Concern
BLM – Bureau of Land Management
BMP – Best Management Practices
CEQ – Council of Environmental Quality
CIA - Cumulative Impact Area
CYFZ – Canyon Country Fire Zone
DEIS – Draft Environmental Impact Statement
DNA – Decision of NEPA Adequacy
DOI – Department of the Interior
DR – Decision Record
EA – Environmental Assessment
EDRR – Early Detection Rapid Response
EIS – Environmental Impact Statement
ESA – Endangered Species Act
FLPMA – Federal Land Policy Management Act
FMP – Fire Management Plan
FMU – Fire Management Unit
FONSI – Finding of no Significant Impact
FRCC – Fire Regime Condition Class
GIS – Geographic Information System
GNA – Good Neighbor Authority
HLI – Health Lands Initiative
HUC – Hydrologic Unit Class
LWC – Lands with Wilderness Characteristics
PAR – Pesticide Application Record
PIF – Partners in Flight
PUR – Pesticide Use Report
PEIS – Programmatic Environmental Impact Statement
PISMP – Programmatic Invasive Species Management Plan
PSD – Plastic Sphere Dispenser
MBTA – Migratory Bird Treaty Act
MFO – Moab Field Office
MOU – Memorandum of Understanding
MPA – Moab Planning Area
MSO – Mexican Spotted Owl
NEPA – National Environmental Policy Act
NHPA – National Historic Preservation Act of 1966
NRHP – National Register of Historic Places
OHV – Off Highway Vehicle
PFC – Proper Functioning Condition
PUP – Pesticide Use Proposal
REA – Rapid Ecological Assessment
RMP – Resource Management Plan

ROD – Record of Decision
SHPO – State Historic Preservation Office
SOP – Standard Operating Procedures
SSS – Special Status Species
SWFL – Southwestern Willow Flycatcher
UDOT – Utah Department of Transportation
UDWR – Utah Division of Wildlife Resources
UPCD – Utah Partners for Conservation and Development
USDA – United States Department of Agriculture
USDI – United States Department of Interior
USHPO – Utah State Historic Preservation Officer
USFWS – United States Fish and Wildlife Service
VCC – Vegetation Condition Class
VRM – Visual Resource Management
WRI – Water Restoration Initiative
WSA – Wilderness Study Area
WUI – Wildland Urban Interface
YBCU – Western Yellow-billed cuckoo

APPENDICES

APPENDIX A: Interdisciplinary Team Checklist

INTERDISCIPLINARY TEAM CHECKLIST

Project Title: Moab Field Office Programmatic Invasive Species Management Plan

NEPA Log Number: DOI-BLM-UT-Y010-2015-0190-EA

File/Serial Number:

Project Leader: Joshua Relph

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

The following elements are not present in the Moab Field Office and have been removed from the checklist: Farmlands (Prime or Unique), Wild Horses and Burros.

Determi-nation	Resource	Rationale for Determination*	Signature	Date
RESOURCES AND ISSUES CONSIDERED (INCLUDES SUPPLEMENTAL AUTHORITIES APPENDIX 1 H-1790-1)				
NI	Air Quality	Potential impacts to air quality from these types of actions have been analyzed in the "2007 Vegetation Treatments using herbicides on BLM lands EIS". Burn plans would be approved prior to any burning activities. The State of Utah Division of Air Quality has classified both Grand and San Juan Counties as having attainment status. It is unlikely that any potential emissions from the proposed action would cause or contribute to any exceedances of the State of Utah National Ambient Air Quality Standards or Air Quality Related Values, or cause or contribute to any localized air quality issues. Therefore air quality would not be analyzed in detail in this EA.	Ann Marie Aubry	6-11-15
NI	Areas of Critical Environmental Concern	All ACECs in the Moab Field Office are managed with an NSO stipulation for vegetative treatments. Those treatments involving surface disturbance would follow stipulations in the Moab RMP (Appendix A) for ACECs, thus protecting the relevant and important values contained in those ACECs. In the long run, there is a benefit to ACECs from invasive species removal, as it returns the system to a more naturally functioning condition.	Katie Stevens	6/9/2015
NI	BLM Natural Areas	All Natural Areas in the Moab Field Office are managed with a no surface disturbance stipulation for vegetative treatments. Vegetation treatments in Natural Areas would follow stipulations in the Moab RMP (Appendix A) for Natural Areas, thus protecting the apparent naturalness contained in those Natural Areas. Any impacts to outstanding opportunities for solitude and/or primitive and unconfined recreation would be temporary in nature. In the long run, there is a benefit to Natural Areas from invasive species removal, as it returns the system to a more naturally	Bill Stevens	6/23/2015

Determi-nation	Resource	Rationale for Determination*	Signature	Date
		functioning condition.		
NI	Cultural Resources	Site specific projects would adhere to the Programmatic Agreement Between The Advisory Council On Historic Preservation, The Bureau of Land Management (Utah), and the Utah State Historic Preservation Office Regarding National Historic Preservation Act Responsibilities For Small Scale Undertakings (Small Scale PA). If the project is larger than the thresholds of the Small Scale PA, the BLM would follow 36 CFR 800. Most of the invasive species work would take place in thick vegetation in flood plains where cultural resources are generally scarce. A literature search would be completed for every undertaking. Survey may or may not be conducted based on the findings, if no survey is recommended then the BLM would conduct section 106 consultation with SHPO as per 36 CFR 800. If no survey is conducted prior to the undertaking due to vegetation density an archaeologist, at the discretion of the BLM, may be present during project implementation. If cultural resources are discovered during the course of the undertaking they would be fully documented and further section 106 consultation would be conducted at that time. Cultural resources would be avoided, and the undertaking is anticipated to have "no adverse impact." If impacts to cultural resources cannot be avoided, a follow-up EA would need to be completed. If any unanticipated discoveries of cultural resources are made the BLM would follow procedures outlined in 36 CFR 800.13.	Leigh Grench	7/7/2015
NI	Greenhouse Gas Emissions	There are minimal greenhouse gas emissions expected from this proposal which involve short term use of engines in a temporary and dispersed nature. Therefore greenhouse gas emissions would not be analyzed in detail in the EA	Ann Marie Aubry	6-11-15
NI	Environmental Justice	There are no EJ populations who have been identified in the planning area, or are likely to be affected by the proposed action.	Bill Stevens	6/23/2015
PI	Fish and Wildlife Excluding USFW Designated Species	The proposed treatments would result in minimal levels of surface disturbance and would yield long-term benefits to fish and amphibian species by increasing the complexity of riparian habitats. Potential short-term impacts to fish and amphibians resulting from herbicide applications are addressed in the "2007 Vegetation Treatments using herbicides on BLM lands EIS". Spraying of herbicides would not occur along margins of aquatic habitats and the use of glyphosate would be restricted to upland vegetation treatments and direct applications to cut stumps.	Pam Riddle/ Mark Grover	6/16/2015
PI	Floodplains	Although there would be no surface disturbance within 100-year floodplains per the 2008 RMP decision SOL-WAT-5 (page 102), any treatments located adjacent to the floodplains that involved complete vegetation removal (ie removal of a dense tamarisk stand) would potentially de-stabilize streambanks, increase soil erosion and reduce floodplain functionality.	Mark Grover	6-11-15
PI	Fuels/Fire Management	Issues related to Fuels/Fire Management makes up a portion of the Proposed Action. The EA analyzes hazardous fuels reduction and fire management activities, all related issues and impacts related to these would be discussed.	Joshua Relph	7/7/2015

Determi-nation	Resource	Rationale for Determination*	Signature	Date
NI	Geology / Mineral Resources/Energy Production	Notify operators of community pits as needed	David Pals	6-16-15
PI	Hydrologic Conditions	This proposal may impact hydrologic conditions by removing dense stands of tamarisk near streams which would increase soil erosion, increase stream bank destabilization, decrease water quality and overall watershed health.	Mark Grover	6-11-15
PI	Invasive Species/Noxious Weeds (EO 13112)	Potential impacts to noxious weeds and other invasive vegetation from invasive plant control has been previously analyzed in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS). This analysis was completed at the national level. The proposal and no action alternatives have the potential to impact invasive species and noxious weeds through control efforts or lack of control efforts, at the local level. Potential relevant impacts to invasive species / noxious weeds would be carried forward for analysis in the EA.	Jordan Davis	6/9/2015
NI	Lands/Access	The proposal would be subject to valid existing rights.	Jan Denney	2/4/2016
PI	Lands with Wilderness Characteristics	Some of the proposed treatments could have a temporary impact on apparent naturalness. Any impacts to outstanding opportunities for solitude and/or primitive and unconfined recreation would be temporary in nature. In the long run, there could be a benefit to lands with wilderness characteristics from invasive species removal, as it returns the system to a more naturally functioning condition. With the exception of the Natural Areas discussed above, none of the areas potentially treatable in these lands are being managed for wilderness characteristics under the 2008 Moab RMP.	Bill Stevens	6/23/2015
NI	Livestock Grazing	The 2007 Programmatic Environmental Impact Statement for Vegetation Treatments using Herbicides, which this EA tiers to, sufficiently addresses the affected environment and potential environmental impacts to livestock. Mitigation measures and Standard Operating Procedures are incorporated into the proposed action which lessens potential impacts to livestock grazing. Thereby, for reasons listed above, livestock grazing is not affected to a degree that detailed analysis is required.	Jordan Davis	6/9/2015
PI	Migratory Birds.	Analyzed within the EA	Pam Riddle	6/16/2015
NI	Native American Religious Concerns	Letters were sent to Native American tribes on January 26th, 2016. To date, one tribe has submitted comments regarding the proposed project.	Leigh Grench	7/7/2015
NI	Paleontology	No impact is expected to PFYC 4 and 5 areas, due to the nature of the treatments and the location of the proposed action. If significant vertebrate fossils are found, work must stop and the BLM district paleontologist must be contacted.	ReBecca Hunt-Foster	6/15/2015
NI	Rangeland Health Standards	Utah Standards for Rangeland Health are individually addressed as separate resources for determination of impacts in this checklist. Thereby, since analysis of relevant impacts would be addressed by these potentially impacted individual resources, Rangeland Health Standards as a whole would not be analyzed.	Jordan Davis	6/9/2015

