United States Department of the Interior
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Environmental Assessment
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Phoenix District Integrated Weed Management

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Acronyms

ACEC	Area of Critical Environmental Concern
ATV	All-Terrain Vehicle
AZDEQ	Arizona Department of Environmental Quality
AZGFD	Arizona Game and Fish Department
AZPIF	Arizona Partners in Flight
AZ-WIPWG	Arizona Wildland Invasive Plant Working Group
BLM	Bureau of Land Management
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DNA	Documentation of NEPA Adequacy
EA	Environmental Assessment
EDRR	Early Detection and Rapid Response
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ESA	Endangered Species Act
FMP	Fire Management Plan
HFO	Hassayampa Field Office
LSFO	Lower Sonoran Field Office
MFP	Management Framework Plan
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PEIS	Programmatic Environmental Impact Statement
PER	Programmatic Environmental Report
RMP	Resource Management Plan
ROD	Record of Decision
SOP	Standard Operating Procedure
SWEPIC	Southwest Exotic Plant Information Clearinghouse
T&E	Threatened and Endangered
USC	United States Code
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compounds
VRM	Visual Resource Management
WSA	Wilderness Study Area
WSRA	Wild and Scenic Rivers Act

1.0 PURPOSE AND NEED FOR THE ACTION

1.1 Introduction

The Bureau of Land Management (BLM) is preparing this Programmatic Environmental Assessment (EA) for Integrated Weed Management on the Phoenix District. The Phoenix District proposes to treat target weed species identified from field reconnaissance and/or potential weed species that could occur in the district. The target weed species include Arizona state-listed weeds and other invasive plant species, as defined by the Arizona Department of Agriculture Noxious Weed List and the BLM National List of Invasive Weed Species of Concern, found on BLM-administered lands. This EA discloses the direct, indirect, and cumulative environmental effects that would result from management of weeds/invasive species, herein referred to as weeds, on BLM lands within the planning area as required by the National Environmental Policy Act of 1969 (NEPA, 42 United States Code [USC] 4321-4347), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the BLM NEPA Handbook (H-1790-1; BLM 2008). The EA is organized following guidance in the BLM NEPA Handbook.

This programmatic analysis is intended to consider the area-wide environmental impacts of implementing an integrated weed management approach by the Phoenix District, which includes the Hassayampa and Lower Sonoran Field Offices. This programmatic EA tiers off the *Final Vegetation Treatment Using Herbicides on Bureau of Land Management (BLM) Lands in 17 Western States* (PEIS; 2007a) and the *Final Vegetation Treatments on BLM lands in 17 Western States Programmatic Environmental Report* (PER; 2007b). The PEIS identifies environmental and human impacts related to herbicide use and appropriate best management practices (BMPs), standard operating procedures (SOPs), mitigation measures, and conservation measures for avoiding or minimizing adverse impacts. The PER describes environmental impacts related to using non-herbicide treatments (i.e., prescribed burning, manual, mechanical, and biological methods) on public lands to control vegetation. This process will hone the 18 approved herbicides identified in the PEIS to those specific for treatment of weed species found in the Hassayampa and Lower Sonoran Field Offices.

This programmatic analysis will be referred to in future efforts to conduct early detection and rapid response treatments to weed infestations. Prior to conducting treatments, a Determination of NEPA Adequacy (DNA) process would be initiated to ensure that the analysis conducted in this EA is sufficient. At that time, a decision would be issued to authorize treatments to be conducted.

1.2 Background

The Phoenix District Lower Sonoran and Hassayampa Field Offices manage approximately 2.4-million acres of public land (Figure 1). These lands include approximately 1.4-million acres of federal land in the Lower Sonoran Field Office in south-central Arizona, including the 486,400 acre Sonoran Desert National Monument, and approximately 1-million acres of federal land in the Hassayampa Field Office north of US Interstate 10, including the 70,900 acre Agua Fria

National Monument. The Phoenix District includes all or portions of the following counties: Apache, Navajo, Coconino, Yavapai, Maricopa, Pinal, and Pima.

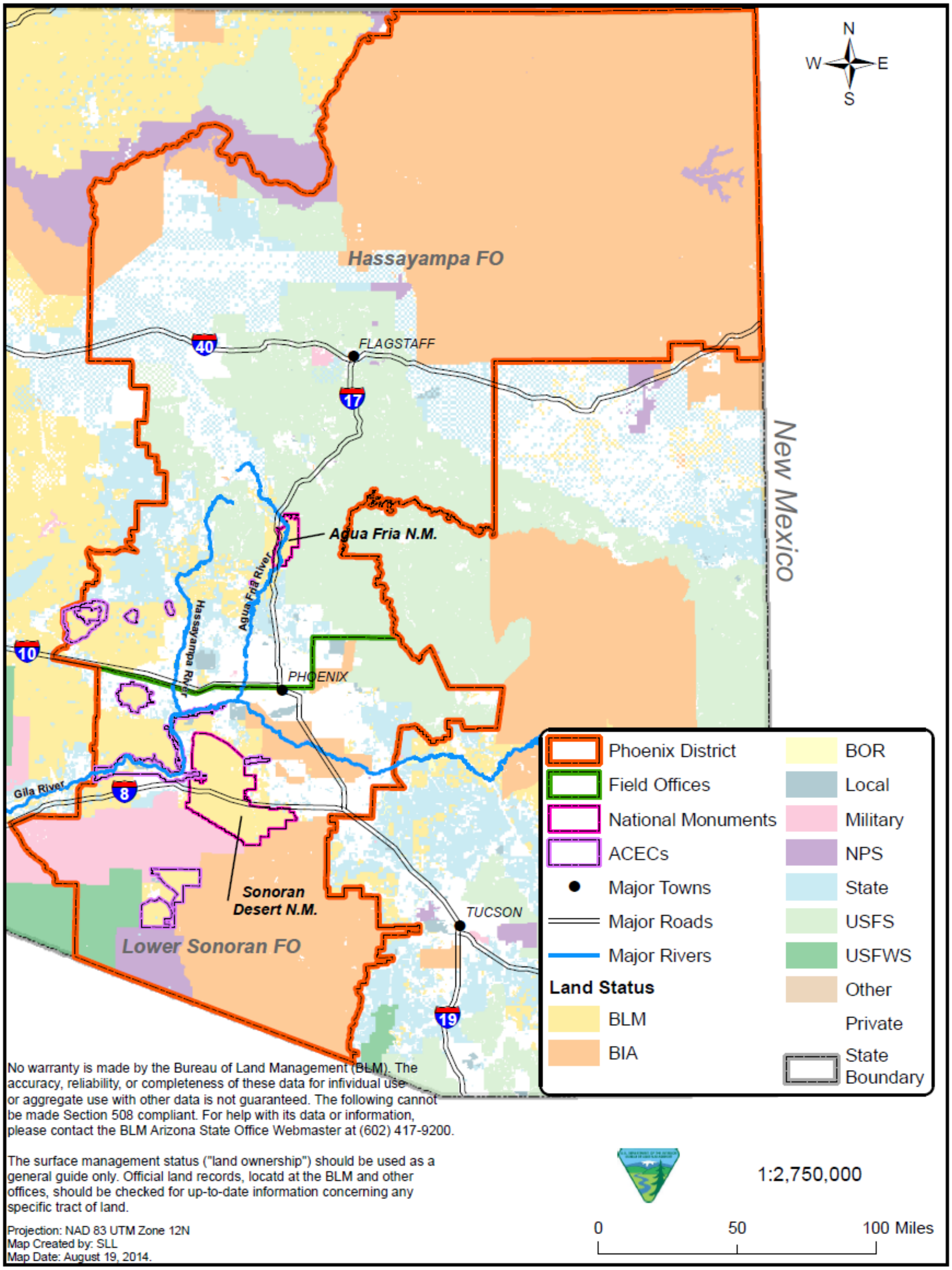

Figure 1. Vicinity Map of the PDO.

BLM has made ecosystem health a priority on the lands it manages and uses the Land Health Standards as described in *Arizona Standards for Rangeland Health and Guidelines for Grazing Administration* in achieving proper functioning of ecological processes (i.e., soils, riparian-wetland sites, upland and riparian-wetland plant communities; 1997). One of the greatest obstacles of healthy ecosystems is the rapid expansion of weeds across public lands. Weeds can dominate and often cause permanent damage to native plant communities and jeopardize the overall health of public lands and activities that occur on them. Weeds can also reduce quality and quantity of habitat and forage for wildlife and livestock, alter soil productivity, increase the potential for soil erosion and adverse impacts on water quality, and may cause a loss of riparian area function.

An integrated weed management protocol could utilize manual, mechanical, biological, and chemical treatment methods, including aerial application of herbicides. In an integrated vegetation management program, each management option is considered, recognizing that no one management option is stand-alone and that each has its own strengths and weaknesses. Utilizing the strengths of each allows for a more effective and environmentally sound program (BLM 2007a). Prevention, early detection and rapid response are the most cost effective methods of weed control (BLM 2007a). Rapid response refers to treating a weed infestation as quickly as possible before it has the chance to expand to the point at which eradication becomes infeasible.

The Phoenix District Office (PDO) has utilized manual, mechanical, chemical, and prescribed fire methods to treat invasive weed species. Weed species to be targeted include weeds known to occur and/or have the potential to occur within the PDO. Some of the targeted weed species are listed in the Arizona Department of Agriculture Noxious Weed list, Arizona Wildland Invasive Plant Working Group (AZ-WIPWG), and/or the BLM National List of Invasive Weed Species of Concern (See Appendix A for complete lists). Weeds known to occur or have the potential to occur within the Phoenix District are located in Table 1. The three categories (Prohibited, Regulated, and Restricted) indicated in Table 1 correspond to the weed classification categories by the State of Arizona. The three categories are based on the following management objectives:

- Prohibited—Are not known to occur in the state and are prohibited from entry into the state.
- Regulated—Are well established and generally distributed and may be controlled or quarantined to prevent further infestation or contamination.
- Restricted—Occur in low numbers as isolated infestations and shall be quarantined to prevent further infestation or contamination.

The AZ-WIPWG classes are based on the following ecological impacts and distributions:

- High—Are widely distributed and are conducive to moderate to high rates of dispersal and establishment; species have severe ecological impacts on ecosystems.
- Medium—Are limited to widespread and are conducive to moderate to high rates of dispersal, often enhanced by disturbance; species have substantial and apparent ecological impacts on ecosystems.
- Low—Are limited and are conducive to low to moderate rates of dispersal; species have minor ecological impacts.

Table 1. Weed Species Known to Occur or Have the Potential to Occur on BLM Lands within the Phoenix District

Weed Name*	Occurrence	AZ State List	AZ-WIPWG Class	BLM National List
Russian knapweed *Acroptilon repens*	Potential	Prohibited & Restricted	High	
Jointed goatgrass *Aegilops cylindrica*	Known	Prohibited & Restricted	Low	
Camelthorn *Alhagi maurorum*	Known	Prohibited & Restricted	Medium	X
Giant reed *Arundo donax*	Known		High	X
Wild oat *Avena fatua*	Known		Medium	
Black mustard *Brassica nigra*	Known			X
Asian mustard *Brassica tournefortii*	Known		Medium	X
Ripgut brome *Bromus diandrus*	Known		Medium	X
Japanese brome *Bromus japonicus*	Known			X
Red brome *Bromus rubens*	Known		High	X
Cheatgrass *Bromus tectorum*	Known		High	X
Globe-podded hoary cress *Cardaria draba*	Potential	Prohibited & Restricted	Medium	X
Malta starthistle *Centaurea melitenisis*	Known		Medium	X
Lambs Quarters *Chenopodium album*	Known			
Field bindweed *Convolvulus arvensis*	Potential	Prohibited & Regulated	Medium	X
Bermuda grass *Cynodon dactylon*	Known		Medium	X
Quackgrass *Elytrigia repens*	Potential	Prohibited & Restricted	Low	
Lehmann lovegrass *Eragrostis lehmanniana*	Known		High	X
Redstem stork's bill *Erodium cicutarium*	Known		Medium	
Halogeton *Halogeton glomeratus*	Known	Prohibited & Restricted		X
Mouse barley *Hordeum murinum*	Known		Medium	

Weed Name*	Occurrence	AZ State List	AZ-WIPWG Class	BLM List	National
Kochia or Fireweed *Kochia scoparia*	Known				
Prickly Lettuce *Lactuca serriola*	Known				
Dalmatian toadflax *Linaria dalmatica*	Known	Prohibited & Restricted	Medium	X	
Yellow sweetclover *Melilotus officinalis*	Known		Medium		
Tree Tobacco *Nicotiana glauca*	Known				
Globe Chamomile *Oncosiphon piluliferum*	Known				
Scotch thistle *Onopordum acanthium*	Potential	Prohibited & Restricted	Low	X	
Buffelgrass *Pennisetum ciliare*	Known	Prohibited & Regulated	High		
Crimson fountain grass *Pennisetum setaceum*	Known		High	X	
Rabbitfootgrass *Poloypogon monospeliensis*	Known				
Ravengrass *Saccharum ravennae*	Potential		Medium		
Russian thistle *Salsola targus*	Known		Medium		
Arabian schismus *Schismus arabicus*	Known		Medium	X	
Mediterranean grass *Schismus barbatus*	Known		Medium	X	
London Rocket *Sisymbrium irio*	Known				
Common sowthistle *Sonchus oleraceus*	Known		Medium		
Johnsongrass *Sorghum halepense*	Known		Medium	X	
Tamarisk *Tamarix* spp.	Known		High	X	
Horse Purslane *Trianthema portulacastrum*	Known				
Puncturevine *Tribulus terrestris*	Known	Prohibited & Regulated			
Fan Palm *Washingtonia* spp.	Known				

*Data based on Southwest Exotic Plant Information Clearinghouse (SWEPIC) database and site-specific field visits

Infestations of weeds occur in varying degrees and densities throughout the Phoenix District. Weed occurrences may vary in size from individual plants to infestations of 100 acres or more. New individual plants and/or infestations of weeds have been documented along the riparian corridors—Gila River, Hassayampa River, Agua Fria River, and Badger Springs Wash, Black Mesa, and in the LSFO. Known locations are listed in the tables below. Weed occurrences, along with potential treatment areas, are continually updated based on noxious weed inventory and monitoring data within the PDO.

Lower Sonoran Field Office

Buffelgrass is commonly observed along major roadways and washes through the Sonoran Desert habitat in the Lower Sonoran Field Office. It is a dominant weed species that is establishing quickly from the southeastern part of the state.

Table 2. Weed Species Observed in LSFO

Location	Weed Name*
Target Weed Species listed by Arizona State, AZ-WIPWG, or the BLM National List	
Lower Sonoran Field Office Sonoran Desert National Monument Sentinal Plain Painted Rock Queen Valley	Buffelgrass *(Cenchrus ciliaris L.)*

Agua Fria Corridor

There were 19 targeted weed species observed and seven non-targeted weed species observed (Table 3). The dominant weed species observed included *Tamarix* spp. with trace amounts of the remaining weed species (Appendix F). The non-native weed species observed only comprised ~>1% of the total live biomass (Appendix F).

Table 3. Weed Species Observed for the Agua Fria Corridor

Location	Weed Name
Target Weed Species listed by Arizona State, AZ-WIPWG, or the BLM National List	
Agua Fria River Corridor	Jointed goatgrass (*Aegilops cylindrical)*
	Wild oat (*Avena fatua)*
	Black mustard (*Brassica nigra)*
	Asian mustard (*Brassica tournefortii)*
	Ripgut brome (*Bromus diandrus)*
	Japanese brome (*Bromus japonicas)*
	Red brome (*Bromus rubens)*
	Malta starthistle (*Centaurea melitenisis)*
	Bermuda grass (*Cynodon dactylon)*
	Redstem stork's bill (*Erodium cicutarium)*
	Mouse barley (*Hordeum murinum)*
	Dalmation toadflax (*Linaria dalmatica)*
	Yellow sweetclover (*Melilotus officinalis)*
	Russian thistle (Salsola targus)
	Arabian schismus (*Schismus arabicus)*

Location	Weed Name
	Mediterranean grass (*Schismus barbatus)*
	Common sowthistle (Sonchus oleraceus)
	Johnsongrass (Sorghum halepense)
	Tamarisk (Tamarix spp; T. chinensis; T. parviflora; T. ramosissima & hybrids)
Non-Native Weed Species Observed Not on the Target Lists	
Agua Fria River Corridor	Tree Tobacco (Nicotiana glauca)
	Fan Palm (Washingtonia spp.)
	Rabbitfootgrass (Poloypogon monospeliensis)
	London Rocket (Sisymbrium irio)
	Prickley Lettuce (Lactuca serriola)
	Lambs Quarters (Chenopodium album)
	Kochia or Fireweed (Kochia scoparia)

Black Mesa—Agua Fria National Monument

There were eight targeted weed species observed (Table 4). The dominant weed species were *Tamarix* spp., *Salsola tragus*, and *Alhagi maurorum* (Appendix F).

Table 4. Weed Species Observed for the Black Mesa Area

Location	Weed Name*
Target Weed Species listed by Arizona State, AZ-WIPWG, or the BLM National List	
Black Mesa	Wild oat (*Avena fatua)*
	Black mustard (*Brassica nigra)*
	Japanese brome (*Bromus japonicas)*
	Red brome (*Bromus rubens)*
	Redstem stork's bill (*Erodium cicutarium)*
	Mouse barley (*Hordeum murinum)*
	Russian thistle (Salsola targus)
	Tamarisk (Tamarix spp; T. chinensis; T. parviflora; T. ramosissima & hybrids)

Gila River Corridor

There were eight targeted weed species observed and four non-targeted species observed (Table 5). The dominant weed species were *Tamarix* spp., *Salsola tragus*, and *Alhagi maurorum* (Appendix F). The non-native weed species observed only comprised ~>1% of the total live biomass (Appendix F).

Table 5. Weed Species Observed for the Gila River Corridor

Location	Weed Name*
Target Weed Species listed by Arizona State, AZ-WIPWG, or the BLM National List	
Gila River Corridor	Asian mustard (*Brassica tournefortii)*
	Bermuda grass (*Cynodon dactylon)*
	Mouse barley (*Hordeum murinum)*
	Russian thistle (Salsola targus)
	Arabian schismus (*Schismus arabicus)*
	Mediterranean grass (*Schismus barbatus)*
	Tamarisk (Tamarix spp; T. chinensis; T. parviflora; T. ramosissima & hybrids)
	Athel Tamarisk (Tamarix aphylla)
Non-Native Weed Species Observed Not on the Target Lists	
Gila River Corridor	London Rocket (Sisymbrium irio)
	Kochia or Fireweed (Kochia scoparia)
	Horse Purslane (Trianthema portulacastrum)
	Globe Chamomile (Oncosiphon piluiferum)

Hassayampa River Corridor

There were 12 targeted weed species observed and four non-targeted weed species observed (Table 6). The dominant weed species observed included *Tamarix* spp. with trace amounts of the remaining weed species (Appendix F). The non-targeted weed species observed only comprised ~>1% of the total live biomass (Appendix F).

Table 6. Weed Species Observed for the Hassayampa River Corridor

	Weed Name*
Target Weed Species listed by Arizona State, AZ-WIPWG, or the BLM National List	
Hassayampa River Corridor	Asian mustard (*Brassica tournefortii)*
	Ripgut brome (*Bromus diandrus)*
	Japanese brome (*Bromus japonicas)*
	Red brome (*Bromus rubens)*
	Bermuda grass (*Cynodon dactylon)*
	Redstem stork's bill (*Erodium cicutarium)*
	Mouse barley (*Hordeum murinum)*
	Russian thistle (Salsola targus)
	Arabian schismus (*Schismus arabicus)*
	Mediterranean grass (*Schismus barbatus)*
	Tamarisk (Tamarix spp; T. chinensis; T. parviflora; T. ramosissima & hybrids)
	Athel Tamarisk (Tamarix aphylla)
Non-Native Weed Species Observed Not on the Target Lists	
Hassayampa River Corridor	Tree Tobacco (Nicotiana glauca)
	Fan Palm (Washingtonia spp.)
	Rabbitfootgrass (Poloypogon monospeliensis)
	London Rocket (Sisymbrium irio)

Badger Springs—Agua Fria National Monument

There were ten targeted weed species observed (Table 7). The dominant weed species observed included *Tamarix* spp. with trace amounts of the remaining weed species (Appendix F).

Table 7. Weed Species Observed for the Badger Springs Area

	Weed Name*
Target Weed Species listed by Arizona State, AZ-WIPWG, or the BLM National List	
Badger Springs	Wild oat (*Avena fatua)*
	Ripgut brome (*Bromus diandrus)*
	Japanese brome (*Bromus japonicas)*
	Red brome (*Bromus rubens)*
	Malta starthistle (*Centaurea melitenisis)*
	Bermuda grass (*Cynodon dactylon)*
	Redstem stork's bill (*Erodium cicutarium)*
	Mouse barley (*Hordeum murinum)*
	Russian thistle (Salsola targus)
	Tamarisk (Tamarix spp; T. chinensis; T. parviflora; T. ramosissima & hybrids)

1.3 Purpose and Need for Action

The purpose of the Proposed Action is to manage weed infestations on BLM-administered lands within the PDO, using early-detection and rapid-response strategies and an integrated approach.

The Proposed Action is needed to be able respond to new weed infestations in a timely manner, before infestation control becomes infeasible. The rapid expansion of invasive plant species across public lands continues to be a primary cause of ecosystem degradation, and control of these species is one of the greatest challenges in land management (BLM 2007a). BLM's desire to control weeds on public lands is driving the need for an integrated approach to weed management. Integrated weed control would improve ecosystem health, thereby working toward achieving land health standards; reduce hazardous fuels; and restore fire-damaged lands by:

1) Controlling weeds and invasive species, and
2) Manipulating vegetation to benefit fish and wildlife habitat, improve riparian and wetland areas, and improve water quality in priority watersheds.

1.4 Conformance with Applicable Land Use Plans

The Proposed Action is in conformance with the following Land Use Plans:
Bradshaw-Harquahala Record of Decision and Approved Resource Management Plan (BLM 2010) & *Agua Fria National Monument Record of Decision and Approved Resource Management Plan* (BLM 2010):

- VM-1. Maintain, restore, or enhance the diversity, distribution, and viability of populations of native plants, and maintain, restore, or enhance the overall ecosystem health.

- VM-2. The distribution and abundance of invasive plants will be contained, and through active management, the impact of invasive species on native ecosystems will be reduced from current levels.

Lower Sonoran Record of Decision and Approved Resource Management Plan (2012) *& Sonoran Desert National Monument Record of Decision and Approved Resource Management Plan* (2012):

- VM-3: Noxious and undesirable plant species will not occur on the landscape or, if they occur, they will make up a sufficiently small percentage of the vegetative community that they do not affect ecological processes.
    - VM-3.1: Control invasive species using an integrated weed-management approach, including prevention, restoration, mechanical, chemical, biological control methods, and prescribed fire, where appropriate
        - VM-3.1.2: Priority will be assigned to the control of invasive species that have a substantial and apparent impact on native plant communities and wildlife. When infestations are identified, they will be evaluated for their potential threat and scheduled for removal accordingly.

1.5 Relationship to Statutes, Regulations, and Other Requirements

The following laws, regulations, acts, and policies guide BLM weed and invasive species management activities:

- The *Carlson-Foley Act of 1968* (Public Law 90-583; 43 U.S.C. 1241 et seq.) and the *Plant Protection Act of 2000* (Public Law 106-224) authorizes and directs agencies to manage weeds and to coordinate with other federal and state agencies in activities to eradicate, suppress, control, prevent, or retard the spread of any weeds on federal lands.

- The *Federal Noxious Weed Act of 1974* (Public Law 93-629), *as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990*, (7 U.S.C. 2801 et seq.) authorizes the Secretary "...to cooperate with other federal and state agencies and others in carrying out operations or measures to eradicate, suppress, control, prevent, or retard the spread of any noxious weed." This act established and funded the undesirable plant management program, implemented cooperative agreements with state agencies, and established integrated management systems to control undesirable plant species.

- The *Federal Land Policy and Management Act of 1976, as amended*, (Public Law 94-579; 43 U.S.C. 1701 et seq.) directs BLM to "…take any action necessary to prevent unnecessary and or undue degradation to public lands."

- The *Public Rangelands Improvement Act of 1978* (Public Law 95-514; 43 U.S.C. 1901 et seq.) requires that BLM manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible.

- *BLM Manual 9015: Integrated Weed Management, 1992*, provides policy relating to the management and coordination of weed activities among BLM, organizations, and individuals.

- *USDI Departmental Manual 609: Weed Control Program, 1995*, prescribes policy to control undesirable or weeds on the lands, waters, or facilities under its jurisdiction to the extent economically practicable, as needed for resource protection and accomplishment of resource management objectives.

- *Executive Order 13112, Invasive Species, 1999*, 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.

- The *Noxious Weed Control and Eradication Act of 2004* (Public Law 108–412) established a program to provide assistance through the states to eligible weed management entities to control or eradicate harmful, non-native weeds on public and private lands.

- The *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement, 2007*, and the *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report*, 2007 analyzed the direct, indirect, and cumulative impacts to various resources from vegetation treatment projects.

The BLM has also identified broad objectives for invasive species prevention and management. These include the *Partners Against Weeds: An Action Plan for the Bureau of Land Management* (BLM 1996) which outlines the actions BLM will take to develop and implement a comprehensive integrated weed management program; and *Pulling Together: National Strategy for Invasive Plant Management* (FICMNEW 1997), which illustrates the goals and objectives of a National invasive plant management plan (prevention, control and eradication).

Additional guidance from the State of Arizona is provided in the *Arizona State Noxious Weed Laws* (Arizona Administrative Code. Title 3. Chapter 4. Article 2. Rule R3-4-244 *Regulated and Restricted Noxious Weeds*, and Rule R3-4-245 *Prohibited Noxious Weeds; and Arizona Administrative Code*. Title 3. Chapter 4. Article 4. Rule R3-4-403 *Noxious Weed Seeds*), and Executive Order 13112.

1.5.1 Precautions for Special Status Species

The *Endangered Species Act of 1973* (ESA; 16 U.S.C. 1536) established federal policies and procedures for protecting federally listed threatened or endangered animal and plant species. *Section 7 of the ESA* requires agencies to work toward the conservation of listed species and to ensure that no agency action is likely to jeopardize a listed species or adversely modify critical habitat. The BLM consulted with the U.S. Fish and Wildlife Service (USFWS) during development of the PEIS, pursuant to Section 7 of the ESA, and prepared a programmatic biological assessment (PBA; BLM 2007c) to evaluate likely impacts to federally listed or proposed threatened or endangered species as a result of weed treatments.

The Phoenix District prepared a *Biological Assessment for the Phoenix District Integrated Weed Management Programmatic Environmental Assessment, July 2015*, which analyzed the impacts to threatened, endangered, and candidate species listed under the ESA of implementing an integrated weeds management program within the Phoenix District Office areas (Appendix G). This biological assessment was prepared in accordance with legal requirements set forth under Section 7 of the ESA (16 U.S.C. 1536 (c)), and follows the standards established in the BLM, NEPA guidelines, ESA consultation guidance (USFWS 1998) and the Alternative Consultation Agreement between the BLM and the USFWS for the Joint Counterpart Endangered Species Act Section 7 Consultation Regulations (2003).

BLM Manual Section 6840, *Special Status Species Management* (BLM 2008), stipulates that "BLM shall designate Bureau sensitive species and implement measures to conserve these species and their habitats, including ESA proposed critical habitat, to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA." Additionally, "All federally designated candidate species, proposed species, and delisted species in the 5 years following their delisting shall be conserved as Bureau sensitive species." See Appendix B for a list of special status species known to occur, or with a reasonable potential to occur, in the Phoenix District.

1.6 Scoping and Public Participation

Public scoping meetings were held on December 14, 2010 at the Arizona Game and Fish Department (AZGFD) and on December 15, 2010 at the Gila Bend Community Center. The meetings were advertised via local newspapers, radio, and a press release. The public meetings were held to gather public comments on the following proposed actions:

1) Continue using the current weed management approach; including hand and mechanical tools.
2) Implementing an integrated weed management approach to reduce or remove invasive plants; including hand tools, mechanical tools, prescribed fire, biological tools, and herbicides.
3) Implementing an integrated weed management approach to reduce or remove invasive plants; including hand tools, mechanical tools, prescribed fire, and biological tools only.

One person attended the public meeting at the AZGFD with no comments. A total of three people attended the public meeting at the Gila Bend Community Center. BLM management was present to answer questions. Maps were available that showed the location of the proposed weed management area and potential site-specific project areas.

In addition to the opportunity to attend a public meeting, written comments were solicited and received via email. Comments were received from the following groups, in addition to general members of the public:

- Sierra Club
- Phoenix Weedwackers
- Arizona Game and Fish Department

In addition to external scoping, the BLM conducted internal scoping with an interdisciplinary team of resource specialists. The major issues identified during the internal scoping process are grouped by resource and can be found in section 1.6.1. To demonstrate a clear cause and effect relationship between the Proposed Action and the resource impacted, resource issues are phrased as questions that illuminate the cause/effect relationship.

The BLM made the EA available for public comment for 30 days between August 6, 2015 and September 7, 2015. No comments were received.

1.6.1 Issues

Issues revealed during scoping are summarized in the table below. If an issue was determined to be non-substantive, then it is not carried forward in the NEPA analysis. Table 8 Scoping Issues / Comments summarizes scoping issues and comments.

Table 8. Public Scoping Issues / Comments

Issue/Comment	Disposition	How are substantive issues addressed?
Suggestion that BLM develops a list of plants that are the greatest threat and focus on these and on plants that have a limited presence but that might be easily eradicated.	**Substantive** (alternatives)	This is part of the Proposed Action. Greatest threat weeds are priority 1 treatment areas and limited presence weeds are rapid response treatments.
Suggestion that BLM work to limit use of chemicals to the greatest degree possible and to use the least harmful chemicals possible.	**Substantive** (alternatives)	This is addressed in the Proposed Action.
Suggestion that each of the applicators should have a State of Arizona pesticide applicator's certification.	**Substantive** (SOP)	Included as Standard Operating Procedures.
Suggestion to implement spot mechanical removal for buffelgrass located near threatened, endangered or other sensitive or special status plants.	**Substantive** (alternatives)	This is addressed in the Proposed Action.
Suggestion that fountain grass appears to be mainly a problem in washes and BLM should consider focusing on mechanical removal and periodic assessment and removal.	**Substantive** (alternatives)	This is addressed in the Proposed Action.
Suggestion to consider surveying and flagging an area to avoid individual plants and nests.	**Substantive** (SOP)	Included as Standard Operating Procedures
Suggestion that personnel shake larger bunches of buffelgrass as doing so will give animals an opportunity to move. According to the commenter, during mechanical removal of the buffelgrass in the Ironwood Forest National Monument, birds, Gila monsters and other wildlife were found in the grass.	**Substantive** (SOP)	Included as Standard Operating Procedures
Suggestion to use a truck-based boom sprayer vs. aerial spraying, as aerial spraying leads to chemical drift and an increased mortality of non-target species.	**Substantive** (SOP)	As part of the Proposed Action, aerial herbicide application will be considered on a project-by-project basis as needed.
Suggestion to consider not using Clopyralid (3, 6-dichloro-2-pyridinecarboxylic acid). According to the commenter, it is known to persist in both dead plants and the soil and therefore it should not be used for treatment of these lands.	**Substantive** (impacts)	The BLM is not proposing to use Clopyralid.
Suggestion for ongoing and long-term monitoring	**Substantive**	Included as Standard

Issue/Comment	Disposition	How are substantive issues addressed?
	(SOP)	Operating Procedures
Domestic sheep and goats can introduce diseases into wild bighorn sheep populations. For this reason, the Department would recommend not allowing the use of sheep or goats within nine miles of bighorn sheep habitat.	**Substantive** (SOP)	Included as Standard Operating Procedures
Suggestion to consider mechanical treatment only after an area of chemical treatment has been controlled.	**Substantive** (alternatives)	This alternative was considered, but removed from detailed analysis.
Desire to comment on the EA prior to issuing a decision.	**Non-substantive (process)**	EA will be available for a 30 day comment period.
Concern about adequate notice given for the scoping period.	**Non-substantive (process)**	Notice of public meetings was made in local newspapers, radio, and a press release.
Concern that arid landscapes are not suitable for livestock grazing.	**Non-substantive**	Out of scope
Suggestion that Arizona alter grazing tax practices	**Non-substantive**	Out of scope
Suggestion that the federal government phase out ranching subsidies	**Non-substantive**	Out of scope
Suggestion that mechanical removal of some of the larger bunches of grass is likely to be more effective than chemical treatment.	**Substantive**	Included as Standard Operating Procedures
Suggestion that mowing malta starthistle—removing the seed heads over a period of 2-3 years—can be effective at containing and eradicating it.	**Substantive**	Included as Standard Operating Procedures

The following issues were identified during the internal scoping process.

Air Resources

- How could pile burning affect air quality?

Special Designations

ACEC

How do proposed treatments affect the values for which ACECs are designated?

- How would application of weed treatments affect biological resources, including habitat alteration of the ACECs?
- How would application of weed treatments affect cultural components of ACECs, particularly rock art?

National Monuments

- How would proposed treatments affect various objects and values of the two National Monuments (will vary by object)?

Wilderness / Lands To Managed to Maintain Wilderness Characteristics

- Could application of weed treatments affect the wilderness character values?

Wetlands & Riparian areas

- How would the application of herbicides affect water—surface or ground?
- How could other weed treatments affect riparian obligate vegetation (particularly in T&E habitat)?

Weeds

- How could treatments (by increasing bare ground) lead to the further spread of other invasives?

Migratory Birds

- How could the removal of nesting habitat affect migratory birds?

Terrestrial and Aquatic Wildlife

- How does application of herbicides potentially affect aquatic wildlife?
- How could general treatments affect nesting/breeding habitat?

Special Status Species

- How would weed treatments affect terrestrial special status species habitat?
- How would potential vegetation removal affect aquatic special status species?
- How would application of herbicides affect special status species?

Veg Communities and Rangeland Health

- How does the Proposed Action potentially improve vegetation communities and rangeland health?

Recreation

- Could treatments have an impact on the safety of the recreating public?

Cultural Resources

- Could treatments affect rock art?
- Could pile burns impact cultural resources?
- Could other weed treatments negatively affect cultural resources?

Soils

- How does the Proposed Action affect soil productivity?
- How could treatments affect soil erosion?

Transportation and Access

- How could treatments and subsequent temporary closures affect access?

Land Use

- How could use of herbicides affect nearby permitted apiaries?

Fire Use

- How would weed treatments affect hazardous fuel loads?
- How would weed treatments decrease potential for severe wildfires?

2.0 ALTERNATIVES

The alternatives considered are Alternative A—No Action Alternative (continue current management), Alternative B—Proposed Action Alternative, and Alternative C—No Herbicide Use.

2.1 Alternative A—No Action Alternative

The No Action alternative would continue on the current course of weed management for the district. Under this course of management, hand pulling of small (less than an acre) weed infestations would continue. Treatment of larger infestations or utilization of other methods (i.e. mechanical, prescribed fire, biological control, and herbicides), would require individual site-specific NEPA analysis prior to conducting the treatment.

2.2 Alternative B—Proposed Action Alternative

This alternative would implement a long-term integrated weed management (IWM) program on public land within the PDO. The objectives of this alternative are to maximize effective weed control, while minimizing negative environmental, impacts and costs. The IWM program would utilize prevention, detection, multiple treatment approaches, and education for use in eradicating, controlling, and/or containing weeds. The IWM program would allow for selection from a range of possible control methods, including hand tools, mechanical tools, biological tools, and herbicides (with appropriate additives, including adjuvants and surfactants).

The Proposed Action involves implementing the IWM program to treat weed infestations of 100 acres or less, using a rapid response approach. Weeds would be treated using the best available weed control technique(s) at the appropriate times based on the life history of the target species and cost-effectiveness. Approximately 25,000 acres would be treated over the life of the project, across the PDO. Of these acres, approximately 500 acres/year would be treated using manual/mechanical methods; approximately 500 acres/year would be treated using Environmental Protection Agency (EPA) reported herbicides; and approximately 500 acres/year would be treated using biological control methods. The weed species known to occur or that have the potential to occur within the PDO and their potential treatment methods are listed in Table 9. Treatments would not be conducted north of Interstate 40.

Implementation of the Proposed Action would provide BLM personnel with a sub-set of the herbicides, adjuvants, and surfactants available for vegetation treatment approved in the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (BLM 2007a).

The Proposed Action incorporates all of the relevant standard operating procedures (SOPs), mitigation measures, best management practices, and conservation measures included in Appendix E and in the *Biological Assessment for the Phoenix District Integrated Weed Management Programmatic Environmental Assessment, July, 2015* (BA) (Appendix G) as project design features.

Table 9. Weed Species Known to Occur or Have the Potential to Occur within the Phoenix District Office and Potential Treatment Methods

Weed Name*	Occurrence	Potential Treatment Methods
Russian knapweed	Potential	Chemical, Mechanical, and Biological
Jointed goatgrass	Known	Chemical and Mechanical
Camelthorn	Known	Chemical
Giant reed	Known	Chemical and Mechanical
Wild oat	Known	Chemical and Mechanical
Black mustard	Known	All*
Asian mustard	Known	Chemical, Mechanical, and Manual
Ripgut brome	Known	Chemical, Mechanical, and Manual
Japanese brome	Known	Chemical, Mechanical, and Biological
Red brome	Known	Chemical and Manual
Cheatgrass	Known	Chemical and Manual
Globe-podded hoary cress	Potential	Chemical and Mechanical
Malta starthistle	Known	Chemical, Mechanical, and Biological
Lambs Quarters	Known	Chemical and Mechanical
Field bindweed	Potential	Chemical, Mechanical, and Biological
Bermuda grass	Known	Chemical and Mechanical
Quackgrass	Potential	All*
Lehmann lovegrass	Known	Chemical
Redstem stork’s bill	Known	Manual and Chemical
Halogeton	Known	Chemical, Mechanical, and Manual
Mouse barley	Known	Chemical and Mechanical
Kochia or Fireweed	Known	Chemical, Mechanical, and Biological
Prickly Lettuce	Known	Chemical and Manual
Dalmatian toadflax	Known	Chemical, Manual, and Biological
Yellow sweetclover	Known	Chemical and Manual
Tree Tobacco	Known	Chemical and Mechanical
Globe Chamomile	Known	Chemical and Manual
Scotch thistle	Potential	Chemical, Manual, and Biological
Buffelgrass	Known	Chemical, Mechanical, and Manual
Crimson fountain grass	Known	Chemical and Manual
Rabbitfootgrass	Known	Chemical and Biological
Ravengrass	Potential	Chemical, Mechanical, and Manual
Russian thistle	Known	Chemical, Manual, and Biological
Arabian schismus	Known	Chemical
Mediterranean grass	Known	Chemical
London Rocket	Known	Chemical and Mechanical
Common sowthistle	Known	Chemical, Manual, and Biological
Johnsongrass	Known	Chemical and Mechanical
Tamarisk	Known	Chemical, Mechanical, and Biological
Horse Purslane	Known	Chemical
Puncturevine	Known	Chemical, Manual, and Biological
Fan Palm	Known	Chemical and Manual

*All = Manual, Mechanical, Biological (Grazers), and Chemical Treatment Methods

2.2.1 Treatment Methods

Manual Treatment

Manual treatments would include the use of hand tools and hand-operated power tools to cut, prune, or remove herbaceous and woody species. Treatments would include but are not limited to cutting undesired plants above ground level; pulling, digging, or grubbing out root systems to prevent resprouting and regrowth; cutting at the ground level or removing competing plants around desired plants; or placing mulch around desired vegetation to limit weed germination or growth (BLM 1991). Hand tools include handsaw, axe, shovel, rake, machete, grubbing hoe, mattock, brush hook, hand clippers, motorized chainsaw, weed whacker, power brush saw, and Pulaski tool.

Manual treatments would typically be used on small isolated infestations, where special status species occur, or in sensitive habitat areas. Manual treatments are most effective on small weed infestations and when complete root removal is possible (Rees et al. 1996). Manual treatments work well for annual or biennial species with tap roots or shallow roots that do not resprout from tissue remaining in the soil. Sandy or gravelly soils allow for easier root removal. Repeated treatments are often necessary due to soil disturbance and residual weed seeds in the seed bank. However, manual treatments are labor intensive compared to other treatment methods such as herbicide and biological control. Typical manual vegetation control costs $70 to $700 per acre (BLM 2007b).

Mechanical Treatment

Mechanical treatments involve the use of a tractor or vehicle with attached implements (e.g., root rippers, plows, harrows, mowers). These vehicles tend to remove all vegetation in the path of travel, and often uproot vegetation and disturb the soil. The type of mechanical method used on a particular site is based on characteristics of the weed species present, seedbed preparation and revegetation needs, topography and terrain, soil characteristics, climatic conditions, and a comparison of the improvement costs to the expected productivity of the site (BLM 1991). Treatments that may be used include mastication and root knifing, chaining, tilling and drilling seed, mowing, roller chopping and cutting, blading, grubbing, and feller bunching.

Mechanical treatments are typically used to remove thick stands of weed infestations. Mechanical methods are appropriate where a high level of control over vegetation removal is needed, such as in sensitive wildlife habitats or near home sites, and are often used instead of prescribed fire or herbicide treatments for vegetation control in the wildland urban interface. Repeated treatments are often necessary due to the spread of seeds by machinery, lack of complete root kill, and residual weed seeds in the seed bank. Typical mechanical vegetation control costs $100 to $600 per acre (BLM 2007b).

Biological Treatment

Biological treatments for the proposed action involves the use of domestic animals to selectively suppress, inhibit, or control vegetation. The use of domestic animals requires a "prescribed grazer," such as sheep or goats, to control the top-growth of certain weeds. Sheep consume a variety of forbs, as well as grasses and shrubs, and goats can eat large quantities of woody vegetation; their daily diets can include up to 50% of the weed (BLM 1991). In order for domestic animals to be effective, the right combination of animals, stocking rates, timing (i.e., high intensity and short-duration grazing), and rest must be used to control a particular weed species while minimizing impacts to perennial native vegetation. Grazing should occur when plants are palatable and grazing can damage or reduce viable seeds.

Biological treatments are used to reduce the targeted weed population to an acceptable level by stressing target plants and reducing competition with the desired plant species. Biological control agents are most suitable for larger sites where the target plant is well established and very competitive with native species. Biological treatments are most effective when used in combination with other treatments. Typical biological vegetation control using domestic animals is $12 to $15 per acre (BLM 2007b).

Chemical/Herbicides

Chemical treatments involve the use of herbicides to kill or suppress target weed plants and the use of chemicals applied with herbicides that improve their efficiency (adjuvants). Application methods that could be used include spraying from a backpack unit or spray bottle or wiping (wicking) directly onto the foliar tissue, horseback sprayers, and sprayers mounted on all-terrain vehicles (ATVs), trucks, helicopters or fixed-wing aircraft. Aerial herbicide application would be considered for use on a project-by-project basis as needed. All chemical treatments would be conducted in accordance with *BLM Manual 9011* (BLM 1991) and the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States PEIS* (BLM 2007a).

Herbicides could be used selectively to control specific vegetation types or non-selectively to clear all vegetation in a particular area. Selection of a specific herbicide and application rate for site-specific use would depend on its effectiveness on a particular weed species, success in previous similar applications, habitat types, soil types, and proximity to water. Herbicide treatments are most effective when used at the optimum time for controlling persistent weeds, including perennial species. Herbicide control is less labor intensive than manual methods and is more effective in controlling larger weed infestations. Typical herbicide application costs $20 to $250 per acre (BLM 2007b).

The Proposed Action includes potential use of four of the 18 herbicide active ingredients approved in the 2007 PEIS (BLM 2007a). The active ingredients include 2, 4-D, glyphosate, imazapyr, and triclopyr. All BLM-approved herbicides have been deemed effective in controlling vegetation, have minimal effects on the environment and human health if used properly, are registered with the U.S. Environmental Protection Agency (EPA), and were approved for use in the 2007 PEIS. Additional information concerning the herbicides available for use under the Proposed Action is included in the 2007 PEIS (BLM 2007a). Appendix D contains a current list of herbicides and adjuvants approved for use with the four active ingredients on BLM lands.

Under the Proposed Action, all application rates, procedures, and restrictions would be within label rates and used according to direction in the 2007 PEIS. The proposed IWM program would incorporate BMPs for preventing weed infestations; SOPs, conservation measures, mitigation measures, and associated monitoring for implementing weed treatments (see Appendix E). These appendices are taken from the RMPs (BLM 2010 a, b) and the PEIS and PER (BLM 2007a, b). In addition to the SOPs that are protective of resources/values in the planning area, restrictions would be applied to public lands that are within all threatened, endangered, candidate, and BLM sensitive species habitat. Any weed treatments in riparian zones would be conducted in a manner to ensure that impacts to non-target species would be minimized and/or avoided. Only herbicides that have been approved for riparian-area application would be used in riparian areas. Weed treatments within wilderness areas would be evaluated under the management guidelines found in BLM's Handbook 6340, *Management of Designated Wilderness Areas*.

Activity Fuel Disposal

Where appropriate prescribed burning of piled vegetation may occur following manual or mechanical treatments. Prescribed burning of piled vegetation debris would remove the potential of contributing to existing hazardous fuel loads and posing as a fire hazard. Piles would be ignited using hand ignitions. Pile burning may be conducted at any time in some locations, though most burning occurs during the winter to reduce the risk of escape fire (BLM 2013). All prescribed pile burning would be implemented with a prescribed fire burn plan and a smoke management plan in accordance with BLM procedures and the *Phoenix District Zone Fire Management Plan* (BLM 2013) and would comply with federal and state air quality regulations. If prescribed pile burning is not an option, vegetative material would be disposed of properly or left on site.

Rehabilitation and Revegetation

Where appropriate, rehabilitation of disturbed area may occur to prevent establishment of weeds following manual, mechanical or chemical treatments or other ground disturbing activities. Revegetation of disturbed soil (except travel ways) would be conducted in a manner that optimizes plant establishment for each specific project site. Revegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary.

Where practical, weed-seed-free topsoil may be stockpiled and placed on disturbed areas (e.g., road embankments or landings). Seeds and straw mulch to be used for site rehabilitation (for wattles, straw bales, dams, etc.) would be inspected to certify that they are free of weed seed and propagules. Native materials would be used where appropriate and feasible.

2.2.2 Strategy for Managing Weeds

The BLM strategy for managing weeds would be to:

- Inventory and map new and known weed occurrences;
- Detect and eradicate new infestations of weeds;

- Contain or control large scale infestations of weeds; and
- Promote public awareness/education of weeds, including partnerships with other agencies, non-profit groups, and Tribes.

Determining which method(s) to use, when, and how often would be based on, but not limited to the following factors adopted from the 2007 PEIS:

- Growth characteristics of the target weeds
- Seed longevity and germination;
- Infestation size;
- Proximity to other weed infestation sites;
- Proximity of the treatment area to sensitive areas, such as wetlands, streams, or habitat for plant or animal species of concern, including federally listed species or designated critical habitat;
- Accessibility by people and/or equipment;
- Proximity to populated places; and
- Effectiveness and cost of treatment methods.

All strategies for managing weeds and factors considered for determining methods are discussed in more detail in the 2007 PEIS, to which this analysis is tiered.

2.2.3 Priorities for the Proposed Action

The 2007 PEIS Record of Decision (ROD) identifies priorities for weed treatment that promote an integrated approach to stop weed spread. These priorities, listed below, would be employed under the Proposed Action.

Priority 1: Take actions to prevent or minimize the need for vegetation control when and where feasible, considering the management objectives of the site.
Priority 2: Use effective non-chemical methods of vegetation control when and where feasible.
Priority 3: Use herbicides after considering the effectiveness of all potential methods or in combination with other methods or controls.

Actions to prevent or minimize the need for vegetation control can include protecting intact systems; maintaining conditions that have led to healthy lands; reducing the impact of ongoing activities; and applying mitigation measures to new projects to minimize soil and vegetation disturbance and avoid introductions of invasive species. If treatment is required, efforts would be focused on activities that restore natural ecosystem processes, and on ventures that are likely to succeed and provide the greatest benefits with the least expenditure of capital. The integrated weed program on BLM-administered lands is based on weed management objectives and priorities that are influenced by weed infestations and site susceptibility. These criteria provide focus and direction for the weed program and allow for site-specific and adaptive decision making. Integrated weed management strategies may include, but are not limited to prevention, manual, mechanical, chemical, and biological methods. These methods could be used alone or in combination; using only one method, such as herbicides, biological controls or hand-pulling alone, is not usually effective. For some of the most aggressive invaders, herbicides are the most effective way to control weed spread. However, herbicides would be used or selected for use only where they can truly be effective in controlling the spread of weeds that pose a threat to native plant communities.

The overriding goal is to prioritize treatments based on their effectiveness and likelihood to have minimal impacts on the environment, and to restore desirable vegetation on lands where necessary (i.e., where desired vegetation cannot reestablish naturally). The following would be used to prioritize weed treatments within the PDO in order to focus efforts towards success.

- Priority 1: New aggressive infestations in an uninfested area or small infestations in areas of special concern (e.g., Wilderness Areas, Areas of Critical Environmental Concern (ACECs), National Monuments).
  Management Objectives: Eradication.
- Priority 2: Areas with designated critical habitat for Threatened and Endangered listed species, special status plant communities, and other areas of valuable wildlife habitat (e.g., sensitive species, riparian habitat).
  Management Objective: Eradication and Control.
- Priority 3: Areas of high traffic or sources of weed infestations with abundant weeds.
  Management Objective: Control by eradicating high priority species and controlling others.
- Priority 4: Areas of low traffic or controlled access.
  Management Objective: Control high and medium priority species and monitor areas.
- Priority 5: Existing large infestations or roadside infestations where spread can be checked or slowed.
  Management Objective: Contain.

Species priority categories would be based on the Arizona and SWEPIC weed databases plus any site-specific weed occurrence information for the PDO, combined with the Arizona Wildland Invasive Plant Working Group ratings to create a prioritized list of weed species for the PDO.

The purpose of the prioritization process is to ensure that the treatment method selected is appropriate for the situation while minimizing risks to non-target species. Several variables would be considered when determining what treatment or combination of treatments would be used in a specific situation. These include:

- Potential hazards to human health
- Possible damage to non-target plants and animals
- Adverse impacts to the general environment
- Cost effectiveness over the long- and short-term
- Ease of implementation

Early Detection and Rapid Response (EDRR) weed treatments would be used on infestations. EDRR can stop the spread of new and emerging invasive plant species before they become established. It is one of the most cost-effective and ecologically viable methods for controlling weeds. This would include the following steps:

- Regularly scheduled monitoring to discover new populations at early stages of development
- Eradication of individual or small weed populations
- Coordination with adjacent landowners

2.3 Alternative C—No Herbicide Use

This alternative would be similar to the Proposed Action in that it would include all the same treatment methods for weeds, with the exception that herbicides would not be used. All SOPs, mitigation measures, and other information described for the Proposed Action alternative in Appendix E would be applicable under this alternative.

2.4 Alternatives Considered but Removed from Detailed Analysis

Through the public scoping process, one alternative was identified that was removed from detailed analysis. The suggestion was to consider mechanical treatment only after an area of chemical treatment has been controlled. The BLM determined that this approach does not meet the purpose and need of having a flexible approach to use the least invasive method of treatment for specific infestations. Mandating chemical use before mechanical use may prove to be more invasive and/or detrimental than implementing a mechanical or other treatment first. For this reason, the alternative was eliminated from detailed analysis.

2.5 Summary of Alternatives

This EA addresses potential impacts that could result from implementing an integrated weed management approach in the PDO. Three alternatives are carried forward for analysis in this EA—No Action, Proposed Action, and No Herbicide Use alternatives. Table 10 illustrates the main components of each alternative.

Table 10. Summary of Alternative Components for IWM in the Phoenix District Office.

Treatments	No Action Alternative	Proposed Action Alternative	No Herbicide Use Alternative
Manual and Mechanical Methods			
Includes hand and power-operated tools; tractor or vehicle with attached implements	No	Yes	Yes
Biological Controls			
Includes use of domestic animals	No	Yes	Yes
Herbicide Use of 4 Approved Chemicals			
Includes Use of four active ingredients approved in the 2007 PEIS; includes aerial application	No	Yes	No

3.0 Affected Environment

This section provides a description of human and natural resources that could be affected by the Proposed Action. The resources presented are based on the issues identified during scoping (see section 1.6.1 in chapter 1). Resources for which an issue was identified are described in detail in the following chapters. Other resources considered, but for which no issue was identified, are not discussed further in this document.

Table 11. Critical and Other Important Elements of the Human Environment.