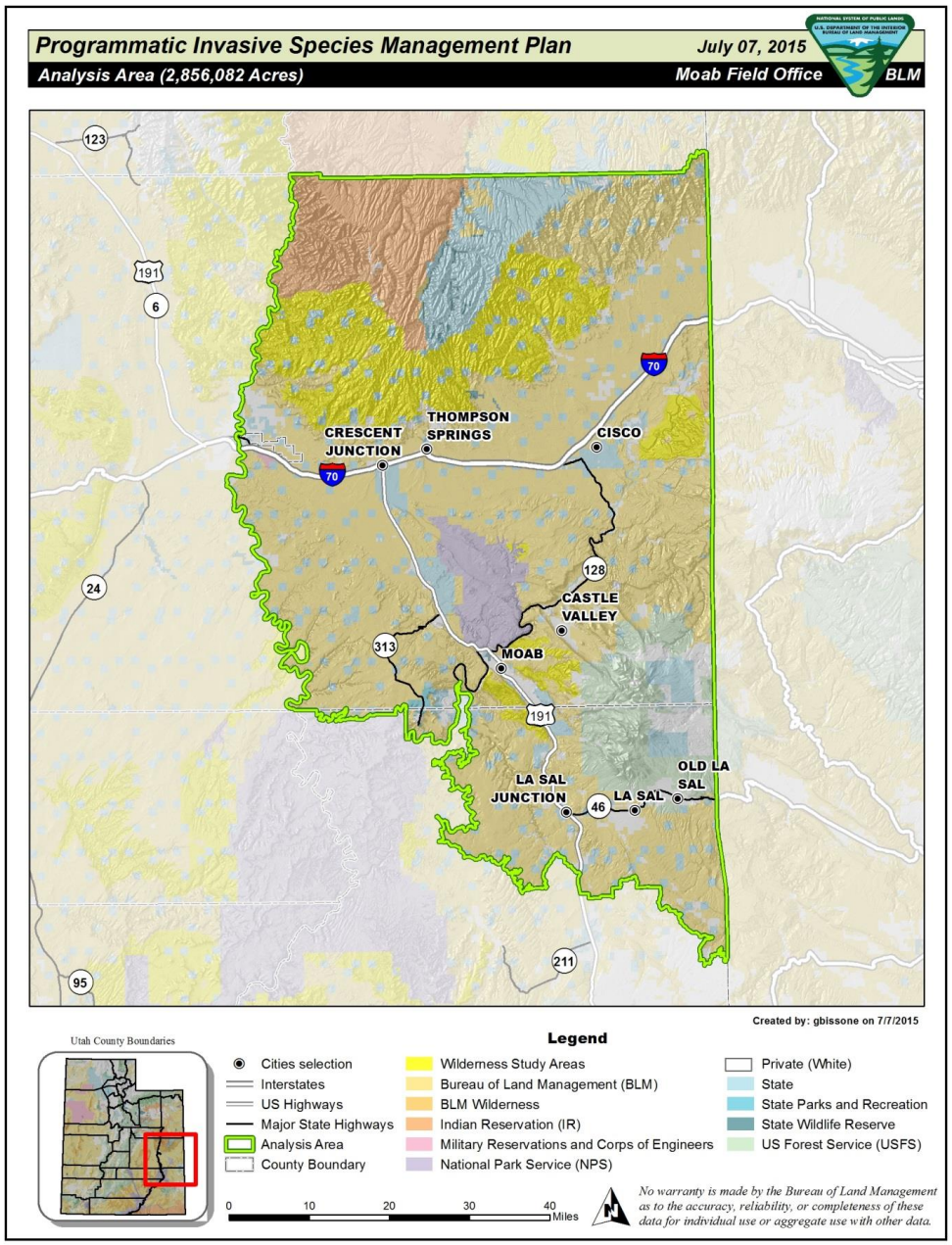
Determi-nation	Resource	Rationale for Determination*	Signature	Date
NI	Recreation	NSO stipulations protect recreation resources from surface disturbing projects. If treatments were to involve surface disturbance, the project would adhere to the Moab RMP (Appendix A) thus protecting those resources. In the long run, there is a benefit to recreation from invasive species removal.	Katie Stevens	6/9/2015
NI	Socio-Economics	Any impacts to employment, labor income and output would be very minor in the context of the planning area's overall economy. Any fiscal impacts to state and local governments would be minimal or non-existent.	Bill Stevens	6/23/2015
PI	Soils	Potential impacts to soils, especially from full removal of dense tamarisk stands, include increased wind and water erosion rates and reduced soil productivity.	Lisa Bryant	6-11-15
PI	Threatened, Endangered or Candidate Plant Species	Surveys for threatened Cycladenia humilis jonesii in Grand and northern San Juan Counties. Surveys for threatened Navajo Sedge in northern San Juan Counties. Surveys for BLM State Sensitive Species which occurs within the Moab Field Office. If threatened plants species, Cycladenia humilis jonesii (Jones Cycladenia), Carex specuicola (Navajo Sedge) and BLM State Sensitive Species which occurs within the Moab Field Office may be impacted by treatments of Invasive Species/Noxious Weeds.	David Williams	6/23/2015
PI	Threatened, Endangered or Candidate Animal Species	Analyzed within the EA	Pam Riddle	6/16/2015
PI	Utah BLM Sensitive Species	Analyzed within the EA	Pamela Riddle	6/16/15
PI	Vegetation Excluding USFW Designated Species	Potential impacts to Vegetation from invasive plant control has been previously analyzed in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS), which this EA tiers. This analysis was done at the national level. The proposal and no action alternatives have the potential to impact vegetative communities through influences to biotic integrity and non-targeted plants. Thereby, potential impacts to vegetation would be analyzed in the EA.	Jordan Davis	6/9/2015
PI	Visual Resources	Invasive plant control could negatively impact visual resources in a way that could attract the attention of the casual observer. The type of treatment used in VRM II areas should be restricted to those that are obviously less visible. In the long run, there is a benefit to visual resources from invasive species removal.	Katie Stevens	6/9/2015
NP	Wastes (hazardous or solid)	No known hazardous or solid waste in area indicated	David Pals	6-16-15
PI	Water Resources/Quality (drinking/surface/ground)	Potential impacts from removal of dense tamarisk stands to water resources include increased sediment loads, decreased water quality conditions and decreased shallow groundwater resources.	Mark Grover	6-11-15
PI	Wetlands/Riparian Zones	Potential impacts from this proposal include increased density of secondary weeds, reduced native plant cover and diversity, and loss of riparian acreage as transitional sites re-vegetate with upland plant species rather than riparian species.	Mark Grover	6-11-15

Determi-nation	Resource	Rationale for Determination*	Signature	Date
PI	Wild and Scenic Rivers	Suitable Wild and Scenic River corridors are protected from surface disturbing activities with an NSO stipulation. Those treatments involving surface disturbance would not be allowed in suitable Wild and Scenic River corridors, thus protecting their outstandingly remarkable values. In the long run, there is a benefit to suitable Wild and Scenic River corridors from invasive species removal	Katie Stevens	6/9/2015
NI	Wilderness/WSA	All WSAs in the Moab Field Office are managed with a no surface disturbance stipulation for vegetative treatments. Vegetation treatments in WSA's would adhere to the Moab RMP (Appendix A) in WSAs, thus protecting the apparent naturalness contained in those WSAs. Any impacts to outstanding opportunities for solitude and/or primitive and unconfined recreation would be temporary in nature. In the long run, there is a benefit to WSAs from invasive species removal, as it returns the system to a more naturally functioning condition.	Bill Stevens	6/23/2015
NI	Woodland / Forestry	The 2007 Programmatic EIS and the Moab RMP 2008, which this document is tiered, have analyzed the affected environment and potential environmental impacts to woodlands and forestry resources. The Proposed Action contains mitigation and Standard Operating Procedures that reduce the impacts to native woodlands and forestry resources. No further analysis is required.	Jordan Davis	6/9/2015

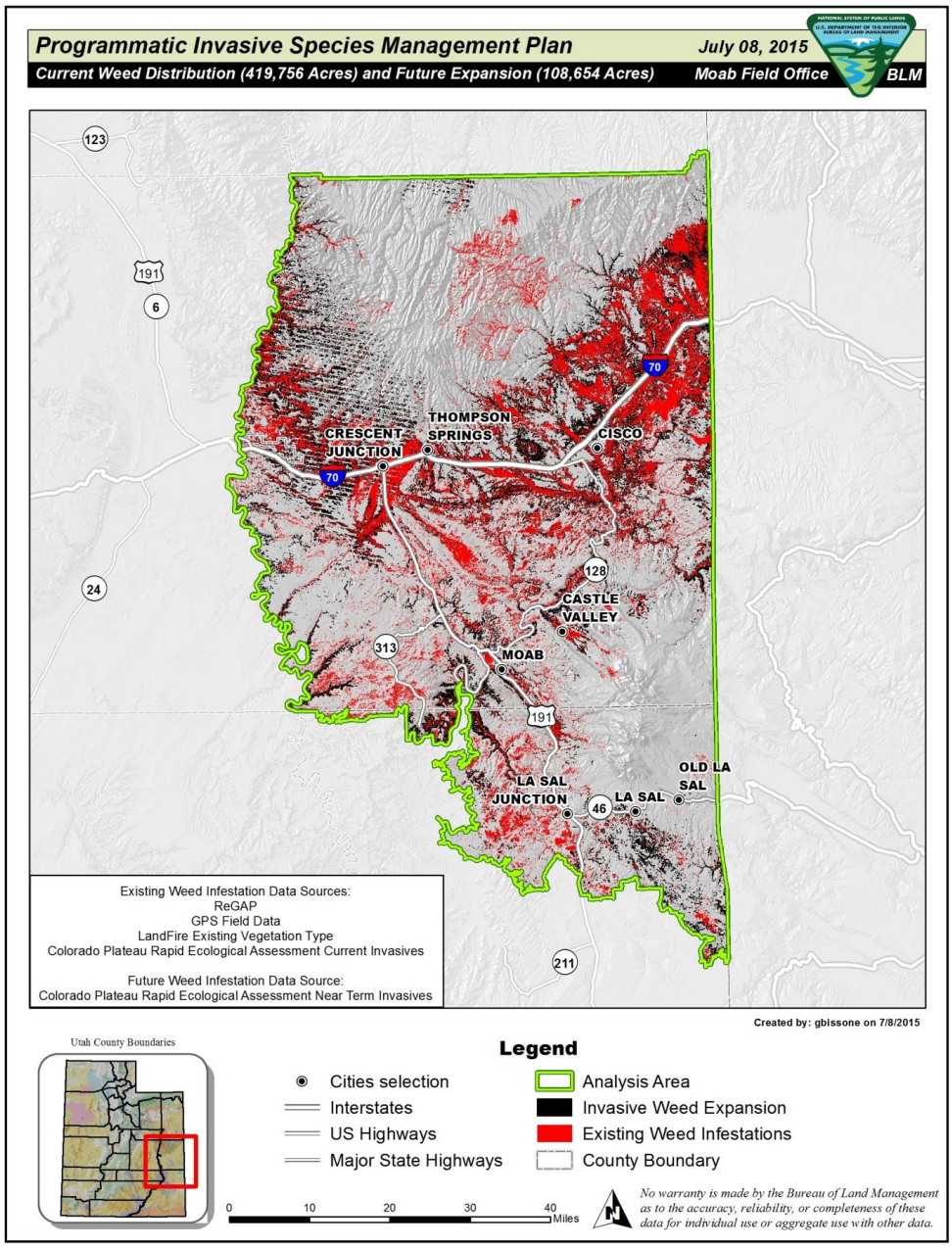
FINAL REVIEW:

Reviewer Title	Signature	Date	Comments
Environmental Coordinator			
Authorized Officer			

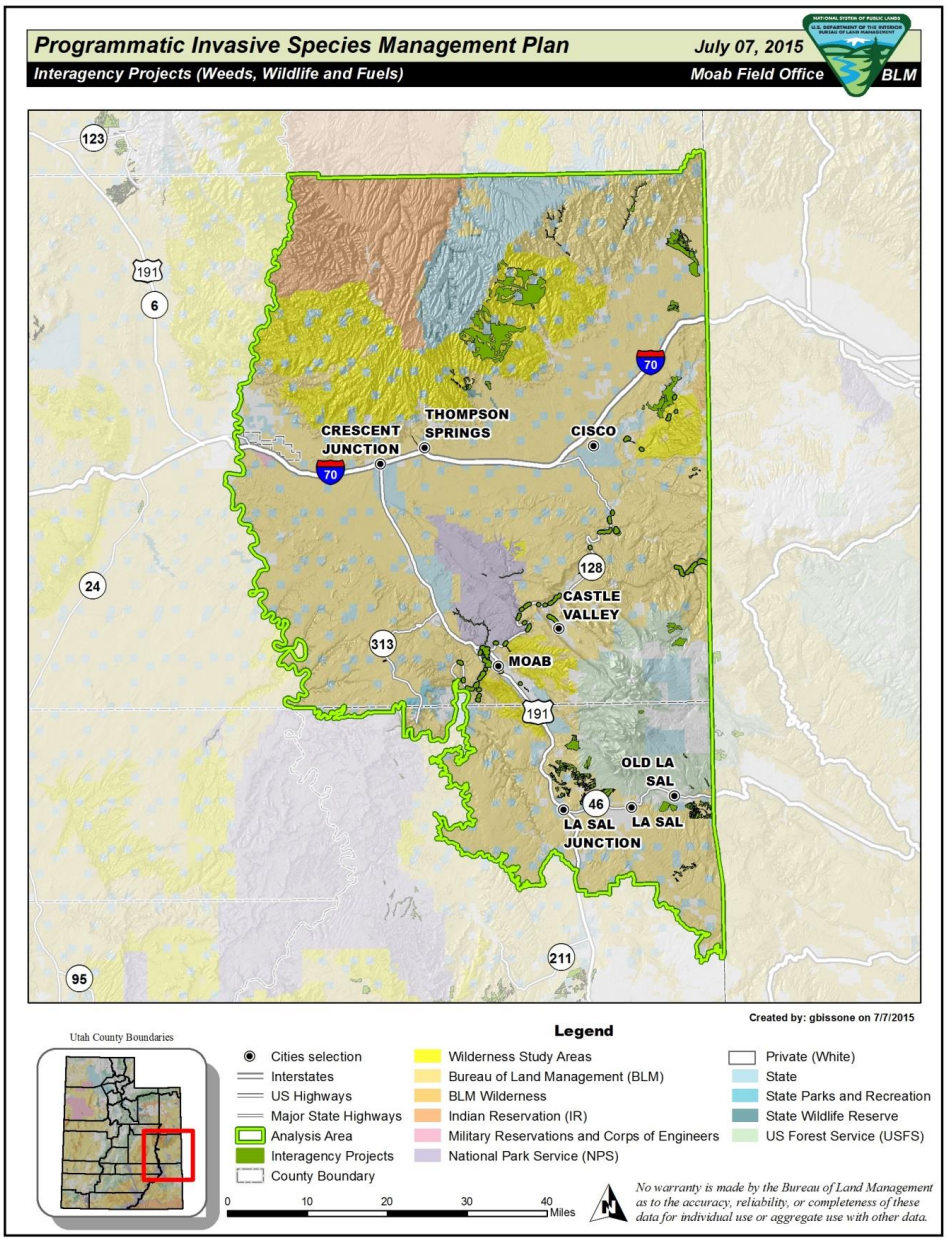
APPENDIX B: Planning Area Map



APPENDIX C: Current and Future Weed Distribution



APPENDIX D: Cumulative Projects Within Analysis Area



APPENDIX E: Species List

SPECIES LIST:

Table 1.1 - Invasive Plants Known to Occur Within the MFO Boundary		
Common Name	**Scientific Name**	**Class**
Diffuse Knapweed	*Centaurea diffusa*	A
Johnsongrass	*Sorghum spp.*	A
Black Henbane	*Hyoseyamus niger*	A
Spotted Knapweed	*Centaurea maculosa*	A
Purple Loosestrife	*Lythrum salicaria*	A
Yellow Starthistle	*Centaurea solstitialis*	A
Bermudagrass	*Cynodon dactylon*	B
Dalmation Toadflax	*Linaria dalmatica*	B
Whitetop / Hoary cress	*Cardaria draba*	B
Musk Thistle	*Carduus nutans*	B
Tall Whitetop / Perennial Pepperweed	*Lepidium latifolium*	B
Russian Knapweed	*Centaurea repens*	B
Scotch Thistle	*Onopordium acanthium*	B
Houndstongue	*Cynoglossum officinale*	C
Canada Thistle	*Cirsium arvense*	C
Field Bindweed / Morning Glory	*Convolvulus arvensis*	C
Tamarisk	*Tamarix spp.*	C
Quackgrass	*Elytrigia repens*	N/A
Cheatgrass	*Bromus tectorum*	N/A
Ravenna Grass	*Saccharum ravennae*	N/A
Burr Buttercup	*Ranunculus testiculatus*	N/A
Bull Thistle	*Cirsium vulgare*	N/A
Jointed Goatgrass	*Aegilops cylindrica*	N/A
Russian Olive	*Elaeagnus angustifolia*	N/A
Russian Thistle / Tumbleweed	*Salsola tragus*	N/A
Tree of Heaven	*Ailanthus altissima*	N/A
Camelthorn	*Alhagi pseudalhagi*	N/A
Annual wheatgrass	*Eremopyrum triticeum*	N/A
Kochia	*Kochia scoparia*	N/A
Puncturevine	*Tribulus terrestris*	N/A
Giant Reed	*Arundo donax*	N/A
Siberian Elm	*Ulmus pumila*	N/A
Locust	*Gleditsia spp.*	N/A
Catalpa	*Catalpa spp.*	N/A
Common Teasel	*Dipsacus fullonum*	N/A

Table 1.2 - Invasive Plants NOT Known to Occur in MFO Boundary Detection May Require Control Measures		
Common Name	**Scientific Name**	**Class**
Leafy Spurge	*Euphorbia esula*	A
Medusahead	*Taeniatherum caput-medusae*	A
Oxeye Daisy	*Chrysanthemum leucanthemum*	A
St. Johnsworts	*Hypericum perforatum*	A
Sulfur cinquefoil	*Potentilla recta*	A
Yellow Toadflax	*Linaria vulgaris*	A
Dyers Woad	*Isatis tinctoria*	B
Poison Hemlock	*Conium maculatum*	B
Squarrose Knapweed	*Centaurea virgata*	B
Reed canary grass	*Phalaris arundinacea*	N/A
Common reed	*Phragmites australis* (non-native version)	N/A

Table 1.3 – Undesired Natives Known to Occur Within the MFO Boundary		
Common Name	**Scientific Name**	**Class**
Poision Ivy	*Toxicodendron radicans*	N/A
Broom Snakeweed	*Gutierrezia sarothrae*	N/A
Buffalobur	*Solanum rostrutum*	N/A
Western Whorled Milkweed	*Asclepias subverticillata*	N/A
Silverleaf Nightshade	*Solanum elaeagnifolium*	N/A

Sources:

http://www.utahweed.org/weeds.htm

Welsh, S.L., N.D. Atwood, L.C. Higgins, and S. Goodrich. 1987. A Utah Flora. Great Basin Naturalist Memoir No. 9. Brigham Young University Press, Provo, Utah.