Resource	No Issue/Not Present	Potential Issue Identified in Scoping	**Resource**	No Issue/Not Present	Potential Issue Identified in Scoping
Air Quality		X	Paleontological Resources	X	
ACECs		X	Wildlife		X
Cultural Resources		X	Recreation Use		X
Environmental Justice	X		Existing and Potential Land Uses		X
Prime or Unique Farmlands	X		Vegetation		X
Floodplains	X		Wild Horses and Burros	X	
Invasive, Non-native Species		X	Visual Resources	X	
Migratory Birds		X	Soils		X
Threatened/Endangered Plants; Sensitive Plants		X	Economic & Social Values	X	
Threatened/Endangered Fish; Sensitive Fish		X	Mineral Resources	X	
Threatened/Endangered Animals; Sensitive Animals		X	Livestock Grazing		X
Wastes, Hazardous or Solid	X		Public Health and Safety	X	
Water Quality—Surface and Ground		X	Travel Management/ Land Access	X	
Wetlands/Riparian Zones (including uplands)		X	Fire Management		X
Wilderness Areas		X	Wild & Scenic Rivers		X

The following issues were considered, but dismissed from analysis because the Proposed Action and alternatives do not affect the issues for the reasons stated below, and therefore are not discussed further in the EA.

Environmental Justice—Executive Order 12898 *General Actions to Address Environmental Justice in Minority Populations and Low-income Populations* requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minorities and low-income populations and communities. The action alternatives would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined by the US EPA Environmental Justice Guidance (US EPA 1998). Therefore, environmental justice was dismissed from further analysis.

Prime or Unique Farmlands—The Farmland Protection Policy Act of 1981, as amended, requires federal agencies to consider adverse effects to prime and unique farmlands that would result in the conversion of these lands to non-agricultural uses. Prime or unique farmland is classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). Prime farmland is defined as land that has the best combination of physical and chemical properties for producing food, forage, fiber, and oil seed, and for other uses (e.g., pasture land, forest land, and crop land). Unique farmland is defined as land other than prime farmland that can produce high value and fiber crops, such as fruits, vegetables, and nuts. There are no prime and unique farmlands present in the PDO; thus this topic was dismissed from further analysis.

Floodplains—Executive Order 11988 *Floodplain Management* requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. The action alternatives would not involve the filling or alterations of floodplain areas, and would not alter the functions and values of floodplains. Therefore, the topic of floodplains was dismissed from further analysis.

Wastes, Hazardous or Solid—The action alternatives would not contribute to hazardous or solid waste. Therefore, the issue of wastes, hazardous or solid, was dismissed from further analysis.

Paleontological Resources—Ground disturbing activities using a tractor or vehicle with attached implements to remove weeds would not disturb unconsolidated sedimentary rocks, which may contain fossils. Therefore, the issue of paleontological resources was dismissed from further analysis.

Wild Horses and Burros—BLM manages wild horse and burro populations to restore and maintain the health of the land and water resources. Burro herd areas surround Lake Pleasant and the Harquahala Big Horn Mountains in the HFO (BLM 2010). Wild horses and burros use the Painted Rock herd area in a transitory manner in the LSFO (BLM 2012). The action alternatives would not impact wild horses or burros or their habitat. Therefore, the issue of wild horses and burros was dismissed from further analysis.

Visual Resources—The action alternatives would not impact visual resources as treatment areas would be scattered across BLM lands and would be conducted at different times. Treatments would not dominate the view or be the major focus of viewer attention and should not alter the color, texture, line, or form of the treatment sites. Therefore, the issue of visual resources was dismissed from further analysis.

Economic & Social Values—The action alternatives would not alter the local economic and social conditions. Therefore, the issue of economic and social values was dismissed from further analysis.

Mineral Resources—PDO manages mineral planning areas, which are areas with federally administered minerals, where the surface rights are held by BLM, State of Arizona, or private parties, and located within the PDO. The action alternatives would not impact mineral resources. Therefore, the issue of mineral resources was dismissed from further analysis.

Travel Management/Land Access—Weed management actions could occur along road rights-of-way and would not prohibit public access to roads and lands. Therefore, travel management/land access was dismissed as an issue.

Public Health and Safety—PDO managers seek to protect public health and safety. PDO staff provides visitors with safety bulletins, press releases, and up-to-date information regarding management actions and potential risks. Standard operating procedures and best management practices provide guidance and would be followed by PDO to ensure that risks to human health and environment from treatment actions would be kept to a minimum. The SOPs and BMPs are included in Appendix E. Therefore, public health and safety as a separate issue was dismissed.

3.1 Related Past, Present, and Reasonably Foreseeable Actions

As defined by NEPA regulations (40 CFR 1508.7), "Cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Human caused and natural events have had varying levels of impacts on the resources and values affected by the proposed IWM approach. Past, present, and future actions include ground disturbing activities associated with new rights-of-ways, mineral exploration, new trail and user areas, and increase of all-terrain vehicle (ATV) use by recreationists, campsite and road maintenance, regular traffic, livestock, wildfires, prescribed pile burns on adjacent lands, and ongoing weed management within PDO and on adjacent lands. Although these actions may not account for all of the impacts that have or are likely to occur in the PDO planning area, GIS analysis, agency records, and professional judgment suggest that they have contributed to the vast majority of cumulative impacts that have occurred in the assessment area. The Cumulative Impact Assessment Area for this analysis consists of the PDO boundary.

3.2 Air Quality

The state of Arizona has adopted the US EPA National Ambient Air Quality Standards (NAAQS) for the six priority pollutants: carbon monoxide, volatile organic compounds (VOCs), nitrogen oxides, sulfur dioxide, ozone, and particulate matter, and developed a State Implementation Plan (SIP), an enforceable plan developed at the state and local level that explains how the area will comply with the NAAQS according to the Clean Air Act.

BLM lands managed by the PDO in nonattainment areas include Ajo in Pima County; Miami in Gila and Pinal counties; and Phoenix in Maricopa and Pinal counties for particulate matter

(PM_{10}). Smoke from prescribed fires produce fine particulates with an aerodynamic diameter of 10µm or less (PM10) and fine particulates with an aerodynamic diameter of 2.5 µm or less ($PM_{2.5}$) emissions that can be adverse to those individuals ingesting them.

Smoke Management Policy and Procedure is regulated by the Arizona Department of Environmental Quality (ADEQ). Regulations are enforced by ADEQ to meet all national and regional air quality standards. All prescribed fires conducted in the PDO must be approved by ADEQ.

Air quality areas within the PDO are classified as Class 1 or 2, which indicate the degree of change in air quality that the state and federal government will allow while still meeting the NAAQS. There are four Class 1 areas—Superstitious Wilderness, Mazatzal Wilderness, Pine Mountain Wilderness, Sycamore Canyon Wilderness—within the PDO boundary (Figure 2); these four wilderness areas are managed by the US Forest Service. Class 1 areas are areas of natural wonder and scenic beauty, where air quality should be given the most stringent protection. Actions located farther than 62 miles from Class 1 areas are generally presumed to not impact air quality-related values. All other areas within the PDO are classified as Class 2 areas. Class 2 areas allow a moderate change in air quality due to industrial and population growth. Appropriate measures are taken to minimize impacts to these areas, though air quality standards for Class 2 areas are less stringent than with Class 1 Airsheds.

3.3 Special Management Areas

3.3.1 Areas of Critical Environmental Concern

ACECs are defined as areas where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect human life and safety from natural hazards. The PDO currently manages approximately 292,000 acres within eight ACECs (Figure 1). There are four ACECs in the Hassayampa Field Office (HFO) and four ACECs in the Lower Sonoran Field Office (LSFO). Table 12 provides information regarding the ACECs, including names, designation rationale, and acreage.

The LSFO allows for treatment of invasive plants in its four ACECs as long as treatments "can be designed to have minor or negligible impact[s] on resource values within the ACEC" (AC-1.1.7). Within the HFO, none of the Land Use Plan decisions precludes activities associated with treatment of invasive plants.

Figure 2. Class 1 Areas in Arizona.

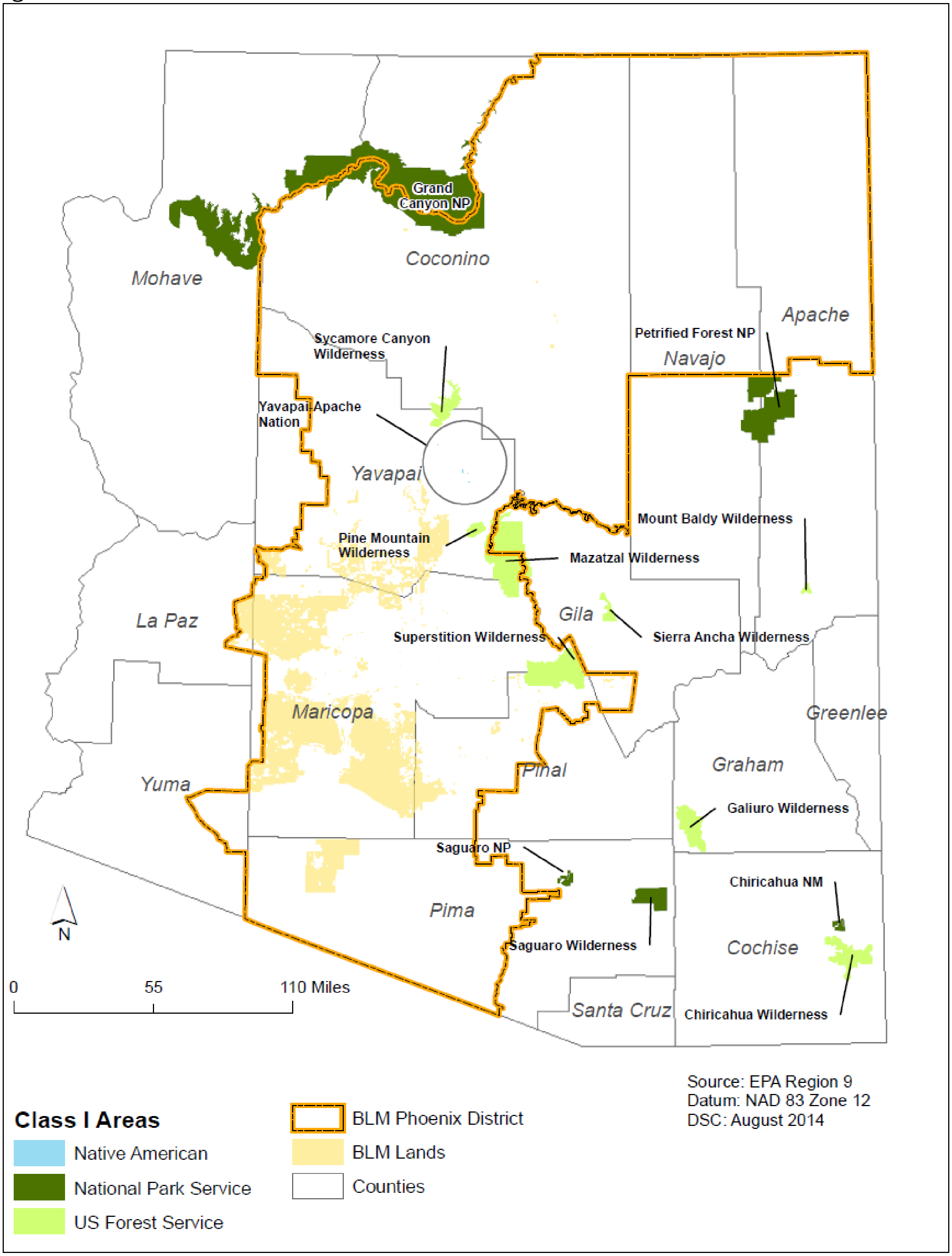

Table 12. Areas of Critical Environmental Concern on the Phoenix District

Name	Acres	Values Present
Hassayampa Field Office		
Vulture Mountains	6,496	wildlife (raptors)
Tule Creek	644	historic and cultural, biological, T&E species (fish)
Harquahala	77,227	wildlife and cultural
Black Butte	9,549	wildlife (raptors)
Lower Sonoran Field Office		
Coffeepot Botanical	8,900	botanical
Cuerda de Lena	58,500	wildlife, T&E (pronghorn), and cultural
Lower Gila Terraces and Historic Trails	82,500	cultural
Saddle Mountain	48,500	outstanding natural area

3.3.2 Wilderness Areas

Wilderness areas offer outstanding opportunities for solitude or a primitive and unconfined type of recreation; such areas may also contain ecological, geological, or other features that have scientific, scenic, or historical value (BLM 2007a). There are eleven congressionally designated wilderness areas in PDO with five in HFO covering 96,820 acres and six in LSFO covering 251,481 acres.

3.3.3 Wild and Scenic Rivers

National Wild and Scenic Rivers are rivers (or river segments) designated by Congress or the Secretary of the Interior, under the authority of the Wild and Scenic Rivers Act (WSRA) of 1968, to protect remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values and to preserve the river in its free-flowing condition. The WSRA has designated three river classes—wild, scenic, and recreational. Wild rivers are free-flowing (lacking impoundments) and generally inaccessible except by trail, with undeveloped watersheds or shorelines and unpolluted water. Scenic rivers are free flowing with shorelines or watersheds largely undeveloped, but accessible in places by roads.

There are three river segments totaling 22.4 miles along the Agua Fria River in the Agua Fria National Monument that were determined to be eligible as a wild and scenic river. These segments are recommended based on outstandingly remarkable values in scenic characteristics, fish and wildlife habitat, and cultural resources (BLM 1994). The scenic value reflects the topographic diversity and ancient volcanic activity in the area. The fish and wildlife habitat is representative of a riparian system that supports wildlife populations in the desert. The cultural resources represent of the most important systems of late prehistoric archeological sites in Arizona. These river segments are awaiting congressional determination of designation and are being managed s under the 1968 National Wild and Scenic Rivers Act and according to guidance in BLM Manual 8351, section 53. There are also 36.3 miles along eight tributaries of the Agua

Fria River within the Agua Fria National Monument that are eligible for study as to their suitability as a wild and scenic river designation (BLM 2010b).

3.3.4 Historic Trails

The Juan Bautista de Anza National Historic Trail (NHT) was designated by Congress in 1990 to commemorate the route of Spanish commander Juan Bautista de Anza's expedition in 1775–1776 from Mexico through Arizona to California to establish a mission and presidio on San Francisco Bay. The Juan Bautista de Anza NHT is a 1,200-mile historic trail corridor with 32.5 miles crossing through the LSFO. The corridor that crosses through the LSFO has several other historic trails (e.g., Butterfield Overland Stage Route, Mormon Battalion Trail) that lie within the NHT corridor, which means portions of the NHT are considered a multicomponent historic trail with associated sites. These historic trails have a trail signature due to the use of wagons and stagecoaches in the mid-nineteenth century (BLM 2013). The historic trails have artifacts, features, and associated historic sites, as well as contain more visible trail signature and corridor area to interpret and protect. Segments of the NHT that cross the LSFO are considered to be among the best-preserved corridor segments and most representative of the historic trail corridor conditions (BLM 2013). The Comprehensive Management and Use Plan for the Juan Bautista de Anza NHT (NPS 1996) provide management guidance.

Currently, the BLM LSFO has marked a 12.5-mile segment crossing the Maricopa Mountains in the Sonoran Desert National Monument with plans of the trail becoming a long-distance recreational trail for the public. Threats to the NHT include increased use near urban areas, unauthorized OHV use, removal of surface and subsurface historic artifacts, and development of private and state lands that include portions of the NHT (BLM 2013).

3.4. Surface Water and Groundwater

The PDO contains a variety of streams, from very small spring creeks to reaches of medium and large rivers. Other surface waters include small springs, seeps, and stock ponds. There are approximately 4,550 miles of stream located within PDO based on the National Hydrography Dataset. The public lands in PDO fall within four major watersheds, the Middle Gila, Verde, Colorado/Lower Gila, and Bill Williams. These watersheds may be defined into river basins that collectively drain the watersheds. The river basins that pertain to this planning effort include the Hassayampa River, Agua Fria River, Lower Salt Rivers, Gila River, and Santa Cruz River. Land ownership varies from solely federal to mixed ownerships with potential influences on water quality both upstream and downstream of the BLM reaches.

The ADEQ and US EPA have identified approximately 270 303(d) listed reaches within the PDO. 303(d) listed reaches are segments that do not meet state water quality standards and are not supporting their designated uses. Of these 270 303(d) listed reaches, 71 (71.87 miles) are within BLM-administered lands in the LSFO. The listed reaches on BLM-administered lands include sections of the Gila River, Painted Rock borrow Pit Lake, Painted Rock Reservoir, and sections of the Salt River (Table 13). The primary reason for 303(d) listing is pesticides. For waters identified on the 303(d) list, states and tribes must develop water quality improvement plans known as total maximum daily loads (TMDLs) that establish allowable pollutant loads set at levels to achieve water quality standards. The EPA must then approve these plans.

In the northern part of the PDO area, the primary groundwater sources are unconsolidated sand and gravel deposits, which fill the bottom of the Agua Fria River Canyon and occur locally in stream alluvium along streams in the Agua Fria River drainage and in drainages in mountainous areas. In the southern part of the PDO, basin fill deposits and in unconsolidated alluvium in the Bradshaw-Harquahala Basin, the Hassayampa Plain, the West Salt River Valley, Gila Bend, and Lower Gila. Groundwater also occurs along fractures in crystalline and metamorphic rock formations. Groundwater levels are generally within a few feet of the surface near streams and tens of feet in areas away from streams. Wells in the southern portion of the PDO area yield up to several hundred gallons per minute (BLM 1985). Well yields from fractured rock are often low and are not a major source of groundwater.

Table 13. 303 (d) Listed Waters within the Lower Sonoran Field Office.

Listed Water	Impairment	Mileage
Gila River, Agua Fria River to Waterman Wash	Chlordane	2.73
Gila River, Centennial Wash to Gillespie Dam	Boron	2.40
Gila River, Hassayampa River to Centennial Wash	Toxaphene	0.53
Gila River, Rainbow Wash to Sand Tank Wash	Chlordane	5.31
Gila River, Salt River to Agua Fria River	Chlordane	0.21
Gila River, Sand Tank Wash to Painted Rock Reservoir	Toxaphene	11.16
Gila River, Waterman Wash to Hassayampa River	DDT	7.16
Painted Rock Borrow Pit Lake	Dissolved Oxygen	1.46
Painted Rock Reservoir	Toxaphene	40.21
Salt River, 23rd AVE WWTP outfall to Gila River	Toxaphene	0.69

3.5 Wetlands/Riparian Zones

Wetlands are generally defined as areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support vegetation that is typically adapted for life in saturated soil, and include bogs, marshes, and wet meadows (BLM 2007a). Wetlands are regulated under Section 404 of the Clean Water Act as a subset of Waters of the U.S. The PDO administers approximately 280 miles of riparian corridor. Proper Functioning Condition (PFC) assessment of the riparian corridors on BLM's lands showed 53.44 miles of riparian corridor classified as PFC. The classification functional–at risk, indicating that riparian areas were functioning but susceptible to degradation, was assigned to 84.44 miles of riparian corridor and 2.50 miles were classified as nonfunctional. Of these 84.44 miles, 28.75 were considered in an upward trend toward PFC, 41.99 miles were showing no apparent trend, and 13.7 miles were considered to be in a downward trend from PFC. A PFC inventory has not been completed for the LSFO because it is impractical to manage for PFC due to the influence of private properties upstream and downstream of BLM-administered lands. There are also 140 wetlands covering approximately 300 acres listed by the US Fish and Wildlife National Wetland Inventory database for PDO BLM-administered lands.

3.6. Migratory Birds

All migratory birds are protected under the 1918 Migratory Bird Treaty Act (16 USC 703), as well as the Neotropical Migratory Bird Conservation Act (16 USC Chapter 80). Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* requires the BLM and other federal agencies to work with the U.S. Fish and Wildlife Service (USFWS) to improve protection for migratory birds. Migratory birds occur within the Phoenix District. Arizona Partners in Flight (APIF) has identified more than 500 bird species in Arizona (Latta et al. 1999). Of the more than 500 species, 238 species are considered neotropical migrants. Important habitat for migratory birds includes wetlands, riparian, desertscrub, and pinyon-juniper woodland. Nine of the birds identified as BLM sensitive species are listed as “high priority” species for conservation by APIF (Appendix B). Many of the birds identified by BLM migrate from Arizona breeding grounds to wintering areas in Mexico and Central and South America.

3.7 Wildlife (Terrestrial and Aquatic)

The PDO is composed of several terrestrial habitat types. These habitat types include: mixed paloverde-cacti, creosote-bursage, grasslands, Evergreen sclerophyll (dry forests), pinyon-juniper, and desert scrub. Wildlife habitat management in PDO consists of maintaining and improving food, shelter, and water. Significant differences in habitat requirements exist between species, whereby good habitat conditions for one species may not meet adequate habitat conditions for another species. Vegetation, which is an important component of habitat, provides food and cover. Food is a source of nutrients and energy, while cover reduces the loss of energy by providing shelter from extremes in wind and temperature, and also affords protection from predators.

3.7.1 Terrestrial

BLM manages vegetation within the PDO to ensure high-quality wildlife habitat. The Arizona Game and Fish Department (AGFD) manages the wildlife populations, including hunting. Hunting categories include big game, small game, upland birds, waterfowl, and predators. Throughout the State, AGFD's management of this program is based on the numbers of animals present in game management units (GMUs). Several GMUs are present within the Phoenix District. Game species found within the Phoenix District include black bear (*Ursus americanus*), desert bighorn sheep (*Ovis canadensis*), elk (*Cervus elaphus*), javelina (*Pecari tajacu*), mountain lion (*Felis concolor*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), and white-tailed deer (*Odocoileus virginianus*).

Upland bird and small game species within PDO include Gambel’s Quail (*Callipepla gambelii*), Mourning Dove (*Zenaida macroura*), White-winged Dove (*Zenaida asiatica*), and desert cottontail rabbit (*Sylvilagus auduboni*).

Furbearers found within PDO include raccoon (*Procyon lotor*), ringtail cat (*Bassariscus astutus*), bobcat (*Felix rufus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), skunks (*Mephitis* sp. and *Conepatus leuconotus*), and badger (*Taxidea taxus*).

Nongame wildlife occurring in PDO includes songbirds, raptors, small mammals, amphibians, and reptiles.

3.7.2 Aquatic

Native and non-native (introduced) fish species are known to inhabit PDO. Native species include Gila chub (*Gila intermedia*), longfin dace (*Agosia chrysogaster*), Gila topminnow (*Poeciliopsis occidentalis*), and desert sucker (*Catostomus clarki*). Desert pupfish (*Cyprinodon macularius)* were reintroduced within the Agua Fria National Monument and in Tule Creek on the Hassayampa Field Office, but follow up fish surveys have thus far failed to detect any desert pupfish. Longfin dace occur throughout the PDO in perennial surface waters. Non-native fish species have been introduced into PDO. These include largemouth bass (*Micropterus salmoides*), white bass (*Morone chrysops*), striped bass (*Morone saxatilis*), yellow bullhead (*Ameiurus natalis*), black crappie (*Pomoxis nigromaculatus*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictus olivaris*), common carp (*Cyprinus carpio*), bluegill (*Lepomis macrochirus*), mosquito fish (*Gambusia affinis*), red shiner (*Cyprinella lutrensis*), and green sunfish (*Lepomis cyanellus*).

3.8 Special Status Species

Special status species include those federally listed as threatened or endangered under the Endangered Species Act (ESA), those proposed or candidates for federal listing, and those species identified by the BLM State Director as sensitive.

A Biological Assessment (BA) for the Integrated Weed Management Project (Appendix G) has been prepared in cooperation with USFWS for a "not likely to adversely affect" determination for all ESA listed and proposed wildlife and plant species. Refer to the referenced BA in Appendix G for additional information regarding the 12 federally threatened, endangered, proposed, and candidate species (one plant, two mammals, three birds, two reptiles, and four fish) known to occur or potentially occur within the PDO project area that may be affected by the proposed action (Table 14).

3.8.1 BLM Sensitive Animals and Plants

In compliance with BLM Manual Section 6840, the BLM's State Director in cooperation with staff professional identified BLM sensitive plant species occurring on BLM-administered lands in Arizona. BLM Manual 6840, *Special Status Species Management*, requires that sensitive animal and plant species and their habitats be managed to promote their conservation and reduce the likelihood and need for listing these species in the future. Currently, there are 5 amphibians, 12 birds, 4 fish, 2 snails, 9 mammals, 1 reptile, and 5 sensitive plant species that occur in the PDO (Appendix B).

Twelve federally listed species (two mammals, three birds, and two reptiles, four fish, and one plant) occurs within the PDO project area. Seven of the species occur within the HFO and seven of the species occurs in the LFSO (Table 14). Both the Bald Eagle and Golden Eagle (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act.

Table 14. Federally-Listed, Proposed, Candidate, and Recently Delisted Wildlife Species and Critical Habitat or Proposed Critical Habitat Occurring within the Project Area that may be Affected by the Proposed Action.

Species	Federal Status	HFO	LSFO
Sonoran pronghorn *Antilocapra americana sonoriensis*	Endangered		X
Lesser long-nosed bat *Leptonycteris curasoae yerbabuenae*	Endangered		X
Birds			
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Endangered Designated Critical Habitat	X	X

Species	Federal Status	HFO	LSFO
Western Yellow-billed Cuckoo *Coccyzus americanus occidentalis*	Threatened Proposed Critical Habitat	X	X
Yuma Clapper Rail *Rallus longirostris yumanensis*	Endangered		X
Reptiles			
Sonoran Desert Tortoise *Gopherus agassizii*	Candidate	X	X
Northern Mexican gartersnake *Thamnophis eques megalops*	Threatened Proposed Critical Habitat	X	
Fish			
Desert pupfish *Cyprinodon macularius*	Endangered	X	
Gila chub *Gila intermedia*	Endangered Designated Critical Habitat	X	
Gila topminnow *Poeciliopsis occidentalis occidentalis*	Endangered	X	
Spikedace *Meda fulgida*	Endangered	--	
Plants			
Acuña Cactus *Echinomastus erectocentrus var. acunensis*	Endangered Proposed Critical Habitat		X

3.9 Native Vegetation

There are nine biotic communities within the PDO area (Brown 1994): AZ Upland and Lower Colorado River Sonoran Desert Scrub, Mohave Desert Scrub, Great Basin Desert Scrub, Great Basin Conifer Woodland, Interior Chaparral, Madrean Evergreen Woodland, Plains and Great Basin Grassland, and Semidesert Grassland. Plant communities in the PDO are highly variable, dependent on elevation, aspect, precipitation, and soil type. There are seven upland vegetation communities and one riparian plant community within the PDO area. The major vegetation communities are: mixed paloverde-cacti, creosote-bursage, evergreen sclerophyll (dry forests), pinyon-juniper, desert scrub grasslands, saltbush, and interior chaparral (BLM 2010a; BLM 1985). The riparian plant community is deciduous woodland, which may consist of mixed broadleaf, cottonwood-willow, mesquite, or conifer-oak communities. Vegetation descriptions were provided in Appendix J of the Proposed Bradshaw-Harquahala Resource Management Plan and Final Environmental Impact Statement (BLM 2010a).

3.10 Recreation

Recreational use of public land is a strong contributor to the quality of life enjoyed by local residents. A vast array of recreation opportunities exist in the PDO, such as, but not limited to, hiking/walking, off highway vehicle (OHV) driving, sightseeing, motorcycle/all-terrain vehicle (ATV) riding, camping, visiting cultural sites, picnicking, photography, wildlife and bird watching, horseback riding, and hunting. Recreational use of public lands varies across the PDO; certain areas experience very little use, while others receive high levels of use. Areas where recreation is one of the principal management objectives may be designated as Special Recreation Management Areas (SRMAs).

SRMAs in the PDO area include Upper Agua Fria River Basin, Castle Hot Springs, Hassayampa, Black Canyon, Ajo, Sentinel Plain, Gila Trails, Saddle Mountain, and Vulture.

In addition to SRMAs, Extensive Recreation Management Areas (ERMAs) exist where the area emphasizes traditional dispersed recreation use of public lands. ERMAs have an undeveloped character that allows visitors to escape crowds, rely on their own skills and equipment for recreational pursuits, and freedom from stricter regulations (BLM 1990).

The Recreation Opportunity Spectrum (ROS) is a classification system to help assure that people recreate in desirable settings and opportunities exist for a broad range of users. The ROS includes six recreation classes: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban.

The BLM issues Special Recreation Permits (SRPs) for commercial and competitive uses, organized group events and activities, and vending operations conducted on public lands. The permits can be for one-time events, such as an OHV race or horse ride, or for on-going commercial uses (e.g., OHV tours, mountain biking tours). The number and kind of SRPs fluctuates from year to year; however, the average number of permits per year is approximately 60.

3.11 Livestock Grazing

Approximately 3.9-million acres are open to livestock grazing within the PDO administrative boundaries. The area open to livestock grazing is divided into 187 livestock grazing allotments of which 159 are currently permitted for use and 28 are vacant. Of the 159 allotments permitted for use, 111 are within HFO administrative boundaries and 48 are within LSFO administrative boundaries. The livestock that graze within PDO administrative lands are mainly cattle but also include sheep, goats, and domestic horses. Grazing allotments are classified into three categories based on the availability of forage: 1) perennial, 2) perennial/ephemeral, or 3) ephemeral (BLM 2010a). The majority of the allotments within the HFO is perennial allotments and is operated yearlong with no increase in grazing during the summer months. Ephemeral and perennial/ephemeral allotments operate from late February to April; use is based on winter rains and annual vegetation production. Appendix F shows allotment names and numbers, permitted AUMs, and livestock numbers and types for the PDO area.

3.12 Cultural Resources and Native American Religious Concerns

The BLM is obligated to maintain, inventory, and manage against the destruction of cultural resources. Cultural resources include archaeological, historic, or architectural sites, structures, or places with historically significant values and uses, and may include locations of traditional cultural or religious importance to specific social or cultural groups. Cultural resources are managed according to their relative importance, to protect historically and culturally significant resources from inadvertent loss, destruction, or impairment, and to encourage and accommodate the appropriate uses of these resources through planning and public participation.

The BLM allocates prehistoric and historic sites to various use categories that include conservation for future use and traditional, public, scientific, and experimental uses. Factors threatening the historical integrity of cultural resources include disturbance or destruction by various development projects or land uses, natural erosion, route proliferation, and unauthorized excavation and artifact collecting by vandals or uninformed recreational users.

3.12.1 Cultural Resources in PDO

There are approximately 1,680 sites recorded in the PDO, according to current PDO records. At the time of the records review on AZSITE, approximately 1,506 previously recorded cultural sites had been recorded in the PDO. Out of the 1,506 previously recorded sites, 386 (25%) were recommended as eligible and 147 were recommended as ineligible for listing in the National Register of Historic Places (NRHP). There were no recommendations for 973 (65%) sites. Most of the sites found in the PDO are prehistoric, and when determined to be eligible for NRHP listing, it is typically under Criterion D—having the potential to yield information important to prehistory or history.

The temporal range of human occupation spans over 10,000 years in the PDO, and the variety and numbers of cultural properties reflects the wide range of environments and resources utilized over millennia of human occupation. Prehistoric site types include temporary and long-term residential, defensive, agricultural, resource procurement, trails, and rock art. Historic site types include residential, mining, agricultural, ranching, military, and historic roads, trails, and railroads. Table 16 lists the archaeological site types and time frames documented in the PDO.

Table 155. Age and Type of Cultural Properties in the PDO

Age	Number of Sites	Percentage of Total	Comments
Prehistoric	1109	73.64	12,000 BC to AD 1500
Historic	245	16.27	AD 1500 to 1950
Unknown	47	3.12	No Diagnostic information or not listed
Multicomponent	75	4.98	Historic and prehistoric elements
No Information	30	1.99	No information or no site card available

3.12.2 Site Disturbance

Archaeological surveys in the PDO are conducted prior to construction or other ground disturbing activities, land exchanges, or for resource management purposes. Surveys have shown that throughout the region, sites are located in prime resource areas, such as water and arable land, and in association with travel corridors. High site density exists along stream channels, flood plains, riparian zones and wetlands. Figure 3 presents archaeological site density in PDO-managed lands.

3.12.3 Archaeological Surveys

The total PDO acreage is 2,392,958 and the acreage of the archaeological surveys within the PDO is approximately 77,930; i.e., roughly 3.26 percent of PDO land has been surveyed for archaeological properties. Overall site density in the PDO equals 0.40 sites per square mile for all inventoried acres. The distribution of the recorded prehistoric sites is 0.00046 sites per every acre surveyed or 0.3 sites per square mile of inventoried acreage. The historic sites recorded in the PDO are distributed at 0.0001 sites per acre inventoried or 0.07 sites per square mile inventoried. In the LSFO, for example, available information indicates that four percent of the area has been surveyed, with 588 sites recorded, while six percent of the SDNM has been surveyed, with more than 300 sites recorded (site totals are from 2003). Densities of 5–15 archaeological sites per square mile are common. Based on this estimated site density, there could be up to 13,000 sites in the LSFO management area alone. Figure 4 presents areas where archaeological surveys have been conducted in the PDO, and conversely, areas with low survey data.

3.12.4 Tribal Consultation and Cultural Property Management

There are tribes that maintain ancestral claims or cultural affiliation with all or portions of the PDO: Salt River Pima-Maricopa Indian Community, Gila River Indian Community, Ak-Chin Indian Community, Tohono O'odham Indian Community, Yavapai-Apache Nation, the Yavapai-Prescott Indian Community, the Pascua Yaqui, the Mohave of the Colorado River Indian Reservation, the Zuni Tribe, and the Hopi Tribe. Locations that have been used repeatedly for resource procurement or other activities may have cultural significance for contemporary Native American communities. Likewise, certain sites or locations may hold significance for religious or ceremonial reasons and may require special care or even avoidance if weed treatments are recommended near them. Tribal consultation was initiated early in the planning process to determine whether places of cultural importance or religious significance are present in proposed weed management areas. SOPs in Appendix E will be followed to eliminate and/or minimize potential impacts.

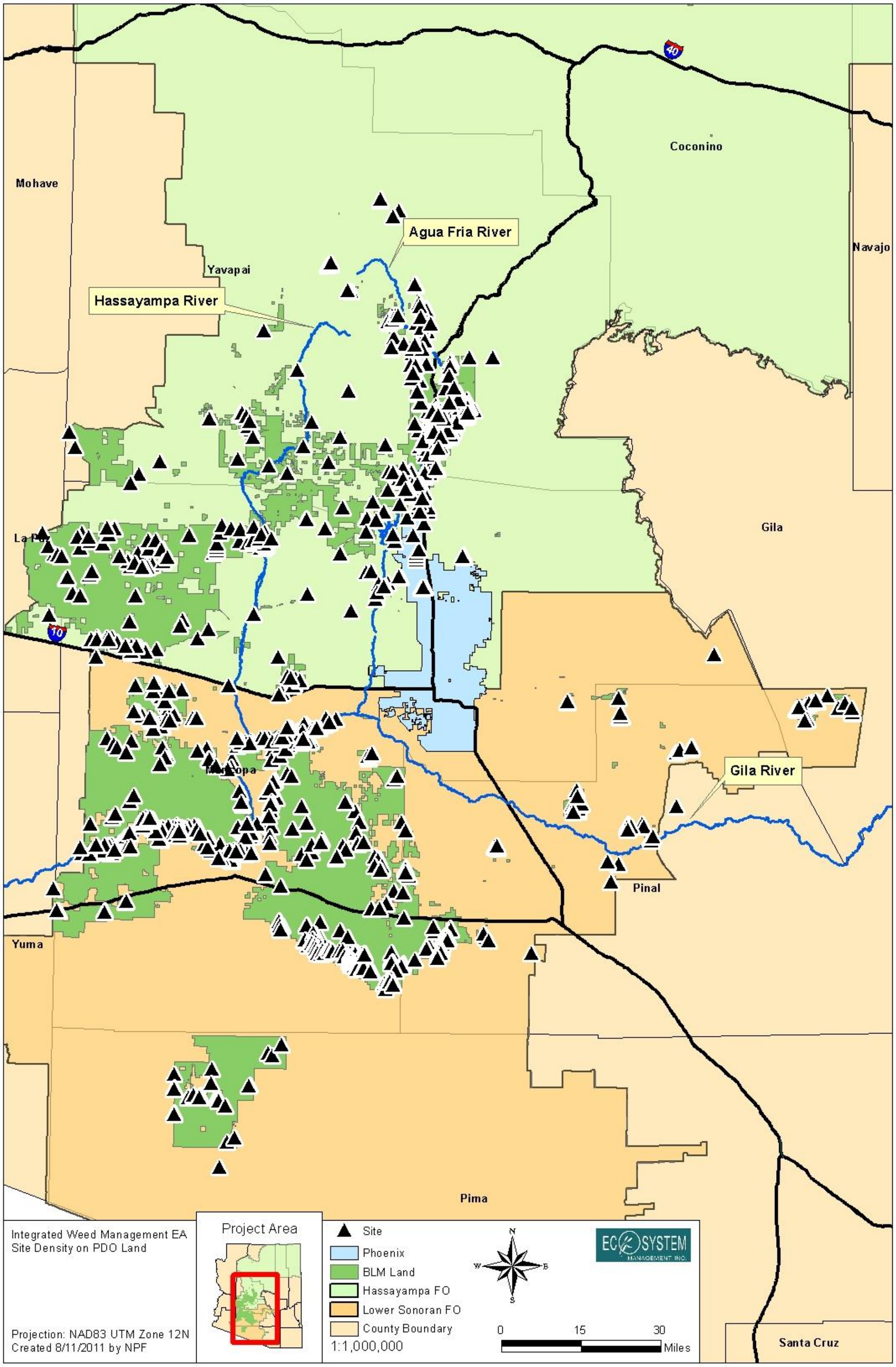

Figure 3. PDO Archaeological Site Distribution.

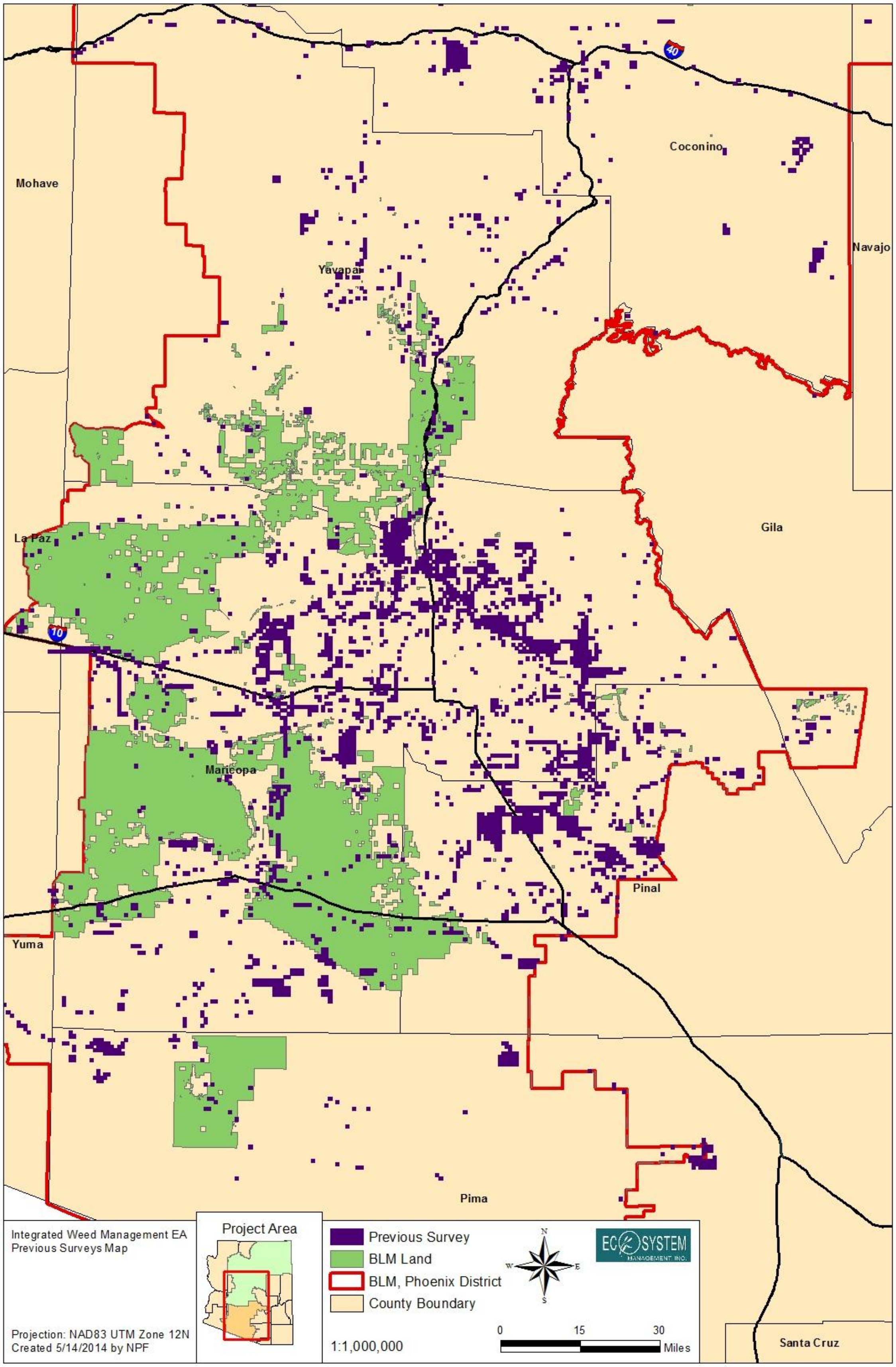

Figure 4. Archaeological Surveys within and near the PDO.

3.13 Soils

The PDO area falls within two major geologic provinces, the Basin and Range and the Colorado Plateau. In the Basin and Range province, the basins generally consist of surficial and sedimentary deposits. The mountain ranges consist of granitoid and metamorphic rock. The Colorado Plateau province consists of flat to gently rolling sedimentary rocks eroded into plateaus and dissected by deep canyons (Hendricks 1985). The soils in the PDO area are extremely diverse as a result of the variety of parent materials, slope, aspect, elevation, climate, and vegetation communities. There are 22 soil associations within the BLM-administered lands.

Soil textures within the PDO include cobbly, gravelly, sandy loam; clay loam; extremely gravelly sand; gravelly-sandy loam; loam; and fine-sandy loam. Sensitive soil surfaces—susceptible to wind and water erosion—erode easily and would regenerate slowly unless protected by desert pavement or well-developed biological soil crusts. Soil disturbance and compaction are present in long-term use areas such as livestock-congregation sites, roads, and parking areas.

Desert pavement consists of a dense layer of stones, sometimes coated with desert varnish and underlain by a porous, skeletal layer of silt or fine sand. If the protective surface layer is disturbed, the silt or fine sand layer could be easily displaced by wind or water.

Biological crusts have a significant influence on soil quality in the arid and semi-arid lands. Soil biological crusts are primarily located in creosote flats and low rainfall regimes with low vegetation cover throughout the LSFO. Biological crusts consist of a variety of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. They positively affect the soil environment by reducing erosion (both wind and water), fixing atmospheric nitrogen, retaining soil moisture, and providing a living organic surface mulch (Belnap et al. 2001). Biological crusts are susceptible to trampling and air pollution.

3.14 Bees and Pollinators (including apiaries)

Currently, there are eight permits for apiaries covering approximately 19 acres within the PDO area. Of the eight permits, there are 38 sites within the HFO and 26 sites within the LSFO (BLM LR2000 2011).

Pollinator-plant interactions include about 400,000 species, with the plant and pollinator relationship varying from dependence on a single species/pollinator to opportunistic pollination with various species pollinating a plant species. In the PDO, the managed honey bees, apiaries, are generalists, pollinating many flowering plant species, and can forage up to 8.5 miles from the colony (National Research Council 2007). Apiaries in the PDO are managed for honey production, but may also provide local ecological benefits to the surrounding vegetation. Honey bees promote increased genetic variability, which could help to facilitate resistance to pathogens and herbivores (National Research Council 2007).

3.15 Fire Management

The Phoenix District Fire Management program is divided into five fire management units (FMUs). Based on historical analysis, the PDO's length of fire season is 160 to 170 days (BLM 2013). PDO's FMUs include lands that are rated at Fire Regime Condition classes I, II, or III. The majority of the district falls within fire condition class I and II. Fire regime condition classes (FRCC) refer to the degree of departure from the natural fire regime and its subsequent effect on vegetation composition and structure on a landscape scale. An FRCC 1 is a low departure (< 33%; generally landscapes are within the historical ranges) and an FRCC 2 is a moderate departure (33–66%) from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances. The primary risk of wildfires is due to thick stands of salt cedar along riparian corridors, and fine fuel loading in other areas. Some burned areas are susceptible to noxious or non-native invasive weed infestations, depending on the proximity of existing weed infestations to the burned areas.

4.0 Environmental Consequences

This chapter describes the potential effects to the environment that could result from implementing the alternatives described in Chapter 2. For each alternative, the environmental effects are analyzed for the resource topics presented in Chapter 3 that were carried forward for analysis.

4.1 Air Quality

Direct and Indirect Effects of Alternative A—No Action

There would be no direct impacts on the existing air quality conditions because no IWM program methods would occur. No particulate matter would be produced and visibility would not be impaired.

Weeds would continue to be treated using manual hand pulling of small infestations (one acre or less) and would likely continue to expand at a faster rate than could be treated. This could result in increased hazardous fuel loads. Weed infestations contributing to hazardous fuel loads could increase the potential for intense wildfires that could consume more plant materials than historical wildfires that occurred under lower fuel load conditions. Wildfires would produce particulate matter emissions and impair visibility within and adjacent to the wildfire. The extent of particulate matter emissions would depend on the intensity and size of the wildfire and the season the wildfire occurred.

Direct and Indirect Effects of Alternative B—Proposed Action

Mechanical and Manual Treatments
Manual and mechanical treatments would have small, localized, and temporary impacts due to particulate matter associated with vehicle and equipment exhaust, and fugitive dust from driving on unpaved roads to treatment sites.

Biological Treatments
Biological treatments would have small, localized, and temporary impacts on air quality associated with animal generated odor and dust, vehicle exhaust used to transport animals, and fugitive dust from driving on unpaved roads to treatment sites.

Chemical Treatments
Herbicide treatment impacts originate from ground vehicle and aircraft exhaust and fugitive dust from driving on unpaved roads to treatment sites for herbicide application. Spray drift and volatilization (evaporation of liquid to gas) may temporarily result in herbicides in the air. SOPs would reduce the amount of drift into non-target areas and the amount of herbicide released into the air through volatilization.

Activity Fuel Disposal
Impacts on air quality from pile burning would be localized, short-term, and quickly dispersed throughout the immediate area. Smoke emission air pollutants include carbon dioxide, carbon monoxide, particulate matter, and VOCs. Carbon dioxide and water vapor make up the majority of emissions (about 90%) from prescribed fire (Prescribed Fire and Fire Effects Working Team 1985). The amount and duration of smoke impacts should be limited by conducting pile burning only during atmospheric conditions that are conducive to good smoke dispersion, by limiting the number of piles burned at one time, scheduling ignitions earlier in the day to allow for more complete combustion during daytime conditions, and planning the ignition during low wind conditions. These factors, combined with the mitigation measures (see Appendix E) would minimize the potential impacts.

Indirect effects would be a long-term decrease in fuel loading due to removal of woody overgrowth and other overabundant weeds contributing to fuel loads. Removal of these fuels would reduce the risk that a future intense wildfire would occur in the PDO. Overall, there would be a decrease in particulate matter emissions and the impairment of visibility from wildfires when they occur.

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under Alternative C, herbicides would not be used for vegetation management. Because there would be no associated emissions, herbicide treatments would not impact air quality. The impacts and effects for manual, mechanical, biological, and activity fuel disposal treatments are the same as the Proposed Action.

Cumulative Impacts

<u>Alternative A—No Action</u>
The No Action Alternative in combination with the past, present, and reasonably foreseeable future actions would have no measurable effect to air quality cumulative impacts because no integrated weed management activities would occur.

<u>Alternative B—Proposed Action</u>
Locally adverse and cumulative impacts to air quality could occur if prescribed burning of piles or other dust-emitting activities occurred in conjunction with on-going wildfires or other

prescribed burn activities, or any other dust-emitting activities within and adjacent to the PDO area such as off-road recreation, construction, and emissions from commercial and industrial developments. However, SOPs, conservation measures, and smoke management procedures and policies by the Arizona Department of Environmental Quality will be followed and should increase the efficiency and effectiveness of communications about, and coordination of, the proposed activities to avoid adverse cumulative effects.

Alternative C—No Herbicide Use
Cumulative impacts would be the same as the Proposed Action.

4.2 Special Management Areas

Direct and Indirect Effects of Alternative A—No Action

The spread of weeds would continue in special management areas (i.e., ACEC, wilderness areas, wild and scenic rivers, historic trails) and would continue to negatively impact the values these areas were designed to protect.

Indirect impacts from the continued increase of weed infestations could be increased hazardous fuel loads and altered fire regimes. Weed infestations contributing to hazardous fuel loads could increase the potential for more frequent, intense wildfires that could consume more plant materials than historical wildfires that occurred under lower fuel load conditions. Wildfires could remove large tracts of vegetation within special area designations, degrading values these areas were designed to protect. The extent of adverse impacts from a wildfire would depend on the intensity and size of the wildfire.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods
Weed treatments have the potential to impair values (e.g., cultural, wildlife, scenic, recreational) for which special management areas were designated or determined eligible. For example, weed treatments could temporarily displace wildlife within and near the treatment areas due to noise and vegetation removal. In the long-term, weed treatments would be beneficial as removal of invasive vegetation would protect and enhance the values for which special management areas were designated, such as rare and sensitive plant species and pristine vegetation communities. Furthermore, the overall health of special management areas would be improved, increasing activities that occur on them, increasing the quality and quantity of habitat and forage for wildlife and livestock, improving soil productivity, reducing the potential for soil erosion and adverse impacts on water quality, and improving riparian area function and values. All treatments would follow the SOPs in Appendix E to minimize potential impacts to special management areas.

Manual Treatments
Manual treatments would be used in the vicinity of sensitive plant species whenever feasible, and sensitive plant species threatened by weed invasion would be a treatment priority. Manual treatments involving digging out root systems could damage or kill non-target plants in close proximity as well as disturb soils. Weed control personnel could also damage or disturb non-target plants and soils. Impacts from manual treatments would be localized and short-term.

Mechanical Treatments

Mechanical treatment may be allowed within special management areas on a very limited number of sites, typically where no other method is feasible (e.g., tamarisk removal) or in areas where mechanical treatments have occurred in the past. The extent of impacts from mechanical treatments on other special management areas would depend on a number of factors, such as the vegetation type of the site, the condition of the site, and the particular unique quality of the site that requires special management. Mechanical treatments in areas managed primarily for recreational purposes (e.g., Juan Bautista de Anza NHT) would not likely degrade the quality of the special management area as long as recreational/interpretive assets (e.g., historical signs) are undisturbed. Overall, mechanical treatments would remove patches of vegetation, which could have a short-term, localized impact.

Indirect impacts would be long-term, beneficial impacts from restoring native plant communities, which should improve the quality of the natural conditions and values that special management areas were designated. Restoring native plant communities could improve habitat (e.g., federally listed species habitat) and reduce potential for severe wildfires by reducing fuel loads.

Biological Treatments

Introduction of grazers or switching species of grazer could adversely affect the unique/important values identified for the special management areas. Domesticated grazing animals could alter plant communities, facilitate expansion of weeds on their fur or through their feces, and/or potentially alter wildlife movements and use patterns in areas where grazing does not occur or did not occur historically. Experimental use of grazing animals would follow SOPs listed in Appendix E to minimize negative impacts to special management area values.

Chemical Treatments

Herbicide treatments could have short-term adverse impacts due to potential killing of non-target native vegetation through imprecise application and/or drift and altering habitat in small areas. The degree of potential effect would depend on the application method. Adhering to the SOPs listed in Appendix E, herbicide application would primarily be applied using ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. These spot applications would be less likely to cause adverse impacts than aerial applications. Indirect, long-term impacts would be beneficial and include the removal/control of weeds, reducing potential wildfire risks, and enhancing/restoring the native plant communities in portions of the special management areas.

Activity Fuel Disposal

Prescribed pile burning could have a range of effects depending on the fuel, size of the pile, weather conditions at the time of the fire, existing environmental conditions (soil and duff moisture, plant species under the pile). Plant species under the slash pile and in a small zone around each pile could be injured or killed. In the long-term, burn pile scars would re-vegetate with vegetation composition likely from surrounding plant species. Impacts to special management areas from burning of piles is expected to be negligible due to the limited size of prescribed pile burns and adherence to SOPs (Appendix E).

Direct and Indirect Effects of Alternative C—No Herbicide Use

Alternative C would have the benefit of protecting wilderness and special management areas, sensitive species, and other resources from accidental exposure to herbicides. However, if weed species are present, the overall health of the ecosystems in the special management areas could suffer. Weeds that have not been treated effectively using other treatment methods, such as Russian knapweed, Canada and Scotch thistles, and yellow star-thistle, would not be controlled under this alternative. An uncontrolled weed population may alter ecosystem processes and facilitate weed colonization, reduce productivity, promote soil erosion, and reduce quality of wildlife habitat and vegetation communities present. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
Past and present actions could have short-term, adverse impacts on special management areas. There would be no measurable cumulative effects to special management areas resulting from Alternative A.