APPENDIX F: Standard Operating Procedures and Best Management Practices for Fuels Management Activities.

Mechanical Treatment

1. The use of heavy machinery such as mechanical masticators would be discontinued at the discretion of the project inspector during periods of precipitation when soil moisture content could increase the potential for deep ruts and/or excess soil compaction.
2. Prior to mobilization in a new project area, all heavy equipment would be power washed off-site to remove potential contaminants. Cleaned equipment would be inspected by the authorized contracting officer to assure that equipment used in mechanical treatment is free of soil and other debris that could contain invasive weed seed or other plant parts prior to transport and use at the project site.
3. Heavy equipment would generally not be utilized within 100 meters of riparian areas. In areas of special concern such as those requiring removal of dense invasive species, a resource advisor would be consulted. Mechanical fuel removal may be allowed to reduce fuels and/or invasive species in areas of special concern. Native riparian vegetation such as willows and cottonwoods are plant species targeted for restoration and would continue to be selectively avoided during riparian treatment.

Prescribed Fire

1. Prescribed fire is normally conducted in the early spring, late fall, and winter months, and only under specific conditions dictated by humidity, wind speed, moisture levels, and time of day. A detailed burn plan delineates weather and fuel moisture conditions required to meet resource objectives. A test fire is typically conducted prior to full ignition to ensure resource objectives can be met. Ignition of burns are conducted by hand (drip torches using a diesel/gasoline mixture), aerial ignition, or by truck-mounted terra torch (utilizing a gasoline/alumagel mixture). Mitigation measures associated with burning-related hazardous materials are included in the risk assessment, job hazard analyses appendix in each authorized burn plan.
2. All prescribed fire would be conducted consistent with the regulations and policies set forth by the Utah Division of Air Quality permitting process as specified in Utah Administrative Code Rule R307-204, Emission Standards: Smoke Management, and the Utah Smoke Management Plan. The goal of this process is to minimize the impacts to air quality from prescribed fire projects. These rules and procedures are designed to coordinate multiple burning projects conducted by multiple agencies to assure that prescribed fires are permitted at a time when weather and atmospheric conditions allow for adequate smoke dispersal.

Manual Treatment (Lop and Scatter and/or Hand Piling)

1. Manual thinning is typically used in areas not suitable for mechanical treatment such as steep, rocky slopes, in areas with resources that require mitigation such as cultural or riparian, or in areas where biomass utilization (firewood permitting) is desirable. Cut trees and brush from hand thinning is either scattered across the ground or stacked into piles to add surface fuels for follow-up prescribed fire. Contract stipulations state that pile size would be no larger than six feet by six feet to mitigate potential heat-related soil damage from burned piles.

2. Piles are burned during peak soil moisture conditions, preferably during periods of light snow cover or during precipitation events, to minimize soil sterilization and to decrease mortality risk to nearby live trees. In riparian areas, piles would not be constructed within the center of the draw or in areas that could be impacted by normal flood flows.

Herbicide Use

1. The use of specific herbicide active ingredients and formulations on BLM lands in Utah are authorized by the Final Environmental Impact Statement and Record of Decision (Utah) for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991b), and the Record of Decision for the 17 Western States Vegetation Management Programmatic Environmental Impact Statement, September, 2007. Both of these documents identify potential impacts to the natural and human environment from the use of herbicides, incorporate standard operating procedures and mitigation measures to ensure the protection of resources, and approve for use on western BLM lands specific herbicide active ingredients. Standard operating procedures (SOPs) are the management controls and performance standards intended to protect and enhance natural resources potentially affected by vegetation treatments that include the use of herbicides. The use of a specific list of herbicide active ingredients and formulations is approved contingent upon uses and application rates as specified in an approved Pesticide Use Proposal (PUP) and on individual herbicide product labels. Application of active ingredients is allowed only where state registration permits the use of these ingredients.
2. The BLM would comply with all Utah state registration requirements for the use of herbicides. In herbicide treatment applications, the BLM Canyon Country Fire Zone would follow SOPs for herbicide use identified in the 2007 Vegetation Management PEIS to ensure that risks to human health and the environment from treatment actions are kept to a minimum. In addition to using the SOPs identified in Appendix A, the BLM would also implement mitigation measures described in the 2007 Vegetation Management PEIS to alleviate potential adverse environmental effects as a result of vegetation treatment activities using herbicides. Herbicides may be applied manually with hand-held devices, aerially, or with broadcast sprayers from an ATV. In fuel management activities that include the use of herbicides, both the SOPs and mitigation measures mentioned above would be attached to the environmental assessment as appendices.

Seeding

1. Fuels management actions may include seeding portions of or an entire project area following or prior to treatment with both native and selected non-native grasses, forbs and browse species. Seed selection is determined through collaboration with resource specialists and from monitoring results in similar vegetative communities. Seed selection is also based upon the most current data regarding the establishment of species likely to promote successional changes toward the desired vegetative community.
2. Seeding can be accomplished with a broadcast spreader or drill seeder, harrow or harrow chain dragged behind mechanized equipment, roller chopper, tractor/dozer, or through aerial application. Seeded portions of treated areas would be rested from grazing for a minimum of two growing seasons following seeding.

Monitoring

1. Transects to document fuel bed characteristics and vegetation composition are established prior to implementation within selected proposed treatment areas. When feasible, transect readings and/or photo plots are documented pre-treatment and at one, three and seven year intervals following treatment completion. Monitoring results are incorporated into management decisions regarding future resource actions that may involve maintenance burning, additional seeding, reintroduction and/or adjustment of grazing seasons or numbers, additional mechanical or herbicide treatment and other actions.
2. Management decisions requiring treatments not previously analyzed would initiate further environmental assessment.

Miscellaneous

1. In select areas, slash and debris from fuel management activities along designated roads or other accessible areas may be made available to the public for wood harvest.
2. All-terrain vehicles (ATVs) may be utilized at various times by BLM and/or contract crews throughout the project area to transport fuel, supplies and equipment. ATV's would avoid disturbance to any identified archaeological sites and/or other buffered areas.
3. BLM personnel would periodically observe ongoing treatments to ensure no adverse effect to nesting raptors or other bird species or to cultural and/or historic remains.

Fireline Rehabilitation Guidelines

The following guidelines can be used in whole or in part depending on ecological site needs, severity of disturbance and management directive within the Canyon Country Fire Zone fuels program(CYFZ).:

Fireline:

1. Pull soil, duff, litter and rocks over line
    - Rake the line to scarify the soil surface; pull soil, duff, litter and rocks back into original position and mimic natural grade
    - Rehabbed line should blend with surrounding contours.
2. Scatter Brush over the Line
    - Cover at least 50% of the fire line
    - Scattered duff, needle litter, and brush should appear random to eliminate the appearance of a straight line disturbance. In general the amount and type of duff, litter, and brush should match the surrounding area.
3. Construct water bars or berms to reduce channeling and deflect erosion on slopes
    - Temporary berms are preferable to water bars. When constructing water bars utilize local woody material
    - Use the following table to create water bars or berms:

Slope %	Spacing (Ft.)
2	250
5	135
10	80
15	60
20	45

Slope %	Spacing (Ft.)
25	40
30	35

- Construct at 45 degree angles to the contour

Aesthetic Considerations

- When replacing larger rocks in the fireline, place the weathered side up
- Obliterate cup trenches and ditches
- Flush cut all stumps
- Remove all flagging, signs, and garbage associated with activity

Walk through adjacent undisturbed areas to take a look at your rehab efforts to determine your success at returning the area to as natural as possible.

APPENDIX G: Weed Prevention Measures and Standard Operating Procedures for Applying Pesticides

Preventative Measures

Once weed populations become established, infestations can increase and expand in size. Weeds colonize highly disturbed ground and invade plant communities that have been degraded, but are also capable of invading intact communities. Therefore, prevention, early detection, and rapid response are the most cost-effective methods of weed control. Prevention, early detection, and rapid response strategies that reduce the need for vegetation treatments for noxious weeds should lead to a reduction in the number of acres treated using herbicides in the future by reducing or preventing weed establishment.

BLM Activity	Preventative Measures
Project Planning	• Incorporate prevention measures into project layout and design, alternative evaluation, and project decisions to prevent the introduction or spread of weeds. • Determine prevention and maintenance needs, including the use of herbicides, at the onset of project planning. • Before ground-disturbing activities begin, inventory weed infestations and prioritize areas for treatment in project operating areas and along access routes. • Remove sources of weed seed and propagules to prevent the spread of existing weeds and new weed infestations. • Pre-treat high-risk sites for weed establishment and spread before implementing projects. • Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and public land kiosks. • Coordinate project activities with nearby herbicide applications to maximize the cost effectiveness of weed treatments.
Project Development	• Minimize soil disturbance to the extent practical, consistent with project objectives. • Avoid creating soil conditions that promote weed germination and establishment. • To prevent weed germination and establishment, retain native vegetation in and around project activity areas and keep soil disturbance to a minimum, consistent with project objectives. • Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict travel to periods when the spread of seeds or propagules is least likely. • Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. • Inspect material sources on site, and ensure that they are weed-

BLM Activity	Preventative Measures
Project Development Continued	free before use and transport. Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material. • Survey the area where material from treated weed-infested sources is used for at least 3 years after project completion to ensure that any weeds transported to the site are promptly detected and controlled. • Prevent weed establishment by not driving through weed-infested areas.. • Inspect and document weed establishment at access roads, cleaning sites, and all disturbed areas; control infestations to prevent weed spread within the project area. • Avoid acquiring water for dust abatement where access to the water is through weed-infested sites. • Identify sites where equipment can be cleaned. Clean equipment before entering public lands. • Clean all equipment before leaving the project site if operating in areas infested with weeds. • Inspect and treat weeds that establish at equipment cleaning sites. • Ensure that rental equipment is free of weed seed. • Inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them.
Revegetation	• Include weed prevention measures, including project inspection and documentation, in operation and reclamation plans. • Retain bonds until reclamation requirements, including weed treatments, are completed, based on inspection and documentation. • To prevent conditions favoring weed establishment, reestablish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques. • Maintain stockpiled, uninfested material in a weed-free condition. • Revegetate disturbed soil (except travel ways on surfaced projects) in a manner that optimizes plant establishment for each specific project site. For each project, define what constitutes disturbed soil and objectives for plant cover revegetation. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary.

BLM Activity	Preventative Measures
Revegetation Continued	• Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g., road embankments or landings). • Inspect seed and straw mulch to be used for site rehabilitation (for wattles, straw bales, dams, etc.) and certify that they are free of weed seed and propagules. • Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least 3 growing seasons following completion of the project. • Use native material where appropriate and feasible. Use certified weed-free or weed-seed-free hay or straw where certified materials are required and/or are reasonably available. • Provide briefings that identify operational practices to reduce weed spread (for example, avoiding known weed infestation areas when locating fire lines). • Evaluate options, including closure, to regulate the flow of traffic on sites where desired vegetation needs to be established. Sites could include road and trail rights-of-way (ROW), andother areas of disturbed soils.

Standard Operating Procedures for Applying Herbicides

Standard Operating Procedures (SOPs) are the management controls and performance standards intended to protect and enhance natural resources that could be affected by vegetation treatments including the use of herbicides. The BLM would follow SOPs to ensure that risks to human health and the environment from herbicide treatment actions and other vegetation treatments are kept to a minimum.

Herbicide application schedules would be designed to minimize potential impacts to non-target plants and animals, while remaining consistent with the objective of the vegetation treatment program. The application rates depend upon the target species, the presence and condition of non-target vegetation, soil type, depth to the water table, presence of other water sources, and the label requirements. The application method chosen depends upon the treatment objective (removal or reduction); accessibility, topography, and size of the treatment area; characteristics of the target species and the desired vegetation; location of sensitive areas and potential environmental impacts in the immediate vicinity; anticipated costs; equipment limitations; and meteorological and vegetative conditions of the treatment area at the time of treatment.

Resource Element	Standard Operating Procedures for Applying Herbicides
Guidance Documents	*BLM Handbook H-9011-1 (Chemical Pest Control); and manuals 1112 (Safety), 9011 (Chemical Pest Control), 9012 (Expenditure of Rangeland Insect Pest Control Funds), 9015 (Integrated Weed Management), and 9220 (Integrated Pest Management)*
General	• Prepare operational and spill contingency plan in advance of treatment. • Conduct a pretreatment survey before applying herbicides.

	• Select herbicide that is least damaging to the environment while providing the desired results. • Select herbicide products carefully to minimize additional impacts from degradation, adjuvants, inert ingredients, and tank mixtures. • Apply the least amount of herbicide needed to achieve the desired result. • Follow herbicide product label for use and storage. • Have licensed applicators apply herbicides. • Use only USEPA-approved herbicides and follow product label directions and "advisory" statements. • Review, understand, and conform to the "Environmental Hazards" section on the herbicide product label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. • Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas. • Minimize the size of application area, when feasible. • Comply with herbicide-free buffer zones to ensure that drift would not affect crops or nearby residents/landowners. • Post treated areas and specify reentry or rest times, if appropriate. • Notify adjacent landowners prior to treatment. • Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at ttp://www.cdms.net/. • Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. • Avoid accidental direct spray and spill conditions to minimize risks to resources. • Consider surrounding land uses before aerial spraying. • Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). • Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground. • Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent. • Use drift control agents and low volatile formulations.

	• Conduct pre-treatment surveys for sensitive habitat and special status species within or adjacent to proposed treatment areas. • Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. • Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. • Turn off applied treatments at the completion of spray runs and during turns to start another spray run. • Refer to the herbicide product label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Clean OHVs to remove seeds.
Air Quality See Manual 7000 (Soil, Water, and Air Management)	• Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. • Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent. • Use drift reduction agents, as appropriate, to reduce the drift hazard. • Select proper application equipment (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). • Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).
Soil See Manual 7000 (Soil, Water, and Air Management	• Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. • Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. • Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.
Water Resources See Manual 7000 (Soil, Water, and Air Management)	• Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. • Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular

	herbicide, as predicted by risk assessments. • Use local historical weather data to choose the month of treatment. Considering the phenology of the target species, schedule treatments based on the condition of the water body and existing water quality conditions. • Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity. Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. • Minimize treating areas with high risk for groundwater contamination. • Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. • Do not rinse spray tanks in or near water bodies. Do not broadcast pellets where there is danger of contaminating water supplies. • Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies. • Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment
Wetlands and Riparian Areas	• Use a selective herbicide and a wick or backpack sprayer. • Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications.
Vegetation See Handbook H-4410-1 (National Range Handbook), and manuals 5000 (Forest Management) and 9015 (Integrated Weed Management)	• Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Use native or sterile species for revegetation and restoration projects to compete with invasive species until desired vegetation establishes. • Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for revegetation and other activities. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing

	permit, to maintain desirable vegetation on the treatment site.
Pollinators	• Complete vegetation treatments seasonally before pollinator foraging plants bloom. • Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. • Design vegetation treatment projects so that nectar and pollen sources for important pollinators • and resources are treated in patches rather than in one single treatment. • Minimize herbicide application rates. Use typical rather than maximum rates where there are important pollinator resources. • Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. • Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. • Make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.
Fish and Other Aquatic Organisms See manuals 6500 (Wildlife and Fisheries Management) and 6780 (Habitat Management Plans)	• Use appropriate buffer zones based on label and risk assessment guidance. • Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments. • Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. • For treatment of aquatic vegetation, 1) treat only that portion of the aquatic system necessary to achieve acceptable vegetation management, 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms, and 3) follow water use restrictions presented on the herbicide label.
Wildlife See manuals 6500 (Wildlife and Fisheries Management) and 6780 (Habitat Management Plans)	• Use herbicides of low toxicity to wildlife, where feasible. • Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area. • Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife
Threatened, Endangered, and	• Survey for special status species before treating an area. Consider effects to special status species when designing

Sensitive Species See Manual 6840 (Special Status Species)	herbicide treatment programs. • Use a selective herbicide and a wick or backpack sprayer to minimize risks to special status plants. • Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for special status species in area to be treated.
Livestock See Handbook H-4120-1 (Grazing Management)	• Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. • As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. • Use herbicides of low toxicity to livestock, where feasible. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. • Avoid use of diquat in riparian pasture while pasture is being used by livestock. • Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. • Provide alternative forage sites for livestock, if possible.
Wild Horses and Burros	• Minimize using herbicides in areas grazed by wild horses and burros. • Use herbicides of low toxicity to wild horses and burros, where feasible. • Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with herbicide product label directions for livestock. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contaminating non-target food and water sources
Cultural Resources and Paleontological Resources See handbooks H-8120-1 (Guidelines for Conducting Tribal	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers

Comment [DJR1]: I'm not sure what of the HB are still valid. I think I will have to bother some folks to find out.

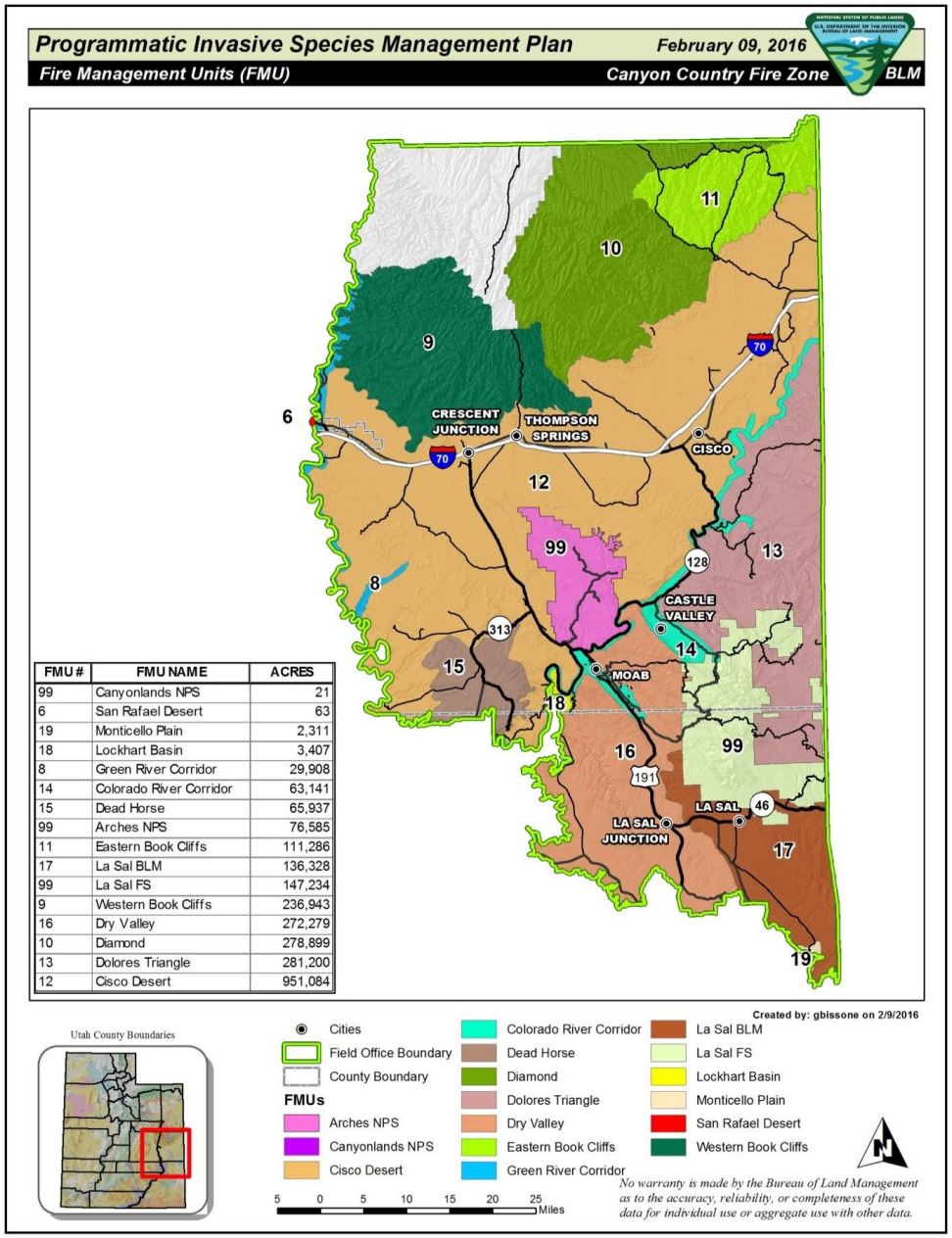
Consultation) and H- 8270-1 (General Procedural Guidance for Paleontological Resource Management), and manuals 8100 (The Foundations for Managing Cultural Resources), 8120 (Tribal Consultation Under Cultural Resource Authorities), and 8270 (Paleontological Resource Management)	Regarding the Manner in Which BLM Would Meet Its Responsibilities Under the National Historic Preservation Act and state protocols or 36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 (General Procedural Guidance for Paleontological Resource Management) to determine known Condition I and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected by herbicide treatments. • Work with tribes to minimize impacts to these resources. • Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments.
Visual Resources See handbooks H-8410-1 (Visual Resource Inventory) and H-8431-1 (Visual Resource Contrast Rating), and manual 8400 (Visual Resource Management)	• Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. • Consider the surrounding land use before assigning aerial spraying as an application method. • Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area. • If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). • Lessen visual impacts by: 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) revegetating the site following treatment. • When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established Visual Resource Management (VRM) objectives.
Wilderness and	• Encourage backcountry pack and saddle stock users to