Alternative B—Proposed Action
There would be short-term, localized, adverse impacts as well as long-term beneficial impacts to wilderness areas and other special management areas through implementation of the integrated weed management tools. The long-term improvement in ecosystem functions in wilderness and special management areas could offset the short-term, localized, adverse impacts. Alternative B in combination with the past, present, and reasonably foreseeable future actions would have a negligible contribution to cumulative impacts.

Alternative C—No Herbicide Use
Compared to Alternative B, this alternative may treat up to 500 acres less annually due to no herbicide treatments. Weed populations that are present could remain uncontrolled and alter ecosystem processes and facilitate weed colonization, reduce productivity, promote soil erosion, and reduce quality of wildlife habitat and vegetation communities present. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a negligible contribution to cumulative impacts.

4.3 Surface Water and Groundwater

Direct and Indirect Effects of Alternative A—No Action

The No Action Alternative would result in the least acres treated annually because of increased labor, time, and cost, associated with manual hand pulling of weeds; treatments would be less than one-acre areas. Salt cedar and other weeds would continue to expand along stream corridors, which could impact ground water levels and modify stream channels. Salt cedar has been shown to use more groundwater resources compared to native plant communities (DeLoach 1991, DeLoach et al 2001).

Indirect effects would be that fuel loadings—woody overgrowth and other over abundant fuels—would continue to increase and more intense wildfires could occur. Salt cedar stands burn more frequently than native mesic plant communities, which could kill and/or damage native vegetation (e.g., cottonwoods; DeLoach et al. 2001). The Gila River Corridor, which has dense salt cedar stands, has had three intense, wildfires in the past seven years. Wildfires, depending on the size and severity, could increase erosion and sediment runoff, resulting in degraded water quality and quantity.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods

The removal of vegetation could temporarily increase water quantity by altering the flow rates and frequency of peak flows. In addition, groundwater availability may improve in the short term, as water lost through evapotranspiration of plants would be reduced.

Vegetation removal by any of the weed treatment methods could cause short-term increases in surface runoff, which could lead to increased erosion and sedimentation. Increased erosion and sedimentation could reduce surface water quality. Increased nutrient flows to nearby stream corridors could also occur due to reduced nutrient uptake by plants (Binkley and Brown 1993).

By exposing more surface area of soil directly to rainfall, and increasing the overland flow of water into water bodies, removal of vegetation may result in decreased water storage capacity of the soil. Over the long term, overland flow could erode the topsoil and cut rills and gullies or deepen existing gullies, concentrating runoff. Reduced infiltration and increased runoff may decrease the recharge of the saturated zone and increase peak flow discharge. Thus, the amount of water retained in the watershed to sustain base flows could be reduced. Increases in streamflow could also lead to alterations in channel morphology. Accelerated runoff could thus cause unstable stream channels to downcut or erode laterally, accelerating erosion and sediment production.

Removal of streamside vegetation could also increase water temperatures resulting from the loss of stream shade. However, the removal of weeds along the stream corridors would reduce the hazardous fuel load, resulting in a beneficial, long-term impact to surface water quality by reducing the risk of more intense wildfires. Intense wildfires could remove most of the plant community, causing an increase in stream sedimentation and discharge (DeBano et al. 1998).

The long-term benefits of weed removal include reducing sedimentation, improving nutrient cycling, and returning the landscape to normal fire cycles (BLM 2007a). Because past fire suppression has radically altered vegetation structure and fuel loads, the risks for vegetation-replacing fires in areas that historically experienced lower intensity and lower frequency burns are more common.

Manual Treatments

Manual treatments would involve minimal soil disturbance or vegetation removal due to the small size of areas treated. Crews could trample individual, non-target plant species along stream corridors. Adverse impacts to surface water and groundwater resources would be short term and minimal as plant materials would remain in the treatment areas and exposed soil areas are not anticipated.

Mechanical Treatments
Impacts on water quality from mechanical treatments would depend on the technique used to remove the vegetation, the proximity of the treatment site to a stream or water body, and the slope of the site. Soil disturbance would occur from equipment used to grub, plow, scrape, or chain the treatment areas and from wheeled or tracked equipment creating ruts. This soil disturbance increases the likelihood of surface runoff (soils, plant materials) into nearby streams or water bodies. In addition, heavy equipment could compact soils, increasing the likelihood of surface runoff by reducing the infiltration capacity of soils. Risks to water quality associated with use of heavy machinery or mechanized equipment could occur from fuel leaks or spills. However, all refueling, oil changes, and lubrication of wheeled and tracked equipment (e.g., bulldozers, passenger vehicles) would be avoided in the field when possible; refueling would not occur near water bodies. All equipment would be checked daily for leaks and equipment with leaks would not be utilized.

Biological Treatments
Biological treatments using livestock could affect water quality and quantity depending on the duration and intensity of grazing and the location proximity to a water body. Grazers could affect surface runoff through trampling, soil disturbance, and soil compaction. Use of grazing animals would follow SOPs listed in Appendix E to minimize negative impacts to water quality and quantity.

Chemical Treatments
Herbicide use could indirectly affect surface water quality through drift, runoff, leaching into the soil, and misapplication/spills. Ground water could be affected only by leaching. Three factors that may contribute to herbicide drift are application technique, weather conditions, and applicator error. Terrestrial applications may also affect surface water and groundwater, primarily as a result of unintentional spills or movement of herbicides from upland sites into aquatic systems, as well as through additional sedimentation stemming from loss of vegetation cover. Herbicides that have low soil adsorption or high water solubility could leach into the groundwater.

The potential for water body contamination would be minimized by implementing buffers between treatment areas and sensitive water sources (Appendix E), unless the herbicide is approved for aquatic application as stated by the manufacturer and label application guidelines. Storm size, herbicide properties, soil properties, and downstream mixing and dilution also play a role in potential water body contaminations. If well-vegetated buffers are left between the sensitive water source and treatment site, they can intercept herbicides and reduce the potential for herbicides to reach surface water.

The four proposed active ingredients for herbicide use—2, 4-D (salt formulation), glyphosate, imazapyr, and triclopyr (triethyamine salt and a BEE formulations)—are approved for riparian and aquatic habitats (BLM 2007a). Negative impacts from herbicide treatments would be minimized by implementing the SOPs and mitigation/conservation measures listed in Appendix E. The aquatic labeled herbicides would not impact water quality if used according to label rates of application. Additionally, spot and localized applications of specific weed patches are less likely to result in drift because they are targeted to specific plants and less herbicide is applied.

Activity Fuel Disposal
Prescribed pile burns are unlikely to affect water quality or quantity because the potential to increase surface erosion is low due to the size of piles, the low to moderate intensity burns, and the buffer that would be placed around perennial and intermittent streams. Low severity burns are less likely to degrade surface water quality and quantity. Vegetation piles that burn at high intensities have the potential for temporary loss of soil fertility leading to lack of vegetation regrowth, causing localized erosion and loss of soil infiltration capacity. In the long term, the pile burn areas should re-colonized with native vegetation surrounding the area.

Direct and Indirect Effects of Alternative C—No Herbicide Use

Alternative C would protect water bodies from accidental exposure to herbicides. However, this alternative would have less impact on weeds than Alternative B due to the reduced acres treated annually and the increased labor, time, and cost associated with manual, mechanical, and biological control options. Consequently, weeds would continue to spread at a faster rate than under Alternative B and land degradation could accelerate, which could lead to reduced water quality. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

<u>Alternative A—No Action</u>
Past and present actions could have short-term, adverse impacts on surface and groundwater water quality. There would be no measurable cumulative effects to surface water and groundwater.

<u>Alternative B—Integrated Weed Management</u>
Alternative B could have short-term, localized, adverse impacts as well as long-term, beneficial impacts. Long-term, beneficial cumulative impacts would be due to the reduction or eradication of weeds, slower weed population spread, and more efficient control of weed infestations thus increased total native vegetation compared to existing conditions. In addition, new weeds that invade PDO from adjacent lands would likely be eradicated and invasion of adjacent lands by weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. Alternative B in combination with the past, present, and reasonably foreseeable future actions would have a negligible contribution to the cumulative adverse impacts.

<u>Alternative C—No Herbicide Use</u>
Alternative C would have short-term, localized adverse impacts as well as long-term, beneficial impacts to surface water and groundwater. There would be up to 500 less acres treated annually due to no herbicide treatments compared to Alternative B. Weed populations that are present in some areas could remain uncontrolled and alter ecosystem processes and facilitate weed colonization, reduce productivity, promote soil erosion, and reduce the quality of water. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a negligible contribution to cumulative impacts.

4.4 Wetlands/Riparian Zones

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, IWM program would not occur, thus no direct impacts to riparian and wetland areas. The No Action Alternative would result in the least acres treated annually because of increased labor, time, and cost, associated with manual hand pulling of weeds; treatments would be less than one-acre areas. Low-value, nonnative vegetation communities (e.g., salt cedar) would continue to persist and expand/ leading to a decline of wetland and riparian functions and values.

Indirect effects would be that fuel loadings—woody overgrowth and over abundant flammable weeds (tamarisk, red brome)—would continue to increase and more intense wildfires could occur. Wildfire impacts depending on the size and severity could increase sediment erosion and runoff, resulting in degraded functions and values of wetland and riparian zones and degraded water quality.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods

Vegetation removal by any of the weed treatment methods could cause short-term increases in surface runoff, which could lead to increased temperature, bank erosion, and sedimentation (Ott 2000). Rates of sedimentation and erosion would be influenced by precipitation events. Increased runoff from precipitation events could scour wetlands and modify their morphology. Sediment loads could also reduce the amount of sunlight available to plants, slowing or reducing plant growth. Increased temperature, erosion, and sedimentation would be reduced and/or eliminated once native vegetation re-established. Increased nutrient flows to nearby wetland/riparian zones could also occur due to reduced nutrient uptake by plants (Binkley and Brown 1993).

Wetland/riparian zones often have mixed vegetation communities of native species and weed species. Removal of weeds along the wetland/riparian banks would improve the health of the wetland/riparian vegetation communities, which improves bank stability, habitat values, and overall wetland and riparian functions. In addition, removal of weeds would reduce the hazardous fuel load, resulting in a beneficial, long-term impact by reducing the risk of more intense wildfires. Intense wildfires could remove most of the plant community, causing an increase in wetland/riparian sedimentation and discharge.

Long-term benefits would be increased vigor, diversity, and reproductive success of desirable species in riparian and wetland habitats, which would reduce erosion, slow the rate of storm-related runoff, improve bank stability, improve hydrologic function, and provide better cover, structural diversity, and food quantity and quality for a variety of wildlife.

Manual Treatments

Manual treatments would target small areas (100 acres or less) and would cause little soil disturbance or erosion. Individual plants could be directly killed or injured by treatment or trampling by crew personnel. Typically, manual treatments could remove weeds without disturbing the more desirable native species.

Mechanical Treatments

Mechanical treatment impacts would depend on the types and amounts of soil disturbance and vegetation removal, the proximity of the treatment to a wetland or riparian area, and the incidence of accidental spill. Impacts from using heavy machinery could cause soil compaction, which could lead to increased surface runoff from the surrounding treated areas. Compaction to soils could reduce water absorption capabilities, limiting water infiltration. The magnitude of effects would depend on the amount of soil compaction and precipitation events. Tracked equipment or low-pressure tires, which distribute the vehicle weight over a larger area, could minimize potential soil compaction. Soil disturbance from mechanical equipment could also increase erosion, degrading the wetland/riparian zone values (e.g., aquatic habitat). Mechanical treatments would follow SOPs listed in Appendix E to minimize impacts to riparian/wetland zones.

Mechanical treatments that uproot plants (e.g., chaining, tilling, grubbing, feller-bunching) may decrease slope stability in riparian areas. The root strength of plants in riparian areas, particularly trees and shrubs, contributes to slope stability. Therefore, the removal of roots may lead to increased incidence of erosion and debris slides and flows (Sidle et al. 1985). Substantial impacts would be most likely if woody vegetation on slopes directly adjacent to aquatic habitats were removed. Further from the water, where the contribution of root strength to maintaining bank integrity declines, effects would be proportionally less severe (National Fire Plan Technical Team 2002).

Biological Treatments

Biological control by domestic animals could cause mortality and injury to non-target riparian and wetland plants through browse and trampling and alteration of riparian channel/wetland morphology. The degree of effect to wetlands and riparian areas from treatments using domestic animals would be dependent on the timing, duration, and intensity of grazing. Use of grazing animals would follow SOPs listed in Appendix E to minimize negative impacts to riparian/wetland zones.

Chemical Treatments

Herbicide treatments could have short-term, adverse impacts on species diversity, competitive interactions, species dominance, and vegetation distribution due to potential killing of non-target vegetation through imprecise application and/or drift, surface water runoff, or erosion. Herbicides may indirectly or directly affect the survival, health, or reproduction of non-target wetland or riparian plants or may affect characteristics of these plant communities and their ecosystem functions. In particular, accidental spills near wetland and riparian zones could be particularly damaging to wetland and riparian vegetation. Risks to wetland and riparian non-target species would depend on a number of factors, including the amount, selectivity, and persistence of the herbicide used; the application method used; the timing of the application; and the plant species present.

Removal of weeds could temporarily reduce vegetation cover causing increased sedimentation, nutrient loading, and temperature, and changes to hydrologic conditions. Risks to wetlands and riparian areas from surface runoff would be influenced by precipitation rates, soil types, and proximity to the application area. The four proposed active herbicide ingredients—2, 4-D (salt formulation), glyphosate, imazapyr, and triclopyr (triethyamine salt and a BEE formulations)—

are approved for riparian and aquatic habitats (BLM 2007a). The aquatic labeled herbicides would not impact water quality if used according to label rates of application. Negative impacts from herbicide treatments would be minimized by implementing the SOPs and mitigation/conservation measures listed in Appendix E.

Activity Fuel Disposal
Prescribed pile burning following mechanical treatments are unlikely to impact wetland or riparian zones because the potential to increase surface erosion is low due to the size of piles, the low to moderate intensity burns, and the buffer that would be placed between piles and wetlands and riparian zones. Vegetation piles that burn at high intensities have the potential for temporary loss of soil fertility leading to lack of vegetation regrowth, causing localized erosion and loss of soil infiltration capacity. In the long term, the pile burn areas should re-colonized with native vegetation surrounding the area.

Rehabilitation and Revegetation
Rehabilitation through seeding and other revegetation and stabilization efforts would have negligible short term impacts due to the minimal activity associated with installation. Long-term impacts would be beneficial for wetlands and riparian zones due to accelerated establishment of vegetation and prevention of erosion.

Direct and Indirect Effects of Alternative C—No Herbicide Use

The potential risks to non-target riparian and wetland plants from accidental spills, drift, and persistence in the environment would be eliminated. However, this alternative would have less impact on weeds than Alternative B due to 500 acres less treated annually. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots (e.g., tamarisk, giant salvinia). Consequently, weeds could continue to spread at a faster rate, outcompeting native wetland and riparian species and contributing to the loss or decline in wetland and riparian functions and values. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to wetlands and riparian areas.

Alternative B—Integrated Weed Management
Alternative B would have the greatest long-term beneficial effects for riparian and wetland vegetation, treating the most acreage annually (1,500 acres) and most effectively. Short-term, adverse impacts would be greater under Alternative B compared to Alternative C, since it includes the use of herbicides with the risk of offsite drift. Alternative B in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to the cumulative short term adverse impacts and minor contribution to beneficial long term cumulative impacts.

Alternative C—No Herbicide Use

Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading wetland and riparian function and values is greater in Alternative C than under Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to the cumulative short term adverse impacts and minor contribution to beneficial long term cumulative impacts.

4.5 Migratory Birds

Direct and Indirect Effects of Alternative A—No Action

There would be no direct impacts to migratory birds under the No Action Alternative, as weeds would continue to be treated using manual hand pulling of small infestations (less than one acre areas). Indirect effects could consist of weeds continuing to expand at a faster rate than could be treated, which could result in weeds out competing native plant communities, reducing quality and quantity of habitat and forage for migratory birds, increasing the potential for soil erosion and adverse impacts on water quality, and degrading wetland and riparian functions and values.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods
Indirect effects would occur from the removal of vegetation, as seeds, berries, and other plant materials utilized as food could decrease in abundance. However, over the long term, effects of vegetation removal could be positive if the species composition of the area changed to favor species of greater food value. Indirect effects could also occur if prey items, such as insects, were affected.

All treatment methods would reduce weeds to varying degrees, allowing native species to increase in abundance, which would be expected to have a long-term positive effect on migratory bird habitat. Fuels reduction treatments, which would potentially reduce the risk of future severe wildfire, would also be likely to have a long-term positive effect on migratory bird species and their habitats.

Manual Treatments
Manual treatment impacts would be short-term and site-specific due to potential soil disturbance from weed removal and potential displacement of birds from the treatment areas due to human presence and noise from hand-held power tools (e.g., chainsaws).

Mechanical Treatments
Mechanical methods would temporarily reduce the vegetation cover in treatment areas with impacts lasting until re-vegetation of native forbs and grasses occurred. Loss of non-target plants used by migratory birds could occur. The extent of impacts would depend on the amount and type of vegetation removed. During mechanical treatments, the presence of crews and equipment could disrupt activities, such as foraging and breeding. However, these disturbances would be short-term and localized.

Biological Treatments

Use of domestic livestock could remove residual cover required by ground-nesting birds or alter species diversity and density in riparian habitats, making areas less suitable for migratory birds. Livestock could potentially harm or trample nests, eggs, and hatchlings.

Use of domestic animals to contain weeds may also indirectly affect habitat by improving conditions for nest parasitism by brown-headed cowbirds (Tibbits et al. 1994). Brown-headed cowbirds prefer bare ground and open areas, conditions that could be created by extensive grazing.

Use of grazing animals would follow SOPs listed in Appendix E to minimize negative impacts to migratory birds and their habitats.

Chemical Treatments

The presence of crews and the use of vehicles associated with herbicide applications may temporarily disturb nesting birds. The extent of impacts would depend on the season and the proximity to nesting birds. Although adult birds would be able to fly away from treatment sites, some birds could be inadvertently exposed to herbicides, as could nests, eggs, and young, flightless birds.

Herbicide treatments could have adverse health impacts on individual birds including death, damage to vital organs, change in body weight, decrease in healthy offspring, and increased susceptibility to predation. However, field studies suggest that appropriate herbicide use is not likely to have significant direct toxicological effects on wildlife (e.g., Cole et al. 1997, Sullivan et al. 1998). Under Alternative B, the four herbicides proposed for use—2,4-D, glyphosate, imazapyr, and triclopyr—could have negative health impacts on birds. Based on the ERAs (BLM 2007a) direct spray by 2, 4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate. Negative impacts could also result from touching plant materials sprayed by 2, 4-D at the typical application rate, or by glyphosate or triclopyr at the maximum application rate. Based on the results of the ERAs ingestion of invertebrates sprayed by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate, would also potentially result in negative health effects.

Indirect, adverse effects could occur if substantial habitat loss of vegetation occurred in suitable nesting habitats, particularly at nest sites. These effects would likely be short-term in nature. Indirect, long-term benefits from removal of weeds would include improvements in habitat and ecosystem function for all migratory birds and reducing the potential for intense, wildfires. SOPs and mitigation/conservation measures listed in Appendix E will be implemented to reduce negative impacts to migratory birds and their habitat.

Activity Fuel Disposal

Smoke associated with pile burning may cause nesting birds to leave their nests, which could reduce reproductive success. In addition, smoke could disturb individual birds and interfere with foraging activities. The adverse, short-term impacts associated with soil disturbance and habitat alteration would be offset by the long-term beneficial impacts of habitat improvement associated with restoring native plant communities and removing weeds.

Rehabilitation and Revegetation
Rehabilitation through seeding and other revegetation and stabilization efforts would have negligible short term impacts due to the minimal human activity associated with installation, which could disrupt activities such as foraging and breeding. Long-term impacts would be beneficial for migratory birds due to accelerated establishment of vegetation.

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under the No Herbicide Use alternative, migratory birds would not be exposed to herbicides and the associated potential impacts. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and causing further damage to susceptible native plant communities and migratory bird nesting and foraging habitat, particularly in areas where other treatment methods are infeasible or ineffective. This alternative would have less impact on weeds than Alternative B due to 500 acres treated less annually. The impacts and effects for manual, mechanical, and biological treatments are similar to Alternative B.

Cumulative Impacts

Alternative A—No Action
Past and present actions could have adverse impacts such as displacement of birds, loss of foraging or nesting habitat, or reduced air quality from wildfires on adjacent lands. There would be no measurable cumulative effects to migratory birds resulting from Alternative A. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for more frequent and intense wildfires that could remove large tracts of vegetation, reducing the quality and quantity of habitat available.

Alternative B—Integrated Weed Management
Alternative B would have the greatest long-term beneficial effects for migratory bird habitats, treating the most acreage annually (1,500 acres) and most effectively. Short-term, adverse impacts would be greater under Alternative B compared to Alternative C, since it includes the use of herbicides and their associated risks from drift and ingestion of invertebrates and touching plant materials exposed to herbicides. The cumulative long-term, beneficial impacts to improving migratory bird habitat and overall health of the lands should offset the short-term, adverse impacts. Alternative B in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus migratory bird habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.6 Wildlife (Terrestrial and Aquatic)

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling of less than one-acre infestations. Weeds would likely continue to expand at a faster rate than could be treated. This could result in altering the species composition and diversity of native plant communities, reduce quality and quantity of habitat and forage for wildlife species, increase the potential for soil erosion and adverse impacts on water quality, and cause degradation or loss of aquatic habitat.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods

Weed treatments could temporarily displace wildlife species from treatment areas due to removal of vegetation or associated human presence and noise. If surrounding habitats were already at or near capacity in the number of wildlife species they could support, displaced wildlife species may have lower productivity or die. Removal of vegetation in aquatic habitats could reduce vegetation cover along stream banks and wetland/riparian banks, which could increase water temperature and sedimentation. However, removal of weeds would likely have beneficial, long-term impacts by restoring native plant communities, thus restoring wildlife habitat. In addition, the removal of weeds could reduce the hazardous fuel loads from habitats, reducing the likelihood of future intense wildfires. Unplanned and uncontrolled fire could consume large tracts of wildlife habitat, having a negative effect on wildlife populations.

Manual Treatments

Human presence and noise from manual treatments could temporarily displace mobile wildlife species (e.g., deer, pronghorn) from the treatment areas and cause stress to wildlife species that are less mobile (e.g., rodents, lizards). These effects would be short-term and are not likely to adversely affect the long-term health and habitat use by wildlife in the treatment areas. Manual treatments would be most effective in sensitive areas, such as wetland and riparian habitat, as it has more control over vegetation impacts than other methods.

Mechanical Treatments

Noise associated to human presence and equipment may alter wildlife use of habitat or temporarily displace wildlife species during treatments. These impacts would be as described for manual treatments. Mechanical treatments could injure or kill non-target plants on the treatment site.

Biological Treatments

Using domestic livestock to control weeds could affect non-target plant species. Domestic livestock does allow for treatment of larger areas and may stimulate new growth of native plant species. If used in moderation, domestic livestock could alter the productivity and composition of plant communities to benefit wildlife habitat (Payne and Bryant 1998). Goats have been show to effectively control shrubs and in sensitive areas such as near streams and wetlands (BLM 2007a, 1991).

Over time, the species composition of the plant community would change as treated weeds die and native vegetation is restored. This would benefit species that favor native vegetation, but may temporarily adversely affect species that adapted to weed species (e.g., tamarisk used as a food source or nesting and foraging habitat). However, as invasive species are replaced by native species and the plant communities are reestablished, it is probable that the wildlife species adapted to weed species would use the restored native plant communities. Indirect impacts to wildlife from biological treatments would be beneficial and long-term as native plant communities are restored and hazardous fuel loads are reduced, making future intense, wildfires unlikely.

Chemical Treatments

Wildlife species may be harmed directly through contamination of food, water sources, habitat alteration, or direct contact. Use of timing restrictions would minimize impacts to wildlife. These timing restrictions would exclude treating during critical wildlife breeding or staging periods, including those for big game such as deer, bighorn sheep, and pronghorn. The SOPs, mitigation measures, and conservation measures (Appendix E) would be implemented to reduce potential adverse impacts.

Toxicological risks to terrestrial biological receptors of the four proposed BLM approved herbicides are listed in the Migratory Bird Section (Section 4.6). These results indicate a moderate risk from direct spray of 2, 4-D applied at a moderate rate and low risk from glyphosate and triclopyr applied at a low rate. Based on the ERA, there is low risk from contact of vegetation sprayed with 2, 4-D at the typical rate and a low risk from vegetation sprayed by glyphosate and triclopyr at maximum rates. Based on the results of the ERAs ingestion of invertebrates sprayed by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate, would also potentially result in negative health effects. Herbicides used properly or improperly could potentially harm wildlife individuals, populations, or species (US Forest Service 2005). Harm at the population or species level is unlikely for general wildlife species because of the size and distribution of treatment areas relative to the dispersal of wildlife populations and the foraging area and the behavior of individual animals. Negative impacts from herbicide treatments on wildlife species and habitat would be minimized by implementing the SOPs and mitigation/conservation measures listed in Appendix E.

Aquatic wildlife species could come into contact with herbicides if sprayed formulations were to enter water bodies during the application process through direct spray, accidental spray by terrestrial herbicides, or off-site drift or surface runoff of herbicides sprayed in upland habitats near water bodies. Herbicides could also enter aquatic habitats during an accidental spill before, during, or after the treatment. The four proposed herbicides—certain formulations of 2,4-D, glyphosate, imazapyr, and triclopyr—are approved for use in aquatic habitats. Furthermore, project specific provisions, which greatly reduce the potential for a chemical spill or use of inappropriate chemicals, are included as part of the weed spraying guidelines. If procedures are followed to prevent spills and direct spraying into fish bearing waters, herbicide use is anticipated to have little effect on aquatic species.

The potential affects to aquatic habitat from the drift of herbicides into water is also expected to be minimal because the chemical application requirements do not allow spraying under windy conditions and because of established buffers in sensitive riparian areas. This combined with the guidelines for the types of chemicals that may be applied within riparian areas is expected to prevent any direct, indirect or cumulative affects to aquatic resources or water quality from chemical drift.

Of the herbicides proposed for use, the following herbicides would potentially result in negative health effects to fish if sprayed directly into aquatic habitats: glyphosate and triclopyr BEE. Furthermore, the following herbicides would potentially result in negative health effects to aquatic invertebrates (a food source for fish species) if sprayed directly into aquatic habitats: glyphosate (the more toxic formulation) and triclopyr BEE.

In all other scenarios (including upland scenarios with 2,4-D, glyphosate, imazapyr, or triclopyr), negative health effects to fish species predicted by ERAs would result from accidental spray of terrestrial herbicides into bodies of water.

Indirect, adverse 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 reproduction; habitat and range disruption if treated areas are avoided due to habitat changes; and increase in predation due to loss of cover (EPA 1998b).

The extent of direct and indirect impacts to wildlife 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.

Long–term benefits would be habitat improvements of increased understory native grasses and forbs and smaller unbroken blocks of weed monocultures; decreased susceptibility to intense, wildfires; decreased to community replacing weed invasions; and increased native forage and cover.

Activity Fuel Disposal
Prescribed burning of piles is likely to create a temporary disturbance to any wildlife species that may be present, but should only last until prescribed burns are completed. Wildlife species with larger home ranges such as pronghorn and deer should not be impacted compared to passerine bird species and lizards. Removal of weeds would have beneficial, long-term impacts to wildlife habitats by restoring native plant communities (including forage plants), thinning vegetation, and reducing hazardous fuel loads.

Rehabilitation and Revegetation
Rehabilitation through seeding and other revegetation and stabilization efforts would have negligible short term impacts due to the minimal human activity associated with installation, which could disrupt activities such as foraging and breeding. Long-term impacts would be beneficial for wildlife due to accelerated establishment of vegetation and reduced erosion.

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under Alternative C, wildlife species would not be exposed to herbicides and the associated risks. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and cause further weed infestations of native plant communities and wildlife habitat, particularly in areas where other treatment methods are infeasible or ineffective. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
Past and present activities have impacted the general quality of aquatic habitat with reduced bank cover and stability, and increased instream sediment, which led to channel widening and decreased instream flows. There would be no measurable cumulative effects to wildlife and their habitat. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for more frequent and intense wildfires that could remove large tracts of vegetation, reducing the quality and quantity of habitat and forage available to wildlife species.

Alternative B—Proposed Action
Alternative B would have the greatest long-term beneficial effects for wildlife species and their habitats, treating the most acreage annually (1,500 acres) and most effectively. Alternative B would have adverse, short–term impacts to individual wildlife species due to displacement by treatment disturbance and potential reduction in forage provided by weed species. However, the long–term benefits would be an increase in native vegetation, as well as reduced the potential for intense wildfires because removing weeds could reduce hazardous fuels. Alternative B in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to beneficial cumulative impacts and a slight contribution to adverse cumulative impacts.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus wildlife habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.7 Special Status Species

4.7.1 Federally Listed Species

The effects of the Proposed Action on ESA listed and proposed species are analyzed in the Biological Assessment (BA) for the PDO Integrated Weed Management EA (Appendix G). This document was prepared in consultation with USFWS for a "not likely to adversely affect" determination for all ESA listed and proposed wildlife and plant species. Refer to the referenced BA for additional information regarding the federally threatened, endangered, proposed, and candidate species that were part of the ESA Section 7 consultation with the USFWS for this EA. The Sonoran desert tortoise, an ESA candidate species, was included in this BA and Section 7 consultation, and is included in this section of the EA. The BA includes species specific Conservation Measures that are incorporated as part of the Proposed Action where these species may be affected by the treatments. The effects of the No Action Alternative and No Herbicide Alternative are discussed below for each of the species that are included in the BA.

4.7.1.1 Plants – Acuña Cactus

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling of small infestations (one acre or less). Consequently, weeds would likely continue to expand at a faster rate than could be treated. This could result in changes to species composition, structure, and diversity of native plant communities, leading to reduced quality and quantity of habitat for acuña cactus, and increase the potential for soil erosion, for weeds to outcompete or threaten special status plant species, and for stand replacing wildfires.

Direct and Indirect Effects of Alternative B—Proposed Action

The direct and indirect effects of the Proposed Action on Acuna Cactus are included in the BA (Appendix G).

Direct and Indirect Effects of Alternative C—No Herbicide Use

Acuña cacti and its habitat would not be exposed to herbicides unless drift from treatments by other parties on adjacent non-BLM lands. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and cause further weed infestations of native plant communities and cacti habitat, and potentially outcompeting or threatening acuña cactus. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action

Past, present, and future activities occurring on non-federal lands adjacent to public lands could indirectly harm plant species. For example, herbicides applied to nearby agricultural lands or rangelands could drift onto public lands and harm federally listed plant species. In addition, there could be impacts to air and water quality from the spread of weeds or from wildfire associated with activities occurring off public lands. The No Action Alternative in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to adverse cumulative impacts.

Alternative B—Proposed Action

The Proposed Action alternative in conjunction with past, present, and foreseeable future actions could have short–term adverse impacts by reducing existing cover and forage, thus increasing the foraging pressure on individual federally listed plant species. However, the cumulative effects of weed treatments would result in long–term benefits to the acuña cactus because of a reduction or eradication of weeds, slower weed population spread, and less total weed infestations thus increased total native vegetation habitat compared to existing conditions. In addition, new weeds that invade PDO from adjacent lands would likely be eradicated and invasion of adjacent lands by weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for acuña cactus within and adjacent to BLM-administered lands in the PDO.

Alternative C—No Herbicide Use

Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus adverse impacts to acuña cactus habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.7.1.2 Wildlife – Sonoran pronghorn, lesser long-nosed bat, southwestern willow flycatcher, western yellow-billed cuckoo, Yuma clapper rail, northern Mexican gartersnake, Sonoran desert tortoise

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, manual hand pulling of small weed infestations (one acre or less in size) would continue. Consequently, weeds would continue to expand at a faster rate than could be treated. This could result in altering the species composition, structure, and diversity of native plant communities, thus reducing the quality and quantity of habitat and forage for wildlife species, increasing the potential for soil erosion and adverse impacts on water quality, and potential degradation or loss of aquatic habitat.

Direct and Indirect Effects of Alternative B—Proposed Action

The direct and indirect effects of the Proposed Action on federally listed wildlife species, and Sonoran desert tortoise, are included in the BA (Appendix G).

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under the No Herbicide Use alternative, federally listed wildlife species and their habitat would not be exposed to herbicides. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and causing further changes in species composition, structure, and diversity of native plant communities and habitat of federally listed wildlife. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
Past, present, and future activities occurring on non-federal lands adjacent to public lands could indirectly harm wildlife species. For example, herbicides applied to nearby agricultural lands or rangelands could drift onto public lands and harm federally listed wildlife species. In addition, there could be impacts to air and water quality from the spread of weeds or from wildfire associated with activities occurring off public lands. The No Action Alternative in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to adverse cumulative impacts.

Alternative B—Proposed Action
The Proposed Action alternative in conjunction with past, present, and foreseeable future actions would have short–term impacts to individuals due to displacement by treatment disturbance and potential reduction in forage and cover habitat for highly mobile species. Short-term, adverse impacts on federally listed wildlife species that are less mobile would be due to stress and disturbance and potential mortality to individuals. However, the cumulative effects of weed treatments would result in long–term benefits because of a reduction or eradication of weeds, slower weed population spread, and less total weed infestations thus increased total native vegetation compared to existing conditions. In addition, new weeds that invade PDO from adjacent lands would likely be eradicated and invasion of adjacent lands by weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for all federally listed wildlife species within and adjacent to BLM-administered lands within the PDO.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological

treatment methods. The risk of degrading native vegetation communities, thus federally listed animal species and their habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.7.1.3 Fish – desert pupfish, Gila chub, Gila topminnow, spikedace

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling. Consequently, weeds would likely continue to expand at a faster rate than could be treated. This could result in changes of species abundance, structure, and diversity of native riparian plant communities, thus reducing quality of habitat for federally listed fish species, and increasing the potential for soil erosion, adverse impacts on water quality, and potential for intense, large wildfires.

Direct and Indirect Effects of Alternative B—Proposed Action

The direct and indirect effects of the Proposed Action on federally listed fish species are included in the BA (Appendix G).

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under the No Herbicide Use alternative, special status fish species and their habitat would not be exposed to herbicides. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and causing further changes in species composition, structure, and diversity of native plant communities and habitat of federally listed fish. This would likely continue to degrade upland and riparian habitats important to the long-term sustainability and functionality of stream habitats and fisheries. In addition, some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

<u>Alternative A—No Action</u>
Past, present, and future livestock grazing on public lands could impact federally listed fish species and other aquatic organisms. Livestock could directly affect federally listed fish by trampling them, their eggs or pre-emergent larvae. Indirect effects could include erosion and degradation of water quality, loss of forage and cover, and removal of water in areas of heavy livestock use that could affect listed fishes and other aquatic organisms.

Fish species could be indirectly harmed by past, present, and future activities occurring on non-federal lands adjacent to public lands. For example, herbicides applied to nearby agricultural lands or rangelands could drift onto public lands and harm federally listed fish species. In addition, there could be impacts to air and water quality from the spread of weeds or from wildfire associated with activities occurring off public lands. The No Action Alternative in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to adverse cumulative impacts.

Alternative B—Proposed Action
The Proposed Action alternative in conjunction with past, present, and foreseeable future actions would have short–term increase in sediment and erosion to treated drainages caused by more intensive mechanical and chemical treatments. These areas would be subject to erosion until native vegetation becomes re-established, after which sediment and erosion to drainages should be less than existing conditions. However, the cumulative effects of weed treatments would result in long–term benefits to aquatic resources and habitats compared to existing conditions through control, eradication, and containment of weeds. This would result in slower weed population spread, and less total weed infestations thus increased total native vegetation compared to existing conditions. In addition, new weeds that invade PDO from adjacent lands would likely be eradicated and invasion of adjacent lands by weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for all federally listed wildlife species within and adjacent to BLM-administered lands within the PDO.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities (upland and riparian), thus federally listed fish species and their habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.7.2 BLM Sensitive Species

4.7.2.1 Plants

BLM sensitive plant species that may occur in the project area are included in Appendix B.

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling of small infestations (one acre or less). Consequently, weeds would likely continue to expand at a faster rate than could be treated. This could result in changes to species composition, structure, and diversity of native plant communities, leading to reduced quality and quantity of habitat for BLM sensitive plant species, and increase the potential for soil erosion, for weeds to outcompete or threaten sensitive plant species, and for stand replacing wildfires.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatments

All treatments could potentially trample BLM sensitive plant species, leading to mortality or injury of individuals. Conservation measures, SOPs and mitigation measures identified in this EA (Appendix E) and in the PEIS and PER would reduce the likelihood of sensitive plant species being impacted by vegetation treatments and non-federal activities on public lands.

Manual Treatments

Impacts associated with manual treatments are variable, but in general effects would be minimal because soil disturbance and risk of erosion would be minimal and limited areas for which this treatment is feasible. Individual plants could be directly killed or injured if accidentally removed during a treatment, or if vegetation piles were burned too close to BLM sensitive plants.

Removal of competing weeds could increase the health or vigor of existing populations, or increase the suitability of unoccupied sites. Removal of fuel sources would reduce the future risks of damaging wildfires. Soil disturbance and risks of erosion would be minimal, unless large areas were cleared of vegetation and debris, especially on steep slopes. There could be a slight increase in fire hazard after a manual treatment if plant materials were left on the ground in the treatment area. However, this increase would most likely be minimal and temporary.

Mechanical Treatments

Potential direct effects from mechanical treatments include injury or mortality to individual BLM sensitive plants or their seed banks. Plants removed by the roots would be unable to recover through resprouting or any other form of vegetative regrowth.

Removal of vegetation may potentially benefit sensitive plant populations by removing large tracts of weed species. This could increase the amount of water and nutrient resources available for the sensitive plants by improving the quality of habitat adjacent to existing habitat. This would also reduce the potential for future severe wild fires.

Activity Fuel Disposal

Direct mortality could also occur if vegetation piles were burned to close to sensitive plant species.

Biological Treatments

Direct effects of weed containment by domestic animals include mortality and injury through trampling and growth stimulation. The degree of effects would depend on timing, area, intensity, frequency, duration, and the species' tolerance to grazing.

Indirect impacts from using domestic animals could include soil compaction from trampling, increased soil erosion from loss of plant cover, and loss of biological soil crusts, which have an important role in hydrology and nutrient cycling. In addition, plant composition would change as the palatable species are consumed, eventually reducing them from the treatment site.

Chemical Treatments
Direct mortality could occur from trucks and/or ATVs used during ground applications. All of the herbicides analyzed in ERAs (BLM 2007a) would pose risks to terrestrial plant species as a result of exposure. Exposure includes direct spray of plants, drift, surface runoff, accidental spills, offsite drift, and wind transport of soils from treatment sites. Possible negative effects could include one or more of the following: mortality, loss of photosynthetic foliage, reduced vigor, abnormal growth, or reduced reproductive output. One or more of these effects, depending on its extent and severity, could result in the extirpation of a sensitive population. Less severe effects could reduce the size of a population further, reduce its ability to compete with other, more vigorous species, or increase its degree of fragmentation.

Based on the results of the ERAs, negative health effects to BLM sensitive plant species could occur if plants were directly sprayed by all herbicides proposed for use (see BA, Appendix C for more information). Non-target sensitive plant species could also be exposed to herbicides directly during off-site drift from a nearby treatment site. However, the application of SOPs to ensure that spraying does not occur under conditions favorable to drift and of conservation and mitigation measures to provide an adequate buffer between target and non-target areas is expected to minimize this risk (Appendix E).

Based on the ERAs, negative effects could also be possible as a result of surface runoff of imazapyr, or triclopyr under certain site conditions. In addition, since information for 2,4-D is unavailable, it is assumed that negative effects could occur as a result of runoff of these herbicides from an upslope application area under all site conditions.

Indirect effects from herbicide treatments could include altering the species composition of treated areas by eliminating or reducing weed species, thus increasing the nutrient and water resources available for sensitive plant species. Provided herbicide treatment programs were able to avoid negatively affecting sensitive plant populations on or near the treatment site, long-term benefits to these populations could occur.

Direct and Indirect Effects of Alternative C—No Herbicide Use

BLM sensitive plant species and their habitats would not be exposed to herbicides unless drift from treatments by other parties on adjacent non-BLM lands occurred. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and cause further weed infestations of native plant communities, and potentially outcompeting or threatening sensitve plant species. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
Past, present, and future activities occurring on non-federal lands adjacent to public lands could indirectly harm BLM sensitive plant species. For example, herbicides applied to nearby

agricultural lands or rangelands could drift onto public lands and harm sensitive plant species. In addition, there could be impacts to air and water quality from the spread of weeds or from wildfire associated with activities occurring off public lands. The No Action Alternative in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to adverse cumulative impacts.

Alternative B—Proposed Action
The Proposed Action alternative in conjunction with past, present, and foreseeable future actions could have short–term adverse impacts by reducing existing cover and forage, thus increasing the foraging pressure on BLM sensitive plants. However, the cumulative effects of weed treatments would result in long–term benefits because of a reduction or eradication of weeds, slower weed population spread, and less total weed infestations thus increased total native vegetation habitat compared to existing conditions. In addition, new weeds that invade PDO from adjacent lands would likely be eradicated and invasion of adjacent lands by weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for all sensitive plant species within and adjacent to BLM-administered lands in the PDO.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus BLM sensitive plant species habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.7.2.2 Wildlife

BLM sensitive wildlife species that may occur in the project area are included in Appendix B.

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, manual hand pulling of small weed infestations (one acre or less in size) would continue. Consequently, weeds would continue to expand at a faster rate than could be treated. This could result in altering the species composition, structure, and diversity of native plant communities, thus reducing the quality and quantity of habitat and forage for BLM sensitive wildlife species, increasing the potential for soil erosion and adverse impacts on water quality, and potential degradation or loss of aquatic habitat.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatments
All vegetation treatments should reduce the coverage of weed species would, which would have a beneficial effect on habitats of BLM sensitive wildlife species by likely improving foraging habitat quality for species and/or their prey. In addition, removal of weeds would likely have beneficial, long-term impacts by restoring native plant communities, thus restoring wildlife

habitat. In addition, the removal of weeds could reduce the hazardous fuel loads from habitats, reducing the likelihood of future intense wildfires.

Removal of vegetation from riparian areas would reduce the plant cover, which could increase water temperature and sedimentation, and reduce shelter (USFS 2000), potentially affecting aquatic species and their prey base. However, removal of weeds would promote establishment of native species and would reduce the risk of future catastrophic wildfires, resulting in positive long-term effects on habitat components.

Conservation measures, SOPs and mitigation measures identified in this EA (Appendix E) would reduce the likelihood of sensitive wildlife species being impacted by vegetation treatments.

Manual Treatments
There would be some disturbance associated with the presence of humans. However, these disturbances should be minimal and short-term in duration.

Mechanical Treatments
During mechanical treatments, the presence of humans and equipment in the area could create enough of a disturbance to disrupt activities such as breeding or feeding. However, these disturbances would be temporary and short-term. Smoke associated with pile burning may cause animals within the treatment area to leave their young or nests, which could reduce reproductive success. In addition, smoke could disturb individuals and interfere with foraging and other activities. Removal of vegetation would likely have some effects on habitat with the degree of impact dependent on the amount and types of vegetation removed.

Equipment used for mechanical treatments could potentially crush or injure individuals that are less mobile. Mechanical treatments would also be expected to increase the potential for erosion over the short term, resulting in some sediment inflow into aquatic habitats. This sediment could cause mortality by smothering eggs and inhibiting respiration in aquatic species.

Biological Treatments
The use of domestic animals could potentially harm or destroy nests, eggs, and nestlings and death or injury to small animals through trampling. Adverse impacts would depend on the mobility and size of the animal species, the length of the grazing treatment, and whether the domestic animals used would be likely to graze on important forage plants or other required habitat components.

Chemical Treatments
The presence of humans and equipment in the area could create enough of a disturbance to disrupt activities such as breeding or feeding. The use of vehicles associated with herbicide applications could crush individual that are less mobile. Some direct spray from herbicides could occur to these less mobile animals. Species directly sprayed could be negatively affected by dermal contact of vegetation or ingestion of vegetation that has been treated with herbicides. Some sensitive species may consume prey or vegetation that has been sprayed with herbicides. ERAs predicted that if bat species were to ingest plant materials sprayed by 2, 4-D at the typical application rate, or by glyphosate or triclopyr at the maximum application rate, negative health effects could potentially occur. According to the ERAs (BLM 2007a), birds that ate prey items

sprayed directly by glyphosate, triclopyr, imazapyr, or 2,4-D could potentially result in negative health effects depending on the application rate. Ingestion of invertebrate prey items that have been sprayed by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate could also result in negative health effects to reptile species.

Treatment with herbicides could result in a substantial, though temporary, reduction in vegetative cover, particularly if a site was broadcast sprayed with a broad-spectrum formulation. Such a loss of vegetation could indirectly impact BLM sensitive species by removing cover. However, other important components for cover, such as woody debris would be maintained, and could even increase in quantity. It is possible that prey items could also be reduced temporarily as a result of crushing, toxicity from spraying, or loss of habitat. However, long-term negative effects to habitat should not occur. Furthermore, treatments to reduce weed species could benefit sensitive wildlife species habitat by returning it to a more native state.

Overall, adverse effects to populations due to herbicide use are expected to be minor. Long–term benefits from removal of weeds would include improvements in habitat and ecosystem function for sensitive wildlife species. Negative impacts from herbicide treatments would be minimized by following the SOPs and mitigation/conservation measures for each listed species in Appendix E.

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under the No Herbicide Use alternative, BLM sensitive wildlife species and their habitats would not be exposed to herbicides. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and causing further changes in species composition, structure, and diversity of native plant communities and habitat of sensitive wildlife species. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

<u>Alternative A—No Action</u>
Past, present, and future activities occurring on non-federal lands adjacent to public lands could indirectly harm BLM sensitive wildlife species. For example, herbicides applied to nearby agricultural lands or rangelands could drift onto public lands and harm sensitive wildlife species. In addition, there could be impacts to air and water quality from the spread of weeds or from wildfire associated with activities occurring off public lands. The No Action Alternative in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to adverse cumulative impacts.

<u>Alternative B—Proposed Action</u>
The Proposed Action alternative in conjunction with past, present, and foreseeable future actions would have short–term impacts to individuals due to displacement by treatment disturbance and

potential reduction in forage and cover habitat for highly mobile species. Short-term, adverse impacts on BLM sensitive wildlife species that are less mobile would be due to stress and disturbance and potential mortality to individuals. However, the cumulative effects of weed treatments would result in long–term benefits because of a reduction or eradication of weeds, slower weed population spread, and less total weed infestations thus increased total native vegetation compared to existing conditions. In addition, new weeds that invade PDO from adjacent lands would likely be eradicated and invasion of adjacent lands by weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for sensitive wildlife species within and adjacent to BLM-administered lands within the PDO.

<u>Alternative C—No Herbicide Use</u>
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus BLM sensitive wildlife species and their habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.7.2.3 Fish

BLM sensitive fish species that may occur in the project area are included in Appendix B.

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling. Consequently, weeds would likely continue to expand at a faster rate than could be treated. This could result in changes of species abundance, structure, and diversity of native plant communities, thus reducing quality of habitat for BLM sensitive fish species, increasing the potential for soil erosion and adverse impacts on water quality due to the increased potential for intense, large wildfires.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods
Any of the treatment methods proposed under the Proposed Action, if applied in riparian areas, could reduce plant cover and shading of the stream, which could increase sedimentation and water temperature (USFS 2000). Riparian cover provides shade to aquatic habitats, which cools water temperatures, and reduces the extent of water temperature fluctuation. In addition, riparian vegetation stabilizes the soil on banks, preventing erosion and sedimentation into streams and other aquatic habitats, and intercepts rainfall to reduce overland flow.

The severity of the effects would vary by treatment method, location, the amount of plant material removed, and the distance from the aquatic habitat. Most of the effects would also be increased in severity if vegetation were removed prior to a period of heavy precipitation. Therefore, timing of the treatments is another important factor.

Over the long term, all treatment methods that remove non-native and competing vegetation are likely to have a beneficial effect on the fish habitat, by promoting growth and establishment of native plant species and reducing the potential for high intensity wildfire. High intensity wildfire has had severe impacts to native fish species and aquatic habitat (Gresswell 1999).

Conservation measures, SOPs and mitigation measures identified in this EA (Appendix E) would reduce the likelihood of fish species being impacted by vegetation treatments.

Manual Treatments

Direct effects to BLM sensitive fish species or their habitats are not anticipated to result from manual vegetation treatments. Burning slash piles after treatments has some potential for direct effects. Ash created by fire has been documented to have life-threatening effects on some species of fish (Agyagos et al. 2001). Mortality of fish and aquatic invertebrates has been reported following intense fires (Minshall and Bock 1991; Gresswell 1999). However, pile burning carried out as a result of the proposed action would cover a small, localized area. Also, pile burning would not take place near a stream or other water body, or within a riparian area.

Manual treatment methods are typically associated with minimal environmental impacts, and as such are often appropriate for sensitive habitats, such as riparian areas. Some soil disturbance would occur during the removal of plants from the soil, but it would not be widespread and should not have a major effect on aquatic habitats.

Mechanical Treatments

The use of mechanical equipment could potentially cause leaking of fuel directly into the water, which would decrease water quality. In addition, the use of heavy equipment in riparian areas could lead to bank collapse, which would also degrade riparian habitat. If vehicles were allowed directly into aquatic habitats, additional effects would be likely.

Mechanical treatments often disturb the soil during vegetation removal (e.g., chaining, tilling, and grubbing), increasing the potential for sediment transport into the stream. The closer these activities occur to the aquatic habitat, the greater their potential effect on BLM sensitive fish species therein. Soil disturbance also increases the likelihood that weeds will recolonize the site (Sheley et al. 1995). Therefore, reseeding or some other form of site restoration would reduce the likelihood that weeds will recolonize the site.

Apart from the removal of noxious weed species, mechanical treatment methods in riparian areas could have a long-term beneficial effect on aquatic habitats by reducing woody overgrowth and other overabundant fuels. Removal of these fuels would reduce the risk that a future stand-replacing or catastrophic wildfire would burn through riparian areas.

Biological Treatments

The potential direct effects of domestic animals on aquatic species and their habitats would minimal, provided the animals did not enter aquatic habitats. If animals were allowed to wallow and wade directly in the water, there could be some mortality or injury to BLM sensitive fish species, primarily eggs and pre-emergent fry due to trampling. The input of domestic animal feces into aquatic habitats also degrades water quality, which could negatively affect sensitive fish species.

Use of domestic animals to control weeds would cause disturbance to the soil, which could induce increased sedimentation. Grazing could also widen stream channels, promote incised channels, lower water tables, reduce pool frequency, and alter water quality (USFWS 1999b). The extent of these effects would vary depending on the number of animals used for the treatment, and the intensity and duration of the treatment. Under more intensive weed containment scenarios, mass erosion from trampling, sliding hooves, and streambank collapse could cause soils to move directly into the stream (USFS 2002). Undercut banks, which often provide shelter to fish species, could be damaged or collapse in grazed areas, thus decreasing the amount of available fish habitat. In addition, heavy trampling could cause soil compaction, which reduces the infiltration of overbank flows and precipitation into riparian soils.

Domestic animals could also degrade the quality of riparian and aquatic areas by facilitating the spread of weed species in these habitats. These animals could carry plant propagules on their hooves and in their fur, and could also release them in their feces.

Chemical Treatments

BLM sensitive fish species could potentially come into contact with herbicides if sprayed formulations were to enter aquatic habitats during the application process. Herbicides could enter waterbodies through direct spray of herbicides approved for use in aquatic habitats (i.e., certain formulations of 2,4-D, glyphosate, imazapyr, and triclopyr), accidental spray of the water by terrestrial herbicides, or off-site drift or surface runoff of herbicides sprayed in nearby upland habitats into aquatic habitats. Chemicals could also enter aquatic habitats during an accidental spill of herbicides before, during, or after the treatment. Sensitive fish species inhabiting water bodies exposed to herbicides would potentially come into contact with contaminated water. The potential risks to aquatic animals as a result of such direct contact with herbicides approved for use by the BLM were assessed in ERAs (BLM 2007a). However, project specific provisions, which greatly reduce the potential for a chemical spill or use of inappropriate chemicals, are included as part of the weed spraying guidelines. If procedures are followed to prevent spills and direct spraying of herbicides into fish bearing waters, the Proposed Action is anticipated to have little effect on federally listed fish species.

The potential affects to fish and fish habitat from the drift of herbicides into water is also expected to be minimal because the chemical application requirements do not allow spraying under windy conditions and because of established buffers in riparian areas. This combined with the guidelines for the types of chemicals that may be applied within riparian areas is expected to prevent any direct, indirect or cumulative affects to fisheries resources or water quality from chemical drift.

Of the herbicides proposed for use, the following herbicides would potentially result in negative health effects to fish if sprayed directly into aquatic habitats: glyphosate and triclopyr BEE. Furthermore, the following herbicides would potentially result in negative health effects to aquatic invertebrates (a food source for the federally listed fish species) if sprayed directly into aquatic habitats: glyphosate (the more toxic formulation) and triclopyr BEE.