Other Special Areas See handbooks H-8550-1 (Management of Wilderness Study Areas (WSAs)), and H- 8560-1 (Management of Designated Wilderness Study Areas), and Manual 8351 (Wild and Scenic Rivers)	feed their livestock only weed-free feed for several days before entering a wilderness area. • Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. • Revegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. • Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. • Use the "minimum tool" to treat noxious and invasive vegetation, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. • Use chemicals only when they are the minimum method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. • Give preference to herbicides that have the least impact on non-target species and the wilderness environment. • Implement herbicide treatments during periods of low human use, where feasible. • Address wilderness and special areas in management plans. • Maintain adequate buffers for Wild and Scenic Rivers (¼ mile on either side of river, ½ mile in Alaska).
Recreation See Handbook H-1601-1 (Land Use Planning Handbook, Appendix C)	• Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. • Adhere to entry restrictions identified on the herbicide product label for public and worker access. • Post signs noting exclusion areas and the duration of exclusion, if necessary. • Use herbicides during periods of low human use, where feasible.
Social and Economic Values	• Consider surrounding land use before selecting aerial spraying as a method, and avoid aerialspraying near agricultural or densely-populated areas. • Post treated areas and specify reentry or rest times, if appropriate. • Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions.

	• Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. • Observe restricted entry intervals specified by the herbicide product label. • Notify local emergency personnel of proposed treatments. • Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources, especially vegetation over areas larger than the treatment area. • Consult with Native American tribes and Alaska Native groups to locate any areas of vegetation that are of significance to the tribes and Native groups and that might be affected by herbicide treatments. • To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies, including chemicals, for herbicide treatment projects through local suppliers. • To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an integrated pest management program for projects proposing local use of herbicides.
Rights-of-way	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Use only herbicides that are approved for use in ROW areas.
Human Health and Safety	• Establish a buffer between treatment areas and human residences based on guidance given in the HHRA, with a minimum buffer of ¼ mile for aerial applications and 100 feet for ground applications, unless a written waiver is granted. • Use protective equipment as directed by the herbicide product label. • Post treated areas with appropriate signs at common public access areas. • Observe restricted entry intervals specified by the herbicide product label. • Provide public notification in newspapers or other media where the potential exists for public exposure.

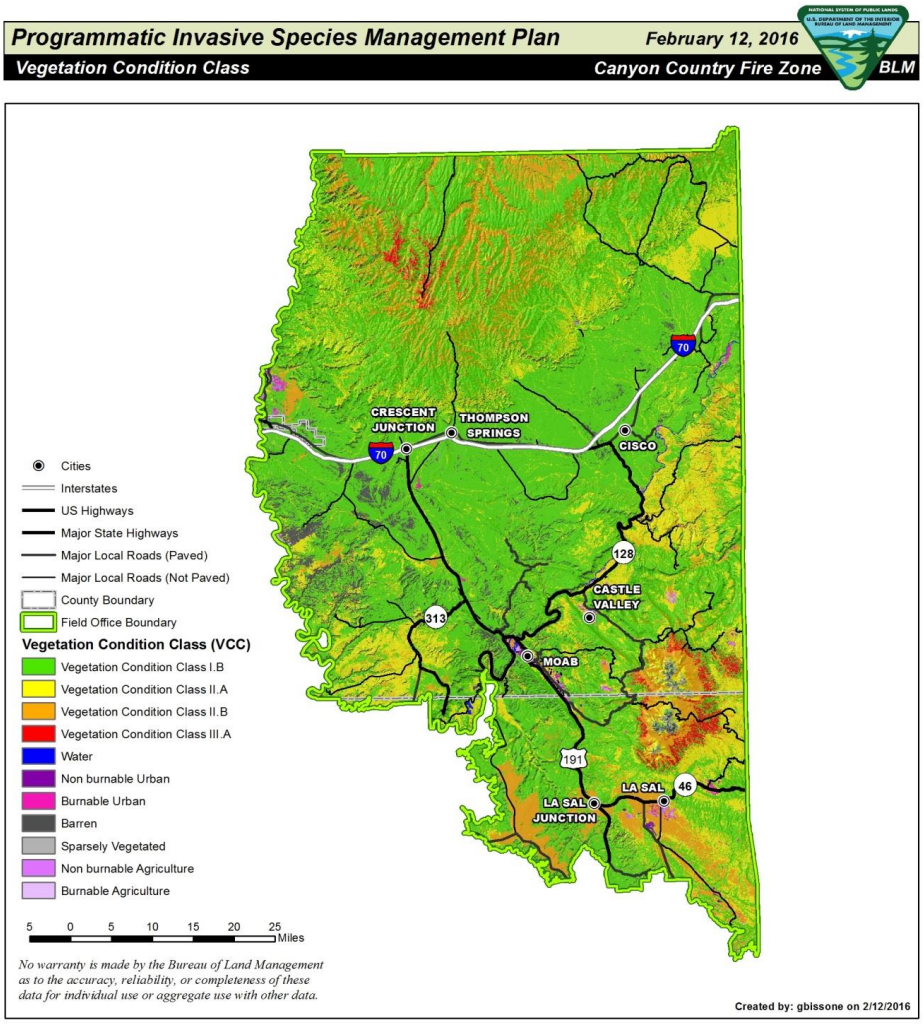
	• Have a copy of MSDSs at work site. • Notify local emergency personnel of proposed treatments. • Contain and clean up spills and request help as needed. • Secure containers during transport. • Follow label directions for use and storage. • Dispose of unwanted herbicides promptly and correctly.

APPENDIX H: Fire Management Units



FMU #	FMU NAME	ACRES
99	Canyonlands NPS	21
6	San Rafael Desert	63
19	Monticello Plain	2,311
18	Lockhart Basin	3,407
8	Green River Corridor	29,908
14	Colorado River Corridor	63,141
15	Dead Horse	65,937
99	Arches NPS	76,585
11	Eastern Book Cliffs	111,286
17	La Sal BLM	136,328
99	La Sal FS	147,234
9	Western Book Cliffs	236,943
16	Dry Valley	272,279
10	Diamond	278,899
13	Dolores Triangle	281,200
12	Cisco Desert	951,084

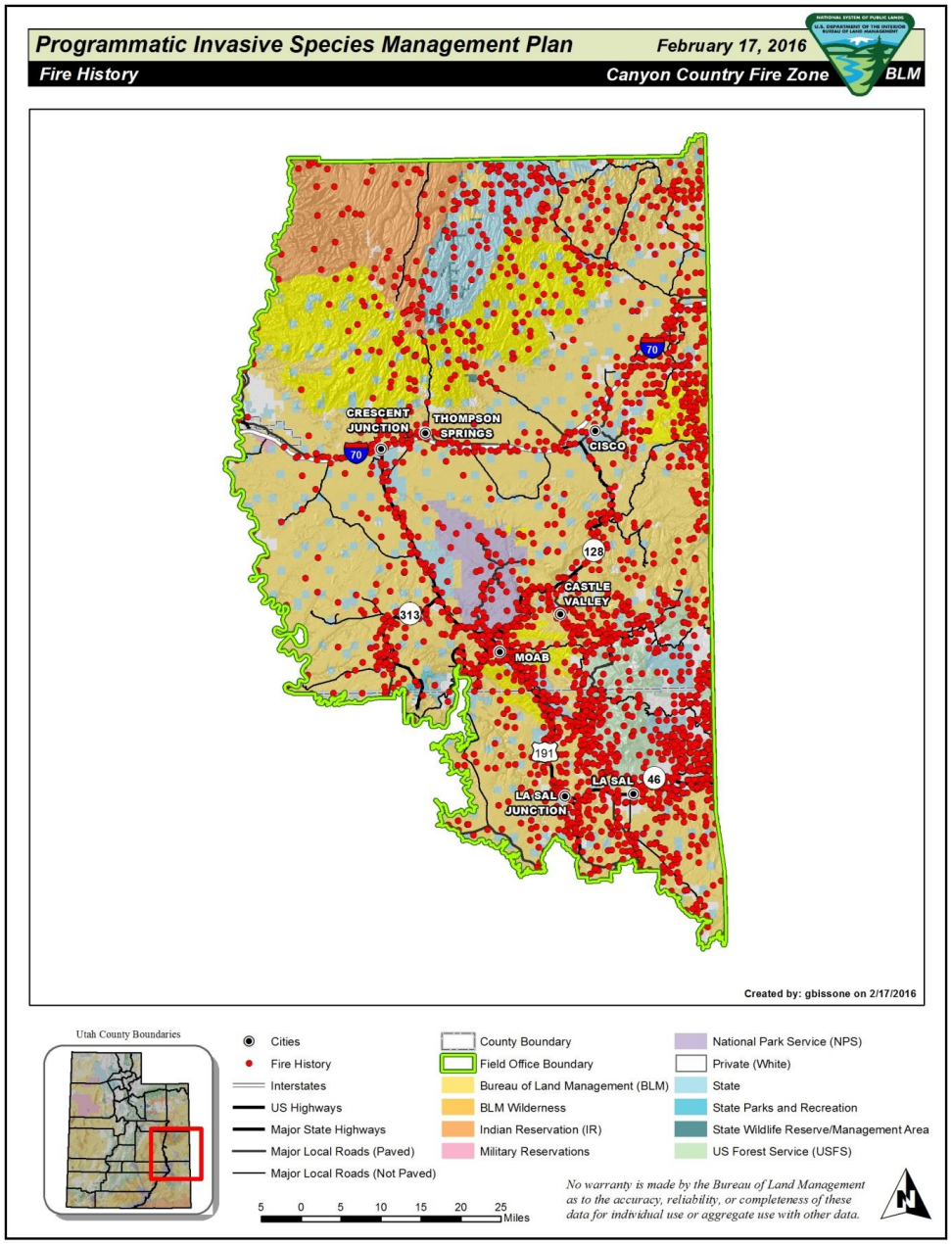
APPENDIX I: Vegetation Condition Class



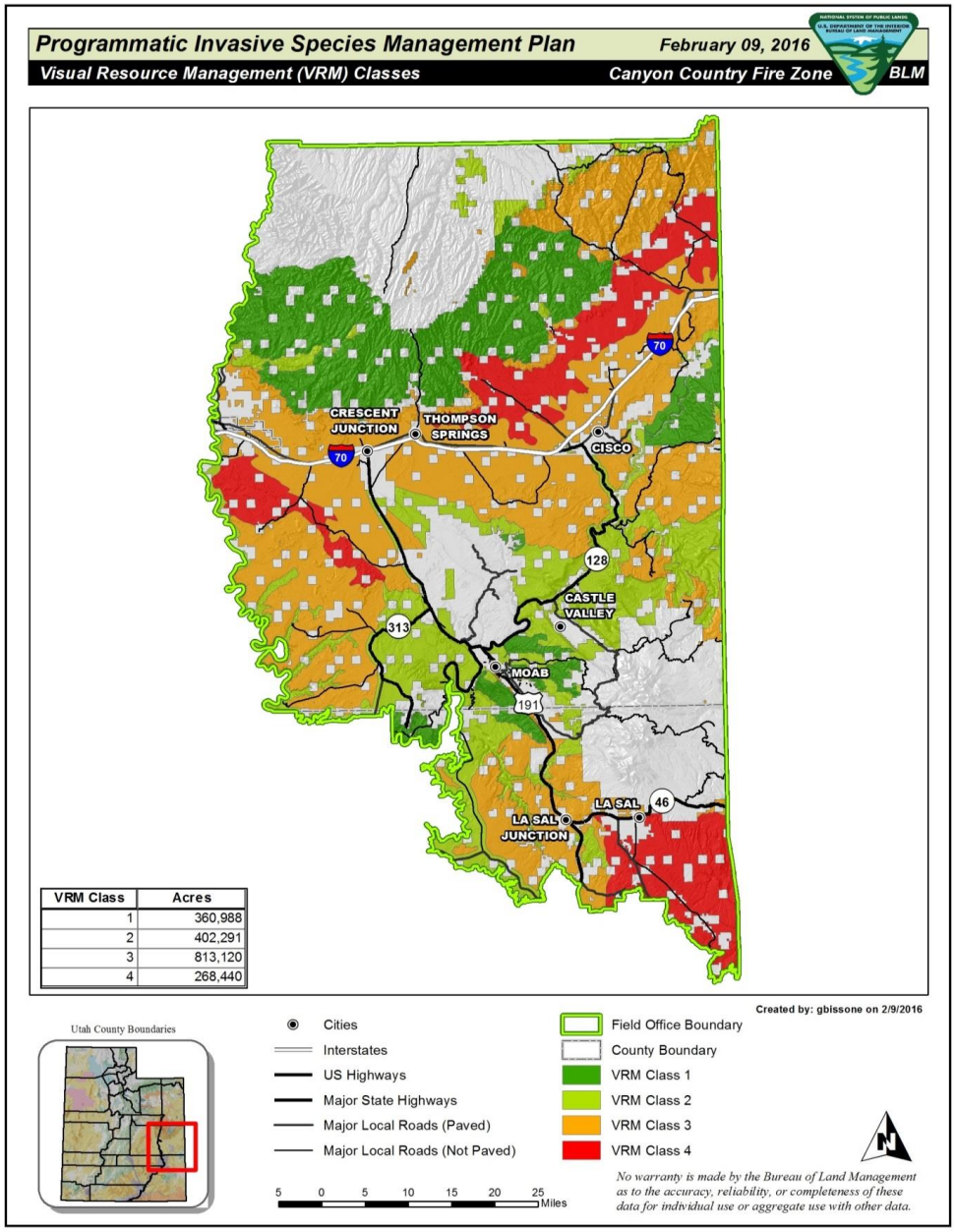
Utah County Boundaries

VCC Class	Description	Acres
Vegetation Condition Class I.B	Low to Moderate, Vegetation Departure 17-33%	1,764,514
Vegetation Condition Class II.A	Moderate to Low, Vegetation Departure 34-50%	562,536
Vegetation Condition Class II.B	Moderate to High, Vegetation Departure 51-66%	290,143
Vegetation Condition Class III.A	High, Vegetation Departure 67-83%	34,671
Water	Water	10,748
Non burnable Urban	Non burnable Urban	11,607
Burnable Urban	Burnable Urban	15,328
Barren	Barren	135,878
Sparsely Vegetated	Sparsely Vegetated	22,092
Non burnable Agriculture	Non burnable Agriculture	4,000
Burnable Agriculture	Burnable Agriculture	4,556