In all other scenarios (including upland scenarios with 2,4-D, glyphosate, imazapyr, or triclopyr), negative health effects to fish species predicted by ERAs would result from accidental spray of terrestrial herbicides into bodies of water.

Herbicides that target aquatic and riparian vegetation may indirectly affect federally listed fish species by removing plants in or adjacent to aquatic habitats. However, herbicide applications often affect non-target vegetation in these habitats as well, some of which may provide necessary habitat components for sensitive fish species, such as cover and food.

Herbicide treatments could also reduce the number of invertebrates available. This could cause a short-term reduction in food availability.

Activity Fuel Disposal
Burning slash piles after treatments has some potential for direct effects. Ash created by fire has been documented to have life-threatening effects on some species of fish (Agyagos et al. 2001). Mortality of fish and aquatic invertebrates has been reported following intense fires (Minshall and Bock 1991; Gresswell 1999). However, pile burning carried out as a result of the proposed action would cover a small, localized area. In addition, pile burning would not take place near a stream or other water body, or within a riparian area.

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under the No Herbicide Use alternative, BLM sensitive fish species and their habitat would not be exposed to herbicides. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and causing further changes in species composition, structure, and diversity of native plant communities and habitat of sensitive fish. This would likely continue to degrade upland and riparian habitats important to the long-term sustainability and functionality of stream habitats and fisheries. In addition, some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
Past, present, and future livestock grazing on public lands could impact BLM sensitive fish species and other aquatic organisms. Livestock could directly affect sensitive fish species by trampling them, their eggs or pre-emergent larvae. Indirect effects could include erosion and degradation of water quality, loss of forage and cover, and removal of water in areas of heavy livestock use that could affect sensitive fishes and other aquatic organisms.

Fish species could be indirectly harmed by past, present, and future activities occurring on non-federal lands adjacent to public lands. For example, herbicides applied to nearby agricultural lands or rangelands could drift onto public lands and harm sensitive fish species. In addition, there could be impacts to air and water quality from the spread of weeds or from wildfire associated with activities occurring off public lands. The No Action Alternative in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to adverse cumulative impacts.

Alternative B—Proposed Action
The Proposed Action alternative in conjunction with past, present, and foreseeable future actions would have short–term increase in sediment and erosion to treated drainages caused by more intensive mechanical and chemical treatments. These areas would be subject to erosion until native vegetation becomes re-established. However, the cumulative effects of weed treatments would result in long–term benefits to aquatic resources and habitats compared to existing conditions through control, eradication, and containment of weeds. This would result in slower weed population spread, and less total weed infestations thus increased total native vegetation compared to existing conditions. In addition, new weeds that invade PDO from adjacent lands would likely be eradicated and invasion of adjacent lands by weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for BLM sensitive fish species within and adjacent to BLM-administered lands within the PDO.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities (upland and riparian), thus BLM sensitive fish species and their habitat is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.8 Native Vegetation

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling of small infestations (one acre or less) and would likely continue to expand at a faster rate than could be treated. This could result in reduced vigor and health of native plant communities as well as increased hazardous fuel loads. Weed infestations contributing to hazardous fuel loads would likely result in intense, larger wildfires that could consume more plant materials than historical wildfires that occurred under lower fuel load conditions.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods
All of the treatment methods have the potential to disturb native plant communities by damaging or killing non-target vegetation. However, treatment methods would also remove hazardous fuels, which should improve the health of native plant communities in which natural fire regimes have been altered.

Indirectly, the IWM program would have long-term, beneficial impacts to native plant communities by increasing the health and vigor of native plant communities, increasing desired native plant species for riparian and upland areas, reducing competition for resources with weeds, creating a more stratified age structure and abundance of native vegetation, increasing native plant diversity, and reducing fuel loads. The degree of beneficial impacts would depend on the amount of acres treated and the success of the treatments over both the short and long term.

Manual Treatments
Manual methods would use manual and hand-operated power tools to remove the entire plant and to minimize seed production. Direct impacts to vegetation could include trampling, damage, or removal of native plant species. There could also be the potential for spilling oil and fuels from hand-held equipment, which could kill or harm native plants. Indirect, adverse impacts could include replacement of weed species with other, more competitive weed species. Implementing the SOPs and mitigation measures (Appendix E) would reduce potential adverse impacts to native vegetation. Overall, adverse impacts would be short term and minimal.

Mechanical Treatments
Vehicles and equipment associated with mechanical treatments could transport seeds of weed species, injure, or kill non-target plants. Indirectly, mechanical treatments would have both short- and long-term beneficial impacts on native vegetation as ecosystem health would improve and abundance and diversity of native plant communities would improve. Removing weed infestations would reduce competition for light, nutrients, and water resources, which could enhance growth of herbaceous plants (Cox et al. 1982).

Biological Treatments
Biological control by domestic animals could lead to soil compaction from trampling, increased soil erosion from loss of plant cover, and loss of biological soil crusts, which have an important role in hydrology and nutrient cycling (Belnap et al. 2001). Impacts to non-target vegetation could occur from trampling or grazing by livestock. The extent of the effects would depend on the animal species used, the plant species' tolerance to grazing, management of the grazing system (e.g., timing, intensity, duration), and existing site conditions and disturbances.

Chemical Treatments
Herbicides could impact non-target plant species through drift, runoff, wind transport, or accidental spills and direct spraying. Possible adverse effects could include one or more of the following: mortality, loss of photosynthetic foliage, reduced vigor, abnormal growth, or reduced reproductive output. Potential adverse impacts would depend on the extent and method of treatment, soil types present, and weather conditions at time of application. However, implementing SOPs to ensure that spraying does not occur under conditions favorable to drift and of mitigation measures to provide an adequate buffer between target and non-target areas is expected to reduce potential adverse risks (Appendix E).

Indirectly, treatments would likely affect plant species composition of a treatment area and may or may not affect plant species diversity (BLM 2007a). Selective herbicides that target certain types of plants (for example, broadleaf species; 2,4-D) while leaving others such as grasses unaffected have the greatest potential to impact species composition, both positively and negatively. To minimize negative impacts, where necessary multiple herbicides should be used to prevent domination by undesirable species. Indirectly, the use of herbicides would benefit plant communities by decreasing the growth, seed production, and competitiveness of target weed plants, thereby releasing native species from competitive pressures (e.g., water, nutrient, and space availability) and aiding in the reestablishment of native species; BLM 2007a). The degree of beneficial impacts would depend on the toxicity of the herbicides to the target weed species, impacts to non-target plant species, and the success of the treatments.

The range of herbicides and herbicide types available to combat weed species present at the PDO would minimize the chance that weeds would become resistant to herbicides that are sprayed in the same location for repeated treatments. Weed resistance to herbicides could be minimized by using multiple herbicides with different sites of action in the same application, alternating herbicides with different sites of action each year, or alternating herbicide use with other effective forms of treatment (BLM 2007). Overall, this alternative provides the greatest likelihood of maintaining and possibly increasing the acreage of healthy rangeland within the PDO.

Activity Fuel Disposal
Prescribed pile burning following mechanical treatments could impact the vegetation under the piles and in a small zone around each pile. Impacts to vegetation around the pile would depend on factors related to how hot the pile burns, and if the fire creeps around in the ground fuels adjacent to the pile. Impacts to vegetation under the pile would depend on the environmental conditions present at the time of burning, such as soil and duff moisture, plant vigor, phonological state (e.g., dormant, flowering, seeding), and fire severity (Agee 1993, Smith and Fischer 1997). Prescribed pile burn areas should re-vegetate with a vegetation composition likely composed of species from the surrounding area. Prescribed pile burn areas that do not re-vegetate naturally, perhaps due to localized, more severe fire effects, would be vulnerable to weed invasion or expansion. If re-seeding of the area does not occur, then weeds could invade and out-compete native vegetation, altering plant community composition, structure, and function both in the present and future. Implementing SOPs, (i.e., monitoring; Appendix E) and reseeding areas that do not re-vegetate naturally would reduce potential adverse impacts.

Rehabilitation and Revegetation
Rehabilitation through seeding and other revegetation and stabilization efforts would have beneficial long-term impacts due to accelerated establishment of vegetation in treated areas and reduced erosion.

Direct and Indirect Effects of Alternative C—No Herbicide Use

This alternative would avoid the risks of adverse impacts to non-target plants from herbicide use. Although non-target species could still be affected by manual and biological controls, the negative impacts to non-target plants would likely be less severe and much more limited. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and cause further damage to susceptible native plant communities and habitat, particularly for species where other treatment methods are infeasible or ineffective. Weeds would continue to degrade native plant communities to a greater extent than the Proposed Action Alternative and would have less impact on weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to vegetation communities. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for more frequent and intense wildfires that could remove large tracts of vegetation, reducing the vigor and health of native plant communities.

Alternative B—Proposed Action
Alternative B would have the greatest long-term beneficial effects on native plant communities, treating the most acreage annually (1,500 acres) and most effectively reducing existing large or remote weed infestations. Alternative B could have adverse impacts to individual plant species due to injury or removal by treatment methods. However, the long–term benefits would be an increase in health and vigor of native vegetation, as well as reduced potential for frequent, intense wildfires as removal of weeds could restore species composition and structure of native plants and reduce hazardous fuels. Alternative B in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to beneficial cumulative impacts and a slight contribution to adverse cumulative impacts.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus overall ecosystem health is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.9 Recreation

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using hand pulling of areas one acre or less in size. Consequently, weeds would likely continue to expand at a faster rate than could be treated. This could result in replacement of native plant communities with weed species, which could degrade the recreation opportunity for activities dependent on healthy native plant populations, including wildlife viewing and hunting. Indirectly, increased weed infestations could contribute to the hazardous fuel loads and alter the fire regime, resulting in conditions more prone to intense, large wildfires and temporarily closing or reducing public use of these areas.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods

Treatment methods could result in temporary closures of treatment areas to recreational users from a few hours to days, depending on the treatment. These closures would be related to health and safety concerns (e.g., smoke, herbicides) and would be based on the specific treatment methods. There could also be short-term degradation to visual aesthetics of the treatment areas as well as noise from crews and equipment. However, the IWM program treatments would be distributed across the PDO affecting up to 1,500 acres annually (about 0.006% of PDO lands) and would not occur at the same time.

Indirect effects would occur from treatments restoring native plant communities, natural fire regimes, and ecosystem processes, which would be beneficial for recreation areas and recreationists. Over time, treatments would improve the aesthetic and visual qualities of recreation areas for recreationists, such as hikers, bikers, and horseback riders; improve desirability of campsites; and improve wildlife habitat for species sought by hunters and bird watchers. Reduction of weed infestations contributing to hazardous fuel loads would reduce the potential for intense, large wildfires that could remove large tracts of vegetation used for recreation.

Manual Treatments

Manual treatments are expected to have temporary adverse impacts from the presence of crews and noise from hand-held tools, such as chainsaws. These effects would be limited in extant and would only last as long as the treatments. The potential visual changes would be small in scale and would be less noticeable compared to other treatment methods. Manual treatments may not require any closures other than setbacks from areas of active weed-whacking or other methods that could represent a safety hazard in the immediate vicinity during the period of active treatment. Manual treatments could impact up to 500 acres annually (about 0.0002% of PDO lands) and treatments would be distribute throughout the PDO.

Mechanical Treatments

Mechanical treatments could require temporary closures of some treatment areas to recreational users. Low intensity treatments such as thinning would generally have less restricted areas to recreational users compared to mechanical treatments using chaining or plowing. Noise associated with mechanical treatments could also temporarily affect recreationists outside the immediate treatment area within hearing distance. The use of heavy machinery would disturb soils and remove tracts of vegetation from the landscape, which could impact use of recreational areas. The degree of adverse effects from mechanical treatments to recreation depends on how much vegetation would be removed and the rate of recovery of the treated area.

Biological Treatments

Domestic livestock could reduce weed vigor by removing aboveground biomass and/or seed heads, could also require temporary closures to prevent conflicts with recreational users. Closures that may be required would be short-term and restricted to the treatment area.

Chemical Treatments

Direct impacts to recreational opportunities would include temporary closures to treatment areas, changes to wildlife habitat (loss of edible plants and fruits on treatment sites), temporary degradation of visual resources, and potential contamination off-site due to herbicidal drift. Site closures would typically be short-term and would follow the recommendations on the herbicide label. In addition, signs stating the chemical used, the date of application, and a contact number for more information would be posted for at least 2 weeks following treatment. Herbicide treatments would temporarily reduce some recreational opportunities, such as bird watching, camping, and hunting. Health risks to recreational users are low for most of the herbicides approved for use on BLM lands, including inadvertent exposure to an herbicide mist or contact with freshly sprayed vegetation (BLM 2007a).

Indirect impacts would include long-term benefits to recreation areas from restored native plant communities and reduced hazardous fuel loads, which recreationists should enjoy and value over degraded recreation areas. Treated sites could become more desirable as destinations for recreational activities, making these areas more popular to recreational users.

Activity Fuel Disposal
Prescribed pile burning following mechanical treatments could impact the vegetation under the piles and in a small zone around each pile as described in Vegetation Communities (Section 4.8). Potential negative impacts to recreation areas include smoke impacts and removal of vegetation under the pile. The amount and duration of smoke impacts would be limited by conducting pile burns only during atmospheric conditions that are conducive to good smoke dispersion, limiting the number of piles burned at one time, and scheduling ignitions early in the day to allow for more complete combustion during daytime conditions. Implementing SOPs and mitigation measures would enable managers to plan and conduct prescribed pile burns would reduce the possibility of adverse impacts.

Direct and Indirect Effects of Alternative C—No Herbicide Use

This alternative would avoid the risks of adverse impacts to recreational areas from herbicide use. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and cause further weed infestations of native plant communities and wildlife habitat, particularly in areas where other treatment methods are infeasible or ineffective. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. The likely increase in weed infestations could result in the degradation of the quality of the recreation area and associated recreation opportunities, especially activities dependent on healthy native plant populations, such as wildlife viewing, hunting, and wildflower viewing. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to recreation resources. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the

potential for more frequent and intense wildfires that could remove vegetation, degrading recreation areas visually for visitors and temporarily closing some areas.

Alternative B—Proposed Action

The Proposed Action could have short-term adverse impacts due to temporary closures and potential noise associated with treatments. Long-term benefits to recreational values would occur from restoring native plant communities, natural fire regime, and ecosystem processes. Alternative B in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to beneficial cumulative impacts and a slight contribution to adverse cumulative impacts.

Alternative C—No Herbicide Use

Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus recreational areas dependent on healthy native plant populations is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.10 Livestock Grazing

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling on infestations one acre or less in size. Consequently, weeds would likely continue to expand at a faster rate than could be treated. This could result in reduced vigor and health of native plant communities, reduce quality and quantity of foraging habitat for livestock, and increased potential for weeds to outcompete native plant species, and increased hazardous fuel load. Weed infestations could reduce the AUMs available for domestic livestock, which tend to avoid most weeds (Olson 1999).

Indirect impacts could include increased potential for intense, large wildfires due to increased weed species that are more prone to frequent wildfire regimes and increasing the hazardous fuel loads. Intense, large wildfires could consume large tracts of vegetation, which would reduce the available forage for livestock. Annual brome species, such as red brome, promote intense wildfires in spring when native perennial grasses are more susceptible to burning, thereby creating conditions favorable to red brome to replace native plant species as the dominant. Red brome creates fuels conducive to shorter frequency for wildfires compared to the natural fire regime native plants have evolved, thus allowing annual grass species such as red brome to dominate.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods

All treatments should reduce the amount of weeds on rangelands, which would benefit livestock by increasing the number of acres suitable for grazing and the quality of forage. The level of benefit would depend on the amount of weeds successfully removed and replaced by native vegetation.

Indirect effects would occur from treatments restoring native plant communities, increasing desired native plant species for grazing, reducing hazardous fuel loads, and reducing potential for frequent, intense wildfires. These effects would increase the quality and quantity of forage available for livestock and would improve the overall health of rangelands. Reduction of weed infestations contributing to hazardous fuel loads would reduce the potential for intense, large wildfires that could remove large tracts of vegetation used as foraging habitat by livestock. The degree of beneficial impacts would depend on the amount of acres treated and the success of the treatments over both the short and long term.

Manual Treatments

Manual treatments would have minimal effects on livestock and their forage because manual treatments would target the removal of undesirable species but would not affect desirable native species. Cattle in particular, preferentially graze native plant species over weeds, which often have low palatability because of toxins, spines, and /or distasteful compounds (Young 1992). Manual treatments would result in beneficial impacts to rangeland management as the quality and quantity of forage habitat increases from restoration of native plant communities.

Mechanical Treatments

Mechanical treatments could temporarily reduce the quantity of forage available for livestock on the treatments site. Treatments that remove plants and their roots, such as chaining, would more likely reduce the amount of forage available than treatments that cut plants at their base. Reduced forage amounts should last until re-growth of native vegetation. Equipment used to conduct mechanical treatments could compact soils, creating bare ground, or removing non-target, native plant species. Indirect, adverse impacts could include replacement of weed species with other, more competitive weed species. All treatments would implement the SOPs and mitigation measures in Appendix E, which would reduce adverse impacts to livestock and their forage.

Beneficial impacts would occur from removal of weeds, which could reduce competition and overstory vegetation of grasses suitable for foraging, thus grass production would be enhanced.

Biological Treatments

Use of domestic animals to manage weeds could affect the livestock that regularly graze on the treatment area. When managed improperly, these animals could compete for the same forage resources as domestic livestock. When managed properly, it has been demonstrated that the use of sheep and goats to manage weeds has improved the conditions of the range, opening up infested sites for grass regrowth, thus providing additional forage for authorized livestock grazing (BLM 2007b).

Chemical Treatments
Direct impacts to livestock could include consumption of contaminated vegetation and temporary loss of available forage in treated areas. Livestock that primarily consumes grass have a greater risk because likelihood for herbicide residue is higher for grass than other plants (Fletcher et al. 1994, Pfleeger et al. 1996). Exposure to harmful doses of herbicide would be unlikely, since animals would be removed from the area if there was a chance they could be harmed by an herbicide, as required by the label instructions. In addition, spot treatment applications, following application rates on the herbicide labels, would reduce potential adverse impacts of residual herbicides on suitable grasses for foraging. Implementing herbicide use strategies for treatment areas on rangelands would also reduce potential adverse impacts to livestock. The extent of adverse impacts to livestock would depend on size of the treatments on grazing allotments, timing of treatments, method of treatments (aerial, spot), and sensitivity to the herbicide used.

Adverse impacts to range operations could include a temporary closure of the treatment area, which would require alternative grazing sites for livestock normally using the treated area. Temporary closures would follow the timeframe as directed on herbicide labels. To reduce adverse impacts to range operations treatments could be scheduled to occur when livestock are not present, following the re-entry timeframe specified on the herbicide label. Herbicide treatments could occur on 500 acres annually throughout the PDO; this could impact up to 0.00013% of the 3.9-million acres that are open to livestock grazing.

Indirect impacts would be beneficial with both short- and long-term benefits due to increased forage quality. Removing weeds would also decrease hazardous fuel loads in treated areas, thus decreasing the potential for intense, large wildfires.

Activity Fuel Disposal
Prescribed pile burning of vegetation should have negligible impacts to livestock and available forage due to limited size and scattered nature of the treatments. A temporary closure of the treatment area may be required, which could require alternative grazing sites for livestock normally using the treated area. Prescribed pile burn areas should re-vegetate with a vegetation composition likely composed of species from the surrounding area. Prescribed pile burn areas that do not re-vegetate naturally, perhaps due to localized, more severe fire effects, would be vulnerable to weed invasion or expansion. If re-seeding of the area does not occur, then weeds could invade and out-compete native vegetation, altering plant community composition, structure, and function both in the present and future. Implementing SOPs, (i.e., monitoring; Appendix E) and reseeding areas that do not re-vegetate naturally would reduce potential adverse impacts.

Direct and Indirect Effects of Alternative C—No Herbicide Use

This alternative would avoid the risks of adverse impacts to non-target plants from herbicide use and would not expose livestock to herbicides. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and cause further damage to native plant communities, including rangeland that provides forage for livestock, particularly in areas where other treatment methods are infeasible or ineffective. Weed infestations could increase to the point that unpalatable species dominate the grazing areas, and reduces the AUMs for livestock. This alternative would likely have less impact on weeds than Alternative B, the Proposed Action. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to rangeland management. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for more frequent and intense wildfires that could remove vegetation, including forage for livestock. Replacement of native plant communities with weed species also reduces the overall health of the rangeland and AUMs available for livestock.

Alternative B—Proposed Action
Treatments under the Proposed Action Alternative would have short-term, adverse impacts due to temporary reduction of the quantity of forage available for livestock. In the long-term, these IWM program actions would assist with maintaining and improving the overall rangeland health, including increasing native grasses for livestock grazing and reducing potential for frequent, intense wildfires.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities, thus available forage and health of rangelands (i.e., healthy native plant populations) is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to cumulative adverse impacts and minor contribution to beneficial cumulative impacts.

4.11 Cultural Resources and Native American Concerns

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling of one acre or less infestations. Weeds would likely continue to expand at a faster rate than could be treated. Continued weed expansion would result in increased densities and distribution of weeds, soil erosion, reduced shading, changes in soil pH, and reduce quality forage and cover for wildlife culturally significant to indigenous people. Increased soil erosion from weed expansion could cause artifacts to become exposed, leading to looting or displacement; losing their context. The direct loss of cultural resources due to erosion and exposure as well as replacement of native species would occur over the long-term. As weeds spread and replace native populations, plants available for use by Native Americans for traditional Native American uses would also be reduced.

The continued expansion of weeds could also increase the hazardous fuel loads within and near cultural resources. This would increase the potential for intense, large wildfires that could remove large tracts of vegetation, including plants culturally significant to the traditional users. Wildfires could also cause discoloration of surface artifacts, burning perishable materials, checkering or cracking of glass and ceramic artifacts, spalling of stone, and melting of metals (Ryan et al. 2012). Archeomagnetic dates and pollen counts could also be altered from a severe, high intensity wildfire. Impacts from a wildfire would depend on the timing, location, intensity, and extent of the wildfire and the mitigation efforts that could be implemented.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to all Treatments
Ground disturbing activities from treatment methods could potentially disturb or destroy unidentified cultural resources on or near the ground surface. Cultural resource inventories of the treatment area would precede management actions that could damage cultural resources or impact culturally significant plants.

Removal of weeds and weed infestations could reduce hazardous fuel loads within and near cultural resources, which would reduce the likelihood of future intense wildfires. Wildfires could remove large tracts of vegetation and the IWM program would help to ensure the long-term protection of cultural resources and improve the overall ecosystem health benefitting plants and animals that are culturally significant to the traditional users.

Locations of Traditional Cultural Properties (TCPs), such as traditional plant gathering areas, are generally not known by BLM or discussed with anyone outside of the affected indigenous community but may be present in the PDO. There may be impacts from vegetation treatments on broader tribal uses of natural resources. Specific vegetation treatment proposals would follow standard procedures for identifying cultural resources, in compliance with Section 106 of the National Historic Preservation Act (NHPA), as implemented through the Protocol for Managing Cultural Resources on Lands Administered by the Bureau of Land Management in Arizona (1984). Consultation with the Tribal leadership will identify and address early in the NEPA process, whether tribes wish to be notified regarding when or where treatments will occur.

Manual Treatments
The use of hand tools and hand-operated power tools to cut or clear vegetation could disturb and/or displace both surface and subsurface cultural resources. With avoidance of known cultural resources and implementation of the SOPs impacts would be reduced or eliminated.

Mechanical Treatments
Mechanical treatments could result in soil displacement, impacting depositional context and integrity, or artifact damage or destruction. Treatments involving surface and shallow subsurface disturbance could introduce organic materials to lower soil layers, thus contaminating surface or shallow subsurface cultural resources containing datable organics—wood, charcoal, preserved plant material, pollen. Mechanical treatments could also displace cultural resources, horizontally or vertically, contained in the upper portions of the soils, compromising the depositional context and integrity, or artifact damage or destruction.

Biological Treatments
Biological agents are not expected to affect cultural resources, as APHIS permits use of biological agents following testing to ensure that biological agents are host-specific and do not affect non-target plant species, including culturally significant native plants. Biological treatments using domestic animals could damage surface artifacts and disrupt surface and shallow subsurface cultural materials. However, pretreatment site-specific investigations and development of measures to discourage livestock from using sensitive areas would decrease this possibility. In addition, consultation with Native American tribes would be undertaken to locate any areas of vegetation of significance to tribes that could be affected by biological treatments.

Chemical Treatments
Herbicide treatments are more likely to have adverse effects on traditional cultural practices of gathering plant foods or materials important to local tribes or groups. Herbicides could harm plants used by Native Americans and could affect the health of the people who gather, handle or ingest recently treated plants, or animals contaminated by herbicides. Since traditionally gathered plants and animals may occur near vegetation treatment areas, drift from herbicide treatments may occur in areas utilized by Native Americans. There could be short-term impacts to traditional cultural uses due to loss of access during treatment. Vehicles taken off-road to apply chemicals may also cause damage to cultural sites. The impacts from use of herbicides would depend on the method of application and the herbicide used. However, pretreatment site-specific investigations and development of measures to reduce herbicide drift would decrease this possibility. In addition to the SOPs, not exceeding the typical application rate when applying 2,4-D and triclopyr in known traditional use areas could be used to reduce or eliminate potential adverse impacts to cultural resources.

There would be indirect, long-term benefits associated with enhancing culturally significant plant and animal habitat as well as improving vegetation cover on eroding archaeological sites. However, herbicide treatments would benefit traditional gathering areas as displacement of native vegetation by weeds is controlled.

Activity Fuel Disposal
Prescribed pile burns following mechanical treatments are not expected to impact cultural resources as they would not occur on or near known cultural resources. A buffer would be placed around all cultural resources to avoid potential impacts.

Direct and Indirect Effects of Alternative C—No Herbicide Use

Although this alternative would eliminate associated risks to cultural resources from herbicide use, weeds would likely continue to spread, possibly increasing erosion rates, and cause further damage to native plant communities, particularly in areas where other treatment methods are infeasible or ineffective. Some areas may not be treated and some weeds and larger infestations would not be controlled and/or eradicated using other treatment methods (manual, mechanical, biological) because they resprout from rhizomes or roots. Increased soil erosion could cause artifacts to become exposed on the surface, increasing potential for looting or displacement; losing their context. The loss of cultural resources could also occur over the long-term from replacement of native species. If weed infestations replace native plant populations, plants that have traditional lifeway values to Native Americans could be reduced or overtaken. Altering native plant communities could impact wildlife habitat quality, which could also reduce wildlife species that have traditional lifeway values. Alternative C would have less impact on weeds compared to Alternative B due to 500 acres would be treated less annually and inefficiency for treating some weeds without the use of herbicides. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to cultural resources from the No Action Alternative. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for more frequent and intense wildfires that could remove vegetation, including plants culturally significant to the indigenous people. Intense wildfires could also have adverse impacts to cultural resources, such as discoloration of artifacts, and exposing more artifacts on the surface. Continued weed expansion of areas with tamarisk could increase the potential for flood risks of first and second terraces along rivers, where cultural sites are typically located.

Alternative B—Propose Action
The Proposed Action would not contribute to cumulative impacts on known cultural resources because site locations are known and would be flagged for avoidance. Treatments could affect unknown cultural resources by soil displacement, impacting depositional context and integrity, or artifact damage or destruction. To avoid impacts to traditional use areas, BLM has consulted with interested tribes in the planning process to locate vegetation and areas of significance to them. Alternative B in combination with the past, present, and reasonably foreseeable future actions would have a negligible contribution to adverse cumulative impacts as well as a minor contribution to beneficial cumulative impacts.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities (changing structure and species composition), thus increasing potential for frequent, intense, large wildfires is greater in Alternative C compared to Alternative B. Frequent, intense wildfires could remove large tracts of native vegetation used for traditional uses and could adversely impact cultural resources, such as discoloration of artifacts and increased erosion that could expose more artifacts on the surface. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to adverse cumulative impacts and a minor contribution to beneficial cumulative impacts.

4.12 Soils

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling of infestations one acre or less in size. Consequently, weeds would continue to expand at a faster rate than could be treated. This could result in changes to species composition and structure of natural plant communities, alter the fire behavior (e.g., frequency), increase the potential for soil erosion and compaction, and change soil composition. Weed infestations can indirectly affect native plants communities by altering soil stability, promoting erosion, colonizing open substrates, affecting the accumulation of litter, salt, or other soil resources (Brooks et al. 2004).

Changes to species composition and structure of native plant communities that could alter the fire behavior to more frequent and intense wildfires would result in wildfires that could consume large tracts of vegetation. The indirect impacts due to increased potential for intense fire effects on soil, include physical alteration of soil structure and development of hydrophobic layers, and damage to nutrient and biotic soil characteristics. Overall soil impacts would depend on the timing, location, intensity, and extent of the wildfire.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to all Treatments

An integrated weed control program could potentially affect soils by altering their physical, chemical, and/or biological properties. Changes could include loss of soil through erosion due to short-term removal of vegetative cover or changes in soil structure, porosity, or organic matter content. Whether such changes are beneficial or harmful would depend on the method of treatment, the soil type, and in some cases (e.g., tamarisk) the weed species being treated. However, the large majority of soil impacts resulting from the Proposed Action are expected to be beneficial; these would include the return of more stable soils, attenuated nutrient cycling, and a return to normal fire cycles (BLM 2007a).

Manual Treatments

Manual treatments would have short-term soil disturbing impacts limited to the area once occupied by the target species. Limiting the number of people and the amount of time spent in each site would help minimize trampling (Tu et al. 2001). Removing the target species would have substantial positive long term impacts to soils. The increased organic matter caused initially by leaves, stems and roots of the treated plants and secondarily by the increased production of grasses and forbs would improve the fertility of the soil.

Mechanical Treatments

Mechanical treatments would cause soil disturbance and compaction due to heavy equipment. Soil compaction could reduce water infiltration capability of soils, soil aeration, and root penetration. The magnitude of soil compaction would depend on the soil texture and the type and weight of the equipment used. Tracked or low-pressure tired equipment reduces the pressure on soil compared to conventional tires.

Mechanical treatments such as balding, chaining, or tilling, would disturb soil through removing topsoil, which could degrade soil quality and function and increase the potential for both wind and water erosion. The fungal component and other microorganisms of the soil community could also decrease or disappear. Microorganisms and fungi help to convert plant and animal materials into nutrients for the soil and aide in other soil processes.

Biological soil crusts that help to reduce erosion, fix atmospheric nitrogen, retain soil moisture, and provide mulch as a living organic surface (Belanp et al. 2001) could be removed or destroyed. This could adversely affect soils by increasing the potential to erosion, weed establishment, and reducing nitrogen inputs and water infiltration. Removing weeds could be beneficial to biological soil crusts that are being shaded out or buried by weed infestations.

Soils could also be contaminated by oils and fuels associated with mechanical equipment. However, implementing BMPs, such as not fueling or servicing equipment in the field and cleaning up spills immediately, would reduce potential impacts to soils by petroleum products. Implementing the SOPs would minimize soil disturbance and prohibit potentially adverse impacts in areas identified by resource specialists as containing highly erodible soils.

Biological Treatments

The use of domestic animals could cause soil disturbance and compaction, increasing the potential to both wind and water erosion; alter the nutrient cycle by depositing organic urine from feces; or damage biological soil crusts at treatment sites. However, implementing the SOPS in addition to limiting the number and amount of time animals remain on a site and using fences and supplemental nutrition (salt blocks) to restrict livestock to treatment areas would reduce potential adverse impacts to soils.

Chemical Treatments

Herbicides may affect soils through increased erosion as vegetation is removed and there is less plant material to intercept precipitation and less to contribute to organic matter that protects soils from erosion. The increased potential for erosion would be temporary lasting until vegetation was reestablished. Re-establishing the native plant community could improve soil stability compared to sites dominated by weed species.

Herbicide applications may result in contact with soils, either intentionally for systemic treatments, or unintentionally as spills, overspray, drift, or windblown dust. Contact may also occur as a result of herbicide transport through plants to their roots where herbicide may be released into the soil (BLM 2007a). The treatment method with the greatest potential for adverse short-term effects on soils is herbicide use on dense monotypic stands leading to substantial loss of vegetation cover. Two of the proposed herbicides, 2, 4-D and glyphosate are relatively non-persistent in soil (BLM 2007a). Impacts from herbicides would depend on the herbicide used and method of application. Following the SOPs and mitigation measures in Appendix E and the herbicide label directions would minimize potential soil contamination.

Activity Fuel Disposal

Prescribed pile burning would impact soils, primarily as a result of removing the protective surface layer and organic matter in the soils. Soils under the pile could be exposed to greater soil heating in the B horizon causing localized soil sterilization and potentially creating hydrophobic characteristics in that layer. The impacts to soils would depend on duration and intensity of burning materials and the soil and fuel moisture content at the time of burning. However, prescribed pile burning would be designed for low to moderate intensity fires that should not adversely affect the B horizon or sterilize the soils. Prescribed burning of the piles could temporarily increase nutrients from burned vegetative material (Rau et al. 2008) into the soil under the pile. Potential increased erosion rom wind and water would last until re-vegetation of the pile burn area occurred. Prescribed pile burn areas should re-vegetate with a vegetation composition likely composed of species from the surrounding area. Implementing SOPs, (i.e., monitoring; Appendix E) and reseeding areas that do not re-vegetate naturally would reduce potential adverse impacts.

Rehabilitation and Revegetation
Rehabilitation through seeding and other revegetation and stabilization efforts would have negligible short term impacts due to the minimal human activity associated with installation, which could cause minimal soil compaction or disturbance. Long-term impacts would be beneficial for soils due to accelerated establishment of vegetation and reduced erosion.

Direct and Indirect Effects of Alternative C—No Herbicide Use

In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, which could cause adverse effects to soil quality from changes in organic matter content, diversity and abundance of soil organisms, and nutrient and water availability. Increased weed abundance could cause changes in species composition and abundance of native plant communities, altering the fuel properties and subsequently fire behavior. Long-term, adverse impacts could be reduced soil productivity due to soil sterilization from wildfire destroying the microbial populations and seeds stored in the soils and potentially creating hydrophobic characteristics in that layer. Impacts from wildfires would depend on the duration and intensity of burning materials and the soil and fuel moisture content at the time of burning. Alternative C would have less impact on weeds than Alternative B due to 500 acres treated less annually and inefficiency for treating some weeds. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to soils. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for more frequent and intense wildfires that could remove vegetation leaving bare ground exposed and vulnerable to erosion. Changing species composition could also alter soil stability in general.

Alternative B—Proposed Action
The potential adverse effects to soils from the Proposed Action are small in comparison to the potential effects of weeds themselves and other influences. In the long-term, restoration of healthy native plant communities would have beneficial impacts on soils due to increased soil stability and reduced potential for frequent, intense wildfires in treatment areas. Alternative B in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to adverse cumulative impacts and a minor contribution to beneficial cumulative impacts.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities (changing structure and

species composition), thus increasing potential for frequent, intense, large wildfires is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to adverse cumulative impacts and a minor contribution to beneficial cumulative impacts.

4.13 Bees and Pollinators (Includes Apiaries)

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, weeds would continue to be treated using manual hand pulling of one acre or less infestations. Consequently, weeds would likely continue to expand at a faster rate than could be treated. Replacement of native plant communities with weeds would reduce available food sources for bees, which could reduce the health of individuals or colonies. Changes in structure and species composition of native plant communities could alter the fire regimes to more frequent and intense wildfires. More frequent and intense wildfires could remove large tracts of native plants used as food sources for bees and could kill entire hives.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods
Commercial activities, including apiaries, could be adversely impacted by IWM treatments in the short term by temporarily reducing site access during treatments.

Indirect effects would occur from treatments restoring native plant communities, increasing desired native plant species for pollinators, and reducing hazardous fuel loads. These effects would increase the quality and quantity of food sources available for bees and would improve the overall health of the ecosystem. Reduction of weed infestations contributing to hazardous fuel loads would reduce the potential for intense, large wildfires that could remove large tracts of vegetation used as foraging habitat by bees. The degree of beneficial impacts would depend on the amount of acres treated and the success of the treatments over both the short and long term.

Manual and Mechanical Treatments
Manual and mechanical treatments should have negligible impacts to existing apiaries because they would remove target weed species and would not impact native plant food sources or hives. Short-term effects could occur from temporary displacement or avoidance of treated areas while vegetation crews are present and temporary access closures to beekeepers. Long-term benefits would be the restoration of native plant communities, which could increase food source plants and densities.

Biological Treatments
The use of domestic livestock would not likely affect bees or their hives as interactions between bees and livestock are not expected. Indirectly, domestic animals could reduce native plants that provide food for bees. However, implementing the SOPS in addition to limiting the number and amount of time animals remain on a site and using fences and supplemental nutrition (salt blocks) to restrict livestock to treatment areas would reduce potential adverse impacts to apiaries.

Chemical Treatments
Herbicides could cause damage or kill existing hives if proper mitigation measures were not followed. Prior to herbicide treatments any managed apiaries in the vicinity would be notified in advance to allow time for removal or protection measures of the hives. Buffer zones would also be implemented for existing hives to reduce potential adverse impacts. In addition, treatments would be delayed during peak flowering of plant sources to minimize any short-term adverse impacts to bees and their hives. Treatments could also be conducted during early morning or evening when bees are not as active.

Herbicide treatments could adversely impact bees and their hives through drift, runoff, wind transport, or accidental spills and direct spraying. Possible negative effects could include one or more of the following: mortality, damage to vital organs, change in body weight, decrease in healthy offspring, and increased susceptibility to predation. Potential adverse impacts would depend on the herbicide used and the method of application (aerial, spot). Implementing SOPs to ensure that spraying does not occur under conditions favorable to drift, providing adequate buffers between target and non-target areas, and following herbicide labels for rate of application is expected to minimize potential adverse impacts (Appendix E).

Direct and Indirect Effects of Alternative C—No Herbicide Use

Under this alternative, bees and their food sources would not be exposed to herbicides. In the absence of herbicide treatments, weeds would likely continue to spread, possibly at increasing rates, and cause further damage to native plant communities, particularly in areas where other treatment methods are infeasible or ineffective. This could lead to reduced plant food sources for bees, and to increased risk of severe wildfires, which could kill entire hives and remove large tracts of native plants that are a primary food source. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to existing land use. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for more frequent and intense wildfires that could remove vegetation, thus reducing available forage plants for bees and/or could destroy hives.

Alternative B—Proposed Action
Alternative B would have the greatest long-term beneficial effects on native plant communities, treating the most acreage annually (1,500 acres) and most effectively (e.g., reducing existing large or remote weed infestations). Alternative B could have adverse impacts to individual plant species due to injury or removal by treatment methods. However, the long–term benefits would be an increase in health and vigor of native food source plants and reduced potential for frequent, intense wildfires as removal of weeds could restore species composition and structure of native plants and reduce hazardous fuels. Alternative B in combination with the past, present, and reasonably foreseeable future actions could have a minor contribution to beneficial cumulative impacts and a slight contribution to adverse cumulative impacts.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities (changing structure and species composition), thus increasing potential for altering fire regimes and intense, large wildfires is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to adverse cumulative impacts and a minor contribution to beneficial cumulative impacts.

4.14 Fire Management

Direct and Indirect Effects of Alternative A—No Action

Under the No Action Alternative, small weed infestations of one acre or less would continue to be treated using manual hand pulling. Weeds would likely continue to expand at a faster rate than could be treated. This could result in changes in species composition and density of native plant communities. Changes in species composition and abundance of native plant communities could cause a change in fuel properties, which could affect fire behavior and alter fire regime characteristics such as frequency, intensity, extent, type, and seasonality of fire. For example, salt cedar stands burn more frequently than native plant communities (DeLoach et al. 2001); salt cedar is the dominant species along the Gila River corridor, which has had three intense, wildfires in the past seven years. In addition, Red brome and/or buffelgrass infestations have also been shown to increase wildfire frequency and extent, which decreases native species abundance and diversity (Brooks et al. 2004, Gill et al. 1990). If the fire regime changes subsequently promote the dominance of weeds, then an invasive plant–fire regime cycle could be established. As more ecosystem components and interactions are altered, restoration of native plant communities becomes more difficult. Restoration may require managing fuel conditions, fire regimes, native plant communities, and other ecosystem properties in addition to weed expansion that caused the changes.

Direct and Indirect Effects of Alternative B—Proposed Action

Common to All Treatment Methods
Using an IWM approach—manual, mechanical, biological, and chemical treatments—to control/eradicate weed infestations would allow restoration of native plant communities and the natural fire regime. In general, treatments would have short-term adverse effects and long-term beneficial effects on fire management resources. The short-term, adverse effects (potential for new weed infestations) that could result from vegetation removal would last until the regrowth of native vegetation on the treatment sites occurred.

Indirect impacts would be long-term and beneficial to fire management resources. All treatment methods would reduce and/or eradicate existing weed infestations, thus reducing hazardous fuel loads at the treatment sites. Reducing the hazardous fuel loads could reduce the severity of future wildfires (e.g., rate of spread, extant, intensity) as well as fire frequency.

Direct and Indirect Effects of Alternative C—No Herbicide Use

This alternative would not allow use of herbicides for the IWM program on about 500 acres/year. This alternative could have less impact on weeds than Alternative B due to the reduced acres treated annually and the increased labor, time, and cost associated with manual, mechanical, and biological control options. Consequently, weeds could continue to spread at a faster rate than under Alternative B and land degradation could accelerate, which could lead to increased hazardous fuel loads. Potential increased hazardous fuel loads would likely continue to increase fire frequency in areas as well as the extent, fire intensity, and rate of spread, thus altering the fire regime. The impacts and effects for manual, mechanical, and biological treatments are the same as Alternative B.

Cumulative Impacts

Alternative A—No Action
There would be no measurable cumulative effects to fire management resources. However, weeds and infestations would likely continue to increase at rates faster than could be treated. The potential for changing species composition and structure of native plant communities could increase the potential for altering fire regimes to more frequent and intense wildfires.

Alternative B—Proposed Action
The Proposed Action Alternative would have long-term beneficial impacts to fire management resources. Reducing weed accumulations (i.e., hazardous fuel accumulations) would restore native plant communities and natural fire regimes. This would improve the overall health of public lands, increasing activities that occur on them, quality and quantity of habitat and forage for wildlife and livestock, improving soil productivity, reducing the potential for soil erosion and adverse impacts on water quality, and improving riparian area function and values. Alternative B in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to adverse cumulative impacts and a minor contribution to beneficial cumulative impacts.

Alternative C—No Herbicide Use
Alternative C would have greater adverse impacts compared to Alternative B because weeds would most likely spread faster. Lack of herbicide use would make control of some weeds and larger infestations difficult or ineffective due to limitations of manual, mechanical, or biological treatment methods. The risk of degrading native vegetation communities and increasing hazardous fuel loads, thus increasing potential for altering fire regimes and intense, large wildfires is greater in Alternative C compared to Alternative B. Alternative C in combination with the past, present, and reasonably foreseeable future actions would have a slight contribution to adverse cumulative impacts and a minor contribution to beneficial cumulative impacts.

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APPENDIX A. Arizona State and BLM National List of Weeds

PROHIBITED:
The following noxious weeds (includes, plants, stolons, rhizomes, cuttings and seed) are prohibited from entry into the state.

Common Name	Scientific Name
Russian knapweed	*Acroptilon repens*
Jointed goatgrass	*Aegilops cylindrica*
Camelthorn	*Alhagi pseudalhagi*
Alligator weed	*Alternanthera philoxeroides*
Hairy whitetop	*Cardaria pubescens*
Lens podded hoary cress	*Cardaria chalepensis*
Globed-podded hoary cress (Whitetop)	*Cardaria draba*
Plumeless thistle	*Carduus acanthoides*
Southern sandbur	*Cenchrus echinatus*
Field sandbur	*Cenchrus incertus*
Purple starthistle	*Centaurea calcitrapa*
Iberian starthistle	*Centaurea iberica*
Squarrose knapweed	*Centaurea squarrosa*
Sicilian starthistle	*Centaurea sulphurea*
Yellow starthistle (St. Barnaby's thistle)	*Centaurea solstitialis*
Diffuse knapweed	*Centaurea diffusa*
Spotted knapweed	*Centaurea maculosa*
Rush skeletonweed	*Chondrilla juncea*
Canada thistle	*Cirsium arvense*
Field bindweed	*Convolvulus arvensis*
Creeping wartcress (Coronopus)	*Coronopus squamatus*
Dudaim melon (Queen Anne's melon)	*Cucumis melo* var. *Dudaim*
Dodder	*Cuscuta* spp.
Alfombrilla (Lightningweed)	*Drymaria arenarioides*
Floating water hyacinth	*Eichhornia crassipes*
Anchored water hyacinth	*Eichhornia azurea*
Quackgrass	*Elytrigia repens*
Leafy spurge	*Euphorbia esula*
Halogeton	*Halogeton glomeratus*
Texas blueweed	*Helianthus ciliaris*
Hydrilla (Florida-elodea)	*Hydrilla verticillata*
Morning glory	*Ipomoea spp.*
Three-lobed morning glory	*Ipomoea triloba*
Dyers woad	*Isatis tinctoria*
Dalmation toadflax	*Linaria genistifolia* var. *dalmatica*
Purple loosestrife	*Lythrum salicaria*
Burclover	*Medicago polymorpha*
Serrated tussock	*Nassella trichotoma*
Scotch thistle	*Onopordum acanthium*
Branched broomrape	*Orobanche ramosa*
Torpedo grass	*Panicum repens*

Common Name	Scientific Name
African rue (Syrian rue)	*Peganum harmala*
Buffelgrass	*Pennisetum ciliare*
Common purslane	*Portulaca oleracea*
Austrian fieldcress	*Rorippa austriaca*
Giant salvina	*Salvinia molesta*
Tansy ragwort	*Senecio jacobaea*
Carolina horsenettle	*Solanum carolinense*
Perennial sowthistle	*Sonchus arvensis*
Tropical Soda Apple	*Solanum viarum*
Puna grass	*Stipa brachychaeta*
Witchweed	*Striga* spp.
Water-chestnut	*Trapa natans*
Puncturevine	*Tribulus terrestris*

REGULATED:
The following noxious weeds are regulated (includes plants, stolons, rhizomes, cuttings and seed) and if found within the state may be controlled or quarantined to prevent further infestation or contamination.

Common Name	Scientific Name
Southern sandbur	*Cenchrus echinatus*
Field sandbur	*Cenchrus incertus*
Field bindweed	*Convolvulus arvensis*
Floating water hyacinth	*Eichhornia crassipes*
Burclover	*Medicago polymorpha*
Buffelgrass	*Pennisetum ciliare*
Common purslane	*Portulaca oleracea*
Giant Salvinia*	*Salvinia molesta*
Puncturevine	*Tribulus terrestris*

* Added by Director's Administrative Order DAO 99-03 on 8/25/99

RESTRICTED:
The following noxious weeds are restricted (includes plants, stolons, rhizomes, cuttings and seed) and if found within the state shall be quarantined to prevent further infestation or contamination.