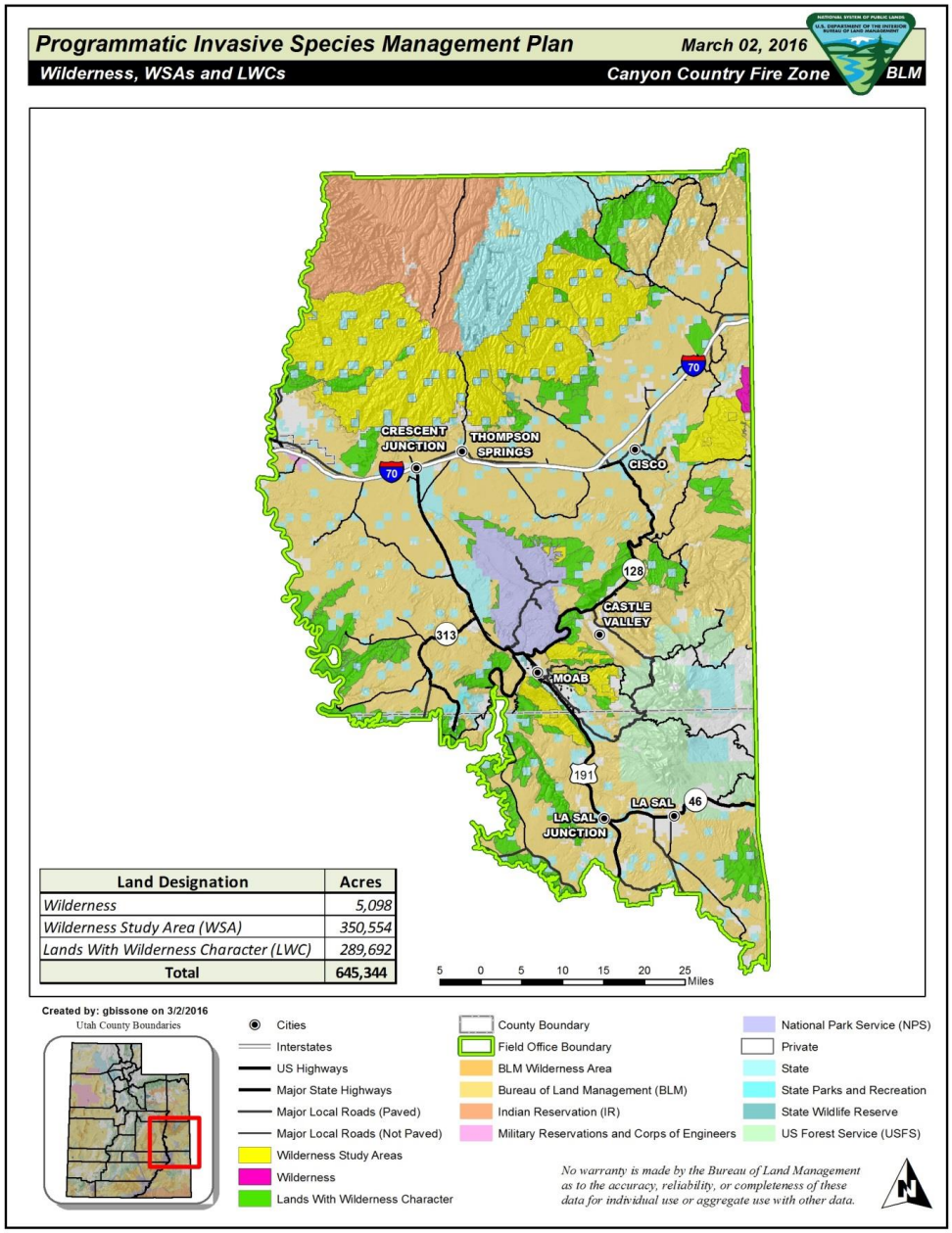
APPENDIX J: Fire History



APPENDIX K: Visual Resource Management Designations



APPENDIX L: Wilderness, WSA's and LWC's



APPENDIX M: Cumulative Impacts Completed Projects

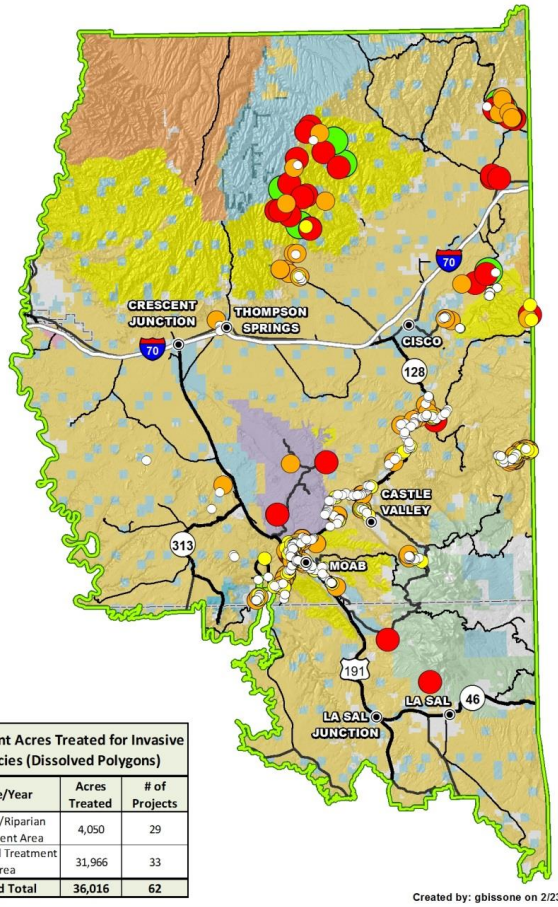
Programmatic Invasive Species Management Plan — February 23, 2016

Cumulative Impacts - Completed Projects — Canyon Country Fire Zone — BLM

Individual Polygons Treated for Invasive Species		
Type/Year	**Acres Treated**	**Polygons Treated**
Aquatic/Riparian Treatment Area	***10,102***	***991***
Unknown Year	*3,169*	*69*
2001	*76*	*3*
2002	*155*	*3*
2003	*155*	*3*
2004	*213*	*35*
2005	*36*	*13*
2006	*1,181*	*12*
2007	*255*	*42*
2008	*640*	*90*
2009	*604*	*153*
2010	*751*	*120*
2011	*727*	*106*
2012	*598*	*137*
2013	*156*	*79*
2014	*940*	*106*
2015	*446*	*20*
Terrestrial Treatment Area	***42,529***	***236***
Unknown Year	*3*	*1*
1994	*3,659*	*1*
2002	*21,738*	*12*
2003	*2,065*	*12*
2005	*31*	*2*
2006	*921*	*15*
2007	*512*	*4*
2008	*127*	*1*
2009	*3,594*	*54*
2010	*11*	*9*
2011	*3,805*	*29*
2012	*4,773*	*29*
2013	*820*	*45*
2014	*418*	*17*
2015	*52*	*5*
Grand Total	**52,631**	**1,227**

The "Completed Projects" dataset represents completed invasive species related projects. It is a compilation of data from the VTRT, WRI, SE Utah Interagency Fuels Layer and the DRRP Reporting datasets. Efforts were made to eliminate duplication between datasets. Multi-part polygons were made single part so that the number of treated polygons could be determined. The polygon dataset was then converted to a point dataset for this representation. Multiple treatments (e.g. re-treatments) within the same footprint are counted separately and will each have a unique point featire and acreage.

Footprint Acres Treated for Invasive Species (Dissolved Polygons)		
Type/Year	**Acres Treated**	**# of Projects**
Aquatic/Riparian Treatment Area	4,050	29
Terrestrial Treatment Area	31,966	33
Grand Total	**36,016**	**62**



Created by: gbissone on 2/23/2016

Utah County Boundaries

Completed Projects
- 0 - 5.0 Acres
- 5.1 - 10.0 Acres
- 10.1 - 100.0 Acres
- 100.1 - 1,000.0 Acres
- 1,000.1 - 15,000.0 Acres)

- Cities
- County Boundary
- Field Office Boundary
- Bureau of Land Management (BLM)
- BLM Wilderness
- Indian Reservation (IR)
- Military Reservations
- National Park Service (NPS)
- Private (White)
- State
- State Parks and Recreation
- State Wildlife Reserve/Management Area
- US Forest Service (USFS)

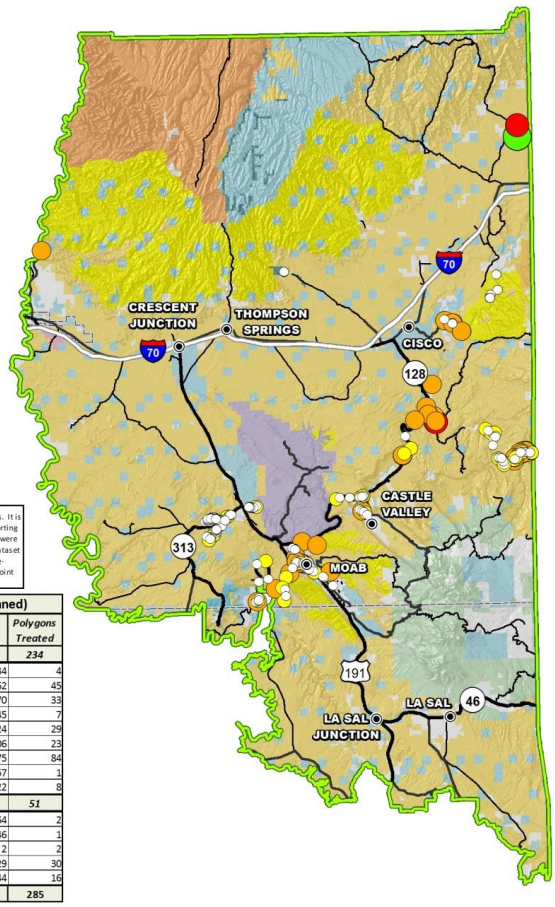
5 0 5 10 15 20 25 Miles

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

APPENDIX N: Cumulative Impacts Future Projects

Programmatic Invasive Species Management Plan — February 23, 2016

Cumulative Impacts - Future Projects — Canyon Country Fire Zone — BLM



Footprint Acres Treated for		
Type/Year	Acres Treated	# of Projects
Aquatic/Riparian Treatment Area	1,196	9
Terrestrial Treatment Area	1,442	5
Grand Total	**2,638**	**14**

The "Future Projects" dataset represents current and planned invasive species related projects. It is a compilation of data from the VTRT, WRI, SE Utah Interagency Fuels Layer and the DRIP Reporting datasets. Efforts were made to eliminate duplication between datasets. Multi-part polygons were made single part so that the number of treated polygons could be determined. The polygon dataset was then converted to a point dataset for this representation. Multiple treatments (e.g. re-treatments) within the same footprint are counted separately and will each have a unique point featire and acreage.

Individual Polygons Treated for Invasive Species (Planned)		
Type/Project Name	*Acres Treated*	*Polygons Treated*
Aquatic/Riparian Treatment Area	***1,796***	***234***
Castle Creek Phase 4	34	4
DOLORES	862	45
FY15 Southeast Utah Riparian Restoration- Phase 2	470	33
Jackson Bottom Tamarisk Removal and Revegetation Phase V	45	7
MILL and PACK CREEKS PLANT RESTORATION VII Next Steps	124	29
MOAB TAMARISK	106	23
Restoration of Riparian Lands and Wetlands in Courthouse...	75	84
Watershed Improvements in Mill Creek Canyon	57	1
Westwater Canyon Project Phase 3 - Colorado River	22	8
Terrestrial Treatment Area	***1,586***	***51***
BITTER CREEK PHASE III	1,264	2
Farm Fire Discretionary Seed	46	1
Nash Wash WMA Habitat Improvement	2	2
Riparian Enhancement: Follow-Up Trts on Private Land Parcels ...	229	30
Westwater Canyon Project Phase 3 - Colorado River	44	16
Grand Total	**3,382**	**285**

Created by: gbissone on 2/23/2016

Utah County Boundaries

Future Projects

- 0 - 5.0 Acres
- 5.1 - 10.0 Acres
- 10.1 - 100.0 Acres
- 100.1 - 1,000.0 Acres
- 1,000.1 - 15,000.0 Acres

- Cities
- County Boundary
- Field Office Boundary
- Bureau of Land Management (BLM)
- BLM Wilderness
- Indian Reservation (IR)
- Military Reservations
- National Park Service (NPS)
- Private (White)
- State
- State Parks and Recreation
- State Wildlife Reserve/Management Area
- US Forest Service (USFS)

5 0 5 10 15 20 25 Miles

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.