Common Name	Scientific Name
Russian knapweed	*Acroptilon repens*
Jointed goatgrass	*Aegilops cylindrica*
Camelthorn	*Alhagi pseudalhagi*
Globed-podded hoary cress (Whitetop)	*Cardaria draba*
Diffuse knapweed	*Centaurea diffusa*
Spotted knapweed	*Centaurea maculosa*
Yellow starthistle	*Centaurea solstitialis*
Dodder	*Cuscuta* spp.
Floating water hyacinth	*Eichhornia crassipes*
Quackgrass	*Elytrigia repens*
Sweet resinbush	*Euryops sunbcarnosus subsp. vulgaris*
Halogeton	*Halogeton glomeratus*
Texas blueweed	*Helianthus ciliaris*
Three-lobed morning glory	*Ipomoea triloba*
Dalmation toadflax	*Linaria genistifolia* var. *dalmatica*
Scotch thistle	*Onopordum acanthium*

AZ-WIPWG List of Weed Species

Common Name	Scientific Name	Rating*
Russian knapweed	*Acroptilon repens*	H
jointed goatgrass	*Aegilops cylindrica*	L
tree of heaven	*Ailanthus altissima*	M
camelthorn	*Alhagi maurorum*	M
giant reed	*Arundo donax*	H
onionweed	*Asphodelus fistulosus*	L
wild oat	*Avena fatua*	M
Asian mustard	*Brassica tournefortii*	M
ripgut brome	*Bromus diandrus*	M
smooth brome	*Bromus inermis*	M
red brome	*Bromus rubens*	H
cheatgrass	*Bromus tectorum*	H
lens podded hoary cress	*Cardaria chalapensis*	M
globe-podded hoary cress	*Cardaria draba*	M
hairy whitetop	*Cardaria pubescens*	M
musk thistle	*Carduus nutans*	M
spotted knapweed	*Centaurea biebersteinii*	M
diffuse knapweed	*Centaurea diffusa*	M
Malta starthistle	*Centaurea melitensis*	M
yellow starthistle	*Centaurea solstitialis*	H
rush skeletonweed	*Chondrilla juncea*	M
Canada thistle	*Cirsium arvense*	M
bull thistle	*Cirsium vulgare*	L
poison hemlock	*Conium maculatum*	M
field bindweed	*Convolvulus arvensis*	M
pampas grass	*Cortaderia selloana*	M
bermudagrass	*Cynodon dactylon*	M
houndstongue	*Cynoglossum officinale*	L
barnyardgrass	*Echinochloa crus-galli*	L
water hyacinth	*Eichhornia crassipes*	H
narrow-leaved oleaster	*Elaeagnus angustifolia*	H
quackgrass	*Elymus repens*	L
weeping lovegrass	*Eragrostis curvula*	L
Lehmann lovegrass	*Eragrostis lehmanniana*	H
redtstem stork's bill	*Erodium cicutarium*	M
leafy spurge	*Euphorbia esula*	H
sweet resinbush	*Euryops multifidus*	H
mouse barley	*Hordeum murinum*	M
hydrilla	*Hydrilla verticillata*	E
perennial pepperweed	*Lepidium latifolium*	H
oxeye daisy	*Leucanthemum vulgare*	L
Dalmatian toadflax	*Linaria dalmatica*	M
yellow toadflax	*Linaria vulgaris*	M
Italian ryegrass	*Lolium perenne*	M
white sweetclover	*Melilotus alba*	M

Common Name	Scientific Name	Rating*
yellow sweetclover	*Melilotus officinalis*	M
common iceplant	*Mesembryanthemum crystallinum*	L
crystal iceplant	*Mesembryanthemum nodiflorum*	M
parrot's feather	*Myriophyllum aquaticum*	H
Eurasian watermilfoil	*Myriophyllum spicatum*	H
Scotch thistle	*Onopordum acanthium*	L
blue panicum	*Panicum antidotale*	L
buffelgrass	*Pennisetum ciliare*	H
fountain grass	*Pennisetum setaceum*	H
African sumac	*Rhus Iancea*	M
Himalayan blackberry	*Rubus armeniacus*	M
ravennagrass	*Saccharum ravennae*	M
slender Russian thistle	*Salsola collina*	M
barbwire Russian thistle	*Salsola paulsenii*	M
common Russian thistle	*Salsola tragus*	M
giant salvinia	*Salvinia molesta*	H
Arabian schismus	*Schismus arabicus*	M
Mediterranean grass	*Schismus barbatus*	M
prickly sowthistle	*Sonchus asper*	M
common sowthistle	*Sonchus oleraceus*	M
johnsongrass	*Sorghum halepense*	M
Athel tamarisk	*Tamarix aphylla*	L
saltcedar	*Tamarix chinensis*	H
smallflower tamarisk	*Tamarix parviflora*	H
tamarisk	*Tamarix ramosissima*	H
puncturevine	*Tribulus terrestris*	E
Siberian elm	*Ulmus pumila*	M
common mullein	*Verbascum thapsus*	E
periwinkle	*Vinca major*	M

*****H = High; M = Medium; L = Low; and E = Evaluated but not listed due to inadequate information.

BLM National List of Invasive Species

Scientific Name	Common Name
Grasses	
Aegilops cylindrica	jointed goatgrass
Ammophila arenaria	European beachgrass
Arundo donax	giant reed
Bromus diandrus	ripgut brome
Bromus japonicus	Japanese brome
Bromus rubens	red brome
Bromus tectorum	downy brome
Cenchrus longispinus	longspine sandbur
Cortaderia jubata	Andean pampas grass
Cortaderia selloana	pampas grass
Cynodon dactylon	bermudagrass
Ehrharta calycina	veldt grass
Elytrigia repens	quackgrass
Eragrostis lehmanniana	Lehmann lovegrass
Nardus stricta	matgrass
Panicum miliaceum	wild proso millet
Pennisetum setaceum	crimson fountain grass
Schismus arabicus	schismus
Schismus barbatus	mediterranean grass
Sorghum halepense	johnsongrass
Taeniatherum caput-medusae	medusa-head
Forbs	
Acroptilon repens	Russian knapweed
Anthemis arvensis	scentless chamomile
Anthemis cotula	mayweed chamomile
Arctium minus	common burdock
Bassia hyssopifolia	bassia Basellaceae
Brassica nigra	black mustard
Brassica tournefortii	wild turnip
Caesalpinia gilliesii	Mexican bird-of-paradise
*Cardaria chalepensi*s	lens-podded whitetop
Cardaria draba	hoary cress
Cardaria pubescens	hairy whitetop

Scientific Name	Common Name
Carduus acanthoides	plumeless thistle
Carduus nutans	musk thistle
Carduus pycnocephalus	Italian thistle
Carduus teniflorus	slender-flowered thistle
Carpobrotus edulis	hottentot fig
Carpobrotus chilensis	sea iceplant
Carthamus lantus	distaff thistle
Carum carvi	common caraway
Centaurea calcitrapa	purple starthistle
Centaurea cyanus	cornflower
Centaurea diffusa	diffuse knapweed
Centaurea iberica	Iberian starthistle
Centaurea jacea	brown knapweed
Centaurea macrocephala	bighead knapweed
Centaurea maculosa	spotted knapweed
Centaurea melitenisis	malta starthistle
Centaurea montana	mountain cornflower
Centaurea nigra	black knapweed
Centaurea nigrescens	Vochin knapweed
Centaurea pratensis	meadow knapweed
Centaurea squarrosa	squarrose knapweed
Centaurea solstitialis	yellow starthistle
Centaurea trichocephala	feather-headed knapweed
Chondrilla juncea	rush skeletonweed
Chrysanthemum leucanthemum	ox-eye daisy
Cichorium intybus	chicory
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Clematis orientalis	Chinese clematis
Conium maculatum	poison hemlock
Convolvulus arvensis	field bindweed
Crepis setosa	bristly hawkweed
Crupina vulgaris	common crupina
Cynara cardunculus	artichoke thistle

Scientific Name	Common Name
Cynoglossum officinale	houndstongue
Digitalis purpurea	foxglove
Dipsacus fullonum	common teasel
Echium vulgare	blueweed
Egeria densa	Brazillian waterweed
Eichhornia crassipes	water hyacinth
Erechtites glomerata	Australian fireweed
Euphorbia cyparissias	cypress spurge
Euphorbia esula	leafy spurge
Euphorbia myrsinites	myrtle spurge
Foeniculum vulgare	fennel
Galega officinalis	goats rue
Gypsophila paniculata	babys breath
Halogeton glomeratus	halogeton
Hesperis matronalis	dames's rocket
Hieracium aurantiacum	orange hawkweed
Hieracium pilosella	mouseear hawkweed
Hieracium pratense	yellow hawkweed
Hydrilla verticillata	hydrilla
Hyoscyamus niger	black henbane
Hypericum perforatum	common St. Johnswort
Hyposhaeris radicata	common catsear
Isatis tinctoria	dyer's woad
Knautia arvensis	blue buttons
Lathyrus latifolius	everlasting peavine
Lepidium latifolium	perennial pepperweed
Linaria genistifolia spp. dalmatica	dalmation toadflax
Linaria vulgaris	yellow toadflax
Lysimachia vulgaris	garden loosestrife
Lythrum salicaria	purple loosestrife
Lythrum virgatum	wand loosestrife
Madia sativa	Chilean tarweed
Myriophyllum spicatum	Eurasian watermilfloil
Onopordum acanthium	Scotch thistle

Scientific Name	Common Name
Onopordum taricum	Scotch thistle
Peganum harmala	African rue
Potentilla recta	sulphur cinquefoil
Salvia aethiopsis	Mediterranean sage
Saponaria officinalis	bouncing bet
Senecio jacobaea	tansy ragwort
Senecio mikanoides	German ivy
Solanum dulcamara	bitter nightshade
Sonchus arvensis	perennial sowthistle
Sphaerophysa salsula	swainsonpea
Tanacetum vulgare	common tansy
Zygophyllum fabago	Syrian bean caper
Shrubs and Trees	
Ailanthus altissima	tree-of-heaven
Alhagi pseudalhagi	camelthorn
Cytisus junceum	Spanish broom
Cytisus monspessulanas	French broom
Cytisus scoparius	Scotch broom
Cytisus striatus	Portugese broom
Elaeagnus angustifolia	Russian olive
Ficus carica	edible fig
Lespedeza cuneata	Himalayan bush clover
Retama monosperma	bridal veil broom
Rubus discolor	Himalaya blackberry
Schinus terebrinthifolius	Brazillian pepper
Tamarix aphylla	athel
Tamarix chinensis	tamarisk
Tamarix gallica	French tamarisk
Tamarix parviflora	small flower tamerisk
Tamarix pentanda	tamarisk
Tamarix ramosissima	salt cedar
Ulex europaeus	gorse
Ulmus pumila	Siberian elm

APPENDIX B. Special Status Species Present or Potentially Present in the Project Area

Common Name	Scientific Name	Status		Habitat	Occurrence
		USFWS	BLM		
WILDLIFE					
Birds					
American Peregrine Falcon	*Falco peregrinus anatum*	DM	S	cliffs	Verified
Bald Eagle (non-listed DPS)	*Haliaeetus leucocephalus*	DM	S	undisturbed foraging/nesting areas	Verified
Cactus Ferruginous Pygmy-Owl	*Glaucidium brasilianum cactorum*	DM	S	dense Sonoran scrub washes	Verified
California Black Rail	*Laterallus jamaicensis coturniculus*	SC	S	marshes along Colorado River	Hypothetical
Desert Purple Martin	*Progne subis hesperia*		S	saguaro cacti	Verified
Ferruginous Hawk (breeding population only)	*Buteo regalis*	SC	S	healthy grasslands	Verified
Gilded Flicker	*Colaptes chrysoides*		S	saguaro cacti	Verified
Golden Eagle	*Aquila chrysaetos*		S	significant cliffs, large undeveloped areas	Verified
Le Conte's Thrasher	*Toxostoma lecontei*		S	remote creosote scrub	Verified
Northern Goshawk	*Accipiter gentilis atricapillus*	SC	S	healthy forests	Verified
Western Burrowing Owl	*Athene cunicularia hypugaea*	SC	S	grasslands, undeveloped valley bottoms	Verified
Pinyon Jay	*Gymnorhinus cyanocephalus*		S	healthy pinyon pine	Verified
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E		Riparian areas with Cottonwood/willow and tamarisk vegetation	Verified

Common Name	Scientific Name	Status		Habitat	Occurrence
				communities	
Yellow-billed Cuckoo	*Coccyzus americanus*	T		Riparian woodlands (cottonwood, willow, or tamarisk galleries).	Verified
Yuma Clapper	*Rallus longirostris yumanensis*	E		Fresh water and brackish marshes	Verified
Mammals					
Allen's Big-eared Bat	*Idionycteris phyllotis*	SC	S	caves, mines	Probable
Arizona Myotis	*Myotis occultus*	SC	S	caves, mines	Probable
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	E		caves, mines	Verified
California Leaf-nosed Bat	*Macrotus californicus*	SC	S	caves, mines	Verified
Cave Myotis	*Myotis velifer*	SC	S	caves, mines	Verified
Greater Western Mastiff Bat	*Eumops perotis californicus*	SC	S	caves, mines	Verified
Spotted Bat	*Euderma maculatum*	SC	S	caves, mines	Probable
Townsend's Big-eared Bat	*Corynorhinus* (=*Plecotus*) *townsendii*		S	caves, mines	Verified
Banner-tailed Kangaroo Rat	*Dipodomys spectabilis*		S	healthy grasslands	Probable
Gunnison's Prairie Dog	*Cynomys gunnisoni*		S	healthy grasslands	Probable
Sonoran pronghorn	*Antilocapra americana sonoriensis*	E		broad intermountain alluvial valleys with creosote-bursage and palo verde-mixed cacti associations.	Verified
Reptiles					
Sonora Mud Turtle	*Kinosternon sonoriense sonoriense*		S	riparian	Verified
Sonoran Desert Tortoise	*Gopherus morafkai*	C	S	rocky hillsides and bajadas	Verified

Common Name	Scientific Name	Status		Habitat	Occurrence
Amphibians					
Great Plains Narrow-mouthed Toad	*Gastrophryne olivacea*		S	healthy grasslands	Verified
Lowland Burrowing Treefrog	*Smilisca fodiens*		S	healthy grasslands	Verified
Lowland Leopard Frog	*Lithobates yavapaiensis*	SC	S	wetlands	Verified
Northern Leopard Frog	*Lithobates pipiens*		S	wetlands	Possible
Sonoran Green Toad	*Bufo retiformis*		S	healthy grasslands	Verified
Invertebrates					
Hydrobiid Spring Snails	all species in genus *Pyrgulopsis*		S	springs	Possible
Succineid Snails	all species in family *Succineidae*		S	springs	Possible
Fish					
Desert Sucker	*Catostomus clarki*	SC	S	aquatic	Verified
Longfin Dace	*Agosia chrysogaster*	SC	S	aquatic	Verified
Sonora Sucker	*Catostomus insignis*	SC	S	aquatic	Verified
Speckled Dace	*Rhinichthys osculus*	SC	S	aquatic	Verified
Desert pupfish	*Cyprinodon macularius*	E		aquatic	Verified
Gila chub	*Gila intermedia*	E, CH		aquatic	Verified
Gila topminnow	*Poeciliopsis occidentalis occidentalis*	E		aquatic	Verified
Spikedace	*Meda fulgida*	T		aquatic	Suitable Hab. Historic
Plants					
Arizona Sonoran Rosewood	*Vauquelinia californica* ssp. *sonorensis*		S	relict species in shady canyons	Verified
California Flannelbush	*Fremontodendron californica*		S	relict populations in shady canyons	Verified
Giant Sedge	*Carex spissa* var. *ultra*		S	springs	Verified
Kofa Mt. Barberry	*Berberis harrisoniana*		S	relict species in shady canyons	Probable
Murphey Agave	*Agave murpheyi*	SC	S	desert foothills, central	Verified

Common Name	Scientific Name	Status		Habitat	Occurrence
				AZ	
Acuna Cactus	*Echinomastus erectocentrus var. acunensis*	E		Well-drained knolls and gravel ridges in Sonoran desertscrub	Verified
USFWS Status: DM – Delisted; E – Endangered; T – Threatened; C – Candidate; SC – Species of Concern; CH – Designated Critical Habitat BLM Status: S – Sensitive					

APPENDIX C. Public Scoping Report

Phoenix District Integrated Weed Management Environmental Assessment Scoping Report

Contents

The BLM Phoenix District Office conducted public scoping for the Integrated Weed Management Environmental Assessment. This report summarizes the scoping process and issues defined to inform the environmental assessment.

Scoping Process

Public Meetings

Two public meetings were held for the purposes of scoping potential issues and alternatives for the Phoenix District Weed Environmental Assessment. Notice of public meetings was made in local newspapers, radio, and a press release. One meeting was held at the Arizona Department of Game and Fish on December 14, 2010. An additional meeting was held at the Gila Bend Community Center on December 15, 2010.

Written Comments

In addition to the opportunity to attend a public meeting, written comments were solicited and received via email. Comments were received from the following groups, in addition to general members of the public:

- Sierra Club
- Phoenix Weedwackers
- Arizona Department of Fish and Game

Specific notes from these meetings can be found in

Public Meeting Notes, later in this document.

Scoping Summary

Scoping comments are:

Non-Substantive Comments

Non-substantive comments received are not utilized in the preparation of the project or environmental assessment. Non-substantive comments are those that:

- Are in favor of or are against the proposed action or alternatives without rationale
- Agree or disagree with BLM policy or resource decisions without justification or supporting data
- Do not pertain to the project area or the project
- Take the form of vague and open ended questions
- Question policies or administrative actions that are outside of the scope of the project
- Beyond the sphere of BLM control

Non-substantive comments received in during the scoping period for the Integrated Weed Management EA include the following. Justifications are parenthetically noted:

- Concern that arid landscapes are not suitable for livestock grazing (Agree or disagree with BLM policy or resource decisions without justification)
- Recommendations to read environmental/pesticide literature (Do not pertain to the project)
- Suggestion that Arizona alter grazing tax practices (Beyond the sphere of BLM control)
- Suggestion that the federal government phase out ranching subsidies (Beyond the sphere of BLM control)

Substantive Comments

Substantive comments are those that do the following:

- Question, with reasonable basis, the accuracy of information utilized
- Question, with reasonable basis, the adequacy of methodology or assumptions
- Present new information relevant to the analysis
- Present reasonable alternatives or mitigation measures, or cause changes/revisions in one or more of the alternatives
- Present process concerns

Substantive comments will be carried forward for further consideration in the Environmental Assessment and influence the purpose and need, alternatives development, and impacts analysis, the EA process. Substantive comments received in during the scoping period for the Integrated Weed Management EA include the following, organized by type:

Process Concerns

- Concern about adequate notice given for the scoping period

- Desire to comment on the EA prior to issuing a decision

Information Relevant to Analysis

- Suggestion that mechanical removal of some of the larger bunches of grass is likely to be more effective than chemical treatment
- Suggestion that mowing malta starthistle – removing the seed heads over a period of 2-3 years – can be effective at containing and eradicating it
- Domestic sheep and goats can introduce diseases into wild bighorn sheep populations.

Reasonable Alternatives/Mitigation Measures

- Suggestion that BLM develop a list of plants that are the greatest threat and focus on those and on plants that have a limited presence but that might be easily eradicated
- Suggestion that BLM work to limit use of chemicals to the greatest degree possible and to use the least harmful chemicals possible
- Suggestion that each of the applicators should have a State of Arizona pesticide applicator's certification
- Suggestion to implement spot mechanical removal for buffelgrass located near threatened, endangered or other sensitive or special status plants
- Suggestion that fountain grass appears to be mainly a problem in washes and BLM should consider focusing on mechanical removal and periodic assessment and removal
- Suggestion to consider surveying and flagging an area to avoid individual plants and nests
- Suggestion that personnel shake larger bunches of buffelgrass as doing so will give the animals an opportunity to move. According to the commenter, during mechanical removal of the buffelgrass in the Ironwood Forest National Monument, birds, Gila monsters and other wildlife were found in the grass
- Suggestion to use a truck-based boom sprayer vs. aerial spraying, as aerial spraying leads to chemical drift and an increased mortality of non-target species.
- Suggestion to consider not using Clopyralid (3,6-dichloro-2-pyridinecarboxylic acid). According to the commenter, it is known to persist in both dead plants and the soil and therefore it should not be used for treatment of these lands
- Suggestion to consider mechanical treatment only after an area of chemical treatment has been controlled
- Suggestion for ongoing and long-term monitoring
- Domestic sheep and goats can introduce diseases into wild bighorn sheep populations. For this reason the Department would recommend not allowing the use of sheep or goats within nine miles of bighorn sheep habitat.

Public Meeting Notes

North Phoenix Public Meeting, December 14, 2010

1 attendee, no comments

Gila Bend Public Meeting December 15, 2010

2 Attendees, several comments

- Concern about biological treatments and potential future infestations of those biological controls in unintended areas.
- Concern that we should post the document to the website and post again in the newspaper that the document is available.
- We can also make the document available ....
- Concern about salt cedar not being a weed, rather it's a "nice tree"
    - So hard to get a tree around here....salt cedar is nice.
    - Need convincing about the "bad" features of the tamarisk – need more education on why it's bad
        - Reduce good habitat for nesting birds
        - Change soil salinity
        - Frequent fire interval returns
        - Reduced Reds for laying fish
    - Any tree is very valuable
- What kind of budget is available to do this work? How much would it cost?
- We are salty here – what kind of native plants could even survive in our soil climate?
- Wish that we could get the farmers on board – get their comments too.

APPENDIX D. Herbicides and Adjuvants Approved for Use on BLM-Administered Lands in Arizona

The BLM would also be able to use new active ingredients that are developed in the future if: 1) they are registered by the EPA for use on one or more land types (e.g., rangeland, aquatic, etc.) managed by the BLM; 2) the BLM determines that the benefits of use on public lands outweigh the risks to human health and the environment; and 3) they meet evaluation criteria to ensure that the decision to use the active ingredient is supported by scientific evaluation and NEPA documentation. These evaluation criteria are discussed in more detail in the PEIS (Appendix E of BLM 2007a).

Herbicides Approved for Use on BLM-Administered Lands in Arizona
Updated September 1, 2011

	Herbicides Approved for Use on BLM Lands in Accordance with the			
	*17 Western States PEIS ROD and Oregon EIS ROD**			
				Update September 1, 2011
ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
2,4-D	AK, AZ, CA, CO, ID, MT, ND,	Agrisolution 2,4-D LV6	Agriliance, L.L.C.	1381-101
	NE, NM, NV, OK, OR, SD, TX,	Agrisolution 2,4-D Amine 4	Agriliance, L.L.C.	1381-103
	UT, WA, WY	Agrisolution 2,4-D LV4	Agriliance, L.L.C.	1381-102
		2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19
		2,4-D LV4	Albaugh, Inc./Agri Star	42750-15
		Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22
		2,4-D LV6	Albaugh, Inc./Agri Star	42750-20
		Five Star	Albaugh, Inc./Agri Star	42750-49
		D-638	Albaugh, Inc./Agri Star	42750-36
		Alligare 2,4-D Amine	Alligare, LLC	81927-38
		2,4-D LV6	Helena Chemical Company	4275-20-5905
		2,4-D Amine	Helena Chemical Company	5905-72
		2,4-D Amine 4	Helena Chemical Company	42750-19-5905
		Opti-Amine	Helena Chemical Company	5905-501
		Barrage HF	Helena Chemical Company	5905-529
		HardBall	Helena Chemical Company	5905-549
		Unison	Helena Chemical Company	5905-542
		Clean Amine	Loveland Products Inc.	34704-120
		Low Vol 4 Ester Weed Killer	Loveland Products Inc.	34704-124
		Low Vol 6 Ester Weed Killer	Loveland Products Inc.	34704-125
		Saber	Loveland Products Inc.	34704-803
		Salvo	Loveland Products Inc.	34704-609
		Savage DS	Loveland Products Inc.	34704-606
		Aqua-Kleen	Nufarm Americas Inc.	71368-4
		Aqua-Kleen	Nufarm Americas Inc.	228-378
		Esteron 99C	Nufarm Americas Inc.	62719-9-71368
		Weedar 64	Nufarm Americas Inc.	71368-1
		Weedone LV-4	Nufarm Americas Inc.	228-139-71368
		Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14
		Weedone LV-6	Nufarm Americas Inc.	71368-11
		Formula 40	Nufarm Americas Inc.	228-357
		2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95
		Platoon	Nufarm Americas Inc.	228-145
		WEEDstroy AM-40	Nufarm Americas Inc.	228-145
		Hi-Dep	PBI Gordon Corp.	2217-703
		2,4-D Amine	Setre (Helena)	5905-72
		Barrage LV Ester	Setre (Helena)	5905-504
		2,4-D LV4	Setre (Helena)	5905-90
		2,4-D LV6	Setre (Helena)	5905-93
		Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA
		Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125
		Salvo LV Ester	UAP-Platte Chem. Co.	34704-609
		2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120
		Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124
		Savage DS	UAP-Platte Chem. Co.	34704-606
		Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2
		Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3
		Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4
		Amine 4	Wilbur-Ellis Co.	2935-512
		Lo Vol-4	Wilbur-Ellis Co.	228-139-2935
		Lo Vol-6 Ester	Wilbur-Ellis Co.	228-95-2935
		Base Camp Amine 4	Wilbur-Ellis Co.	71368-1-2935
		Broadrange 55	Wilbur-Ellis Co.	2217-813-2935
		Agrisolution 2,4-D LV6	Winflied Solutions, LLC	1381-101
		Agrisolution 2,4-D Amine 4	Winfield Solutions, LLC	1381-103
		Agrisolution 2,4-D LV4	Winfield Solutions, LLC	1381-102

	Herbicides Approved for Use on BLM Lands in Accordance with the 17 Western States PEIS ROD and Oregon EIS ROD*			Update September 1, 2011
ACTIVE INGREDIENT	**STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD**	**TRADE NAME**	**MANUFACTURER**	**EPA REG. NUMBER**
2,4-D	AK, AZ, CA, CO, ID, MT, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, WY	Agrisolution 2,4-D LV6	Agriliance, L.L.C.	1381-101
		Agrisolution 2,4-D Amine 4	Agriliance, L.L.C.	1381-103
		Agrisolution 2,4-D LV4	Agriliance, L.L.C.	1381-102
		2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19
		2,4-D LV 4	Albaugh, Inc./Agri Star	42750-15
		Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22
		2,4-D LV 6	Albaugh, Inc./Agri Star	42750-20
		Five Star	Albaugh, Inc./Agri Star	42750-49
		D-638	Albaugh, Inc./Agri Star	42750-36
		Alligare 2,4-D Amine	Alligare, LLC	81927-38
		2,4-D LV6	Helena Chemical Company	4275-20-5905
		2,4-D Amine	Helena Chemical Company	5905-72
		2,4-D Amine 4	Helena Chemical Company	42750-19-5905
		Opti-Amine	Helena Chemical Company	5905-501
		Barrage HF	Helena Chemical Company	5905-529
		HardBall	Helena Chemical Company	5905-549
		Unison	Helena Chemical Company	5905-542
		Clean Amine	Loveland Products Inc.	34704-120
		Low Vol 4 Ester Weed Killer	Loveland Products Inc.	34704-124
		Low Vol 6 Ester Weed Killer	Loveland Products Inc.	34704-125
		Saber	Loveland Products Inc.	34704-803
		Salvo	Loveland Products Inc.	34704-609
		Savage DS	Loveland Products Inc.	34704-606
		Aqua-Kleen	Nufarm Americas Inc.	71368-4
		Aqua-Kleen	Nufarm Americas Inc.	228-378
		Esteron 99C	Nufarm Americas Inc.	62719-9-71368
		Weedar 64	Nufarm Americas Inc.	71368-1
		Weedone LV-4	Nufarm Americas Inc.	228-139-71368
		Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14
		Weedone LV-6	Nufarm Americas Inc.	71368-11
		Formula 40	Nufarm Americas Inc.	228-357
		2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95
		Platoon	Nufarm Americas Inc.	228-145
		WEEDstroy AM-40	Nufarm Americas Inc.	228-145
		Hi-Dep	PBI Gordon Corp.	2217-703
		2,4-D Amine	Setre (Helena)	5905-72
		Barrage LV Ester	Setre (Helena)	5905-504
		2,4-D LV4	Setre (Helena)	5905-90
		2,4-D LV6	Setre (Helena)	5905-93
		Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA
		Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125
		Salvo LV Ester	UAP-Platte Chem. Co.	34704-609
		2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120
		Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124
		Savage DS	UAP-Platte Chem. Co.	34704-606
		Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2
		Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3
		Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4
		Amine 4	Wilbur-Ellis Co.	2935-512
		Lo Vol-4	Wilbur-Ellis Co.	228-139-2935
		Lo Vol-6 Ester	Wilbur-Ellis Co.	228-95-2935
		Base Camp Amine 4	Wilbur-Ellis Co.	71368-1-2935
		Broadrange 55	Wilbur-Ellis Co.	2217-813-2935
		Agrisolution 2,4-D LV6	Winflied Solutions, LLC	1381-101
		Agrisolution 2,4-D Amine 4	Winfield Solutions, LLC	1381-103
		Agrisolution 2,4-D LV4	Winfield Solutions, LLC	1381-102

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
Glyphosate	AK, AZ, CA, CO, ID, MT, ND,	Aqua Star	Albaugh, Inc./Agri Star	42750-59
	NE, NM, NV, OK, OR, SD, TX,	Forest Star	Albaugh, Inc./Agri Star	42570-61
	UT, WA, WY	GlyStar Gold	Albaugh, Inc./Agri Star	42750-61
		Gly Star Original	Albaugh, Inc./Agri Star	42750-60
		Gly Star Plus	Albaugh, Inc./Agri Star	42750-61
		Gly Star Pro	Albaugh, Inc./Agri Star	42750-61
		Glyphosate 4 PLUS	Alligare, LLC	81927-9
		Glyphosate 5.4	Alligare, LLC	81927-8
		Glyfos	Cheminova	4787-31
		Glyfos PRO	Cheminova	67760-57
		Glyfos Aquatic	Cheminova	4787-34
		ClearOut 41 Plus	Chem. Prod. Tech., LLC	70829-3
		Accord Concentrate	Dow AgroSciences	62719-324
		Accord SP	Dow AgroSciences	62719-322
		Accord XRT	Dow AgroSciences	62719-517
		Accord XRT II	Dow AgroSciences	62719-556
		Glypro	Dow AgroSciences	62719-324
		Glypro Plus	Dow AgroSciences	62719-322
		Rodeo	Dow AgroSciences	62719-324
		Showdown	Helena Chemical Company	71368-25-5905
		Mirage	Loveland Products Inc.	34704-889
		Mirage Plus	Loveland Products Inc.	34704-890
		Aquamaster	Monsanto	524-343
		Roundup Original	Monsanto	524-445
		Roundup Original II	Monsanto	524-454
		Roundup Original II CA	Monsanto	524-475
		Honcho	Monsanto	524-445
		Honcho Plus	Monsanto	524-454
		Roundup PRO	Monsanto	524-475
		Roundup PRO Concentrate	Monsanto	524-529
		Roundup PRO Dry	Monsanto	524-505
		Roundup PROMAX	Monsanto	524-579
		Aqua Neat	Nufarm Americas Inc.	228-365
		Credit Xtreme	Nufarm Americas Inc.	71368-81
		Foresters	Nufarm Americas Inc.	228-381
		Razor	Nufarm Americas Inc.	228-366
		Razor Pro	Nufarm Americas Inc.	228-366
		GlyphoMate 41	PBI/Gordon Corporation	2217-847
		AquaPro Aquatic Herbicide	SePRO Corporation	62719-324-67690
		Rattler	Setre (Helena)	524-445-5905
		Buccaneer	Tenkoz	55467-10
		Buccaneer Plus	Tenkoz	55467-9
		Mirage Herbicide	UAP-Platte Chem. Co.	524-445-34704
		Mirage Plus Herbicide	UAP-Platte Chem. Co.	524-454-34704
		Gly-4 Plus	Universal Crop Protection Alliance, LLC	72693-1
		Gly-4 Plus	Universal Crop Protection Alliance, LLC	42750-61-72693
		Gly-4	Universal Crop Protection Alliance, LLC	42750-60-72693
		Glyphosate 4	Vegetation Man., LLC	73220-6-74477
		Agrisolutions Cornerstone	Winfield Solutions, LLC	1381-191
		Agrisolutions Cornerstone Plus	Winfield Solutions, LLC	1381-192
		Agrisolutions Rascal	Winfield Solutions, LLC	1381-191
		Agrisolutions Rascal Plus	Winfield Solutions, LLC	1381-192
Glyphosate + 2,4-D		Landmaster BW	Albaugh, Inc./Agri Star	42570-62
		Campaign	Monsanto	524-351
		Landmaster BW	Monsanto	524-351

**Refer to the complete label before considering the use of any herbicide formulation. Label changes can impact the intended use through, for example, the creation or elimination of Special Local Need (SLN) or 24(c) registrations; changes in application sites, rates, and timing; and county restrictions.*

Adjuvants Approved for Use on BLM-Administered Lands in Arizona
Updated September 1, 2011

Adjuvants Approved for Use on BLM Administered Lands				
				Update: September 1, 2011
Adjuvant Class	**Adjuvant Type**	**Trade Name**	**Manufacturer**	**Comments**
Surfactant	Non-ionic	Agrisolutions Preference	Agriliance, LLC.	WA Reg. No. 1381-50011
		A-90	Alligare, LLC	
		Aqufact	Aqumix, Inc.	
		Brewer 90-10	Brewer International	
		Baron	Crown (Estes Incorporated)	
		N.I.S. 80	Estes Incorporated	
		Inlet	Helena Chemical Company	CA Reg. No. 5905-50099-AA
		Spec 90/10	Helena Chemical Company	
		Optima	Helena Chemical Company	CA Reg. No. 5905-50075-AA
		Induce	Setre (Helena)	CA Reg. No. 5905-50066-AA
			Helena Chemical Company	CA Reg. No. 5905-50091-AA
		Activator 90	Loveland Products Inc.	CA Reg. No. 34704-50034-AA
		LI-700	Loveland Products Inc.	CA Reg. No. 34704-50035
				WA Reg. No. AW36208-70004
		Spreader 90	Loveland Products Inc.	WA Reg. No. 34704-05002-AA
		UAP Surfactant 80/20	Loveland Products Inc.	
		X-77	Loveland Products Inc.	CA Reg. No. 34704-50044
		Elite Platinum	Red River Specialties, Inc.	
		Red River 90	Red River Specialties, Inc.	
		Red River NIS	Red River Specialties, Inc.	
		Cornbelt Premier 90	Van Diest Supply Co.	
		Cornbelt Trophy Gold	Van Diest Supply Co.	
		Spray Activator 85	Van Diest Supply Co.	
		R-900	Wilbur-Ellis	
		Super Spread 90	Wilbur-Ellis	WA Reg. No. AW-2935-70016
		Super Spread 7000	Wilbur-Ellis	CA Reg. No. 2935-50170
				WA Reg. No. AW-2935-0002
		Agrisolutions Activate Plus	Winfield Solutions, LLC	CA Reg. No. 9779-50004-AA
				WA Reg. No. 1381-09001
		Agrisolutions Preference	Winfield Solutions, LLC	WA Reg. No. 1381-50011

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant (cont.)	Spreader/Sticker	Agri-Trend Spreader	Agri-Trend	
		TopFilm	Biosorb, Inc.	
		Bind-It	Estes Incorporated	
		Surf-King PLUS	Crown (Estes Incorporated)	
		CWC 90	CWC Chemical, Inc.	
		Cohere	Helena Chemical Company	CA Reg. No. 5905-50083-A
		Attach	Loveland Products Inc.	CA Reg. No. 34704-50026
		Bond	Loveland Products Inc.	CA Reg. No. 36208-50005
		Tactic	Loveland Products Inc.	CA Reg. No. 34704-50041-AA
		Widespread Max	Loveland Products Inc.	CA Reg. No. 34704-50061
				WA Reg. No. 34704-09001
		Nu-Film-IR	Miller Chem. & Fert. Corp.	
		Nu Film 17	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50021-AA
		Nu Film P	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50022-AA
		Lastick	Setre (Helena)	
		Insist 90	Wilbur-Ellis	
		R-56	Wilbur-Ellis	CA Reg. No. 2935-50144
	Silicone-based	SilEnergy	Brewer International	
		Silnet 200	Brewer International	
		Bind-It MAX	Estes Incorporated	
		Thoroughbred	Estes Incorporated	
		Aero Dyne-Amic	Helena Chemical Company	CA Reg. No. 5905-50080-AA
		Dyne-Amic	Helena Chemical Company	CA Reg. No. 5095-50071-AA
		Kinetic	Setre (Helena)	CA Reg. No. 5905-50087-AA
		Freeway	Loveland Products Inc.	CA Reg. No. 34704-50031
				WA Reg. No. 34704-04005
		Phase	Loveland Products Inc.	CA Reg. No. 34704-50037-AA
		Phase II	Loveland Products Inc.	
		Silwet L-77	Loveland Products Inc.	CA Reg. No. 34704-50043
		Elite Marvel	Red River Specialties, Inc.	
		Sun Spreader	Red River Specialties, Inc.	
		Sylgard 309	Wilbur-Ellis	CA Reg. No. 2935-50161
		Syl-Tac	Wilbur-Ellis	CA Reg. No. 2935-50167

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-based	Crop Oil Concentrate	Alligare Forestry Oil	Alligare, LLC	
		Brewer 83-17	Brewer International	
		Majestic	Crown (Estes Incorporated)	
		Agri-Dex	Helena Chemical Company	CA # 5905-50094-AA
		Crop Oil Concentrate	Helena Chemical Company	CA Reg. No. 5905-50085-AA
		Power-Line Crop Oil	Land View Inc.	
		Crop Oil Concentrate	Loveland Products Inc.	
		Maximizer Crop Oil Conc.	Loveland Products Inc.	CA Reg. No. 34704-50059
				WA Reg. No. 34704-08002
		Herbimax	Loveland Products Inc.	CA Reg. No. 34704-50032-AA
				WA Reg. No. 34704-04006
		Red River Forestry Oil	Red River Specialties, Inc.	
		Red River Pacer Crop Oil	Red River Specialties, Inc.	
		Cornbelt Crop Oil Concentrate	Van Diest Supply Co.	
		Cornbelt Premium Crop Oil Concentrate	Van Diest Supply Co.	
		R.O.C. Rigo Oil Conc.	Wilbur-Ellis	
		Mor-Act	Wilbur-Ellis	CA Reg. No. 2935-50098
		Agrisolutions Prime Oil	Winfield Solutions, LLC	CA Reg. No. 979-50002-AA
		Agrisolutions Superb HC	Winfield Solutions, LLC	WA Reg. No. 1381-06003
	Methylated Seed Oil	MSO Concentrate	Alligare, LLC	
		SunEnergy	Brewer International	
		Sun Wet	Brewer International	
		Premium MSO	Helena Chemical Company	
		Methylated Spray Oil Conc.	Helena Chemical Company	
		MSO Concentrate	Loveland Products Inc.	CA Reg. No. 34704-50029-AA
		Elite Supreme	Red River Specialties, Inc.	
		Red River Supreme	Red River Specialties, Inc.	
		Sunburn	Red River Specialties, Inc.	
		Sunset	Red River Specialties, Inc.	
		Cornbelt Base	Van Diest Supply Co.	
		Cornbelt Methylates Soy-Stik	Van Diest Supply Co.	
		Hasten	Wilbur-Ellis	CA Reg. No. 2935-50160
				WA Reg. No. 2935-02004
		Super Spread MSO	Wilbur-Ellis	
		Agrisolutions Destiny HC	Winfield Solutions, LLC	WA Reg. No. 1381-09002

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-Based (cont.)	Methylated Seed Oil + Organosilicone	Inergy	Crown (Estes Incorporated)	
	Vegetable Oil	Noble	Estes Incorporated	
		Amigo	Loveland Products Inc.	CA Reg. No. 34704-50028-AA
				WA Reg. No. 34704-04002
		Elite Natural	Red River Specialities	
		Competitor	Wilbur-Ellis	CA Reg. No. 2935-50173
				WA Reg. No. AW-2935-04001
Fertilizer-based	Nitrogen-based	Quest	Setre (Helena)	CA Reg. No. 5905-50076-AA
		Quest	Helena Chemical Company	CA Reg. No. 5905-50076-AA
		Actamaster Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50006
		Actamaster Soluble Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50001
		Dispatch	Loveland Products Inc.	
		Dispatch 111	Loveland Products Inc.	
		Dispatch 2N	Loveland Products Inc.	
		Dispatch AMS	Loveland Products Inc.	
		Flame	Loveland Products Inc.	
		Cornbelt Gardian	Van Diest Supply Co.	
		Cornbelt Gardian Plus	Van Diest Supply Co.	
		Bronc	Wilbur-Ellis	
		Bronc Max	Wilbur-Ellis	
		Bronc Max EDT	Wilbur-Ellis	
		Bronc Plus Dry EDT	Wilbur-Ellis	WA Reg. No.2935-03002
		Agrisolutions Alliance	Winfield Solutions, LLC	CA Reg. No. 1381-50002-AA
				WA Reg. No.1381-05005
		Agrisolutions Class Act NG	Winfield Solutions, LLC	WA Reg. No. 1381-01004
		Agrisolutions Corral AMS Liquid	Winfield Solutions, LLC	WA Reg. No. 1381-01006
		Bronc Total	Wilbur-Ellis	
		Cayuse Plus	Wilbur-Ellis	CA Reg. No. 2935-50171
Special Purpose or Utility	Buffering Agent	Buffers P.S.	Helena Chemical Company	CA Reg. No. 5905-50062-ZA
		Spray-Aide	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50006-AA
		Oblique	Red River Specialties, Inc.	
		Tri-Fol	Wilbur-Ellis	CA Reg. No. 2935-50152

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose	Colorants	Hi-Light	Becker-Underwood	
or Utility - cont.		Hi-Light WSP	Becker-Underwood	
		Spray Indicator XL	Helena Chemical Company	
		Marker Dye	Loveland Products Inc.	
		TurfTrax	Loveland Products Inc.	
		TurfTrax Blue Spray Indicator	Loveland Products Inc.	
		BullsEye	Milliken Chemical	
		Signal	Precision	
		SPI-Max Blue Spray Marker	PROKoZ	
		Elite Splendor	Red River Specialities, Inc.	
	Compatibility/	E Z MIX	Loveland Products Inc.	CA Reg. No. 36208-50006
	Suspension	Support	Loveland Products Inc.	WA Reg. No. 34704-04011
	Agent	Blendex VHC	Setre (Helena)	
	Deposition Aid	Cygnet Plus	Brewer International	CA Reg. No. 1051114-50001
		Poly Control 2	Brewer International	
		CWC Sharpshooter	CWC Chemical, Inc.	
		Grounded	Helena Chemical Company	
		Grounded - CA	Helena Chemical Company	CA Reg. No. 5905-50096-AA
		ProMate Impel	Helena Chemical Company	
		Pointblank	Helena Chemical Company	CA Reg. No. 52467-50008-AA-5905
		Strike Zone DF	Helena Chemical Company	CA Reg. No. 5905-50084-AA
		Compadre	Loveland Products Inc.	CA Reg. No. 34704-50050
				WA Reg. No. 34704-06004
		Intac Plus	Loveland Products Inc.	
		Liberate	Loveland Products Inc.	CA Reg. No. 34704-50030-AA
				WA Reg. No. 34704-04008
		Reign	Loveland Products Inc.	CA Reg. No. 34704-50045
				WA Reg. No. 34704-05010
		Weather Gard	Loveland Products Inc.	CA Reg. No. 34704-50042-AA
		Mist-Control	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50011-AA
		Sustain	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50015-AA
		Exit	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50014-AA
		Elite Secure Ultra	Red River Specialties, Inc.	
		Secure Ultra	Red River Specialties, Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose	Deposition Aid - cont.	Sta Put	Setre (Helena)	CA Reg. No. 5905-50068-AA
or Utility - cont.		Agripharm Drift Control	Walco International	
		Bivert	Wilbur-Ellis	CA Reg. No. 2935-50163
		Coverage G-20	Wilbur-Ellis	
		Crosshair	Wilbur-Ellis	
		EDT Concentrate	Wilbur-Ellis	
		Agrisolutions Interlock	Winfield Solutions, LLC	
	Defoaming Agent	Defoamer	Brewer International	
		Foambuster Max	Helena Chemical Company	
		Fighter-F 10	Loveland Products Inc.	
		Fighter-F Dry	Loveland Products Inc.	
		Unfoamer	Loveland Products Inc.	CA Reg. No. 34704-50062
				WA Reg. No. 34704-09002
		Foam Fighter	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50005-AA
		Red River Defoamer	Red River Specialities, Inc.	
		Foam Buster	Setre (Helena)	CA Reg. No. 5905-50072-AA
		Cornbelt Defoamer	Van Diest Supply Co	
		No Foam	Wilbur-Ellis	CA Reg. No. 2935-50136
	Diluent/Deposition Agent	Improved JLB Oil Plus	Brewer International	
		JLB Oil Plus	Brewer International	
		Hy-Grade I	CWC Chemical, Inc	
		Hy-Grade EC	CWC Chemical, Inc	
		Red River Basal Oil	Red River Specialties, Inc.	
		In-Place	Wilbur-Ellis	CA Reg. No. 2935-50169
		W.E.B. Oil	Wilbur-Ellis	CA Reg. No. 2935-50166
				WA Reg. No. AW 2935-70023
	Foam Marker	Align	Helena Chemical Company	
		Red River Foam Marker	Red River Specialties, Inc.	
		R-160	Wilbur-Ellis	
	Invert Emulsion Agent	Redi-vert II	Wilbur-Ellis	CA Reg. No. 2935-50168
	Tank Cleaner	Wipe Out	Helena Chemical Company	
		All Clear	Loveland Products Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose	Tank Cleaner cont.	Tank and Equipment Cleaner	Loveland Products Inc.	
or Utility - cont.		Red River Tank Cleaner	Red River Specialties, Inc.	
		Kutter	Wilbur-Ellis	
		Neutral-Clean	Wilbur-Ellis	
		Combelt Tank-Aid	Van Diest Supply Co.	
	Water Conditioning	Rush	Crown (Estes Incorporated)	
		AccuQuest WM	Helena Chemical Company	
		Hel-Fire	Helena Chemical Company	
		Blendmaster	Loveland Products Inc.	
		Choice	Loveland Products Inc.	CA Reg. No. 34704-50027-AA
				WA Reg. No. 34704-04004
		Choice Xtra	Loveland Products Inc.	
		Choice Weather Master	Loveland Products Inc.	CA Reg. No. 34704-50038-AA
		Elite Imperial	Red River Specialities, Inc.	
		Combelt N-Tense	Van Diest Supply Co.	
		Climb	Wilbur-Ellis	CA Reg. No. 2935-50181
				WA Reg. No. 2935-09001
		Cut-Rate	Wilbur-Ellis	

APPENDIX E. Standard Operating Procedures, Best Management Practices, Mitigation Measures, Monitoring, and Conservation Measures

Standard Operating Procedures for General Vegetation Treatments

Standard operating procedures and treatment methods will be used to achieve desired future conditions for vegetation management. BLM policies and guidance for public land treatments will be followed in implementing all treatment methods. Many guidelines are provided in BLM Handbook H-1740-1, Renewable Resource Improvement and Treatment Guidelines and Procedures (1987); in BLM Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration (1997); in BLM programmatic documents such as Environmental Impact Statement for Vegetation Treatments, Watersheds and Wildlife Habitats on Public Lands Administered by the BLM in the Western United States, Including Alaska (1991) and Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Impact Statement (2007a); and in other general and specific program policy, procedures, and standards pertinent to implementation of renewable resource improvements. Standard operating procedures for wilderness, special management areas, migratory birds, and cultural resources are described below in the table.

Resource Element	Standard Operating Procedure
Wilderness	Wilderness areas will be treated using a combination of methods (manual, mechanical, chemical, biological) known to be effective while causing the least damage to non-target plant species per BLM's Management of Designated Wilderness Manual. Treatments would be implemented using the Minimum Requirements Decision Guide, which would be used to determine if restoration activities are warranted and the most appropriate method to use to minimize impacts to wilderness qualities.
Special Management Areas (ACEC, Wild and Scenic Rivers, Historic Trails)	Weed treatments cannot degrade the unique values, quality, character, or integrity of these lands. Only weed treatments that would protect and/or improve the natural condition of the identified values for which the area was designated would be allowed.
Migratory Birds	To avoid direct impacts to migratory birds weed removal activities would be scheduled to take place outside of the migratory bird breeding season (March 1–September 1) when feasible. If work could not be avoided during those timeframes, the treatment area will be surveyed by a qualified biologist prior to treatment to determine if active nests and/or potential nesting substrate are present. The treatments will be designed to avoid active nests as well as potential nesting sites in vegetation that is too dense to adequately survey for active nests.
Threatened, Endangered, and Sensitive Species See Manual 6840 (Special Status Species)	• Consider effects to special status species when designing and implementing herbicide treatments. • Follow all conservation measures in the Biological Assessment (Appendix G).

Cultural Resources	All treatment areas will be analyzed to determine the level and adequacy of previous cultural resource surveys. If ground-disturbing activities are proposed in areas that have not been previously surveyed, Class III pedestrian surveys that meet the federal and state standards would be conducted prior to any weed management activities. If previously recorded or newly discovered cultural resources that are NRHP listed or eligible for listing cannot be avoided by weed management activities, they will be treated in accordance with the Secretary of the Interior's *Guidelines for the Treatment of Historic Properties* and applicable state laws. If a traditional cultural property or a sacred place is identified within the treatment area, specific management prescriptions would be developed to protect the values and characteristics of that site.

The standard approaches to manual, chemical, mechanical, biological, and fire treatment methods are described in detail below. The specific methods applied would depend on area-specific management objectives with an assessment of environmental impacts.

Standard Operating Procedures for Manual Vegetation Treatment

Hand-operated power tools and hand tools are used to cut, clear, or prune herbaceous and woody plants. In manual treatments workers do the following:
• cut plants above ground level,
• pull, grub, or dig out plant root systems to prevent later sprouting and regrowth,
• scalp at ground level or remove competing plants around desired vegetation, and
• place mulch around desired vegetation to limit the growth of competing vegetation.

Hand tools such as the handsaw, axe, shovel, rake, machete, grubbing hoe, mattock (combination of axe and grubbing hoe), brush hook, and hand clippers are used in manual treatments. Axes, shovels, grubbing hoes, and mattocks can dig up and cut below the surface to remove the main roots of plants such as prickly pear and mesquite that have roots that can quickly resprout in response to surface cutting or clearing. Workers also may use power tools such as chainsaws and power brush saws.

Although manual vegetation treatment is labor intensive and costly, compared to prescribed burning or herbicide application, it can be extremely species selective and can be used in areas of sensitive habitats or areas that are inaccessible to ground vehicles. Manual treatment of undesired plants would be used on sites where fire (prescribed or naturally ignited) is undesirable or where significant constraints prevent widespread use of fire as a management tool. These sites comprise a range of vegetation communities or habitat types. They include areas where there may be wildlife concerns, yet it is deemed beneficial to remove trees, shrubs, or other fuel-loading vegetation. Manual vegetation treatments cause less ground disturbance and generally remove less vegetation than prescribed fire or mechanical treatments.

Standard Operating Procedures for Mechanical Vegetation Treatment

Mechanical vegetation treatments employ several different types of equipment to suppress, inhibit, or control herbaceous and woody vegetation. The goal of mechanical treatments is to kill or reduce the cover of undesirable vegetation and thus encourage the growth of desirable plants. BLM uses wheeled tractors, crawler-type tractors, mowers, or specially designed vehicles with attached implements for mechanical vegetation treatments. Mechanical equipment is used to reduce fuel hazards in accordance with BLM established procedures. Re-seeding after mechanical treatments is important to help ensure that desirable plants and not weedy species will become established on the site. Mechanical treatment and reseeding should occur at a time to best control the undesirable vegetation and encourage the establishing of desirable vegetation. The best mechanical method for treating undesired plants in a particular location depends on the following factors:

- characteristics of the undesired species present, such as plant density stem size, woodiness, brittleness, and resprouting ability,
- need for seedbed preparation, revegetation, and improved water infiltration rates,
- topography and terrain,
- soil characteristics such as type, depth, amount and size of rocks, erosion potential, and susceptibility to compaction,
- climatic and seasonal conditions,
- potential cost of improvement as compared to expected results, and
- potential effects to special status species.

Bulldozing consists of a wheeled or crawler tractor with a heavy hydraulic controlled blade. Bulldozers push over and uproot vegetation and leave it in windrows or piles. Bulldozing is best adapted to removing scattered stands of large brush or trees. Several different kinds of blades can be used, depending of the type of vegetation and goals of the project. The disadvantage of bulldozing is that is disturbs soil and may damage non-target plants.

Disk plowing in its various forms can be used for removing shallow-rooted herbaceous and woody plants. Disk plows should only be used where all of the vegetation is intended to be killed. Several different kinds of root plows are specific for certain types of vegetation. In addition to killing vegetation, disk plowing loosens the soil surface to prepare it for seeding and to improve the rate of water infiltration. The disadvantage of disk plowing is that it may be expensive and usually kills all species. Also, plowing is usually not practicable on steep slopes (> 35-45 percent slope) or rocky soil. Plant species that sprout from roots may survive.

Vegetation is chained and cabled by dragging heavy anchor chains or steel cables hooked to tractors in a U-shape, half circle, or J-shaped manner. Effective on rocky soils and steep slopes, chaining and cabling are best used to control non-sprouting woody vegetation such as small trees and shrubs. Desirable shrubs may be damaged in the process. This control method normally does not injure herbaceous vegetation. It is cost effective because it can readily treat large areas. The chains or cables also scarify the soil surface in anticipation of seeding desirable species. The disadvantage is that weedy herbaceous vegetation can survive this treatment.

Various tractor attachments are used for mowing, beating, crushing, chopping, or shredding vegetation, depending on the nature of the plant stand and goals of the project. The advantage in using this type of equipment is that selective plants may be targeted to achieve specific goals. For example, mowing is effective in reducing plant height to a desirable condition, and mowing usually does not kill vegetation. Mowing is more effective on herbaceous than woody vegetation, as mowing can remove seed heads on herbaceous plants.

On the other hand, a rolling cutter leaves herbaceous vegetation but can kill woody nonsprouting vegetation by breaking stems at ground level. Mowing, beating, crushing, chopping, or shredding usually does not disturb soil. Rocky soil and steep slopes may limit the use of this equipment. Debris management after a mechanical treatment is critical in fuels reduction projects. Vegetation material that is left on a site will dry and may become more hazardous than before the treatment. Herbaceous material is usually not a problem because it will decompose relatively fast, depending on soil moisture, ambient humidity, and temperature. Woody vegetation should be piled and burned under acceptable fire management practices.

Standard Operating Procedures for Biological Vegetation Treatment

Biological control using cattle, sheep, or goats would be applied to treatment areas for short periods. In using grazing animals as effective biological control measures, several factors will be considered:
• target plant species present,
• size of the infestation of target plant species,
• other plant species present,
• stage of growth of both target and other plant species,
• palatability of all plant species present,
• selectivity of all plant species present by the grazing animal being considered for use,
• availability of that grazing animal within the treatment site area,
• type of management program that is logical and realistic for the treatment site, and
• potential impacts to native wildlife and their habitat.

Standard Operating Procedures for Pile Burning

Prescribed burning is the planned application of fire to wildland fuels in their natural or modified state, under specific conditions of fuels, weather, and other variables, to allow the fire to remain in a predetermined area and to achieve site-specific fire and resource management objectives. Treatments would be implemented in accordance with BLM's procedures in Prescribed Fire Management (BLM 2000).

Before conducting a prescribed burn, a written plan must be prepared. The plan must:
• consider effects to special status species;
• consider existing conditions (amount of fuel, fuel moisture, temperatures, terrain, weather forecasts), and
• name the people responsible for overseeing the fire.

Also, natural fire that is allowed to burn needs to be carefully monitored to ensure that it will not threaten communities, ecosystems, and other values to be protected. This monitoring may require special expertise such as fire-use management teams that support the overall fire management planning and implementation for a specific prescribed fire project entails the following four phases:

<u>Phase One</u>: Information/assessment includes the following:
• determining the area to be treated,
• inventorying and assessing site-specific conditions (live and dead vegetation densities, dead and down woody fuel loadings, soil types),
• analyzing historic and present fire management,
• identifying resource objectives from land use plans, and
• conducting NEPA analysis and compliance.

<u>Phase Two</u>: Prescribed fire plan development includes the following:
• developing the site-specific prescribed fire plan to BLM's standards,
• reviewing the plan, and
• obtaining plan approval from local BLM's field office administrators.

<u>Phase Three</u>: Implementation includes the following:
• preparing the prescribed fire boundary to ensure that the fire remains within prescribed boundaries,
• preparing the site, which may include building firelines, and improving vehicle routes and wildlife and stock trails by limbing trees and clearing debris, and
• igniting the fire according to the plan's prescribed parameters.

<u>Phase Four</u>: Monitoring and evaluation includes assessment and long-term monitoring of the fire treatment to ensure that the prescribed fire has met the objectives of the approved prescribed fire plan.

All prescribed burns will be conducted during atmospheric conditions that are conducive to good smoke dispersion, by limiting the number of piles burned at one time, scheduling ignitions earlier in the day to allow for more complete combustion during daytime conditions, and planning the ignition during low wind conditions.

Standard Operating Procedures for Herbicide Use

Resource Element	Standard Operating Procedure
General See 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*).	• 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 degradates, 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 will 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 http://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. • 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

Resource Element	Standard Operating Procedure
	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 a water 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

Resource Element	Standard Operating Procedure
	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 or hay 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, needed to maintain desirable vegetation on the treatment site.
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 offsite 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. • Avoid using glyphosate formulations that include the adjuvant R-11 in aquatic ecosystems and either avoid using formulations with the surfactant POEA or seek to use the formulation with the lowest amount of POEA available to reduce risks to amphibians and aquatic organisms.
Threatened, Endangered, and Sensitive Species See Manual 6840 (Special Status Species)	• Consider effects to special status species when designing and implementing herbicide treatments. • Follow all conservation measures in the Biological Assessment (Appendix G). •

Best Management Practices for Weed Prevention

This list incorporates many suggested practices under many types of land management operation types and is designed to allow managers to pick and choose those practices that are most applicable and feasible for each situation.

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, 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 practicable, 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-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 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, re-establish 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.
- 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 ROW, and other areas of disturbed soils.

Mitigation Measures for Vegetation Treatments

Resource Element	Mitigation Measures
Air Quality	None Proposed
Soil	None Proposed
Water Resources*	Establish appropriate (herbicide-specific) buffer zones to downstream water bodies, habitats, and species/populations of interest. Consult ERAs for appropriate buffer zones, which can vary based on the type of plant, and application method.
Wetlands and Riparian Areas	See mitigation for Water Resources and Quality and Vegetation.
Vegetation**	• Minimize the use of terrestrial herbicides in watersheds with down-gradient ponds and streams if potential impacts to aquatic plants are of concern. • Establish appropriate (herbicide specific) buffer zones around downstream water bodies, habitats, and species/populations of interest. Consult the ERAs for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios. •
Fish and Other Aquatic Organisms***	• Limit the use of terrestrial herbicides in watersheds with characteristics suitable for potential surface runoff that have fish-bearing streams during periods when fish are in life stages most

Resource Element	Mitigation Measures
	sensitive to the herbicide(s) used. • Establish appropriate herbicide-specific buffer zones for water bodies, habitats, or fish or other aquatic species of interest. Consult individual ERAs for more specific information on appropriate buffer distances. • Avoid using the adjuvant R-11® in aquatic environments and either avoid using glyphosate formulations containing the surfactant POEA or seek to use formulations with the least amount of POEA to reduce risks to aquatic organisms.
Wildlife**	• To minimize risks to terrestrial wildlife, do not exceed the typical application rate for applications of triclopyr, where feasible. • Minimize the size of application areas, where practical, when applying 2,4-D to limit impacts to wildlife, particularly through contamination of food items. • Where practical, limit glyphosate to spot applications in rangeland and wildlife habitat areas to avoid contamination of wildlife food items. • Avoid using the adjuvant R-11® in aquatic environments, and either avoid using glyphosate formulations containing POEA, or seek to use formulations with the least amount of POEA, to reduce risks to amphibians. •

*See Appendix C of the National PEIS, Table C-16(http://www.blm.gov/wo/st/en/prog/more/veg_eis.html) for appropriate buffer zones, which can vary based on the type of plant, and application method.
**See Tables 4-12 and 4-14 in Chapter 4 of the National PEIS (http://www.blm.gov/wo/st/en/prog/more/veg_eis.html) for appropriate buffer zones, which can vary based on the type of plant, and application method.
*** Consult the ecological risk assessments (ERAs) in Appendix C of the National PEIS http://www.blm.gov/wo/st/en/prog/more/veg_eis.html) for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios.

Monitoring

The BLM has prepared numerous guidance and strategy documents to aid field personnel in developing and implementing monitoring plans and strategies (PEIS Appendix D; BLM 2007a). Monitoring would be used to ensure that vegetation management SOPs and mitigation measures are adopted and implemented appropriately and determined to be effective at established intervals and standards for monitoring and evaluating land management actions approved in the land use plans for the HFO and LSFO. Monitoring strategies would vary in time and space depending on the species and would be used as an adaptive process that would continually build upon past monitoring results. During preparation of implementation plans, treatment objectives, standards, and guidelines would be stated in measurable terms, where feasible, so that treatment outcomes can be measured, evaluated, and used to guide future treatment actions.

Conservation Measures for Special Status Species

General

- The BLM will identify appropriate application methods, including rate, time, and mode of application (source characterization) for projects involving the use of herbicides.

- The BLM will incorporate appropriate SOPs, mitigation measures, and conservation measures identified in the PEIS and PBA or in future ERAs and BAs that address herbicides, TEPC species, and site conditions similar to those for projects in the PDO area.
- The BLM will use herbicides in a manner consistent with labeling instructions, design criteria, and any issued reasonable and prudent measures with terms and conditions to ensure that unlawful taking of a TEPC species does not occur. In the unanticipated and unlikely event of an adverse effect on any TEPC species, formal consultation will be initiated with the USFWS pursuant to ESA Section 7.

Plants

At a minimum all weed management plans must include the following:

- A survey of all proposed action areas within potential habitat by a botanically qualified biologist, botanist, or ecologist to determine the presence/absence of the species.
- Establish site-specific no activity buffers by a qualified botanist, biologist, or ecologist in areas of occupied habitat within the proposed project area. To protect occupied habitat, treatment activities would not occur within these buffers.
- Collect baseline information on the existing condition of TEPC plant species and their habitats in the proposed project area.
- Establish pre-treatment monitoring programs to track the size and vigor of TEPC populations and the state of their habitats. These monitoring programs would help in anticipating the future effects of vegetation treatments on TEPC plant species.
- Assessment of the need for site revegetation post treatment to minimize the opportunity for noxious weed invasion and establishment.

The following must also be included in all weed management plans:

- Given the high risk for damage to TEPC plants and their habitat from burning, mechanical treatments, and use of domestic animals to contain weeds, none of these treatment methods should be utilized within 330 feet of sensitive plant populations UNLESS the treatments are specifically designed to maintain or improve the existing population.
- Off-highway use of motorized vehicles associated with treatments should be avoided in suitable or occupied habitat.
- Conduct post-treatment monitoring to determine the effectiveness of the project. In addition, the following guidance must be considered in all weed management plans in which herbicide treatments are proposed to minimize or avoid risks to TEPC species. The exact conservation measures to be included in management plans would depend on the herbicide that would be used, the desired mode of application, and the conditions of the site. Given the potential for off-site drift and surface runoff, populations of TEPC species on lands not administered by the BLM would need to be considered if they are located near proposed herbicide treatment sites.

- Do not use herbicide treatments in areas where TEPC plant species may be subject to direct spray.
- Ensure that applicators review, understand, and conform to the “Environmental Hazards” section on herbicide labels (this section warns of known pesticide risks and provides practical ways to avoid harm to organisms or the environment).

- To avoid negative effects to TEPC plant species from offsite drift, surface runoff, and/or wind erosion, establish suitable buffer zones between treatment sites and known or suspected of TEPC plants and apply the site-specific precautions outlined below.
- Follow all instructions and standard operating procedures (SOPs) to avoid spill or direct spray of herbicides into aquatic habitats that support TEPC plant species.
- Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.

The buffer distances listed below for ***broadcast spraying*** of the BLM-approved herbicides are conservative estimates compiled from ERAs cited in the PEIS and PBA (BLM 2007a, c). In most cases, a suggested buffer represents the first modeled distance from an application site for which no risks were predicted. Manual or spot treatments of undesirable vegetation may occur within the listed buffer zones if it is determined that TEPC plants would not be affected. Additional precautions during spot treatments within buffer distances from TEPC plants or their habitat would be considered while planning local projects and included as conservation measures in local-level NEPA.

Note that the buffer distances for aquatic TEPC plants reported in ERAs are typically smaller than those for terrestrial TEPC plants, indicating less susceptibility to injury or mortality from direct spray or aerial drift. The buffer distances for aquatic plants refer only to emergent or submergent species (i.e., that occur in seasonally or permanently inundated sites). Buffer distances used by the PDO for herbicide treatments in proximity to riparian plants or non-aquatic wetland plants would be the same as for terrestrial TEPC plants.

2,4-D
- Do not apply within 0.5 mile of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants.
- Do not use aquatic formulations in aquatic habitats containing aquatic TEPC plants.

Glyphosate
- Do not apply aerially within 300 feet of terrestrial TEPC plants.
- Do not apply within 50 feet of terrestrial TEPC plants when using a low boom at the typical rate.
- Do not apply within 300 feet of terrestrial TEPC plants when using a low boom at the maximum rate or a high boom at either rate.
- Do not apply within 0.5 mile of terrestrial TEPC plants when using a high boom at either rate.

Imazapyr
- Do not apply within 900 feet of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants at the typical ate when using aerial or ground methods at the typical rate.
- Do not apply within 0.5 mile of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants when using aerial or ground methods at the maximum rate.
- Do not use aquatic formulations in aquatic habitats containing aquatic TEPC plants.
- Do not apply within 0.5 mile of TEPC plants in areas where wind erosion is likely.

Triclopyr Acid
- Do not apply aerially at the typical rate within 500 feet of terrestrial TEPC plants.

- Do not apply aerially at the maximum rate within 0.5 mile of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants.
- Do not apply within 300 feet of terrestrial TEPC plants using a low boom at the typical rate.
- Do not apply within 0.5 mile of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants when using a low boom at the maximum rate or a high boom at either rate.
- If applying to aquatic habitats containing aquatic TEPC plants, do not exceed the targeted water concentration on the product label.
- Do not apply within 0.5 mile of TEPC plants in areas where wind erosion is likely.

Triclopyr BEE

- Do not apply aerially at the typical rate within 500 feet of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants.
- Do not apply aerially at the maximum rate within 0.5 mile of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants.
- Do not apply within 300 feet of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants when using a low boom at the typical rate.
- Do not apply within 0.5 mile of terrestrial TEPC plants or aquatic habitats containing aquatic TEPC plants when using a low boom at the maximum rate or a high boom at either rate.
- Do not use aquatic formulations in aquatic habitats containing aquatic TEPC plants.
- Do not apply within 0.5 mile of TEPC plants in areas where wind erosion is likely.

In addition to the selection of specific locations, herbicides, application methods, application rates, and buffer distances for specific sites during the annual treatment planning, the PDO would also consider measures to prevent the spread of weeds in occupied or suitable habitat conjunction with weed treatments and all projects involving ground-disturbing activities. These measures include the following:

- Seed cleared areas that are prone to invasion by downy brome or other noxious weeds with an appropriate seed mixture to reduce the probability of noxious weeds or other undesirable plants becoming established on the site.
- Where seeding is warranted, seed bares areas (whether from ground disturbance or removal of weeds) as soon as appropriate after treatment, considering the time of year and any waiting period following use of a specific herbicide.
- Use only native species when revegetating bares areas in occupied or suitable habitat and use only species that are compatible with the specific habitat or TEPC plant.
- Use only native seed that is certified free of noxious weed seeds in occupied or suitable TEPC species habitat.
- Use only certified weed-free straw and hay bales for mulch or erosion control in occupied or suitable TEPC species habitat.
- Wash vehicles and heavy equipment used during weed treatment activities prior to arriving at a new location to avoid transferring noxious weed seeds.

In addition, the PDO would develop and implement additional conservation measures, as necessary, during project-level analysis at the project level.

Aquatic animals

Conservation Measures for Site Access and Fueling/Equipment Maintenance

For treatments occurring in watersheds with TEPC species or designated critical habitat, or in undesignated critical habitat (i.e., unoccupied habitat critical to species recovery):

- Where feasible, access work site only on existing roads, and limit all travel on roads when damage to the road surface will result or is occurring.
- Where TEPC aquatic species occur, consider ground-disturbing activities on a case by case basis, and implement SOPs to ensure minimal erosion or impact to the aquatic habitat. Do not conduct biomass removal (harvest) activities that will alter the timing, magnitude, duration, or spatial distribution of peak, high, and low flows outside the range of natural variability.
- **Within riparian areas**, do not drive vehicles off established roads; do not land helicopters except in emergencies.
- **Outside riparian areas**, do not drive vehicles off established roads on slopes steeper than 20%.
- **Within 150 feet of wetlands or riparian areas**, do not fuel/refuel equipment, store fuel, or perform equipment maintenance (locate all fueling and fuel storage areas, as well as service landings outside protected riparian areas).
- Prior to helicopter fueling operations, prepare a transportation, storage, and emergency spill plan and obtain the appropriate approvals; for other heavy equipment fueling operations use a slip-tank not greater than 250 gallons; prepare spill containment and cleanup provisions for maintenance operations.

Conservation Measures Related to Revegetation Treatments

- **Outside riparian areas**, avoid hydromulching within buffer zones established at the local level. This precaution will limit adding sediments and nutrients and increasing water turbidity.
- **Within riparian areas**, engage in consultation at the local level to ensure that revegetation activities incorporate knowledge of site-specific conditions and project design.

Conservation Measures Related to Herbicide Treatments

- Maintain equipment used for transportation, storage, or application of chemicals in a leak-proof condition.
- Do not store or mix herbicides, or conduct post-application cleaning within riparian areas.
- Ensure that trained personnel monitor weather conditions at spray times during application.
- Strictly enforce all herbicide labels.
- Follow all instructions and SOPs to avoid spilling or direct spraying herbicides into aquatic habitats.
- Do not broadcast spray when wind velocity exceeds 10 mph.
- Do not broadcast spray within 100 feet of open water when wind velocity exceeds 5 mph.
- Do not broadcast spray if precipitation is occurring or is expected within 24 hours.
- Do not broadcast spray if air turbulence is sufficient to affect the normal spray pattern.
- Do not broadcast spray in upland habitats within 0.5 mile of aquatic habitat when the potential exists for runoff from the treated area into the aquatic habitat.
- Use only herbicides approved for use in aquatic systems when treating weeds in riparian areas, 100-year floodplains, or Designated Critical Habitat for TEPC fish species.
- Treat the smallest area that will achieve the desired level of weed control.

- Use the typical application rate, rather than the maximum application rate, whenever practicable based on the weed species, site conditions, application method, and desired level of weed control.

The special restrictions and buffer distances provided below are based on the information provided by ERAs and are designed to provide protection to TEPC plants. Observe the following buffers or restrictions on application methods for specific herbicides:

- Do not use terrestrial formulations of glyphosate, or triclopyr BEE to treat aquatic vegetation where aquatic vertebrates or TEPC aquatic invertebrates occur or may occur.
- Do not use imazapyr to treat upland sites with the potential for transport by runoff or aerial drift into streams, ponds, or lakes where aquatic vertebrates or TEPC aquatic invertebrates occur or may occur.
- Do not broadcast spray glyphosate, or triclopyr BEE by either aerial or ground methods to treat upland sites adjacent to aquatic habitats that support or may support aquatic vertebrates or TEPC aquatic invertebrates.
- Do not use glyphosate formulations that include R-11 and either avoid formulations with the surfactant POEA or use the formulation with the lowest amount of POEA available.

Conservation Measures Related to Biological Control Treatments using Livestock

For treatments in **watersheds** that support TEPC species or in critical habitat:

- Where terrain permits, locate stock handling facilities, camp facilities, and improvements at least 300 feet from lakes, streams, and springs.
- Educate stock handlers about at-risk fish species and how to minimize negative effects to the species and their associated habitat.
- Employ appropriate dispersion techniques to range management, including judicial placement of salt blocks, troughs, and fencing, to prevent damage to riparian areas but increase weed control. Equip each watering trough with a float valve.

For treatments within **riparian** areas, more protective measures are required:

- Do not conduct weed treatments involving domestic animals, except where it is determined that these treatments will not damage the riparian system, or will provide long-term benefits to riparian and adjacent aquatic habitats.
- Do not locate troughs, storage tanks, or guzzlers near streams with TEPC species, unless their placement will enhance weed-control effectiveness without damaging the riparian system.

Conservation Measures Related to Mechanical Treatments

Note: these measures apply only to treatments occurring in watersheds that support TEPC species or in unoccupied habitat critical to species recovery (including but not limited to critical habitat, as designated by USFWS).

Outside riparian areas in watersheds with TEPC species or designated or undesignated critical habitat (i.e., unoccupied habitat critical to species recovery):

- Conduct soil-disturbing treatments only on slopes of 20% or less, where feasible.
- Do not conduct log hauling activities on native surface roads prone to erosion, where feasible.

Within riparian areas in these watersheds, more protective measures will be required to avoid negatively affecting TEPC species or their habitat:

- Do not use vehicles or heavy equipment, except when crossing at established crossings.
- Do not remove large woody debris or snags during mechanical treatment activities.
- Do not conduct ground disturbing activities (e.g., disking, drilling, chaining, and plowing).
- Ensure that all mowing follows guidance to avoid negative effects to streambanks and riparian vegetation and major effects to streamside shade.
- Do not use equipment in perennial channels or in intermittent channels with water, except at crossings that already exist.
- Leave suitable quantities (to be determined at the local level) of excess vegetation and slash on site.
- Do not apply fertilizers or seed mixtures that contain chemicals by aerial methods.
- Do not apply fertilizer within 25 feet of streams and supersaturated soils; apply fertilizer following labeling instructions.
- Do not apply fertilizer in desert habitats.
- Do not completely remove trees and shrubs.

Conservation Measures Related to Pile Burning

Within riparian areas, in watersheds with TEPC species or their habitats:

- Conduct prescribed burning only when long-term maintenance of the riparian area is the primary objective, and where low intensity fires can be maintained.
- Do not construct black lines, except by non-mechanized methods.
- Utilize/create only the following firelines: natural barriers; hand-built lines parallel to the stream channel and outside of buffer zones established at the local level; or hand built lines perpendicular to the stream channel with waterbars and the same distance requirement.
- Do not ignite fires using aerial methods.
- In forested riparian areas, keep fires to low severity levels to ensure that excessive vegetation removal does not occur.
- Have a fisheries biologist determine whether pumping activity can occur in streams with TEP species.
- During water drafting/pumping, maintain a continuous surface flow of the stream that does not alter original wetted stream width.
- Do not alter dams or channels in order to pump in streams occupied by TEP species.
- Do not allow helicopter dipping from waters occupied by TEP species, except in lakes outside of the spawning period.
- Consult with a local fisheries biologist prior to helicopter dipping in order to avoid entrainment and harassment of TEP species.

In addition, the PDO would develop and implement additional conservation measures, as necessary, during project-level analysis at the project level.

APPENDIX F. Currently Permitted Grazing Allotments Administered by the PDO

Hassayampa Field Office

Allotment Name	Allotment Number	Permitted AUMS	Livestock Number	Livestock Type
Hassayampa Field Office				
6Y Ranch Lease	5042	213	25	Cattle
A Bar V	5047	24	2	Cattle
Aguila	3000	5073	427	Cattle
Antelope Creek	6238	600	50	Cattle
Arrow Y (15)	84	204	33	Cattle
Arrow Y (3)	69	2151	339	Cattle
Auza	5032	84	7	Cattle
Beardsley Canal	6185	12	1	Cattle
Bialac	3008	Ephemeral		Cattle
Big Bug Creek	6143	108	9	Cattle
Big Rebel Mine	6066	36	3	Cattle
Black Canyon	6122	95	16	Horse
Bo Nine	6095	948	79	Cattle
Boulder Creek	6215	5040	600	Cattle
Box Canyon Ranch	5029	72	6	Cattle
Buckhorn	6243	924	175	Cattle/Horse
Buckhorn Creek	6150	72	6	Cattle
Bumble Bee	6161	2640	485	Cattle
Cactus Garden	3011	1098	104	Cattle
Carter-Herrera	3015	512	52	Cattle
Castle Hot Springs	6206	60	8	Cattle
Central Az Ranch Co	3014	2329	211	Cattle
Champie	6026	1100	195	Cattle
Chaparral Gulch	6065	408	34	Cattle
Clem	3017	1085	400	Cattle
Congress	3019	3242	614	Cattle
Congress-Sky Arrow	5014	108	52	Cattle
Cooper Ranch	5013	2220	185	Cattle
Copper Mountain	6139	216	18	Cattle
Cottonwood Creek	6246	96	8	Cattle
Coughlin	5015	168	14	Cattle
Cross Mountain	3021	12	1	Cattle
Desert Hills	3025	365	39	Cattle
Desert Hills Lease	5016	432	36	Cattle
Dewey	6094	180	75	Goat
Douglas	3026	144	300	Cattle
Eagle Eye	3027	Ephemeral		Cattle
Echeverria	3029	713	60	Cattle

Allotment Name	Allotment Number	Permitted AUMS	Livestock Number	Livestock Type
Effus	3030	1155	125	Cattle
Eleven L	6103	1962	244	Cattle/Horse
Flat Iron	3031	457	38	Cattle
Foraker	5017	180	15	Cattle
Forepaugh Cattle Co.	5012	888	74	Cattle
Galena Gulch	6201	432	36	Cattle
Garcia	3095	3150	350	Cattle/Sheep
Grantham Bros. Lease	5049	156	13	Cattle
Green Gulch	6229	12	1	Cattle
Hackberry Gulch	6057	60	5	Cattle
Hackberry Mine	6046	12	1	Cattle
Hassayampa River	6035	12	1	Cattle
Hassayampa River Ran	5008	732	61	Cattle
Heine	5023	24	2	Cattle
Hozoni	6223	1703	330	Cattle
Humboldt	6181	24	2	Cattle
Humbug	6245	101	111	Cattle/Horse
J V Bar	6222	1781	209	Cattle/Horse
Jesus Canyon	6227	1068	111	Cattle/Horse
Jones	3045	900	75	Cattle
Kennedy	3010	360	30	Cattle
Kirkland	5019	132	11	Cattle
Lockett	6109	60	5	Cattle
Los Caballeros	3052	939	103	Cattle/Horse
Lower Bo Nine	95	60	5	Cattle
Mayer	6011	264	22	Cattle
Michael Lease	5033	516	52	Cattle
Minnehaha Creek	6021	60	5	Cattle
Moralez	5035	826	86	Cattle
Ohaco	3060	1476	150	Cattle
Osborne Spring Wash	6213	60	5	Cattle
Oso Ranch Allotment	5040	768	64	Cattle
Poland Junction	6135	276	23	Cattle
Quarter Circle J	5020	144	12	Cattle
R. and E. Park Lease	85	144	33	Cattle
Rafter Lazy W Ranch	5030	120	10	Cattle
Ridgeway-Kong	3071	120	10	Cattle

Allotment Name	Allotment Number	Permitted AUMS	Livestock Number	Livestock Type
Rock Springs	6219	96	8	Cattle
Sky Arrow	3079	684	339	Cattle
Sprouse	3081	819	75	Cattle
Square M	5010	60	5	Cattle
Tee	6128	1728	144	Cattle
Texas Gulch	6048	48	4	Cattle
Thompson Lease	5004	144	12	Cattle
Three Canyon	6142	252	21	Cattle
Turner	3084	Ephemeral		Cattle
U Cross	6239	1667	248	Cattle
VX Ranch	6104	680	111	Cattle/Horse
W Diamond	5028	384	32	Cattle
Wagoner	6147	12	1	Cattle
West Wing Mountain	6056	Ephemeral		Cattle/Sheep
Whitehead	5048	288	24	Cattle
Yarber Wash	6027	156	13	Cattle
Agua Fria National Monument				
Badger Spring Wash	6182	12	1	Cattle
Bluebell	6012	72	6	Cattle
Box Bar	6063	2447	206	Cattle
Cordes	6005	731	2470	Sheep
Cordes	6005	936	78	Cattle/Horse
Cosanti Ranch	6145	48	4	Cattle
Cross Y	6013	2790	250	Cattle
EZ Ranch	6045	972	81	Cattle
Horseshoe	6235	4572	381	Cattle
2Y	48	216	18	Cattle
Sycamore	6169	696	58	Cattle/Horse
TOTAL		74,428		

Lower Sonoran Field Office

Allotment Name	Allotment Number	Permitted AUMS	Livestock Number	Livestock Type
Lower Sonoran Field Office				
Arkansas Gulch	6097	36		
Beloat[1]	3007	2,212		
Big Horn[1]	3009	148		
Buckeye Mountain	6050	48		
Buzzards Roost	6080	48		
Childs	3016	3,802		
Clem[2]	3017	196		
Conley[1]	3018	464		
Coyote Flat #2[3]	106	361		
Florence Junction	6053	24		
Gable-Ming	3032	4,200		
Gila Bend Indians	3035	903		
Hansen	3039	917		
Hazen[1]	3042	295		
Kirian	3046	387		
Lost Gulch	6014	324		
Lower Vekol[1]	3053	338		
Rescue Canyon	6082	300		
Saddle Mountain	3072	553		
Sentinel	3076	353		
Smelter Canyon	6226	12		
Table Top	3083	144		
Ward	3086	1,476		
A Lazy T	3002	Ephemeral		
Amavisca	3003	Ephemeral		
Arnold[*]	3004	Ephemeral		
Artex	3005	Ephemeral		
Dendora Valley	3024	Ephemeral		
Gable-Peterson	3033	Ephemeral		
Gila River Comm.	3036	Ephemeral		
Gillespie	3037	Ephemeral		
Hazen-Shepard	3043	Ephemeral		
Jagow-Kreager	3044	Ephemeral		
Layton	3049	Ephemeral		
Mariani	3054	Ephemeral		
North Star	6248	Ephemeral		
Painted Rock	3062	Ephemeral		
Palo Verde Mtns	6174	Ephemeral		
Powers Butte	3068	Ephemeral		
Queen Valley	6173	Ephemeral		
Santa Rosa	5055	Ephemeral		

Allotment Name	Allotment Number	Permitted AUMS	Livestock Number	Livestock Type
Sevey	3039	Ephemeral		
Stout	3082	Ephemeral		
Walker Butte	6041	Ephemeral		
Wilson [4]	3092	n/a		
Sonoran Desert National Monument				
Beloat	3007	776		
Big Horn	3009	2,812		
Conley	3018	3,403		
Hazen	3042	886		
Lower Vekol	3053	826		
Arnold	3004	n/a		
Big Horn	3009	3,144		
South Vekol	3080	1,862		
Table Top	3083	2,046		
Vekol	3085	832		
Santa Rosa	5055	Ephemeral		
TOTAL		**34,128**		

APPENDIX G: Biological Assessment for the Phoenix District Integrated Weed Management Plan

United States Department of the Interior
Bureau of Land Management

Biological Assessment
July 2015

Phoenix District Integrated Weed Management
Biological Assessment

Prepared for: BLM Phoenix District
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Phoenix, Arizona

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Appendices

1.0 Introduction

The Bureau of Land Management (BLM) is preparing this Biological Assessment (BA) for Integrated Weed Management (IWM) on the Phoenix District. The Phoenix District proposes to treat Arizona state-listed noxious weeds and other invasive plant species, as defined by the Arizona Department of Agriculture Noxious Weed List or the BLM National List of Invasive Weed Species of Concern, found on BLM-administered lands within the Phoenix District Office (PDO). The Proposed Action involves implementing IWM to treat weed infestations of 100 acres or less, using an early detection/rapid response approach. The Proposed Action is to treat small infestations of noxious weeds before they spread to the point where they are very difficult and costly to control. These treatments are expected to have long-term ecosystem benefits through restoring native plant communities and reducing the risk of high intensity wildfires. Because BLM vegetation treatment activities have the potential to modify the physical environment, this programmatic BA was prepared to analyze the potential effects to federally listed threatened and endangered species, species proposed for listing, proposed and designated critical habitats, and candidate species as a result of vegetation treatments. This biological assessment provides the determinations of the likelihood of effects to the U.S. Fish and Wildlife Service (USFWS) federally listed species anticipated through implementation of the proposed action. This BA tiers to the *Final Biological Assessment for Vegetation Treatment Using Herbicides on Bureau of Land Management (BLM) Lands in 17 Western States* (BLM 2007a) and the *Final Vegetation Treatments on BLM lands in 17 Western States Programmatic Environmental Report* (PER; 2007b).

The proposed actions outlined in this BA, and the effects of these actions, are general descriptions of possible outcomes that may affect listed species from the implementation of treatments. Conservation measures are outlined for each treatment tool as it pertains to individual listed species. These conservation measures have been cooperatively developed with the Arizona Ecological Services Office of the USFWS and are designed to attenuate actions that "may adversely affect" listed species, thus rendering the actions "not likely to adversely affect" species at the programmatic level. In the event that BLM cannot adhere to the conservation measures for a particular proposed treatment, BLM will evaluate effects to listed species, and the need to consult with the USFWS, at the project level.

Table 16. Threatened, endangered, proposed and candidate species (TEPC) and critical habitat or proposed critical habitat that may be affected by the Proposed Action. The "X" indicates where the species is known to occur within the Phoenix District Office (HFO = Hassayampa Field Office; LSFO = Lower Sonoran Field Office). The dashed lines (--) indicate that the species no longer occurs in the Field Office.

Species Name	Federal Status	HFO	LSFO
Mammals			
Sonoran pronghorn *Antilocapra americana sonoriensis*	Endangered		X
Lesser long-nosed bat *Leptonycteris curasoae yerbabuenae*	Endangered		X
Birds			
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Endangered Designated Critical Habitat	X X	X X
Western Yellow-billed Cuckoo *Coccyzus americanus occidentalis*	Threatened Proposed Critical Habitat	X X	X X
Yuma Clapper Rail	Endangered		X

Species Name	Federal Status	HFO	LSFO
Rallus longirostris yumanensis			
Reptiles			
Sonoran Desert Tortoise *Gopherus morafkai*	Candidate	X	X
Northern Mexican gartersnake *Thamnophis eques megalops*	Threatened Proposed Critical Habitat	X X	
Fish			
Desert pupfish *Cyprinodon macularius*	Endangered	X	
Gila chub *Gila intermedia*	Endangered Designated Critical Habitat	X X	
Gila topminnow *Poeciliopsis occidentalis occidentalis*	Endangered	X	
Spikedace *Meda fulgida*	Endangered	--	
Plants			
Acuña Cactus *Echinomastus erectocentrus* var. *acunensis*	Endangered Proposed Critical Habitat		X X

The PDO manages approximately 2.4 million acres of public land managed by the Lower Sonoran (LSFO) and Hassayampa (HFO) Field Offices (Figure 1). These lands include approximately 1.4 million acres of federal land in the LSFO in south-central Arizona, including the 500,000-acre Sonoran Desert National Monument and approximately 1-million acres of federal land in the HFO north of US Interstate 10, including the 70,900-acre Agua Fria National Monument. The PDO includes all or portions of the following counties: Apache, Navajo, Coconino, Yavapai, Maricopa, Pinal, and Pima.

BLM has made ecosystem health a priority on the lands it manages and uses the Land Health Standards as described in *Arizona Standards for Rangeland Health and Guidelines for Grazing Administration* in achieving proper functioning of ecological processes (i.e., soils, riparian-wetland sites, upland and riparian-wetland plant communities; 1997). One of the greatest obstacles of healthy ecosystems is the rapid expansion of weeds across public lands. Weeds can dominate and often cause permanent damage to natural plant communities, jeopardize the overall health of public lands and activities that occur on them. Weeds can also reduce quality and quantity of habitat and forage for wildlife and livestock, alter soil productivity, increase the potential for soil erosion and adverse impacts on water quality, and may cause a loss of riparian area function. The PDO has utilized manual, mechanical, and prescribed fire methods to treat invasive weed species. Currently, there are 36 weed species known to occur within the PDO (Table 2).

The purpose of this BA is to:

- Evaluate the effects of proposed vegetation treatments on listed species, candidate species, species proposed for listing, and/or their critical habitat or proposed critical habitat within the PDO. These effects are being considered as part of this consultation with the USFWS for vegetation treatment activities in the PDO.
- Determine the need for consultation and conference with the USFWS.
- Meet the requirements of the ESA and the National Environmental Policy Act (NEPA, 42 U.S.C. 4321 *et seq.*, implemented at 40 Code of Federal Regulations [CFR] parts 1500-1508).

- Prepare effects determination on the listed species, candidate species, species proposed for listing, and/or their critical habitat or proposed critical habitat within the PDO for the proposed action.
- Recommend conservation measures to reduce or eliminate adverse effects on the listed species, candidate species, species proposed for listing, and/or their critical habitat or proposed critical habitat within the PDO.

The effects of many land uses in the planning area have been evaluated in several consultations or conferences and subsequent biological or conference opinions. Consultations and Conferences within the planning areas include:

[2-21-88-F-167]	The Phoenix Resource Management Plan and Environmental Impact Statement (EIS)
[2-21-91-F-060]	Tule Creek Exclosure
[2-21-91-F-469]	Tule Creek Riparian Exclosure Pipeline
[2-21-93-F-263]	Revised Black Canyon Habitat Management Plan (HMP)
[2-21-96-F-421]	Lower Gila North Management Framework Plan and Lower Gila North Final Grazing Environmental Impact Statement (EIS)
[2-21-96-F-422]	Eastern Arizona Grazing EIS, Phoenix District portion
[2-21-97-I-399]	Lake Pleasant Burro Herd Management Plan
[2-21-99-F-031]	Reintroduction of Gila Topminnow and Desert Pupfish into Three Tributaries of the Agua Fria River
[2-21-03-F-210]	BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management
[2-21-03-C-409]	Existing Phoenix Resource Management Plan for the Agua Fria National Monument
[2-21-03-F-0409-R1]	Existing Phoenix Field Office Planning Decisions and Associated Activities on Gila Chub in the Agua Fria National Monument
[2-21-05-F-0785]	Effects of the Agua Fria National Monument and Bradshaw-Harquahala Resource Management Plan on Federally-Listed Species
[22410-2006-F-0006]	Activities Affecting the Gila Topminnow and Desert Pupfish at Buckhorn spring, and Desert Pupfish at Tule Creek
[22410-F-2009-0106]	Proposed Translocation of Gila Topminnow and Desert Pupfish to Morgan City Wash and Chalky Spring
[22410-2009-F-0509]	Hazardous Fuels Reduction and Vegetation Restoration in the Lower Gila River
[02EAAZ00-2012-F-0203]	Sonoran Desert National Monument and Lower Sonoran Resource Management Plan

Figure 5. Vicinity Map of BLM Phoenix District Office

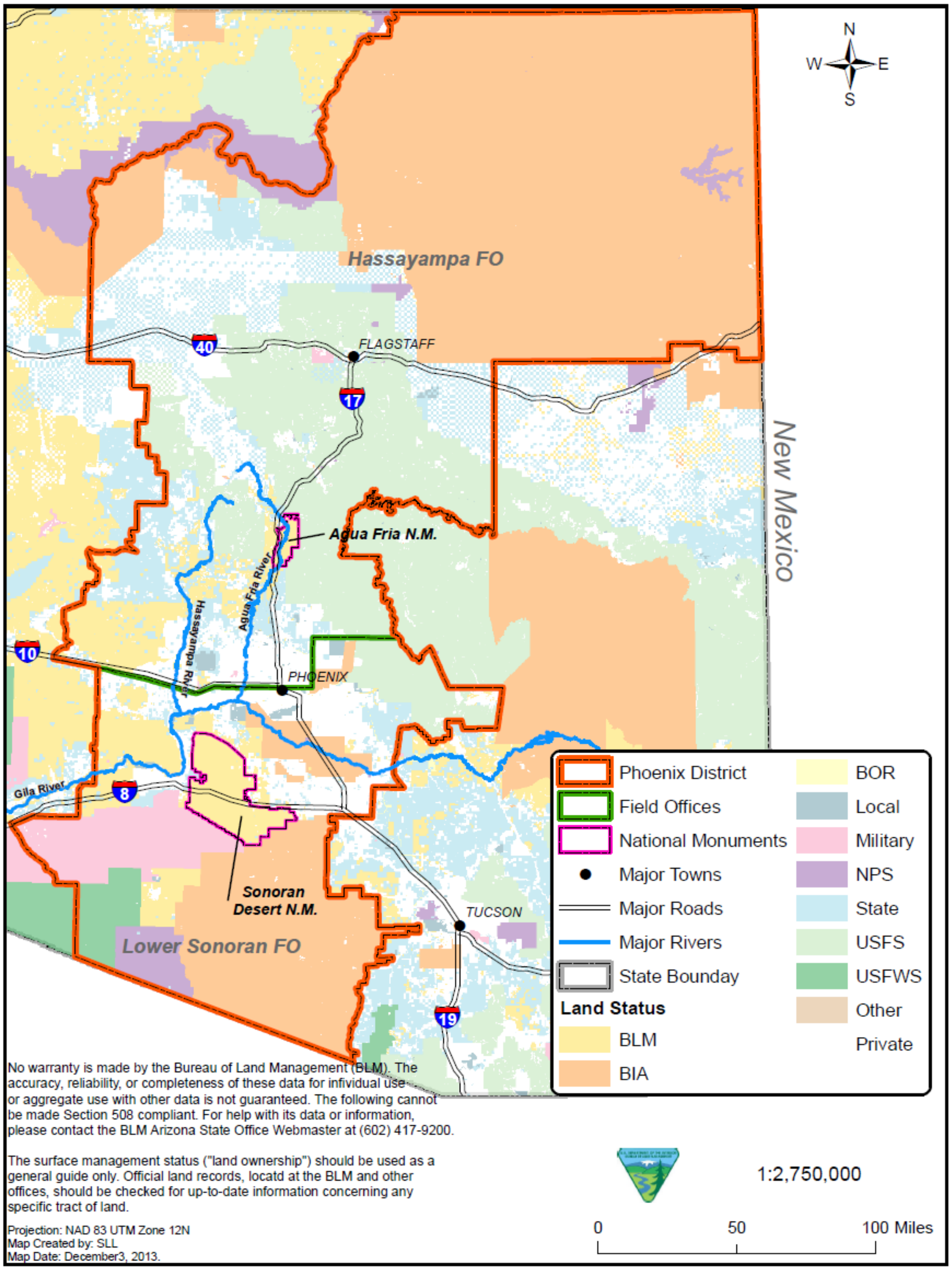

Table 17. Weed Species Known to Occur on BLM Lands within the Phoenix District

Weed Name*	AZ Agriculture List	AZ-WIPWG Class	BLM National List
Russian knapweed *Acroptilon repens*	Prohibited & Restricted	High	
Jointed goatgrass *Aegilops cylindrica*	Prohibited & Restricted	Low	
Camelthorn *Alhagi maurorum*	Prohibited & Restricted	Medium	X
Giant reed *Arundo donax*		High	X
Wild oat *Avena fatua*		Medium	
Black mustard *Brassica nigra*			X
Asian mustard *Brassica tournefortii*		Medium	X
Ripgut brome *Bromus diandrus*		Medium	X
Smooth brome *Bromus inermis*		Medium	X
Japanese brome *Bromus japonicus*			X
Red brome *Bromus rubens*		High	X
Cheatgrass *Bromus tectorum*		High	X
Globe-podded hoary cress *Cardaria draba*	Prohibited & Restricted	Medium	X
Malta starthistle *Centaurea melitenisis*		Medium	X
Squarrose knapweed *Centaurea squarrosa*			X
Field bindweed *Convolvulus arvensis*	Prohibited & Regulated	Medium	X
Bermuda grass *Cynodon dactylon*		Medium	X
Quackgrass *Elytrigia repens*	Prohibited & Restricted	Low	
Lehmann lovegrass *Eragrostis lehmanniana*		High	X
Redstem stork's bill *Erodium cicutarium*		Medium	
Halogeton *Halogeton glomeratus*	Prohibited & Restricted		X
Mouse barley *Hordeum murinum*		Medium	
Dalmatian toadflax *Linaria dalmatica*	Prohibited & Restricted	Medium	X
Yellow sweetclover		Medium	

Weed Name*	AZ Agriculture List	AZ-WIPWG Class	BLM National List
Melilotus officinalis			
Scotch thistle *Onopordum acanthium*	Prohibited & Restricted	Low	X
Buffelgrass *Pennisetum ciliare*	Prohibited & Regulated	High	
Crimson fountain grass *Pennisetum setaceum*		High	X
Ravengrass *Saccharum ravennae*		Medium	
Russian thistle *Salsola targus*		Medium	
Giant salvina *Salvinia molesta*	Prohibited & Regulated	High	
Arabian schismus *Schismus arabicus*		Medium	X
Mediterranean grass *Schismus barbatus*		Medium	X
Common sowthistle *Sonchus oleraceus*		Medium	
Johnsongrass *Sorghum halepense*		Medium	X
Tamarisk *Tamarix* spp.		High	X
Puncturevine *Tribulus terrestris*	Prohibited & Regulated		

*Data based on Southwest Exotic Plant Information *Clearinghouse* (SWEPIC) database and site-specific field visits

2.0 Description of the Proposed Action

The purpose of the proposed action is to maximize effective weed control, while minimizing negative environmental, impacts, and costs. The Integrated Weed Management (IWM) utilizes prevention, detection, multiple treatment approaches, and education for use in eradicating, controlling, and/or containing weeds. The IWM approach would allow for selection from a range of possible control methods, including hand tools, mechanical tools, biological tools, prescribed fire (pile burning only for this Proposed Action), and herbicides (with appropriate additives, including adjuvants and surfactants).

The Proposed Action involves implementing IWM to treat weed infestations of 100 acres or less, using a rapid response approach. The Proposed Action will allow BLM to treat small infestations of noxious weeds before they spread to the point where they are very difficult and costly to control. These treatments are expected to have long-term ecosystem benefits through restoring native plant communities and reducing the risk of high intensity wildfires. Weeds would be treated using the best available weed control technique(s) at the appropriate times based on the life history of the target species and cost-effectiveness. The weed species known to occur or that have the potential to occur within the PDO and their potential treatment methods are listed in Table 3. Prior to conducting treatments, a Determination of NEPA Adequacy (DNA) process would be initiated to ensure that the analysis conducted in this EA is sufficient. If the analysis is determined to be sufficient, a decision would be issued to conduct treatments. Treatments would not be conducted north of Interstate 40.

The Proposed Action includes potential use of four of the 18 herbicide active ingredients approved in the *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (2007 PEIS) (BLM 2007a). The active ingredients include 2, 4-D, glyphosate, imazapyr, and triclopyr. Standard Operating Procedures (SOPs) for herbicide application were identified in the 2007 PEIS and would be followed.

Table 18. Weed Species Known to Occur or Have the Potential to Occur within the Phoenix District Office and Potential Treatment Methods

Weed Name*	Occurrence	Potential Treatment Methods
Russian knapweed	Potential	Chemical, Mechanical, and Biological
Jointed goatgrass	Known	Chemical and Mechanical
Camelthorn	Known	Chemical
Giant reed	Known	Chemical and Mechanical
Wild oat	Known	Chemical and Mechanical
Black mustard	Known	All*
Asian mustard	Known	Chemical, Mechanical, and Manual
Ripgut brome	Known	Chemical, Mechanical, and Manual
Japanese brome	Known	Chemical, Mechanical, and Biological
Red brome	Known	Chemical and Manual
Cheatgrass	Known	Chemical and Manual
Globe-podded hoary cress	Potential	Chemical and Mechanical
Malta starthistle	Known	Chemical, Mechanical, and Biological
Lambs Quarters	Known	Chemical and Mechanical
Field bindweed	Potential	Chemical, Mechanical, and Biological
Bermuda grass	Known	Chemical and Mechanical
Quackgrass	Potential	All*
Lehmann lovegrass	Known	Chemical
Redstem stork's bill	Known	Manual and Chemical
Halogeton	Known	Chemical, Mechanical, and Manual
Mouse barley	Known	Chemical and Mechanical
Kochia or Fireweed	Known	Chemical, Mechanical, and Biological
Prickly Lettuce	Known	Chemical and Manual
Dalmatian toadflax	Known	Chemical, Manual, and Biological
Yellow sweetclover	Known	Chemical and Manual
Tree Tobacco	Known	Chemical and Mechanical
Globe Chamomile	Known	Chemical and Manual
Scotch thistle	Potential	Chemical, Manual, and Biological
Buffelgrass	Known	Chemical, Mechanical, and Manual
Crimson fountain grass	Known	Chemical and Manual

Weed Name*	Occurrence	Potential Treatment Methods
Rabbitfootgrass	Known	Chemical and Biological
Ravengrass	Potential	Chemical, Mechanical, and Manual
Russian thistle	Known	Chemical, Manual, and Biological
Arabian schismus	Known	Chemical
Mediterranean grass	Known	Chemical
London Rocket	Known	Chemical and Mechanical
Common sowthistle	Known	Chemical, Manual, and Biological
Johnsongrass	Known	Chemical and Mechanical
Tamarisk	Known	Chemical, Manual, and Mechanical
Horse Purslane	Known	Chemical
Puncturevine	Known	Chemical, Manual, and Biological
Fan Palm	Known	Chemical and Manual

*All = Manual, Mechanical, Biological (Grazers), and Chemical Treatment Methods

2.1 Treatment Methods

<u>Manual Treatment</u>

Manual treatments would include the use of hand tools and hand-operated power tools to cut, prune, or remove herbaceous and woody species. Treatments would include but are not limited to cutting undesired plants above ground level; pulling, digging, or grubbing out root systems to prevent re-sprouting and regrowth; cutting at the ground level or removing competing plants around desired plants; or placing mulch around desired vegetation to limit weed germination or growth (BLM 1991). Hand tools would include handsaw, axe, shovel, rake, machete, grubbing hoe, mattock, brush hook, hand clippers, motorized chainsaw, weed whacker, power brush saw, and Pulaski tool.

Manual treatments would typically be used on small isolated infestations, where special status species occur, or in sensitive habitat areas. Manual treatments are most effective on small weed infestations and when complete root removal is possible (Rees et al. 1996). Manual treatments work well for annual or biennial species with tap roots or shallow roots that do not re-sprout from tissue remaining in the soil. Sandy or gravelly soils allow for easier root removal. Repeated treatments are often necessary due to soil disturbance and residual weed seeds in the seed bank.

Where appropriate prescribed burning of piled vegetation may occur following manual treatments. Prescribed burning of piled vegetation debris would remove the potential of contributing to existing hazardous fuel loads and destroying seeds of undesirable plants in the pile. If piles are placed on top of undesirable plants, such as piling cuttings on top or juniper stumps during grassland restoration projects, root tissues could be destroyed, preventing re-sprouting of the undesirable plants. Piles would be ignited using hand ignitions such as hand-held drip torch, fusee, or backpack propane tanks. Pile burning may be conducted at any time in some locations, though most burning occurs during the winter to reduce the risk of escape fire (BLM 2009). Vegetative material in the piles will first have to dry long enough for the material to ignite and be consumed by the fire. All prescribed pile burning would be implemented with a prescribed fire burn plan and a smoke management plan in accordance with BLM procedures and the *Phoenix District Zone Fire Management Plan* (BLM 2009) and would comply with federal and state air quality regulations. Pile burning would generally be used under low wind conditions to reduce the probability of escape.

Mechanical Treatment

Mechanical treatments involve the use of a tractor or vehicle with attached implements (e.g., root rippers, plows, harrows, mowers). These vehicles tend to remove all vegetation in the path of travel, and often uproot vegetation and disturb the soil. The type of mechanical method used on a particular site is based on characteristics of the weed species present, seedbed preparation and revegetation needs, topography and terrain, soil characteristics, climatic conditions, and a comparison of the improvement costs to the expected productivity of the site (BLM 1991). Treatments that may be used include mastication and root knifing, chaining, tilling and drilling seed, mowing, roller chopping and cutting, blading, grubbing, and feller-bunching.

Where appropriate prescribed burning of piled vegetation may occur following mechanical treatments. Prescribed burning of piled vegetation debris would remove the potential of contributing to existing hazardous fuel loads and destroying seeds of undesirable plants in the pile. If piles are placed on top of undesirable plants, such as piling cuttings on top or juniper stumps during grassland restoration projects, root tissues could be destroyed, preventing re-sprouting of the undesirable plants. Piles would be ignited using hand ignitions such as hand-held drip torch, fusee, or backpack propane tanks. Pile burning may be conducted at any time in some locations, though most burning occurs during the winter to reduce the risk of escape fire (BLM 2009). Vegetative material in the piles will first have to dry long enough for the material to ignite and be consumed by the fire. All prescribed pile burning would be implemented with a prescribed fire burn plan and a smoke management plan in accordance with BLM procedures and the *Phoenix District Zone Fire Management Plan* (BLM 2009) and would comply with federal and state air quality regulations. Pile burning would generally be used under low wind conditions to reduce the probability of escape.

Mechanical treatments are typically used to remove thick stands of weed infestations. Mechanical methods are appropriate where a high level of control over vegetation removal is needed, such as in sensitive wildlife habitats or near home sites, and are often used instead of prescribed fire or herbicide treatments for vegetation control in the wildland urban interface. Repeated treatments are often necessary due to the spread of seeds by machinery, lack of complete root kill, and residual weed seeds in the seed bank.

Biological Treatment

Biological treatments proposed in this EA involve the use of domestic animals to selectively suppress, inhibit, or control vegetation. The use of domestic animals requires a “prescribed grazer,” such as sheep or goats, to control the top-growth of certain weeds. Sheep consume a variety of forbs, as well as grasses and shrubs, and goats can eat large quantities of woody vegetation; their daily diets can include up to 50% of the weed (BLM 1991). In order for domestic animals to be effective, the right combination of animals, stocking rates, timing (i.e., high intensity and short-duration grazing), and rest must be used to control a particular weed species while minimizing impacts to perennial native vegetation. Grazing should occur when plants are palatable and grazing can damage or reduce viable seeds.

Biological treatments are used to reduce the targeted weed population to an acceptable level by stressing target plants and reducing competition with the desired plant species. Biological control agents are most suitable for larger sites where the target plant is well established and very competitive with native species. Biological treatments are most effective when used in combination with other treatments.

Chemical/Herbicides

Chemical treatments involve the use of herbicides to kill or suppress target weed plants and the use of chemicals applied with herbicides that improve their efficiency (adjuvants). Chemical treatment would be used to control unwanted vegetation. Application methods that would be used include spraying from a backpack unit or spray bottle or wiping (wicking) directly onto the foliar tissue, horseback sprayers, and sprayers mounted on all-terrain vehicles (ATVs), trucks, helicopters or fixed-wing aircraft. Aerial herbicide application would be considered for use on a project by project basis as needed. All chemical treatments would be conducted in accordance with *BLM Manual 9011* (BLM 1991) and the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States PEIS* (BLM 2007c).

Herbicides could be used selectively to control specific vegetation types or non-selectively to clear all vegetation in a particular area. Selection of a specific herbicide and application rate for site-specific use would depend on its effectiveness on a particular weed species, success in previous similar applications, habitat types, soil types, and proximity to water. Herbicide treatments are most effective when used at the optimum time for controlling persistent weeds, including perennial species. Herbicide control is less labor intensive than manual methods and is more effective in controlling larger weed infestations.

The Proposed Action includes potential use of four of the 18 herbicide active ingredients approved in the 2007 PEIS (BLM 2007a). The active ingredients include 2, 4-D, glyphosate, imazapyr, and triclopyr. All BLM-approved herbicides have been deemed effective in controlling vegetation, have minimal effects on the environment and human health if used properly, are registered with the U.S. Environmental Protection Agency (EPA), and were approved for use in the 2007 PEIS. Additional information concerning the herbicides available for use under the Proposed Action is included in the 2007 PEIS (BLM 2007a). Appendix A contains a current list of herbicides and adjuvants approved for use with the four active ingredients on BLM lands.

Under the Proposed Action, all application rates, procedures, and restrictions would be within label rates and used according to direction in the 2007 PEIS. The proposed IWM approach would incorporate BMPs for preventing weed infestations; SOPs, conservation measures, mitigation measures, and associated monitoring for implementing weed treatments (see Appendix B). These appendices are taken from the RMPs (BLM 2010 a, b) and the PEIS and PER (BLM 2007a, b). In addition to the SOPs that are protective of resources/values in the planning area, restrictions would be applied to public lands that are within all threatened, endangered, candidate, and BLM sensitive species habitat. Any weed treatments in riparian zones would be conducted in a manner to ensure that impacts to non-target species would be minimized and/or avoided. Only herbicides that have been approved for riparian-area application would be used in riparian areas.

2.2.2 Strategy for Managing Weeds

The BLM strategy for managing weeds would be to:

- Inventory and map new and known noxious weed occurrences;
- Detect and eradicate new infestations of weeds;
- Contain or control large scale infestations of weeds; and
- Promote public awareness/education of weeds, including partnerships with other agencies and Tribes.

Determining which method(s) to use, when, and how often would be based on, but not limited to the following factors adopted from the 2007 PEIS:

- Growth characteristics of the target weeds
- Seed longevity and germination;
- Infestation size;
- Proximity to other weed infestation sites;
- Proximity of the treatment area to sensitive areas, such as wetlands, streams, or habitat for plant or animal species of concern, including federally listed species or designated critical habitat;
- Accessibility by people and/or equipment;
- Proximity to populated places; and
- Effectiveness and cost of treatment methods.

All strategies for managing weeds and factors considered for determining methods are discussed in more detail in the 2007 PEIS, to which this analysis is tiered.

2.2.3 Priorities for the Proposed Action

The 2007 PEIS ROD identifies priorities for weed treatment that promotes an integrated approach to stop weed spread. These priorities, listed below, would be employed under the Action alternatives.

Priority 1: Take actions to prevent or minimize the need for vegetation control when and where feasible, considering the management objectives of the site.
Priority 2: Use effective non-chemical methods of vegetation control when and where feasible.
Priority 3: Use herbicides after considering the effectiveness of all potential methods or in combination with other methods or controls.

Actions to prevent or minimize the need for vegetation control can include protecting intact systems; maintaining conditions that have led to healthy lands; reducing the impact of ongoing activities; and applying mitigation measures to new projects to minimize soil and vegetation disturbance and avoid introductions of invasive species. If treatment is required, efforts would be focused on activities that restore natural ecosystem processes, and on ventures that are likely to succeed and provide the greatest benefits with the least expenditure of capital. The integrated weed program on BLM-administered lands is based on weed management objectives and priorities that are influenced by weed infestations and site susceptibility. These criteria provide focus and direction for the weed program and allow for site-specific and adaptive decision making. Integrated weed management strategies may include, but are not limited to prevention, manual, mechanical, chemical, and biological methods. These methods could be used alone or in combination; using only one method, such as herbicides, biological controls or hand-pulling alone, is not usually effective. For some of the most aggressive invaders, herbicides are the most effective way to control weed spread. However, herbicides would be used or selected for use only where they can truly be effective in controlling the spread of weeds that pose a threat to native plant communities.

The overriding goal is to prioritize treatment methods based on their effectiveness and likelihood to have minimal impacts on the environment, and to restore desirable vegetation on lands where necessary (i.e., where desired vegetation cannot reestablish naturally). The following would be used to prioritize weed treatments within the PDO in order to focus efforts towards success.

- Priority 1: New aggressive infestations in an uninfested area or small infestations in areas of special concern (e.g., Wilderness Areas, Areas of Critical Environmental Concern (ACECs), National Monuments).
  Management Objectives: Eradication.
- Priority 2: Areas with designated critical habitat for Threatened and Endangered listed species, special status plant communities, and other areas of valuable wildlife habitat (e.g., sensitive species, riparian habitat).
  Management Objective: Eradication and Control.
- Priority 3: Areas of high traffic or sources of weed infestations with abundant weeds.
  Management Objective: Control by eradicating high priority species and controlling others.
- Priority 4: Areas of low traffic or controlled access.
  Management Objective: Control high and medium priority species and monitor areas.
- Priority 5: Existing large infestations or roadside infestations where spread can be checked or slowed.
  Management Objective: Contain.

Species priority categories would be based on the Arizona and SWEPIC weed databases plus any site-specific weed occurrence information for the PDO, combined with the Arizona Wildland Invasive Plant Working Group ratings to create a prioritized list of weed species for the PDO.
The purpose of the prioritization process is to ensure that the treatment method selected is appropriate for the situation while minimizing risks to non-target species. Several variables would be considered when determining what treatment or combination of treatments would be used in a specific situation. These include:

- Potential hazards to human health
- Possible damage to non-target plants and animals
- Adverse impacts to the general environment
- Cost effectiveness over the long- and short-term
- Ease of implementation

Early Detection and Rapid Response (EDRR) weed treatments would be used on infestations. EDRR can stop the spread of new and emerging invasive plant species before they become established. It is one of the most cost-effective and ecologically viable methods for controlling weeds. This would include the following steps:

- Regularly scheduled monitoring to discover new populations at early stages of development
- Eradication of individual or small weed populations
- Coordination with adjacent landowners

3.0 Federally Listed, Proposed and Candidate Species Descriptions, Effects, and Conservation Measures

This section provides descriptions of federally listed, proposed and candidate species, and critical habitat or proposed critical habitat that may be effected by the proposed action, as well as the potential effects of the Proposed Action on these species and habitats, and conservation measures that would be implemented to avoid or minimize adverse effects. The species are divided into three categories—plant, wildlife, and fish. Threatened and endangered species that were determined not to be affected by the Proposed Action are listed in the table in Appendix E.

3.1 Federally Listed Plant Species and Proposed Critical Habitat

3.1.1 Acuña Cactus

Status and Distribution: The acuña cactus was listed as a federal candidate species by the USFWS in 1980. In 2012 the acuña cactus was proposed endangered with proposed critical habitat (FR 77 60510). In October of 2013, the acuña cactus was listed endangered (78 FR 60608). The state of Arizona lists the acuña cactus as species as highly safeguarded with no collection allowed and the Arizona Natural Heritage Program (AZNHP) ranks this species as G3T1T2Q/S1, which indicates the species is imperiled and vulnerable throughout its range and critically imperiled for the state of Arizona.

Range-Wide:
Historically, this species was found in southern Arizona and northern Mexico. Currently, this species is found in Arizona in western Pima, Maricopa, and Pinal counties, including Organ Pipe Cactus National Monument, Ajo, Coffee Pot Mountain, and Florence. Potential habitats exist in Sand Tank Mountains of the Barry M. Goldwater Air Force Range and the Tohono O'odham tribal lands (AGFD 2004).

PDO: There are three known populations occurring in the Sonoran Desert National Monument, Coffeepot Botanical ACEC, and a population near the Ajo community.

Life History: This succulent perennial is restricted to well-drained knolls and gravel ridges (Phillips, Phillips and Brian 1982) on granite soils in Sonoran Desert Scrub communities at elevations ranging from 1,300–2,600 feet (USFWS 2000). Soils are shallow, very gravelly and cobbly, moderately coarse to moderately fine textured, gently sloping to very steep such as on hills and mountains.

Acuña cactus usually occurs on open, rocky sites within the Palo-Verde Cactus Association of the Arizona Upland Subdivision of the Sonoran Desert scrub. Associated species of sites occupied by acuña cactus include creosote-bush *(Larrea tridentata*), bursage (*Franseria dumosa*), wild buckwheat (*Erioginum fasiculatum*), ocotillo (*Fouquieria splendens*), white-thorn acacia (*Acacia constricta*), fairyduster (*Calliandra eriophylla*), and jojoba (*Simmondsia chinensis*).

The Acuña cactus flowers between early March to mid-April; flowering is correlated to plant size. Flower production is associated with amount of winter rainfall. Flowers are pink to purple (2 in long). Immature plants look distinctly different from mature plants.

Reasons for Decline/Vulnerability: The decline of the species is attributable to illegal collection, fragmentation of habitat due to habitat destruction, past mining operations, and perhaps drought induced mortality.

Effects of Vegetation Treatments

Common to All Treatments

All treatments could potentially trample the acuña cactus, leading to mortality or injury of individuals.

Manual Treatments

Direct Effects. Individual plants could be directly killed or injured if accidentally cut or trampled during a treatment, or if vegetation piles were burned too close to acuña cacti.

Indirect Effects. Removal of competing weeds could increase the health or vigor of existing populations, or increase the suitability of unoccupied sites. Removal of fuel sources would reduce the future risks of damaging wildfires.

Mechanical Treatments

Direct Effects. Potential direct effects from mechanical treatments include injury or mortality to individual cacti or their seed banks. Direct mortality could also occur if vegetation piles were burned to close to acuña cacti.

Indirect Effects. Soil compaction could occur from equipment, which could lead to the puddling of water; scarification; and mixing of soil layers (Spence et al. 1996). Removal of vegetation may potentially benefit acuña cactus populations by removing noxious weed species. This could increase the amount of water and nutrient resources available for the acuña cactus and by improving the quality of habitat adjacent to existing habitat. Removing noxious weeds may also reduce the potential for future severe wild fires.

Biological Treatments

Domestic Animals
Direct Effects. Direct effects of weed containment by domestic animals include mortality and injury through trampling. The degree of effects would depend on timing, area, intensity, frequency and duration of grazing. To reduce the likelihood of injury or mortality to acuña cactus, domestic animals would not be used to treat weeds in areas of known acuña cactus occurrence.

Chemical Treatments

Direct Effects. Direct mortality could occur from trucks and/or ATVs used during ground applications. All of the herbicides analyzed in ERAs (BLM 2007a) would pose risks to terrestrial plant species as a result of exposure. Exposure includes direct spray of plants, drift, surface runoff, accidental spills, offsite drift, and wind transport of soils from treatment sites. Possible negative effects could include one or more of the following: mortality, loss of photosynthetic foliage, reduced vigor, abnormal growth, or reduced reproductive output. One or more of these effects, depending on its extent and severity, could result in the extirpation of a sensitive population. Less severe effects could reduce the size of a population further, reduce its ability to compete with other, more vigorous species, or increase its degree of fragmentation.

Based on the results of the ERAs, negative health effects to acuña cactus could occur if plants were directly sprayed by all herbicides proposed for use (see Appendix A). Non-target acuña cacti could also be exposed to herbicides directly during off-site drift from a nearby treatment site. However, the application of SOPs to ensure that spraying does not occur under conditions favorable to drift and of conservation and mitigation measures to provide an adequate buffer between target and non-target areas is expected to minimize this risk (Appendix B).

For the herbicides proposed for use by the BLM in the PDO, negative effects to acuña cacti could potentially occur by ground and/or aerial applications at distances ranging from 50 feet for ground application of glyphosate to 900 feet for aerial application of imazapyr (see Appendix C). For 2,4,-D ERAs were unable to assess risks with certainty (i.e., some information was unavailable or drift scenarios did not go out far enough to establish a precise buffer distance), and a conservative buffer distance of 0.5 mile is assumed.

Based on the ERAs, negative effects to acuña cacti could also be possible as a result of surface runoff of imazapyr, or triclopyr under certain site conditions. In addition, since information for 2,4-D is unavailable, it is assumed that negative effects could occur as a result of runoff of these herbicides from an upslope application area under all site conditions.

Indirect Effects. Herbicide treatments could alter the species composition of treated areas by eliminating or reducing weed species, thus increasing the nutrient and water resources available for the acuña cactus. Provided herbicide treatment programs were able to avoid negatively affecting acuña cactus populations on or near the treatment site, long-term benefits to these populations are expected occur.

Conservation Measures

To minimize or avoid impacts to the acuña cactus, the PDO would apply the following measures:

- Prior to treatments, survey all areas proposed for treatment in suitable acuña cactus habitat in proposed for treatment for acuña cactus.
- Establish site-specific no activity buffers by a qualified botanist, biologist, or ecologist in areas of occupied habitat within the proposed project area. To protect occupied habitat, treatment activities would not occur within these buffers.
- Collect baseline information on the existing condition of acuña cactus and their habitats in the proposed project area.
- Monitor the size and vigor of acuña cactus populations and the state of their habitats post-treatment in the project area.
- Assessment of the need for site revegetation post treatment to minimize the opportunity for noxious weed invasion and establishment.
- Given the high risk for damage to acuña cacti and their habitat from mechanical treatments and the use of domestic animals to contain weeds, these treatment methods should not be utilized within 900 meters of known populations.
- Off-road use of motorized vehicles associated with treatments will be avoided in suitable or occupied habitat.
- Conduct post-treatment monitoring to determine the effectiveness of the project.
- Do not use herbicide treatments in areas where acuña cactus may be subject to direct spray.
- Ensure that applicators review, understand, and conform to the “Environmental Hazards” section on herbicide labels (this section warns of known pesticide risks and provides practical ways to avoid harm to organisms or the environment).
- To avoid negative effects from offsite drift, surface runoff, and/or wind erosion, establish suitable buffer zones between treatment sites and known or suspected acuña cactus sites and apply the site-specific precautions outlined below.
- Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.

The buffer distances for ***broadcast spraying*** of the four BLM-approved herbicides that would be used are conservative estimates compiled from ERAs cited in the PEIS and PBA (BLM 2007a,).

2,4-D

- Do not apply within 0.5 mile of known acuña cactus.

Glyphosate

- Do not apply aerially within 300 feet of known acuña cactus.

- Do not apply within 50 feet of known acuña cactus when using a low boom at the typical rate.
- Do not apply within 300 feet of known acuña cactus when using a low boom at the maximum rate or a high boom at either rate.
- Do not apply within 0.5 mile of known acuña cactus when using a high boom at either rate.

Imazapyr
- Do not apply within 900 feet of known acuña cactus at the typical rate when using aerial or ground methods at the typical rate.
- Do not apply within 0.5 mile of known acuña cactus when using aerial or ground methods at the maximum rate.
- Do not apply within 0.5 mile of known acuña cactus in areas where wind erosion is likely.

Triclopyr Acid
- Do not apply aerially at the typical rate within 500 feet of known acuña cactus.
- Do not apply aerially at the maximum rate within 0.5 mile known acuña cactus.
- Do not apply within 300 feet of known acuña cactus using a low boom at the typical rate.
- Do not apply within 0.5 mile of known acuña cactus when using a low boom at the maximum rate or a high boom at either rate.
- Do not apply within 0.5 mile of acuña cactus plants in areas where wind erosion is likely.

Triclopyr BEE
- Do not apply aerially at the typical rate within 500 feet of known acuña cactus.
- Do not apply aerially at the maximum rate within 0.5 mile of known acuña cactus.
- Do not apply within 300 feet of known acuña cactus when using a low boom at the typical rate.
- Do not apply within 0.5 mile of known acuña cactus when using a low boom at the maximum rate or a high boom at either rate.
- Do not apply within 0.5 mile of acuña cactus plants in areas where wind erosion is likely.

In addition to the selection of specific locations, herbicides, application methods, application rates, and buffer distances for specific sites during the annual treatment planning, the PDO would also consider measures to prevent the spread of weeds in occupied or suitable habitat conjunction with weed treatments and all projects involving ground-disturbing activities. These measures include the following:
- Seed cleared areas that are prone to invasion by noxious weeds with a locally sourced native seed mixture to reduce the probability of noxious weeds or other undesirable plants becoming established on the site.
- Where seeding is warranted, seed areas (whether from ground disturbance or removal of weeds) as soon as appropriate after treatment, considering the time of year and any waiting period following use of a specific herbicide.
- Use only locally sourced native species when revegetating bare areas in occupied or suitable habitat and use only species that are compatible with the specific habitat for acuña cactus.
- Use only native seed that is certified free of noxious weed seeds in occupied or suitable acuña cactus habitat.
- Use only certified weed-free straw and hay bales for mulch or erosion control in occupied or suitable acuña cactus habitat.
- Wash vehicles and heavy equipment used during weed treatment activities prior to arriving at a new location to avoid transferring noxious weed seeds.

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

3.1.2 Acuña Cactus Proposed Critical Habitat

In October, 2012, the USFWS proposed designating approximately 53,720 acres of critical habitat for the acuña cactus (USFWS 2012). The proposed critical habitat is located in Maricopa, Pima, and Pinal Counties, AZ, with approximately 29,536 acres on federal land. The majority of acuña cacti in the PDO occur in the Sauceda Mountains. An estimated 655 plants in 2011, or 19.3 percent of known individuals, occurred on BLM land, with the largest population at Coffeepot Mountain (USFWS 2012).

The Primary Constituent Elements (PCE) for critical habitats are defined as “those physical and biological features (primary constituent elements) that are essential to the conservation of the species and that may require special management considerations or protection. These features include but are not limited to: Space for individual and population growth and for normal behavior; food, water, air, light, minerals or other nutritional or physiological requirements; cover or shelter; sites for germination or seed dispersal; and habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.” (USFWS 2004).

The PCEs for acuña cactus critical habitat are:

1. Native vegetation within the Paloverde–Cacti–Mixed Scrub Series of the Arizona Upland Subdivision of the Sonoran Desert-scrub at elevations between 365 to 1,150 m (1,198 to 3,773 ft.). This vegetation must contain predominantly native plant species that: a. Provide protection to the Acuña cactus. Examples of such plants are creosote bush, ironwood, and paloverde; b. Provide for pollinator habitat with a radius of 900 m (2,953 ft) around each individual, reproducing Acuña cactus; c. Allow for seed dispersal through the presence of bare soils immediately adjacent to and within 10 m (32.8 ft.) of individual, reproducing Acuña cactus.

2. Soils overlying rhyolite, andesite, tuff, granite, granodiorite, diorite, or Cornelia quartz monzonite bedrock that are in valley bottoms, on small knolls, or on ridgetops, and are generally on slopes of less than 30 percent (USFWS 2012a).

<u>Manual Treatments</u>

Direct and Indirect Effects. Some limited amount of soil disturbance would occur that may slightly increase the risk of erosion. Removal of competing weeds could increase the health or vigor of existing populations, or increase the suitability of unoccupied sites. Removal of fuel sources would reduce the future risks of damaging wildfires.

<u>Mechanical Treatments</u>

Direct Effects. Soil compaction could occur from equipment, which could lead to the puddling of water; scarification; and mixing of soil layers (Spence et al. 1996). Increased soil erosion could occur at the treatment site due to the removal of vegetation and soil surface disturbance.

Indirect Effects. Removal of vegetation may potentially benefit acuña cactus habitat by removing noxious weed species. This could increase the amount of water and nutrient resources available for the Acuña cactus and improve the quality of habitat adjacent to existing habitat. This may also reduce the potential for future severe wild fires.

Biological Treatments

Domestic Animals
Direct Effects. Using domestic animals could lead to soil compaction from trampling, increased soil erosion from loss of plant cover, and loss of biological soil crusts, which have an important role in hydrology and nutrient cycling.

Indirect Effects. Removal of vegetation may potentially benefit acuña cactus habitat by removing noxious weed species. This could increase the amount of water and nutrient resources available for the Acuña cactus and improve the quality of habitat adjacent to existing habitat. This may also reduce the potential for future severe wild fires. Plant composition would change as the palatable species are consumed, eventually reducing them from the treatment site.

Chemical Treatments

Direct Effects. All of the herbicides analyzed in ERAs (BLM 2007a) would pose risks to terrestrial plant species as a result of exposure. Exposure includes direct spray of plants, drift, surface runoff, accidental spills, offsite drift, and wind transport of soils from treatment sites.

Indirect Effects. Herbicide treatments could alter the species composition of treated areas by eliminating or reducing weed species, thus increasing the nutrient and water resources available for the acuña cactus. Tolerance of some target weed species to specific herbicides could occur over time (Powles and Holtum 1994, Jasieniuk et al. 1996). The introduction of chemicals into the ecosystem could also have unforeseen cumulative impacts to plants, soils, insects, wildlife, and ecosystem processes in general.

Conservation Measures
To minimize or avoid impacts to acuña cactus proposed critical habitat, the PDO would apply the acuña cactus conservation measures listed above in section 3.1.1.

3.1.3 Cumulative Impacts

Potential cumulative adverse effects on acuña cactus may result from the continued increase of ground disturbing activities on state and private lands such as mining, construction, and OHV use. Vectors for weed dispersal such as vehicles, recreationists, livestock, and wildlife would continue to be present, spreading weed disseminules to new sites. New weeds that invade PDO from adjacent lands would be subject to treatment under the Proposed Action and invasion of weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for acuña cactus within and adjacent to BLM-administered lands in the PDO.

3.1.4 Determination of Effects for acuña cactus and Proposed Critical Habitat

With application of the conservation measures, SOPs, and mitigation measures discussed above and in the appendices, the Proposed Action ***May Affect, but is not Likely to Adversely Affect*** acuña cactus.

With application of the conservation measures, SOPs, and mitigation measures discussed above and in the appendices, the Proposed Action ***May Affect, but is not Likely to Adversely Affect*** acuña cactus and proposed critical habitat.

3.2 Federally Listed, Proposed, and Candidate Wildlife Species, and Designated and Proposed Critical Habitat

3.2.1 Sonoran Pronghorn

Status and Distribution: The Sonoran pronghorn was listed as an endangered species by the USFWS in1967 (32 FR 4001). Critical habitat has not been designated for the Sonoran pronghorn.

Range-Wide: The Sonoran pronghorn, one of five subspecies of pronghorn (Nowak and Paradiso 1983), inhabits southwestern Arizona in the U.S. and northwestern Sonora in Mexico. Currently, there are three populations of the Sonoran pronghorn, including: (1) the U.S. population in southwestern Arizona; (2) a population in the Pinacate Region of northwestern Sonoran; and (3) a population on the Gulf of California west and south of Caborca, Sonora.

PDO: The Arizona population is located in the Barry M. Goldwater Range, Organ Pipe Cactus National Monument, Cabeza Prieta National Wildlife Refuge, and Bureau of Land Management lands southwest of Ajo community (BLM 1985).

Life History: All Sonoran pronghorn populations occur in Sonoran desert scrub vegetation communities. Two of seven identified subdivisions of the Sonoran desert encompass the habitat of this subspecies: the Lower Colorado River Valley and the Arizona Upland. Common plant species found in the Lower Colorado River Valley include creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), ironwood (*Olneya tesota*), blue palo verde, and mesquite. Common species in the Arizona Upland include foothill palo verde (*Parkinsonia floridum*), catclaw acacia (*Acacia greggii*), teddy bear cholla (*Cylindorpuntia bigelovii*), buckhorn cholla (*C. acanthocarpa*), and staghorn cholla (*C. versicolor*). Typical habitat ranges in elevation from 2,000 to 4,000 ft. Pronghorn appear to use flat valleys and isolated hills to a greater degree than other topographic features of the Sonoran Desert (Arizona Game and Fish Department 1985).

Washes flow briefly after rains during the monsoon season and after sustained winter rains. The network created by these washes provides important thermal cover for Sonoran pronghorn during the hot summer season. Drainages and bajadas are used during spring and summer, with bajadas used as fawning areas during the spring. Pronghorn appear to use palo verde, ironwood, and mesquite (*Prosopis* spp.) for cover. Playas provide abundant forbs during the spring, especially during good rain years. Pronghorn vacate these areas later in the season when forbs dry up (Hughes and Smith 1990). Some of the sandy areas provide a greater variety of seasonal vegetation. The openness of these areas appears to be attractive for pronghorn, as the annuals, grasses, and shrubs provide good forage species, particularly in the spring. These areas have long been considered important Sonoran pronghorn habitat in the U.S. However, the decreased palatability of annuals as summer approaches and a lack of sufficient woody vegetation for nutrition and thermal protection requirements drive pronghorns to bajada habitat in the southeast portion of the range by early summer.

Pronghorn gestation is approximately 240 days, and fawns are born between February and May, and parturition appears to coincide with spring forage abundance. Does usually have twins, and fawns appear to suckle for about 2 months, feeding on vegetation soon after. Fawning areas have been documented in the Mohawk Dunes and the bajadas of the Sierra Pintas, Mohawk, Bates, and Growler mountain ranges.

The Sonoran pronghorn diet typically consists of anywhere from 20–99% forbs in certain seasons so the presence of these plants in the vegetation communities is vital.

Reasons for Decline/Vulnerability: The decline of this species is attributable to a number of factors, including a lack of recruitment, insufficient forage and/or water, drought coupled with predation, difficulties for population expansion due to barriers to historical habitat, illegal hunting, degradation of habitat from livestock grazing, the diminishing size of the Gila and Sonoyta rivers, and human encroachment. Sonoran pronghorn numbers continue to decline. During a range-wide survey (completed in 2002), 21 to 33 animals were estimated (Arizona Game and Fish Department 2002). This number is down from estimates of 99 animals in 1999 and 142 animals in 2000. The drought of 2002 appears to have played a large part in this most recent decline in numbers.

Effects of Vegetation Treatments

Common to All Treatment Methods

Indirect Effects. The Sonoran pronghorn occurs in desert habitats, many of which have been impacted by non-native species. The invasion of exotics typically occurs at the expense of native plant species, including Sonoran pronghorn forage plants. Therefore, any treatment method that aids in returning native conditions to habitat should have a beneficial effect on this species. In addition, the removal of hazardous fuels from habitats that support pronghorns would be expected to reduce the likelihood of a future high-intensity wildfire. Such an unplanned and uncontrolled fire could consume large tracts of Sonoran pronghorn habitat, having a negative effect on species populations.

Sonoran pronghorns rely on xeroriparian areas as habitat corridors. Therefore, removal of vegetation, resulting in reduced cover in these areas could have negative effects on pronghorns by reducing their ability to disperse from one habitat area to another. Individual treatment methods would vary in their potential to affect xeroriparian areas.

Manual Treatments

Direct Effects. Noise from manual treatments and the presence of humans may cause displacement of pronghorns from treatment areas during the treatments. There are no known fawning areas within the PDO, thus stress to fawns or pregnant individuals is unlikely.

Indirect Effects. Removal of vegetation may potentially reduce forage habitat and temporarily displace Sonoran pronghorns to seek food in less suitable habitats. Removal of noxious weeds should promote the establishment of native vegetation.

Mechanical Treatments

Direct Effects. Noise from equipment and the presence of humans may cause displacement of pronghorns from treatment areas during the treatments. There are no known fawning areas within the PDO, thus stress to fawns or pregnant individuals is unlikely.

Indirect Effects. Removal of vegetation may potentially reduce forage habitat and temporarily displace Sonoran pronghorns to seek food in less suitable habitats. Removal of noxious weeds should promote the establishment of native vegetation.

Biological Treatments

Domestic Animals
Indirect Effects. Utilization of grasslands by domestic animals could affect both the quality and quantity of preferred forage that is needed to sustain healthy pronghorn herds (Ellis 1970; Howard et al. 1990). There is some speculation that livestock, sheep and pronghorns favor the same species of perennial grass, and that grazing by domestic animals may compete with or exclude Sonoran pronghorns. Therefore, use

of domestic animals to contain weeds is likely to have a negative effect on Sonoran pronghorn, with the severity of effects depending on the food needs of the grazer, the food resources in the area, and the intensity and duration of the treatment.

Chemical Treatments

Direct Effects. Disturbance associated with the presence of humans during chemical treatments may cause displacement of Sonoran pronghorns from the treatment area. Sonoran pronghorns are highly, mobile and would typically be able to move out of an herbicide treatment area; however, it is possible that an accidental spray of Sonoran pronghorns could occur. Based on the results of the ERAs (BLM 2007a), negative health effects to pronghorns could occur if animals were directly sprayed by 2,4-D, glyphosate, triclopyr at the typical application rate, or by imazapyr at the maximum application rate (see Appendix C). However, the likelihood of an accidental direct spray is low due to Sonoran pronghorns are a large and readily visible species. Pronghorns coming into contact with foliage sprayed by 2,4-D at the typical application rate, or by glyphosate or triclopyr at the maximum application rate could have negative health effects.

ERAs predicted that if Sonoran pronghorns were to ingest plant materials sprayed by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate, negative health effects could potentially occur (see Appendix C). These predictions are overly conservative in that they assume all of the animal's diet would consist of contaminated vegetation, which is an unlikely, though not impossible, scenario.

Indirect Effects. Removal of vegetation may potentially reduce forage habitat and temporarily displace Sonoran pronghorns to seek food in less suitable habitats. Removal of noxious weeds should promote the establishment of native vegetation.

Conservation Measures

To minimize or avoid impacts to the Sonoran pronghorn, the PDO would apply the following measures:

- Contact the Service and species experts to coordinate activities prior to any weed removal projects inside of the endangered and experimental Sonoran pronghorn population ranges.
- Do not use aerial applications of herbicides inside of endangered or experimental population ranges.
- Prior to treatments, survey all suitable habitat in areas proposed for treatment for Sonoran pronghorns.
- Avoid biological treatment by domestic animals in areas used for forage by Sonoran pronghorns.
- Avoid fawning areas during treatments (as determined by a qualified wildlife biologist).
- Closely follow all application instructions and use restrictions on herbicide labels.
- Avoid broadcast spraying herbicides in key pronghorn foraging areas.
- Do not use 2,4-D in Sonoran pronghorn habitats; do not broadcast spray 2,4-D within 0.25 mile of Sonoran pronghorn habitat.
- Do not broadcast spray glyphosate or triclopyr in Sonoran pronghorn habitat; do not broadcast spray these herbicides in areas adjacent to Sonoran pronghorn habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying imazapyr in or near Sonoran pronghorn habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, imazapyr, or triclopyr to vegetation in Sonoran pronghorn habitat, utilize the typical, rather than the maximum, application rate.

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

3.2.2 Lesser Long-nosed Bat

Status and Distribution: The lesser long-nosed bat was listed as an endangered species by the USFWS in1988 (53 FR 38456) without critical habitat. The state of Arizona Game and Fish Department (AGFD) lists the lesser long-nosed bat as a species of special concern and the Arizona Natural Heritage Program (AZNHP) ranks this species as G4/S2S3, which indicates the species is secure and common throughout its range and critically imperiled for the state of Arizona.

Range-Wide: Historically, this species ranged from central Arizona and southwest New Mexico through much of Mexico to El Salvador. Currently, this nectar-, pollen-, and fruit-eating bat migrates seasonally from Mexico to southern Arizona and southwestern New Mexico. It has been found in southern Arizona from the Picacho Mountains southwest to the Agua Dulce Mountains and southeast to the Chiricahua Mountains. It has also been found in far southwestern Mexico in the Animas and Peloncillo mountains, and throughout the drier parts of Mexico. The subspecies is a seasonal resident in Arizona, usually arriving in early April and departing in mid- to late September. It apparently resides in New Mexico only from mid-July to early September (Hoyt et al. 1994).

PDO: This bat species inhabits desert scrub habitat with agave and columnar cacti blooms present as food plants in paloverde-mixed cacti vegetation. This bat species typically uses day-roost in caves and abandoned tunnels. This species is known to occur in the Sonoran Desert National Monument including the Vekol Grassland Valley, BLM lands near Ajo community including the Coffepot Botanical ACEC, and BLM lands south of Chandler Heights.

Life History: The lesser long-nosed bat inhabits desert grassland and shrubland up to the oak transition. They roost in caves, mine tunnels, and occasionally in old buildings. It is unclear precisely what factors identify potential roost sites as “suitable,” but maternity roosts tend to be very warm and poorly ventilated, at least where the young are actually raised. Such roosts reduce the energetic requirements of adult females while they are raising their young (Arends et al. 1995). Lesser long-nosed bats have been found living in caves and mines displaying a variety of microclimates (e.g., dry and hot, wet and hot, dry and cool, wet and cool). They are found in well-ventilated caves as well as those that are poorly ventilated and filled with strong ammonia fumes. The subspecies sometimes co-occurs with other species of bats.

In Arizona, females arrive pregnant and as early as the second week in April. One young per year is born during May. It is thought that periods of birth and lactation coincide with peak flower availability. Young probably are nursed for about 6 weeks, begin to fly at 4 weeks, and begin to leave the roost on evening flights at 6 to 7 weeks. Maternity colonies break up by the end of July (AGFD 2011a).

In Arizona, the lesser long-nosed bat feeds on nectar and pollen from flowers of saguaro and organ pipe cactus in early summer and agave later in the summer and early fall. They may feed on ripe cactus fruits at the end of the flowering season. In the project area important forage plants for lesser long-nosed bats are: saguaro cactus (Carnegia gigantea), organ pipe cactus (Stenocereus thurberi), Palmer’s century plant (Agave palmeri), Parry’s agave (Agave parryi), and desert agave (Agave deserti). During the winter period in Mexico, primary food plants appear to be *Ceiba*, *Bombax*, and *Ipomoea* (AGFD 2011a). By eating nectar, pollen, and fruit, lesser long-nosed bats are important pollinators and seed dispersers of their food plants. Some studies suggest that the foraging radius of these bats from their day roosts to areas supporting food plants may be as great as 50–100 km (USFWS 1997). Major maternity colonies within foraging range of public lands on PDO are located at Old Mammon Mine, Bluebird Mine and Copper Mountain Mine.

Reasons for Decline/Vulnerability: Significant population declines are thought to be associated with reduced numbers and size of maternity colonies in Arizona and Sonora due to exclusion and disturbance. Excess harvest of agaves in Mexico, the collection of cacti in the U.S., and the conversion of habitat for agricultural uses, livestock grazing, wood-cutting, and other development may also contribute to the decline of long-nosed bat populations. These bats are particularly vulnerable due to many individuals using only a small number of communal roosts. In addition, this subspecies appears to be sensitive to human disturbance, and bats may temporarily abandon their roosts and move to another in response to a single brief human visit.

Effects of Vegetation Treatments

Effects Common to All Treatments

All vegetation treatments that reduce the coverage of non-native species would be expected to have a beneficial effect on the lesser long-nosed bat habitat by likely improving habitat for lesser long-nosed bat forage plants. In addition, some of the most common invasive species found in bat habitat areas are fire tolerant species, such as red brome, that increase the potential for a severe wildfire by adding to the fuels base (BLM 1996). Furthermore, all vegetation treatments that reduce weeds would also provide a long-term benefit to lesser long-nosed bats by helping to reduce the likelihood of a future severe wildfire. A severe fire could destroy large stands of lesser long-nosed bat forage plants.

Manual Treatments

Direct and Indirect Effects. There are no anticipated negative effects from manual control treatment methods, either on bats or their habitats. There would be minimal disturbance associated with hand removal of vegetation; forage plants would not be targeted.

Mechanical Treatments

Direct Effects. There would be no direct effects to the lesser long-nosed bat because they use caves, mines, and old buildings, sites that would not be impacted by the equipment or the vegetation removal.

Indirect Effects. Mechanical vegetation removal could incidentally injure or destroy forage plants, thus reducing the available food supply.

Biological Treatments

Domestic Animals
Indirect Effects. Domestic animals have been observed foraging on developing flower stalks (USFS 1996). Although plants are sometimes able to sprout a new rosette, prolonged grazing in the same area would be expected to reduce flower production. Other evidence of domestic animals harming forage plants has been observed in the trampling of saguaro seedlings, grazing seedlings, or grazing nurse plants, which are other species that provide protective cover to the seedlings (BLM 1996). Domestic animals could also impact habitat by contributing to the spread of invasive species that increase fire fuel loads and degrade the habitat, such as red brome.

Chemical Treatments

Direct Effects: Direct spraying of lesser long-nosed bats is highly unlikely because they roost in covered areas and are active in the evening. Based on the results of the ERAs (BLM 2007a), negative health effects to bats could occur if animals were directly sprayed by, 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate (see Appendix C).

Bats could be negatively affected by dermal contact or ingesting vegetation that has been treated with herbicides. ERAs predicted that if lesser long-nosed bats were to come into contact with plant materials sprayed by 2,4-D at the typical application rate, or by glyphosate or triclopyr at the maximum application rate, negative health effects could potentially occur . Furthermore, negative effects could potentially occur if bats were to ingest plant materials treated with 2,4-D at the typical application rate, or with glyphosate at the maximum application rate (see Appendix C). These effects would be possible if herbicide applications occurred in areas where bats forage for nectar, pollen, and/or fruit.

Indirect Effects. Negative effects to non-target plant species could result from direct spray by all herbicides approved for use by the BLM. In addition, non-target plants could also be impacted by off-site drift and surface runoff of several herbicides. Forage plants could experience inadvertent mortality or reduced reproductive output as a result of direct spray, off-site drift, or surface runoff of herbicide treatments, thus resulting in reduced forage available to the lesser long-nosed bats.

Conservation Measures

To minimize or avoid impacts to the lesser long-nosed bat, the PDO would apply the following measures:

- When implementing chemical treatments within known or potential lesser long-nosed bat habitat, only treat between October 1 and April 1 when lesser long-nosed bats are unlikely to be present in Arizona.
- Instruct all field personnel on the identification of lesser long-nosed bat forage plants and the importance of their protection. In the project area important forage plants for lesser long-nosed bats are: saguaro cactus (Carnegia gigantea), organ pipe cactus (Stenocereus thurberi), Palmer's century plant (Agave palmeri), Parry's agave (Agave parryi), and desert agave (Agave deserti).
- Within known or potential lesser long-nosed bat habitat protect forage plants to the greatest extent possible. Do not remove forage plants during treatments. Avoid driving over plants, piling slash on top of plants, burning, and using domestic animals to control weeds.
- To protect forage plants from herbicide treatments in known or potential lesser long-nosed bat habitat, do not apply herbicides when drift onto forage plants is likely.

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

3.2.3 Southwestern Willow Flycatcher

Status and Distribution: The southwestern willow flycatcher was listed as a federally endangered species in 1995 (60 FR 10694) with designated critical habitat in 2005 (70 FR 60886). Revised designated critical habitat was finalized in 2013 (USFWS 2013a). The AGFD lists the southwestern willow flycatcher as a species of special concern and the AZNHP ranks this species as G5/T1T2, S1, which indicates the species is vulnerable throughout its range and critically imperiled for the state of Arizona.

Range-Wide: The historic distribution included southern Nevada, southern Utah, southern California, Arizona, New Mexico, western Texas, and possibly southwestern Colorado. The historical distribution and the current breeding distribution is the same for this subspecies except for Texas. In Arizona, territories were detected on the Agua Fria, Big Sandy, Bill Williams, Colorado, Gila, Hassayampa, Little Colorado, Salt, San Francisco, Santa Maria, San Pedro, Verde, and Virgin Rivers, and Cherry, Cienaga, Pinal, and Tonto creeks. Most flycatchers likely winter in Mexico, Central America, and possibly South America (AGFD 2002a).

PDO: This species is known to nest along the Hassayampa River, Gila River, and the Agua Fria channel below the dam at Lake Pleasant.

Life History: This species is a riparian obligate that nests in dense riparian habitats along rivers, streams, or other wetlands with trees or shrubs near or next to surface water. It typically inhabits cottonwood/willow thickets along rivers and streams, although with the significant loss of this native riparian vegetation, the species will also use tamarisk (*Tamarix* spp.) or Russian olive (*Eleagnus angustifolia*) thickets and riparian associates. They appear to avoid riparian areas found in steep, closed canyons.

The breeding season of the southwestern willow flycatcher runs from May to July. Between three and four eggs are laid, and incubation lasts approximately 12–13 days. Young fledge approximately 12–15 days after hatching.

Southwestern willow flycatchers are insectivorous, but may also consume a few berries or seeds. Flycatchers forage within and above the canopy, along the patch edge, in openings within the territory, and above water, and glean food from tall trees and herbaceous ground cover (Bent 1960; McCabe 1991).

Reasons for Decline/Vulnerability: This species is threatened by the degradation, reduction, and conversion of riparian habitat to agricultural and urban development. Additional, reasons for the decline/vulnerability of the flycatcher include: the fragmented distribution and low numbers of the current population; predation; cowbird brood parasitism; and other events such as fires and floods that are naturally occurring, but have become more frequent and intense as a result of the proliferation of exotic vegetation and degraded watersheds, respectively (AGFD 2002a).

A recent threat is destruction of nesting habitat by the tamarisk-eating leaf beetle. Because tamarisk provides essential structure and density, over half of all known flycatcher territories contain tamarisk. Loss of tamarisk vegetation without replacement by native trees will likely impact the flycatcher in Arizona, New Mexico, and southern Nevada, southern Utah, and southern Colorado, and possibly areas in California.

Effects of Vegetation Treatments

Effects Common to All Treatments

Direct Effects. Removal of vegetation could directly affect southwestern willow flycatchers if trees or shrubs with active nests are removed.

Indirect Effects. Treatment methods could alter the species composition and structure of a riparian habitat, which could in turn affect its suitability for the southwestern willow flycatcher. Thinning of understory vegetation, for example, may reduce the suitability of a riparian site for nesting, as this species requires dense vegetation above and around the nest for cover. Negative effects could occur from removing tamarisk, since tamarisk can provide nesting and foraging habitat.

A treatment program that reduces invasive species (such as tamarisk), allowing natives (such as cottonwoods and willows) to increase in abundance, would be expected to have a long-term positive effect on riparian habitat. Removing invasive plants (such as tamarisk) would reduce the risk of future severe wildfire and would also be likely to have a long-term positive effect on this riparian-dwelling species.

Indirect effects could also occur from the removal of vegetation, as seeds, berries, and other plant materials utilized as food, or used as habitat for prey species, could decrease in abundance. However, over the long term, effects of vegetation removal could be positive if the species composition of the area changed to favor species of greater food and habitat value.

Manual Treatments

Direct and Indirect Effects. There would be some disturbance associated with the presence of humans, which would have the greatest impact on Southwestern willow flycatcher populations if treatments take place during the breeding season when reproductive success could be affected. Smoke associated with pile burning may cause nesting birds to leave their nests if pile burning takes place during the breeding season, which could reduce reproductive success. In addition, smoke could disturb individual birds and interfere with foraging and other activities.

Mechanical Treatments

Direct and Indirect Effects. During mechanical treatments, the presence of humans and equipment in the area could create enough of a disturbance to disrupt activities such as breeding or feeding if treatments take place when this migratory bird is in the treatment area. If pile burning takes place during the breeding season smoke may cause nesting birds to leave their nests, which could reduce reproductive success. In addition, smoke could disturb individual birds and interfere with foraging and other activities.

Biological Treatments

Domestic Animals

Direct Effects. Grazing domestic animals in and near riparian areas could potentially harm or destroy nests, eggs, and nestlings if treatments take place during the breeding season. Domestic animals could make physical contact with nests or supporting branches, resulting in destruction of nests and spillage of eggs and nestlings (USFS 2002).

Indirect Effects. Use of domestic animals to control weeds could alter riparian habitat, making it less suitable for willow flycatchers. Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western U.S. (USDA Forest Service 2002). Grazing reduces the diversity and density of riparian plant species, especially cottonwoods and willows, which are utilized as nesting trees by southwestern willow flycatchers (BLM 1996). Cottonwood and willow seedlings may be grazed or trampled, thus reducing survival rates. Under heavier grazing treatments, established vegetation may be hedged to a height of 6 to 7 feet, resulting in a marked reduction in understory vegetation on which this bird species relies. It has been noted that most of the areas still known to support southwestern willow flycatchers have low to nonexistent levels of grazing by domestic animals (Suckling et al. 1992 *cited in* USFS 2002). Use of domestic animals to contain weeds may also indirectly affect habitat by improving conditions for nest parasitism by brown-headed cowbirds (Tibbits et al. 1994).

Chemical Treatments

Direct Effects. The presence of humans and use of vehicles associated with herbicide applications may temporarily disturb southwestern willow flycatchers in the treatment area. The severity of these effects would depend on the season, and the vicinity of disturbances to nesting habitat. Although adult birds would be able to fly away from treatment sites, some birds could inadvertently be exposed to herbicides, as could nests, eggs, and young, flightless birds. Based on the ERAs (BLM 2007a), negative health effects to southwestern willow flycatchers could occur from direct spray by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate (Appendix C).

Southwestern willow flycatchers could be negatively affected by dermal contact of vegetation that has been treated with herbicides. ERAs predicted that if southwestern willow flycatchers were to touch plant materials sprayed by 2,4-D at the typical application rate, or of glyphosate or triclopyr at the maximum application rate, negative health effects could potentially result. Based on the results of the ERAs ingestion of invertebrates sprayed by glyphosate or triclopyr at the typical application rate, or by imazapyr at the maximum application rate, would potentially result in negative health effects (Appendix C).

Indirect Effects. Herbicide treatments in southwestern willow flycatcher habitats could negatively affect these habitats if substantial loss of vegetation occurred with effects being greatest around nests. Over the long-term, a reduction in weed species could benefit the southwestern willow flycatcher by increasing native plant species and reducing potential future wildfires.

Conservation Measures

To minimize or avoid impacts to the southwestern willow flycatcher, the PDO would apply the following measures:

- Riparian areas that are suitable for use by southwestern willow flycatcher will be evaluated for the need for consultation at the project level prior to treatment. Project level evaluation, including detailed information about the location, time of year, species of vegetation to be removed, and method and extent of vegetation removal are necessary because of complex life history and habitat requirements of the flycatcher. In particular, riparian areas consisting of the following vegetation species should be evaluated further; Goodings willow (*Salix gooddingii*), coyote willow (*Salix exigua*), Geyer's willow (*Salix geyeriana*), arroyo willow (*Salix lasiolepis*), red willow (*Salix laaevigaata*) yewleaf willow (*Salix taxifolia*), seepwillow (also known as mulefat, *Baccharis spp*.) boxelder (*Acer negundo*), tamarisk (also known as saltceader, *Tamarix ramosissima*), stingling nettle (*Urtica spp*.), blackberry (*Rubus app*.), cottonwood (*Populus spp*.), arrowweed (*Tessaria sercea*), and Russian olive (*Elaeagnus angustifolia*) (78 FR 343 534; Service, 2002).
- Specific river reaches, in Management Units have been identified as having substantial recovery value and are listed in table 10 of the flycatcher Recovery Plan (see attached; Service, 2002 p. 86-92). These locations will be evaluated for the need for consultation at the project level.

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

To minimize or avoid impacts to southwestern willow flycatcher critical habitat, the PDO would apply the southwestern willow flycatcher conservation measures listed above in section 3.2.3.

3.2.4 Southwestern Willow Flycatcher Critical Habitat

Critical habitat for the Southwestern Willow Flycatcher was designated in 2005 (USFWS 2005a) and revised in 2013 (USFWS 2013a). Critical habitat is designated on public lands within the Phoenix District along portions of the Hassayampa River and Gila River.

The PCEs for Southwester Willow Flycatcher critical habitat are:

1. Nesting habitat with trees and shrubs that include, but are not limited to, willow species and boxelder (*Acer negundo*).

2. Dense riparian vegetation with thickets of trees and shrubs ranging in height from 2 m to 30 m (6 to 98 ft.) with lower-stature thickets of (2–4 m or 6–13 ft. tall) found at higher elevation riparian forests and tall-stature thickets at found at middle- and lower-elevation riparian forests.

3. Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft.) above ground or dense foliage only at the shrub level, or as a low, dense tree canopy.

4. Sites for nesting that contain a dense tree and/or shrub canopy (the amount of cover provided by tree and shrub branches measured from the ground; i.e., a tree or shrub canopy with densities ranging from 50 percent to 100 percent).

5. Dense patches of riparian forests that are interspersed with small openings of open water or marsh or shorter/sparser vegetation, that creates a mosaic that is not uniformly dense. Patch size may be as small as 0.1 ha (0.25 ac) or as large as 70 ha (175 ac).

6. A variety of insect prey populations, including but not limited to, wasps and bees (Hymenoptera); flies (Diptera); beetles (Coleoptera); butterflies/moths and caterpillars (Lepidoptera); and spittlebugs (Homoptera; USFWS 2013a).

Effects of Vegetation Treatments

<u>Effects Common to All Treatments</u>

Direct Effects. Treatment methods could alter the species composition and structure of a riparian habitat, which could in turn affect its suitability for the southwestern willow flycatcher. Thinning of understory vegetation, for example, may reduce the suitability of a riparian site for nesting, as this species requires dense vegetation above and around the nest for cover. Negative effects could occur from removing tamarisk, since tamarisk can provide nesting and foraging habitat.

Indirect Effects. A treatment program that reduces invasive species (such as tamarisk), allowing natives (such as cottonwoods and willows) to increase in abundance, would be expected to have a long-term positive effect on riparian habitat. Removing invasive plants (such as tamarisk), would reduce the risk of future severe wildfire, and would likely have a long-term positive effect on this riparian-dwelling species.

Indirect effects could also occur from the removal of vegetation, as seeds, berries, and other plant materials utilized as food, or as habitat for prey species, could decrease in abundance. However, over the long term, effects of vegetation removal could be positive if the species composition of the area changed to favor species of greater food or habitat value.

<u>Manual Treatments</u>

Direct and Indirect Effects. Discussed above in “Effects Common to All Treatments”.

<u>Mechanical Treatments</u>

Direct and Indirect Effects. Discussed above in “Effects Common to All Treatments”.

Biological Treatments

Domestic Animals
Indirect Effects. Use of domestic animals to control weeds could alter riparian habitat, making it less suitable. Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western U.S. (USDA Forest Service 2002). Grazing reduces the diversity and density of riparian plant species, especially cottonwoods and willows, which are utilized as nesting trees by southwestern willow flycatchers (BLM 1996). Cottonwood and willow seedlings may be grazed or trampled, thus reducing survival rates. Under heavier grazing treatments, established vegetation may be hedged to a height of 6 to 7 feet, resulting in a marked reduction in understory vegetation on which this bird species rely. It has been noted that most of the areas still known to support southwestern willow flycatchers have low to nonexistent levels of grazing by domestic animals (Suckling et al. 1992 *cited in* USFS 2002). Use of domestic animals to contain weeds may also indirectly affect habitat by improving conditions for nest parasitism by Brown-headed Cowbirds (Tibbits et al. 1994).

Chemical Treatments

Indirect Effects. Herbicide treatments in southwestern willow flycatcher habitats could negatively affect these habitats if substantial loss of vegetation occurred with effects being greatest around nests. Over the long term, a reduction in weed species could benefit the southwestern willow flycatcher by increasing native plant species and reducing potential future wildfires.

Conservation Measures
To minimize or avoid impacts to southwestern willow flycatcher critical habitat, the PDO would apply the southwestern willow flycatcher conservation measures listed above.

3.2.5 Western Yellow-billed Cuckoo

Status and Distribution: On October 3, 2014, the U.S. Fish and Wildlife Service listed the western yellow-billed cuckoo as a threatened species under the Endangered Species Act (79 FR 5991). The AGFD lists the western yellow-billed cuckoo as a species of special concern and the AZNHP ranks this species as G5, S3, which indicates the species is secure (i.e., common, widespread) throughout its range and vulnerable for the state of Arizona.

Range-Wide: The historic distribution included California and Arizona, New Mexico, Oregon and Washington, western Colorado, western Wyoming, Idaho, Nevada, and Utah, and probably uncommon and very local in British Columbia. Currently, it nests from southern Canada through northeastern United States, south through the United States to the Florida Keys, Central America and southern Baja California (AGFD 2002b). In Arizona, territories were detected in Southern and central Arizona and extreme northeast. This species winters from South America to central Argentina and Uruguay (AGFD 2002b).

PDO: This species is known to nest along riparian areas of the Agua Fria River and its tributaries and the Hassayampa River, and has been detected along the Gila River.

Life History: This subspecies is a riparian obligate that typically nests in dense riparian woodlands with cottonwoods and willow stands along river floodplains. It typically inhabits cottonwood/willow thickets, although with the significant loss of this native riparian vegetation, the species will also use tamarisk (*Tamarix* spp.) thickets, large mesquite bosques, and riparian associates.

The breeding season of the western yellow-billed cuckoo runs from May to July. Between three and four eggs are laid, and incubation lasts approximately 4–11 days. Young are atricial and fledge approximately 7–8 days after hatching.

Western yellow-billed cuckoos forage on caterpillars, bird eggs, frogs, lizards, ants, beetles, wasps, flies, berries, and fruit.

Reasons for Decline/Vulnerability: This species is threatened by the degradation, reduction, and conversion of riparian habitat to agricultural and urban development. Estimates of riparian habitat losses include 90–95 percent for Arizona (AGFD 2002b).

Effects of Vegetation Treatments

<u>Effects Common to All Treatments</u>

Direct Effects. Removal of vegetation could directly affect yellow-billed cuckoos if trees or shrubs with active nests are removed.

Indirect Effects. Treatment methods could alter the species composition and structure of a riparian habitat, which could in turn affect its suitability for the western yellow-billed cuckoo. Thinning of understory vegetation, for example, may reduce the suitability of a riparian site for nesting, as this species requires dense vegetation above and around the nest for cover.

A treatment program that reduces invasive species (such as tamarisk), allowing natives (such as cottonwoods and willows) to increase in abundance, would be expected to have a long-term positive effect on riparian habitat. Removing invasive plants (such as tamarisk) would reduce the risk of future severe wildfire, and would also be likely to have a long-term positive effect on yellow-billed cuckoo.

<u>Manual Treatments</u>

Direct Effects. There would be some disturbance associated with the presence of humans, which would have the greatest impact on western yellow-billed cuckoo populations during the breeding season, when reproductive success could be affected. Smoke associated with pile burning may cause nesting birds to leave their nests, which could reduce reproductive success. In addition, smoke could disturb individual birds and interfere with foraging and other activities.

<u>Mechanical Treatments</u>

Direct Effects. During mechanical control, the presence of humans and equipment in the area could create enough of a disturbance to disrupt activities such as breeding or feeding. Smoke associated with pile burning may cause nesting birds to leave their nests, which could reduce reproductive success. In addition, smoke could disturb individual birds and interfere with foraging and other activities.

<u>Biological Treatments</u>

Domestic Animals
Direct Effects. Grazing domestic animals in and near riparian areas could potentially harm or destroy nests, eggs, and nestlings. Domestic animals sometimes make physical contact with nests or supporting branches, resulting in destruction of nests and spillage of eggs and nestlings (USFS 2002).

Indirect Effects. Use of domestic animals to control weeds could alter riparian habitat, making it less suitable. Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western U.S. (USDA Forest Service 2002). Grazing reduces the diversity and density of riparian plant species, especially cottonwoods and willows, which are utilized as nesting trees by western yellow-billed cuckoos (BLM 1996). Cottonwood and willow seedlings may be grazed or trampled, thus reducing survival rates. Under heavier grazing treatments, established vegetation may be hedged to a height of 6 to 7 feet, resulting in a marked reduction in understory vegetation on which this bird species relies.

Chemical Treatments

Direct Effects. The presence of humans and use of vehicles associated with herbicide applications may temporarily disturb western yellow-billed cuckoos in the treatment area. The severity of these effects would depend on the season, and the vicinity of disturbances to nesting habitat. Although adult birds would be able to fly away from treatment sites, some birds could inadvertently be exposed to herbicides, as could nests, eggs, and young, flightless birds. Based on the ERAs (BLM 2007a), negative health effects to western yellow-billed cuckoos could occur from direct spray by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate (Appendix C).

Western yellow-billed cuckoos could be negatively affected by dermal contact of vegetation that has been treated with herbicides. ERAs predicted that if threatened, endangered, or proposed birds were to touch plant materials sprayed by 2,4-D at the typical application rate, or by glyphosate or triclopyr at the maximum application rate, negative health effects could potentially result. Based on the results of the ERAs ingestion of invertebrates sprayed by glyphosate or triclopyr at the typical application rate, or by imazapyr at the maximum application rate, would potentially result in negative health effects (Appendix C).

Indirect Effects. Herbicide treatments in western yellow-billed cuckoo habitats could negatively affect these habitats if substantial loss of vegetation occurred with effects being greatest around nest sites. Over the long-term, a reduction in weed species should benefit the western yellow-billed cuckoo by reducing the risk of future severe wildfires and promoting the establishment of native plant species.

Conservation Measures

To minimize or avoid impacts to the western yellow-billed cuckoo, the PDO would apply the following measures:

- Riparian areas that are suitable for use by yellow-billed cuckoo will be evaluated for the need for consultation at the project level prior to treatment. Project level evaluation, including detailed information about the location, time of year, species of vegetation to be removed, and method and extent of vegetation removal are necessary because of complex life history and habitat requirements of the cuckoo. In particular, riparian areas consisting of the following species should be given special consideration; willow (*Salix spp.*), tamarisk (also known as saltceader, *Tamarix spp.*), cottonwood (*Populus fremontii*), mesquite (*Prosopis spp.*), velvet ash (*Fraxinus velutina*), Arizona sycamore (*Plantanus wrightii*) box elder (*Acer negundo*), Arizona alder (*Alnus oblongifolia*), Arizona walnut (*Juglans major*), oak (*Quercus spp*.), netleaf hackberry (*Celtis reticulate*), Mexican elderberry (*Sambuccus mexicanus*), seep willow (*Baccharis glutinosa*), soapberry (*Sapindus saponaria*), and juniper (*Juniperus spp*.).

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

To minimize or avoid impacts to yellow-billed cuckoo proposed critical habitat, the PDO would apply the yellow-billed cuckoo conservation measures listed above.

3.2.6 Yellow-billed Cuckoo Proposed Critical Habitat

Critical habitat for the yellow-billed cuckoo was proposed in August of 2014 (79 FR 48547). Critical habitat is proposed on BLM public lands within the Phoenix District along portions of the Hassayampa River, Gila River, Agua Fria River, and tributaries to the Agua Fria River on the Agua Fria National Monument.

The PCEs for yellow-billed cuckoo proposed critical habitat are:

1. *Riparian woodlands*. Riparian woodlands with mixed willow cottonwood vegetation, mesquite-thorn forest vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 ft (100 m) in width and 200 ac (81 ha) or more in extent. These habitat patches contain one or more nesting groves, which are generally willow dominated, have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats.

2. *Adequate prey base*. Presence of a prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.

3. *Dynamic riverine processes*. River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (e.g. lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old.

Effects of Vegetation Treatments

<u>Effects Common to All Treatments</u>

Direct Effects. Vegetation treatments could alter the species composition and structure of riparian habitat within the proposed critical habitat units, which could in turn affect its suitability for the yellow-billed cuckoo. Negative effects could occur from removing tamarisk, since tamarisk can provide nesting and foraging habitat.

Indirect Effects. A treatment program that reduces invasive species (such as tamarisk), allowing natives (such as cottonwoods and willows) to increase in abundance, would be expected to have a long-term positive effect on yellow-billed cuckoo proposed critical habitat. Yellow-billed cuckoos have a strong association with cotton wood – willow dominated habitat (Johnson et al. 2008). Removing invasive plants (such as tamarisk), would favor the establishment of native riparian trees and would reduce the risk of future severe wildfire. This would likely have a long-term positive effect on the yellow-billed cuckoo and its proposed critical habitat.

<u>Manual Treatments</u>

Direct and Indirect Effects. Discussed above in “Effects Common to All Treatments”.

Mechanical Treatments

Direct and Indirect Effects. Discussed above in “Effects Common to All Treatments”.

Biological Treatments

Domestic Animals
Direct and Indirect Effects. Use of domestic animals to control weeds could alter riparian habitat, making it less suitable for yellow-billed cuckoos. Overuse by livestock has been a major factor in the degradation and modification of riparian habitats in the western U.S. (USDA Forest Service 2002). Grazing reduces the diversity and density of riparian plant species, especially cottonwoods and willows, which are utilized as nesting trees by yellow-billed cuckoos. Cottonwood and willow seedlings may be grazed or trampled, thus reducing survival rates.

Chemical Treatments

Indirect Effects. Herbicide treatments in yellow-billed cuckoo proposed critical habitat could negatively affect these habitats if substantial loss of vegetation occurred, with effects being greatest around nests. Over the long term, a reduction in weed species could benefit the yellow-billed cuckoo proposed critical habitat by promoting the establishment of native riparian trees such as Goodding’s willow and Fremont cottonwood.

Conservation Measures
To minimize or avoid impacts to yellow-billed cuckoo proposed critical habitat, the PDO would apply the yellow-billed cuckoo conservation measures listed above in section 3.2.5.

3.2.7 Yuma Clapper Rail

Status and Distribution: The Yuma clapper rail was listed as a federal endangered species in 1967 (32 FR 4001) without designated critical habitat. The AGFD lists the Yuma clapper rail as a species of special concern and the AZNHP ranks this species as G5T3, S3, which indicates the subspecies is vulnerable throughout its range and for the state of Arizona.

Range-Wide: The historic distribution is uncertain, but may have included the Lower Colorado River (LCR) and its tributaries in Mexico and the United States (AGFD 2006). Currently, it is known to occur in the LCR from Gulf of California in Mexico to Virgin River and Las Vegas area in northern Arizona and Nevada (Garnett et al. 2004), with concentrations in the U.S. along the LCR from the vicinity of Laughlin, Nevada to Yuma, Arizona. In Arizona, territories were detected in Colorado River as far north as Lake Mead, Virgin River, Bill Williams River, the lower Gila River from near Phoenix to the Colorado River, and the lower Salt and Verde Rivers (AGFD 2006). Until recently, most of the population was thought to retreat to Mexico during the winter; it is now estimated that over 70% of the breeding population winters along the Lower Colorado River (Eddleman 1989). Birds along the Gila River are thought to migrate during the winter, perhaps because of cooler temperatures at those slightly higher elevations (Corman and Wise 2005).

PDO: This species is known to nest along the Gila River upstream from Gillespie Dam (BLM 1985).

Life History: This subspecies is associated with dense emergent riparian vegetation. Yuma clapper rails require a mudflat or sandbar with dense herbaceous or woody vegetation for nesting and foraging. This is the only clapper rail to breed in freshwater marshes; also inhabit brackish water marshes and side waters. They prefer the tallest, densest cattail and bulrush marshes (Rosenberg et al. 1991). Most are found within the Lower Colorado Subdivision of the Sonoran Desertscrub biome.

Yuma clapper rails breed from March through July, with most eggs hatching during the first week of June. Nests are built in three major microhabitats: at the base of living clumps of cattail or bulrush, under wind thrown bulrush, or on the top of dead cattails remaining from the previous year's growth (USFWS 1997). Nesting materials and cover are obtained from mature cattail/bulrush stands. Both adults care for eggs and young, and clutch size is typically six to eight eggs. Incubation lasts approximately and lasts about 21-23 days.

In winter, most Yuma clapper rails are found in heavily overgrown, relatively narrow, wet sloughs and backwaters, which have more varied vegetation cover of mature and decadent herbaceous and woody vegetation than do lacustrine marshes.

Yuma clapper rails forage on crayfish and other crustaceans, it is believed there are seasonal shifts in habitat use by crayfish, which may affect use of habitats by the rails (AGFD 2006).

Reasons for Decline/Vulnerability: This species is threatened by habitat destruction due to stream channelization and elimination of marsh habitat (AGFD 2006).

Effects of Vegetation Treatments

Effects Common to All Treatments

Indirect Effects. Yuma clapper rails are associated primarily with dense marsh vegetation. Therefore, any treatment method that reduces the cover of herbaceous vegetation in clapper rail habitats would be expected to negatively affect the species. However, activities that reduce the likelihood of wildfire and the coverage of weed species in Yuma clapper rail habitat would benefit the species.

Manual Treatments

Direct and Indirect Effects. Manual weed treatments could potentially result in the destruction of nests and the eggs therein. There would be some disturbance associated with the presence of humans, which would have the greatest impact on Yuma clapper rail populations during the breeding season, when reproductive success could be affected. Smoke associated with pile burning may cause nesting birds to leave their nests, which could reduce reproductive success. In addition, smoke could disturb individual birds and interfere with foraging and other activities.

Mechanical Treatments

Direct Effects. Mechanical removal of vegetation during the breeding season could result in the destruction of nests and any eggs therein. During mechanical control, the presence of humans and equipment in the area could create enough of a disturbance to disrupt activities such as breeding or feeding. However, these disturbances would be temporary and short-term. Smoke associated with pile burning may cause nesting birds to leave their nests, which could reduce reproductive success. In addition, smoke could disturb individual birds and interfere with foraging and other activities.

Indirect Effects. The use of large equipment in and near wetland habitats could result in some leakage of oil and other fuels into aquatic habitats that support Yuma clapper rail prey species. These effects would be localized and of short duration, but there would be some risks of clapper rails foraging in contaminated waters.

In addition, large-scale removal of herbaceous vegetation within clapper rail habitat would make the habitat less suitable for Yuma clapper rails. However, removal of saltcedar, either directly from Yuma clapper rail habitats, or from adjacent riparian habitats, would reduce the risk of high intensity wildfires and would promote the growth of native vegetation which would improve clapper rail habitat in the long term.

Biological Treatments

Domestic Animals

Direct Effects. Domestic animals could potentially trample juvenile birds, nests, or eggs.

Indirect Effects. Use of domestic animals to control weeds could affect Yuma clapper rail prey items by altering the aquatic habitats in which they occur. The feces of domestic animals can degrade water quality, and intensive grazing in riparian areas can alter water levels and channel widths, and increase sedimentation, all of which could negatively affect Yuma clapper rail habitat.

Chemical/Herbicide Treatments

Direct Effects. The presence of humans and use of vehicles associated with herbicide applications may temporarily disturb Yuma clapper rails in the treatment area. The severity of these effects would depend on the season, and the vicinity of disturbances to nesting habitat. Although adult birds would be able to fly away from treatment sites, some birds could inadvertently be exposed to herbicides, as could nests, eggs, and young, flightless birds. Based on the ERAs (BLM 2007a), negative health effects to Yuma clapper rails could occur from direct spray 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate (Appendix C).

Yuma clapper rails could be negatively affected by dermal contact of vegetation or ingestion of food items that have been treated with herbicides. ERAs predicted that if Yuma clapper rails were to touch plant materials sprayed by 2,4-D at the typical application rate, or by glyphosate or triclopyr at the maximum application rate, negative health effects could potentially result. Based on the results of the ERAs ingestion of invertebrates sprayed by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate, would potentially result in negative health effects (Appendix C).

Indirect Effects. Herbicide treatments in Yuma clapper rail habitat could negatively affect the species by eliminating suitable nesting habitat and reducing the amount of vegetative cover available to the species. Effects would be greatest if treatments during the nesting season exposed nests, eggs, and/or newly-hatched birds. However there would be long-term beneficial effects, such as removal of weed species such as tamarisk would be expected to make treated areas more suitable for Yuma clapper rails.

Conservation Measures

To minimize or avoid impacts to the Yuma clapper rail, the PDO would apply the following measures:

- Do not conduct vegetation treatments within 0.5 mile of known nest sites or unsurveyed suitable habitat during the breeding season (March 15 to August 31).

- The rail is resident in the Arizona year round. Treatment activities will avoid occupied or unsurveyed suitable habitat during the post-breeding season or the appropriate conservation measures will be applied as outlined below.
- Mechanical treatments may occur outside the breeding season, but must be at least 100 feet from suitable open water/marsh habitat.
- Do not use domestic livestock methods within occupied or unsurveyed suitable habitat for Yuma clapper rails.
- Fire will only be used to burn slash piles. Slash will be piled and burned in areas where the activity and smoke associated with the burning will not affect occupied or unsurveyed suitable habitat.
- 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 Yuma clapper rail habitats; do not broadcast spray 2,4-D within 0.25 mile of Yuma clapper rail habitat.
- Do not broadcast spray glyphosate or triclopyr in Yuma clapper rail habitat; do not broadcast spray these herbicides in areas adjacent to Yuma clapper rail habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying imazapyr in or adjacent to Yuma clapper rail habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate or triclopyr to vegetation in Yuma clapper rail habitat, utilize the typical, rather than the maximum, application rate.

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

3.2.7 Sonoran Desert Tortoise

Status and Distribution: The Sonoran desert tortoise was listed as a federal candidate species in 2010. The AGFD lists the Sonoran desert tortoise as a species of special concern and the AZNHP ranks this species as G4T4, S4, which indicates the subspecies is secure, but uncommon throughout its range and for the state of Arizona.

Range-Wide: The historic distribution is the same as the current, which includes south and east of the Colorado River in Arizona in all counties except for Navajo, Apache, Coconino, and Greenlee counties, south to the Rio Yaqui in southern Sonora, Mexico (USFWS 2011).

PDO: Three habitat classifications, based on population, viability, size, density, trend, and manageability, were devised from BLM's inventories of desert tortoise habitat throughout the PDO between 1989 and 1999. There is approximately 2 million acres of desert tortoise habitat within the PDO area with approximately 500,000 acres of habitat categorized as essential to maintaining viable populations.

Life History: This species typically inhabits rocky slopes and bajadas of Mojave and Sonoran desertscrub (AGFD 2010). It is associated with Sonoran and Mojave desertscrub, including a variety of biotic communities within or extending from the Sonoran Desert but most often in paloverde-mixed cacti associations. Tortoises are found in the Arizona Upland and Lower Colorado River subdivision of the Sonoran Desert, desert grassland, and ecotonal areas consisting of Sonoran desertscub with elements of Mojave desertscrub and juniper woodland, interior chaparral, and desert grassland (Averill-Murray and Klug 2000).

Desert tortoises spend much of their lives in burrows, emerging to feed and mate during late winter and early spring. They typically remain active through the spring, and sometimes emerge again after summer storms. During these activity periods, desert tortoises eat a wide variety of herbaceous plants, particularly grasses and the flowers of annual plants (Berry 1974, Luckenbach 1982). Activity decreases sharply after mid-October as tortoises withdraw into winter hibernacula. Desert tortoises exhibit delayed maturity and live a long life. Eggs and hatchlings are quite vulnerable, and pre-reproductive adult mortality averages 98% (Wilbur and Morin 1988, Turner et al. 1987). Adults, however, are well-protected against most predators (apart from humans) and other environmental hazards (Turner et al. 1987; Germano 1992). Their longevity helps compensate for their variable annual reproductive success, which is correlated with environmental conditions.

Sonoran desert tortoise eat a variety of annual and perennial grasses, forbs, and succulents that includes but is not limited to dicot annuals, grasses, herbaceous perennials, trees and shrubs, subshrubs/woody vines, and succulents.

Reasons for Decline/Vulnerability: This species is threatened by weed species invasions and altered fire regimes; urban and agricultural development and human population growth; barriers to dispersal and genetic exchange; off-highway vehicles; roads and highways; historical ironwood and mesquite tree harvest in Mexico; improper livestock grazing (predominantly in Mexico); undocumented human immigration and interdiction activities; illegal collection; predation from feral dogs; human depredation and vandalism; drought; and climate change. Threats to the Sonoran desert tortoise are highly synergistic in their effect on the population (USFWS 2011).

Effects of Vegetation Treatments

Effects Common to All Treatments

Indirect Effects. Removal of hazardous fuels could positively affect Sonoran desert tortoises by reducing the potential for a future severe wildfire. Removal of weed species would likely have beneficial long-term effects on foraging habitat by increasing native plants available.

Manual Treatments

Direct and Indirect Effects. There would be some disturbance associated with the presence of humans. However, these disturbances should be minimal and short-term in duration. Removal of weeds would likely have some beneficial effects on Sonoran desert tortoise habitat through enhancing the growth and distributions of native plant species.

Mechanical Treatments

Direct Effects. The use of mechanical equipment could potentially crush or injure individual tortoises.

Indirect Effects. Large-scale removal of herbaceous vegetation would potentially reduce the amount available for foraging. However, removal of weeds would benefit the species by increasing the potential for native plants thus increasing the foraging quality.

Biological Treatments

Domestic Animals

Direct Effects. Use of domestic animals to contain weeds in habitats occupied by Sonoran desert tortoise could cause death or injury to individuals through trampling. In addition, trampling of young tortoises could occur, potentially reducing the number of individuals that reach reproductive age.

Indirect Effects. Desert tortoises could be negatively affected by treatments involving domestic animals, as tortoises depend on herbaceous forage for food and would be competing with domestic animals. Use of domestic animals to control weeds would cause the removal of vegetation resulting in increased erosion, as well as reducing water infiltration and accelerating runoff. If the use of domestic animals is successful at reducing the cover of noxious weeds, desert tortoises may be benefited through an increased potential for native plants.

Chemical Treatments

Direct Effects. The presence of humans and use of vehicles associated with herbicide applications could crush individual tortoises. Although tortoises would attempt to escape work crews, they are slow moving and would not be able to flee the area to avoid mechanical equipment and some individuals may seek cover in shallow burrows, where they would not necessarily be protected from crushing. Some direct spray from herbicides could occur. Sonoran desert tortoises could be negatively affected by dermal contact of vegetation or ingestion of vegetation that has been treated with herbicides. ERAs (BLM 2007a), predicted that if Sonoran desert tortoises were to touch plant materials sprayed by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate, negative health effects could potentially result (Appendix C).

Indirect Effects. Herbicide treatments could result in a substantial, though temporary, reduction in vegetation used as a food source, particularly if a site was broadcast sprayed with a broad-spectrum formulation. Such a loss of vegetation could indirectly impact tortoises by reducing the amount of available forage temporarily in treatment areas. Treatments to reduce weeds should benefit tortoise habitat over the long term by returning it to a more native state.

Conservation Measures

To minimize or avoid impacts to the Sonoran desert tortoise, the PDO would apply the following measures when treating in Sonoran desert tortoise habitat:

- In Sonoran desert tortoise habitat conduct vegetation treatments when tortoises are least active (typically November 1 to March 1).
- During treatment and pre-treatment activities look out for and avoid tortoises.
- Prior to operating or moving vehicles or equipment, check underneath and around vehicles/equipment to insure that tortoises are not in danger of being injured.
- If tortoises must be moved to avoid harming them, move them according to the Arizona Game and Fish *Guidelines to handling Sonoran desert tortoises encountered on development projects* (Appendix D).
- To the greatest extent possible, avoid desert tortoise burrows during herbicide treatments.
- When conducting herbicide treatments in upland habitats occupied by Sonoran desert tortoises, do not broadcast spray 2,4-D, glyphosate, or triclopyr; do not broadcast spray these herbicides in areas adjacent to habitats occupied by Sonoran desert tortoises under conditions when spray drift onto the habitat is likely.
- If conducting manual spot applications of glyphosate or triclopyr to vegetation in upland habitats occupied by Sonoran desert tortoises, utilize the typical, rather than the maximum, application rate.
- If spraying imazapyr in or adjacent to upland habitats occupied by Sonoran desert tortoises, apply at the typical, rather than the maximum, application rate.

- Do not carry out pile burning activities in Sonoran desert tortoise habitat.

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

3.2.8 Northern Mexican Gartersnake

Status and Distribution: Listed threatened July 8, 2014 (79 FR 38677) with proposed critical habitat (FR 78 41550).

Range-Wide:
Historical Range**:** The northern Mexican gartersnakes' historical distribution in the U.S. included the Santa Cruz, San Pedro, Colorado, Gila, Salt, Agua Fria, Rio Yaqui, and Verde River watersheds in Arizona, in addition to the upper Gila and San Francisco headwater streams in western Grant and Hidalgo counties in New Mexico. In Mexico, northern Mexican gartersnakes historically occurred within the Sierra Madre Occidental and the Mexican Plateau in the Mexican states of Sonora, Chihuahua, Durango, Coahila, Zacatecas, Guanajuato, Nayarit, Hidalgo, Jalisco, San Luis Potosí, Aguascalientes, Tlaxacala, Puebla, México, Michoacán, Oaxaca, Veracruz, and Querétaro.

Current Range: The northern Mexican gartersnake is likely extirpated from New Mexico. In Arizona, its distribution has been reduced to less than ten percent of its former range along large mainstem rivers. The species is considered likely extant in fragmented populations within the middle/upper Verde River drainage, middle/lower Tonto Creek, and the Cienega Creek drainage, as well as in a small number of isolated wetland habitats in southeastern Arizona. The species' current distribution in Mexico is uncertain.

PDO: Critical habitat was proposed along the Agua Fria River from the confluence with Squaw Creek to Dewey, Arizona. This proposed critical habitat contains lands administered by the BLM both on and off of the Agua Fria National Monument, as well as state and private lands. Critical habitat was also proposed along Little Ash Creek on the Agua Fria National Monument.

Life History:
This species occurs up to about 8,500 feet in elevation, but is most frequently found between 3,000 and 5,000 feet. The northern Mexican gartersnake uses three general habitat types in Arizona: 1) source area ponds and cienegas; 2) lowland river riparian forests and woodlands; and 3) upland stream gallery forests. This species uses densely vegetated cienegas, cienega-streams, and stock tanks in the southern part of its distribution in Mexico and within its historical distribution in New Mexico.

An important component to suitable northern Mexican gartersnake habitat is a stable native prey base. The northern Mexican gartersnake is surface-active at ambient temperatures ranging from 71° F to 91° F and forages along the banks of waterbodies feeding primarily upon native fish and adult and larval native ranid frogs (e.g. lowland leopard frog, Chiricahua leopard frog, etc.). It may also supplement its diet with earthworms and vertebrates such as lizards, small rodents, salamanders, and hylid frogs (treefrogs). In some populations, adult Northern Mexican gartersnakes will prey upon juvenile nonnative bullfrogs and/or bullfrog tadpoles where they co-occur.

Sexual maturity in male northern Mexican gartersnakes occurs at two years, and in two to three years in females. Northern Mexican gartersnakes are ovoviviparous. The species mates in April and May in their northern distribution and gives live birth to between seven and 26 neonates (average is 13.6) in July and August. Only half of the sexually mature females within a population reproduce in any one season.

Reasons for Decline/Vulnerability:
Current threats to the northern Mexican gartersnake include: 1) destruction and modification of its habitat; 2) predation from nonnative bullfrogs; 3) significant reductions in its native prey base from predation/competition associations with nonnative species; and 4) genetic effects from fragmentation of populations caused by items 1–3.

Effects of Vegetation Treatments

Effects Common to All Treatments

Indirect Effects. Removal of vegetation in riparian habitat could negatively affect northern Mexican gartersnakes by eliminating important sources of cover over the short term. Removal of vegetation would reduce the plant biomass of riparian areas, which could increase water temperature and sedimentation, and decrease water storage capacity (USFS 2000), potentially affecting northern Mexican gartersnakes and their prey base. However, removal of weeds and a reduction in the risk of a future catastrophic wildfire would likely have positive long-term effects on habitat components.

Manual Treatments

Direct Effects. There would be some disturbance associated with the presence of humans. However, these disturbances should be minimal and short-term in duration.

Mechanical Treatments

Direct Effects. Equipment used during mechanical treatments could directly affect northern Mexican gartersnakes by killing or injuring individuals. During removal of downed woody material, placing the material into piles could also crush individuals.

Indirect Effects. Mechanical treatments would be expected to increase the potential for erosion over the short term, resulting in some sediment inflow into aquatic habitats. This sediment could cause mortality by smothering eggs and larvae, and inhibit respiration in fish and tadpoles on which northern Mexican gartersnakes feed. Use of equipment may also crush prey species.

Biological Treatments

Domestic Animals
Direct Effects. Use of domestic animals to contain weeds in riparian habitat occupied by northern Mexican gartersnakes could cause death or injury to individuals through trampling.

Indirect Effects. Use of domestic animals could negatively affect aquatic and riparian habitats utilized by northern Mexican gartersnakes. One study indicated that exclusion of cattle grazing resulted in re-establishment of native trees and native wetland plants, re-establishment of creek pools, and an expansion of frog populations into streams and ungrazed stock ponds (Dunne 1995). When cattle drink from small ponds and streams, they can draw down water levels, leaving egg masses above the water surface, thereby subjecting them to desiccation and/or disease (USDA Forest Service 2002).

Other effects of grazing on aquatic habitats include nutrient loading; reduction of shade and cover, which result in increases in water temperature; more intermittent flows; changes in stream channel morphology; and sedimentation caused by bank degradation and off-site soil erosion (USDA Forest Service 2002). Presence of domestic animals in riparian vegetation could cause mass erosion from trampling, hoof slide, and streambank collapse, all of which cause soils from the bank to enter the stream, reducing the quality of habitat. Trampling could also compact the soils and reduce infiltration, which in turn may decrease the recharge of the saturated zone and increase peak flow discharge. Removal of streambank vegetation, in addition to causing greater fluctuations in temperature, could also result in decreased water storage capacity and increased erosion potential. The removal of vegetation in upland areas could also increase erosion, as well as reducing water infiltration and accelerating runoff. Domestic animals may also disturb egg masses and larvae of prey species potentially reducing the prey base.

<u>Chemical Treatments</u>

Direct Effects. Herbicide treatments could result in the crushing of northern Mexican gartersnakes, primarily by vehicles, which could injure or kill individuals. Although most individuals would attempt to escape work crews, many individuals would do so by seeking cover where they would not necessarily be protected from crushing. Northern Mexican gartersnakes could potentially be exposed to direct spray of chemicals, come into contact with sprayed vegetation after a treatment, or ingest sprayed prey items after a treatment. Northern Mexican gartersnakes could be exposed to herbicides while in aquatic environments due to herbicides entering the water through various exposure pathways (direct spray of herbicides into a water body, off-site drift of herbicides applied to adjacent uplands into a water body, runoff from upland areas, or an accidental spill of herbicides directly from a truck/ATV or helicopter into a water body).

Based on information in the ERAs (BLM 2007a), direct spray of northern Mexican gartersnakes by 2,4-D, glyphosate, imazapyr, or triclopyr could potentially result in negative health effects. Dermal contact with vegetation treated by glyphosate or triclopyr at the maximum application rate, or vegetation treated by 2,4-D at the typical application rate, could potentially result in negative health effects to northern Mexican gartersnakes as well. Northern Mexican gartersnakes may consume both vertebrate and invertebrate prey items. Ingestion of invertebrate prey items that have been sprayed by 2,4-D, glyphosate, or triclopyr at the typical application rate, or by imazapyr at the maximum application rate could result in negative health effects to reptile species (Appendix C). Since ingestion of vertebrate prey contaminated by 2,4-D, glyphosate, or triclopyr was not examined in the ERAs for these herbicides, exposure to these chemicals via this exposure pathway cannot be determined.

Indirect Effects. Treatment with herbicides could result in a substantial, though temporary, reduction in vegetative cover, particularly if a site was broadcast sprayed with a broad-spectrum formulation. Such a loss of vegetation could indirectly impact northern Mexican gartersnakes by removing cover. However, other important components for cover, such as woody debris would be maintained, and could even increase in quantity. It is possible that prey items could also be reduced temporarily as a result of crushing, toxicity from spraying, or loss of habitat. However, long-term negative effects to habitat should not occur. Furthermore, treatments to reduce weedy species could benefit northern Mexican gartersnake habitat by returning it to a more native state.

Conservation Measures
To minimize or avoid impacts to the northern Mexican gartersnake, the PDO would apply the following measures:

• Do not use domestic livestock biological treatment methods within suitable habitat for northern Mexican gartersnakes.
• Prior to burning slash piles within one mile of critical habitat or riparian/wetland areas that contain suitable habitat for northern Mexican gartersnakes, evaluate the potential effects to northern Mexican gartersnakes, and if the activity may affect the species initiate consultation with the USFWS.
• Following treatments replant or reseed treated areas with native species, if needed.

• Within riparian areas, wetlands, and aquatic habitats, conduct herbicide treatments only with herbicides that are approved for use in those areas.
• Do not broadcast spray herbicides (including 2,4-D, glyphosphate, or triclopyr BEE) in riparian areas or wetlands that may provide habitat for northern Mexican gartersnakes; do not broadcast spray 2,4-D within ¼ mile of habitat that may be occupied by northern Mexican gartersnakes.
• When conducting herbicide treatments in upland areas adjacent to aquatic or wetland habitats that support northern Mexican gartersnakes, do not broadcast spray during conditions under which off-site drift is likely.
• In watersheds where northern Mexican gartersnakes occur, do not apply triclopyr BEE in upland habitats upslope of aquatic habitats that support northern Mexican gartersnakes under conditions that would likely result in surface runoff.
• Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats that support northern Mexican gartersnakes.
• Within northern Mexican gartersnake habitat, do not drive vehicles off established roads.
• Within 150 feet of northern Mexican gartersnake habitat, do not fuel/refuel equipment, store fuel, or perform equipment maintenance (locate all fueling and fuel storage areas, as well as service landings outside protected riparian areas and ensure proper storage and secondary containment measures and protocols are strictly followed).

3.2.9 Northern Mexican Gartersnake Proposed Critical Habitat

Critical habitat for the northern Mexican gartersnake was proposed in 2013 (USFWS 2013b). Approximately 303,338 acres would be on federal lands. Portions of the proposed Agua Fria River Subbasin Unit are located on the Phoenix District. Proposed critical habitat would extend 600 feet from either side of the bankfull stage of water bodies.

In PDO critical habitat is proposed along the Agua Fria River from the confluence with Squaw Creek to Dewey, AZ. This proposed designation contains lands administered by the BLM both on and off of the Agua Fria National Monument, as well as state and private lands. Critical habitat was also proposed along Little Ash Creek on the Agua Fria National Monument.

It is likely that the alteration of riparian habitats by invasive plants has a negative effect on Northern Mexican Gartersnake habitat. One of the five reasons for its proposed threatened status is the present or threatened destruction, modification, or curtailment of its habitat or range (USFWS 2013c). High-intensity wildfires—often fueled by nonnative plants—also threatens northern Mexican gartersnake habitat (USFWS 2013c).

The PCEs for critical habitat are:

1. Aquatic or riparian habitat that includes: a. Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in-channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; or b. Lentic wetlands such as livestock tanks, springs, and cienegas; and c. Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and d. Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present at levels that do not affect survival of any age class of the northern Mexican gartersnake or the maintenance of prey populations.

2. Adequate terrestrial space (600 ft. [182.9 m] lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity).

3. A prey base consisting of viable populations of native amphibian and native fish species.

4. An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis*, *Procambarus clarki*, etc.), or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring (USFWS 2013b).

Effects of Vegetation Treatments

Effects Common to All Treatments

Directs and Indirect Effects. Removal of vegetation would reduce the plant biomass of riparian areas, which could increase water temperature and sedimentation, decrease water storage capacity, and reduce shelter (USFS 2000), potentially affecting northern Mexican gartersnakes and their prey base. However, removal of weeds and a reduction in the risk of a future catastrophic wildfire would likely have positive long-term effects on habitat components.

Manual Treatments

Indirect Effects. Reduced potential for wildfire and overall habitat restoration.

Mechanical Treatments

Direct and Indirect Effects. Mechanical treatments would be expected to increase the potential for erosion over the short term, resulting in some sediment inflow into aquatic habitats. This sediment could cause mortality by smothering eggs and larvae, and inhibit respiration in fish and tadpoles on which northern Mexican gartersnakes feed. Use of equipment may also crush prey species.

Biological Treatments

Domestic Animals
Direct and Indirect Effects. Use of domestic animals could negatively affect aquatic and riparian habitats utilized by northern Mexican gartersnakes. One study indicated that exclusion of cattle grazing resulted in reestablishment of native trees and native wetland plants, reestablishment of creek pools, and an expansion of frog populations in streams and ungrazed stock ponds (Dunne 1995). When cattle drink from small ponds and streams, they can draw down water levels, leaving egg masses above the water surface, thereby subjecting them to desiccation and/or disease (USDA Forest Service 2002).

Other effects of grazing on aquatic habitats include nutrient loading; reduction of shade and cover, which result in increases in water temperature; more intermittent flows; changes in stream channel morphology; and sedimentation caused by bank degradation and off-site soil erosion (USDA Forest Service 2002). Presence of domestic animals in riparian vegetation could cause mass erosion from trampling, hoof slide, and streambank collapse, all of which cause soils from the bank to enter the stream, reducing the quality of habitat. Trampling could also compact the soils and reduce infiltration, which in turn may decrease the recharge of the saturated zone and increase peak flow discharge. Removal of streambank vegetation, in addition to causing greater fluctuations in temperature, could also result in decreased water storage capacity and increased erosion potential. The removal of vegetation in upland areas could also increase erosion, as well as reducing water infiltration and accelerating runoff. Domestic animals may also disturb egg masses and larvae of prey species potentially reducing the prey base.

Chemical Treatments

Directs and Indirect Effects. Treatment of upland sites with herbicides could result in a substantial, though temporary, reduction in vegetative cover, particularly if a site was broadcast sprayed with a broad-spectrum formulation. However, other important components for cover, such as woody debris would be maintained, and could even increase in quantity. It is possible that prey items could also be reduced temporarily as a result of crushing, toxicity from spraying, or loss of habitat. However, long-term negative effects to habitat should not occur. Furthermore, treatments to reduce weedy species could benefit northern Mexican gartersnake habitat by returning it to a more native state.

Conservation Measures
To minimize or avoid impacts to northern Mexican gartersnake proposed critical habitat, the PDO would apply the northern Mexican gartersnake conservation measures listed above in section 3.2.10.

3.2.10 Cumulative Impacts

Potential cumulative adverse effects may result from the continued increase of ground disturbing activities on state and private lands such as mining, construction, and OHV use. Vectors for weed dispersal such as vehicles, recreationists, livestock, and wildlife would continue to be present, spreading weed disseminules to new sites. New weeds that invade PDO from adjacent lands would be subject to treatment under the Proposed Action and invasion of weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated.

The Proposed Action alternative in conjunction with past, present, and foreseeable future actions would have short–term impacts to individuals due to displacement by treatment disturbance and potential reduction in forage and cover habitat for highly mobile species. Short-term, adverse impacts on federally listed wildlife species that are less mobile would be due to stress and disturbance and potential mortality to individuals. However, the cumulative effects of weed treatments would result in long–term benefits because of a reduction or eradication of weeds, slower weed population spread, and less total weed infestations thus increased total native vegetation compared to existing conditions. These would result in cumulatively improved habitat conditions for all federally listed wildlife species within and adjacent to BLM-administered lands within the PDO.

3.2.11 Determination of Effects for Wildlife Species and Critical Habitat and Proposed Critical Habitat

With application of the conservation measures, SOPs, and mitigation measures discussed above and in the appendices, the Proposed Action ***May Affect, but is not Likely to Adversely Affect*** Sonoran pronghorn, lesser long-nosed bat, southwestern willow flycatcher, Yuma clapper rail, western yellow-billed cuckoo, northern Mexican gartersnake and Sonoran desert tortoise.

With application of the conservation measures, SOPs, and mitigation measures discussed above and in the appendices, the Proposed Action ***May Affect, but is not Likely to Adversely Affect*** designated critical habitat for southwestern willow flycatcher or proposed critical habitat for northern Mexican gartersnake and yellow-billed cuckoo.

3.3 Federally Listed Fish Species

3.3.1 Gila Topminnow

Status and Distribution: The Gila topminnow was federally listed as endangered species in 1967 (32 FR 4001) without critical habitat. The AGFD lists the Gila topminnow as a species of special concern and the AZNHP ranks this species as G3T3, S1S2, which indicates the species is vulnerable throughout its range and critically imperiled for the state of Arizona.

Range-Wide: Historically, this species was common throughout the Gila River drainage in Arizona and extending into Mexico and New Mexico (USFWS 2011). Currently, this species is found in Mexico and Arizona. In Arizona, most of the remaining native populations occur in the Santa Cruz River system. The Gila topminnow also occurs in small streams, springs, and cienegas in Gila, Pinal, Graham, Yavapai, Santa Cruz, Pima, Maricopa, and La Paz counties (USFWS 2011).

PDO: Reintroduced populations occur in Tule Creek, Buckhorn Spring, Chalky Spring on BLM lands within the Bradshaw-Harquahala Planning Area; and Larry Creek and Lousy Canyon within the Agua Fria National Monument.

Life History: This species typically inhabits small streams, springs, and cienegas below 4,500 ft elevation, primarily in shallow areas with aquatic vegetation and debris for cover. This species is known to be able to tolerate high water temperatures and low dissolved oxygen (USFWS 2011). Preferred habitat contains dense mats of algae and debris, usually along stream margins or below riffles, with sandy substrates, sometimes covered with organic muds and debris (Minckley 1973).

The diet of the Gila topminnow is fairly generalized, consisting mostly of bottom debris, vegetative material, and amphipod crustaceans. The topminnows feed voraciously upon aquatic insect larvae, such as mosquitoes, when available. The breeding season for this species lasts from April to November with females carrying up to two broods simultaneously (AGFD 2001b). The typical brood size ranges from 10-15 young, with larger broods produced during the summer. Young produced early in the breeding season may reach sexual maturity in a few weeks to several months. Topminnows are not thought to live longer than a year under natural conditions (Minckley 1973).

Reasons for Decline/Vulnerability: Impacts include the introduction and spread of nonindigenous predatory and competitive fishes, water impoundment and diversion, water pollution, groundwater pumping, stream channelization, and habitat modification (USFWS 2011).

3.3.2 Gila Chub

Status and Distribution: The Gila chub was federally listed as endangered species in 2005 with critical habitat (32 FR 4001). The AGFD lists the Gila chub as a species of special concern and the AZNHP ranks this species as G2, S2, which indicates the species is imperiled throughout its range and throughout the state of Arizona.

Range-Wide: Historically, this species occurred throughout the Gila River basin, with the possible exception of the Salt River drainage above Roosevelt Lake (USFWS 2011). Currently, this species is found in approximately 43 rivers, streams, and spring-fed tributaries throughout the Gila River basin in northern Sonora, Mexico, central and southeastern Arizona, and western New Mexico. In Arizona, there are currently 29 populations remaining in tributaries of the Agua Fria, Babocomari, Gila, San Francisco, San Pedro, Santa Cruz, and upper Verde rivers in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties, Arizona, and in Grant County, New Mexico (USFWS 2011).

PDO: Natural populations occur in Indian and Silver Creeks and reintroduced populations occur in Larry Creek and Lousy Canyon, all within the Agua Fria National Monument. Designated critical habitat includes portions of Silver Creek, Larry Creek, Lousy Canyon, and Indian Creek – all tributaries of the Agua Fria River within the Agua Fria National Monument.

Life History: This species typically inhabits pools in smaller streams, cienegas, and artificial impoundments ranging in elevation from 2,000 to 5,500 ft (USFWS 2011). They utilize diverse habitat types based on season and age. Adults have been collected from deep pools with heavily vegetated margins and undercut banks. Juveniles have been collected from riffles, pools and undercut banks of runs. In larger stream systems they utilize heavily vegetated backwaters for cover and feeding. Gila chub are highly secretive, preferring quiet deeper waters, especially pools, or remaining near cover including terrestrial vegetation, boulders, and fallen logs.

Associated riparian vegetation community consists of willow (*Salix* spp.), tamarisk (*Tamarix* spp.), cottonwoods (*Populus* spp.), seep-willow (*Baccharis glutinosa*), and ash (*Fraxinus* spp.). Typical aquatic vegetation includes watercress (*Nasturtium officianale*), horsetail (*Equisetum* spp.), rushes (*Juncus* spp.), and speedwell (*Veronica anagallis-aquatica*).

Gila chub are omnivorous, preferring terrestrial and aquatic insects with adults feeding during evening and early morning hours on small fish and invertebrates and juveniles feeding throughout the day on insects and filamentous and diatomaceous algae (AGFD 2002c).

Reproduction occurs primarily from late spring into summer in streams, but can extend into late winter in constant temperature springs. Spawning occurs over beds of submerged aquatic vegetation (Minckley 1973). Actively breeding fish become fire-red along ventro-lateral surfaces and the eyes become yellow to yellow-orange (Minckley 1973).

Reasons for Decline/Vulnerability: Threats include aquifer pumping; stream diversion; reduction in stream flows; habitat alteration and competition by nonnative crayfishes; predation by and competition with nonnative fishes (AGFD 2002c).

3.3.3 Gila Chub Critical Habitat

Critical habitat for the Gila chub was designated in 2005 (USFWS 2005b). On the Phoenix District, designated habitat is located on portions of Silver Creek, Indian Creek, Larry Creek, and Lousy Canyon, tributaries of the Agua Fria, all within the Agua Fria National Monument. Natural populations occur in Indian and Silver Creeks and reintroduced populations occur in Larry Creek and Lousy Canyon. Fish critical habitat generally includes the 100-year floodplain where portions of the floodplain contain the primary constituent elements (PCE) defined for the critical habitat.

Gila chub habitat is threatened by wildfires—which are exacerbated by nonnative species and high fuel loads—because of the high amounts of sediment and ash that enter streams during rains following fire (USFWS 2005b).

The PCEs of Gila chub critical habitat are:

1. Perennial pools, areas of higher velocity between pools, and areas of shallow water among plants or eddies all found in headwaters, springs, and cienegas, generally of smaller tributaries.

2. Water temperatures for spawning ranging from 17 to 24 °C (62.6 to 75.2 °F), and seasonally appropriate temperatures for all life stages (varying from approximately 10 °C to 30 °C).

3. Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH (e.g. ranging from 6.5 to 9.5), dissolved oxygen (e.g. ranging from 3.0 to 10.0) and conductivity (e.g. 100 to 1000 mmhos).

4. Food base consisting of invertebrates (e.g. aquatic and terrestrial insects) and aquatic plants (e.g. diatoms and filamentous green algae).

5. Sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, a high degree of streambank stability, and a healthy, intact riparian vegetation community.

6. Habitat devoid of nonnative aquatic species detrimental to Gila chub or habitat in which detrimental nonnatives are kept at a level that allows Gila chub to continue to survive and reproduce.

7. Streams that maintain a natural flow pattern including periodic flooding.

3.3.4 Spikedace

Status and Distribution: The spikedace was federally listed as threatened in 1986 (51 FR 23769, 1986) with critical habitat designated in 2007 (72 FR 13356). Critical habitat was vacated by court ruling in May 2009. Spikedace was uplisted to endangered with critical habitat in 2012 (77 FR 10810).

Range-Wide: Historically, this species was common throughout much of the Gila River drainage above Phoenix, Arizona, including the Gila, Verde, Agua Fria, Salt, San Pedro, and San Francisco rivers (USFWS 2011). Currently, this species is found in Aravaipa Creek, a tributary of the San Pedro River, Eagle Creek, and the upper Verde River system in Arizona, and the upper Gila River system in New Mexico (USFWS 2011).

PDO: The historic distribution included the Agua Fria River. Extensive sampling of the Agua Fria River has not resulted in any recent occurrence records. The Agua Fria River is occupied an abundance of non-native fishes including: channel catfish (*Ictalurus punctatus*), carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), red shiner (*Cyprinella lutrensis*), fathead minnow (*Pimephales promelas*) and mosquitofish (*Gambusia affinis*). The Agua Fria River is saturated with non-native predatory fish making it currently unsuitable for spikedace to exist. With active management however there is potential for the Agua Fria River to support a spikedace population. Management actions in the *Bradshaw-Harquahala Resource Management Plan* call for the BLM to work with the US Fish and Wildlife Service and the Arizona Game and Fish Department to re-establish a spikedace population in the Agua Fria River. Currently, there are no spikedace populations in the BLM Phoenix District.

Life History: This species typically inhabits moderate to large perennial streams, where it inhabits moderate to fast velocity waters over gravel and rubble substrates. Specific habitat consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges. (USFWS 2011).

The diet of the spikedace is largely determined by, type of habitat and time of year (Minckley 1973) and consists of aquatic and terrestrial insects and small fry during certain seasons. The breeding season for this species occurs in spring and summer with females laying approximately 100-300 eggs or more (McKinley 1973). Young grow rapidly, attaining adult size by November of the year spawned. Spikedace live approximately 2 years, with reproduction typically occurring in 1-year-old fish.

Reasons for Decline/Vulnerability: Primary threat is habitat destruction due to damming, channel alteration, riparian destruction, channel downcutting, water diversion and groundwater pumping; and the introduction and spread of exotic predatory and competitive fish species (USFWS 2011).

3.3.5 Desert Pupfish

Status and Distribution: The Desert pupfish was federally listed as endangered species in 1986 with critical habitat (51 FR 10842). The AGFD lists the desert pupfish as a species of special concern and the AZNHP ranks this species as G1, S1, which indicates the species is critically imperiled throughout its range and throughout the state of Arizona.

Range-Wide: Historically, this species was once common in desert springs, marshes, backwaters, and tributaries of the Rio Sonoyta, San Pedro River, Santa Cruz River, lower Gila River, and lower Colorado River drainages in Arizona, California, and Mexico (USFWS 2011). Currently, there are three natural populations that occur in California along with the irrigation ditches around the Salton Sea. In Arizona, reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai Counties (USFWS 2011).

PDO: Desert pupfish were transplanted into Larry Creek and Lousy Canyon Creek within Agua Fria National Monument and in Tule Creek on the Hassayampa Field Office. Recent surveys have not detected desert pupfish in these streams, but they may still be present.

Life History: The desert pupfish typically inhabits shallow water of desert springs, small streams, and marshes below 5,000 ft. elevation. This species is known to be able to tolerate high water temperatures and high salinities (USFWS 2011).

Pupfish are opportunistic omnivores, consuming whatever algae, plants, invertebrates, and detritus are available (Cox 1966, 1972; Naiman 1979). During breeding season, male pupfish become highly aggressive and territorial. Hatching occurs within a few days. Under favorable conditions, sexual maturity may be reached in six weeks. Pupfish are not thought to live longer than a year under natural conditions (Minckley 1973).

Reasons for Decline/Vulnerability: Impacts include the introduction and spread of predatory and competitive fishes, water impoundment and diversion, water pollution, stream channelization, and habitat modification (USFWS 2011).

3.3.6 Vegetation Treatment Effects on Fishes and Habitat

Effects Common to All Treatments

Indirect Effects. Any of the treatment methods proposed under the Proposed Action, if applied in riparian areas, would reduce the plant biomass of riparian areas, which could increase water temperature and sedimentation, and decrease water storage capacity (USFS 2000). Riparian cover provides shade to aquatic habitats, which cools water temperatures, and reduces the extent of water temperature fluctuation. In addition, riparian vegetation stabilizes the soil on banks, preventing erosion and sedimentation into streams and other aquatic habitats, and intercepts rainfall to reduce overland flow. Riparian vegetation also increases habitat quality by buffering streams from incoming sediments and other pollutants, building a sod of herbaceous plants to form undercut banks, increasing habitat complexity, and increasing terrestrial invertebrate prey for fish species (Platts 1991).

Exposing more surface area of soil directly to rainfall, increased erosion could occur. As a result, sediment production is increased. Increased sedimentation entering aquatic habitats as a result of destabilized streambanks and increased erosion could cover spawning/rearing areas, thereby reducing the survival of fish embryos and juveniles (USDA Forest Service 2000). A number of sublethal effects to fish species may also occur as a result of sedimentation, including avoidance behavior, reduced feeding and growth, and physiological stress (Waters 1995). Increased sediment loads can also reduce primary production in streams (USFS 2000). Reduced instream plant growth, combined with the reductions in riparian vegetation, can limit populations of terrestrial and aquatic insects, which also serve as food sources for the federally listed fish species in PDO.

The severity of the effects would vary by treatment method, location, the amount of plant material removed, and the distance from the aquatic habitat. Most of the effects would also be increased in severity if vegetation were removed prior to a period of heavy precipitation. Therefore, timing of the treatments is another important factor. The effects of vegetation removal would persist until treatment areas were revegetated.

Over the long term, all treatment methods that remove non-native and competing vegetation are likely to have a beneficial effect on the fish habitat, provided that native or other desirable plant species are returned to those habitats after the treatments. Weeds could have substantial negative effects on stream/riparian areas by outcompeting more desirable riparian vegetation, reducing biodiversity, altering aquatic habitats (e.g., reducing streambank protection, undercut bank cover, overhanging vegetation cover, pool depth and volume, and detrital and nutrient inputs; and increasing erosion and fine sediment deposition, stream width, and thermal relationships), and altering natural ecosystem processes (National Fire Plan Technical Team 2002). Vegetation treatments that target noxious weeds adjacent to aquatic habitats should result in conditions that would be more suitable for supporting aquatic species.

A long-term benefit of the removal of fuels is the decreased risk of a future severe wildfire. Because past fire suppression has altered vegetation structure and fuel loads, the risks for high severity fires in areas that historically experienced lower intensity and lower frequency burns are now at all-time highs. With heavy fuel loading a wildfire burning through watersheds that support federally listed fish species could potentially have much worse effects on aquatic habitats and these species than any of the treatment methods themselves (Gresswell 1999). Any treatment method that reduces ignitable fuels could decrease the risk of high intensity wildfire.

<u>Manual Treatments</u>

Direct Effects. Direct effects to the federally listed fish species or their habitats are not anticipated to result from manual vegetation treatments. Burning slash piles after treatments has some potential for direct effects. Ash created by fire has been documented to have life-threatening effects on some species of fish (Agyagos et al. 2001). Mortality of fish and aquatic invertebrates has been reported following intense fires (Minshall and Bock 1991; Gresswell 1999). However, pile burning carried out as a result of the proposed action would cover a small, localized area. Also, pile burning would not take place near a stream or other water body, or within a riparian area.

Indirect Effects: Manual treatment methods are typically associated with minimal environmental impacts, and as such are often appropriate for sensitive habitats, such as riparian areas. Some soil disturbance would occur during the removal of plants from the soil, but it would not be widespread and should not have a major effect on aquatic habitats. Provided manual methods are used appropriately (e.g., for small infestations and where native vegetation will replace the removed weeds), effects of this treatment method should be beneficial for listed fish species and their habitats.

Mechanical Treatments

Direct Effects. The use of mechanical equipment could potentially cause leaking of fuel directly into the water, which would decrease water quality. In addition, the use of heavy equipment in riparian areas could lead to bank collapse, which would also degrade riparian habitat. If vehicles were allowed directly into aquatic habitats, additional effects would be likely. Burning slash piles after treatments has some potential for direct effects. Ash created by fire has been documented to have life-threatening effects on some species of fish (Agyagos et al. 2001). Mortality of fish and aquatic invertebrates has been reported following intense fires (Minshall and Bock 1991; Gresswell 1999). However, pile burning carried out as a result of the proposed action would cover a small, localized area. Also, pile burning would not take place near a stream or other water body, or within a riparian area.

Indirect Effects. Mechanical treatments often disturb the soil during vegetation removal (e.g., chaining, tilling, and grubbing), increasing the potential for sediment transport into the stream. The closer these activities occur to the aquatic habitat, the greater their potential effect on the federally listed fish species therein. Soil disturbance also increases the likelihood that weeds will recolonize the site (Sheley et al. 1995). Therefore, reseeding or some other form of site restoration would be likely be needed for mechanical treatment methods to benefit riparian habitats/aquatic species.

Mechanical treatments that uproot plants (e.g., chaining, tilling, grubbing, feller-bunching) decrease slope stability in riparian areas. The root strength of plants in riparian areas, particularly trees and shrubs, contributes to slope stability. Therefore, the removal of roots may lead to increased incidence of erosion and debris slides and flows (Sidle et al. 1985). Substantial impacts would be most likely if woody vegetation on slopes directly adjacent to aquatic habitats were removed. Further from the water, where the contribution of root strength to maintaining streambank integrity declines, effects would be proportionally less severe (National Fire Plan Technical Team 2002).

Apart from the removal of noxious weed species, mechanical treatment methods in riparian areas could have a long-term beneficial effect on aquatic habitats by reducing overabundant fuels. Removal of these fuels would reduce the risk that a future stand-replacing or catastrophic wildfire would burn through riparian areas. With adequate buffers to ensure bank stability and coarse woody debris recruitment, and measures to reduce sedimentation into streams (see Conservation Measures section), mechanical treatments could help restore riparian areas to their historical states, without damaging aquatic habitats over the short term.

Biological Treatments

Domestic Animals

Direct Effects. The potential direct effects of domestic animals on listed fish species and their habitats would be minimal, provided the animals did not enter aquatic habitats. If animals were allowed to wallow and wade directly in the water, there could be some mortality or injury to the federally listed fish species, primarily eggs and pre-emergent fry due to trampling. The input of domestic animal feces into aquatic habitats also degrades water quality, which could negatively affect the federally listed fish species.

Indirect Effects. Use of domestic animals to control weeds would cause disturbance to the soil, which could induce increased sedimentation. Grazing could also widen stream channels, promote incised channels, lower water tables, reduce pool frequency, and alter water quality (USFWS 1999b). The extent of these effects would vary depending on the number of animals used for the treatment, and the intensity and duration of the treatment. Under more intensive weed containment scenarios, mass erosion from trampling, sliding hooves, and streambank collapse could cause soils to move directly into the stream (USFS 2002). Undercut banks, which often provide shelter to fish species, could be damaged or collapse in grazed areas, thus decreasing the amount of available fish habitat. In addition, heavy trampling could cause soil compaction, which reduces the infiltration of overbank flows and precipitation into riparian soils.

Domestic animals could also degrade the quality of riparian and aquatic areas by facilitating the spread of weed species in these habitats. These animals could carry plant propagules on their hooves and in their fur, and could also release them in their feces.

Chemical Treatments

Direct Effects. The federally listed fish species could potentially come into contact with herbicides if sprayed formulations were to enter aquatic habitats during the application process. Herbicides could enter waterbodies through direct spray of herbicides approved for use in aquatic habitats (i.e., certain formulations of 2,4-D, glyphosate, imazapyr, and triclopyr), accidental spray of the water by terrestrial herbicides, or off-site drift or surface runoff of herbicides sprayed in nearby upland habitats into aquatic habitats. Chemicals could also enter aquatic habitats during an accidental spill of herbicides before, during, or after the treatment. Federally listed fish species inhabiting water bodies exposed to herbicides would potentially come into contact with contaminated water. The potential risks to aquatic animals as a result of such direct contact with herbicides approved for use by the BLM were assessed in ERAs (BLM 2007a). However, project specific provisions, which greatly reduce the potential for a chemical spill or use of inappropriate chemicals, are included as part of the weed spraying guidelines. If procedures are followed to prevent spills and direct spraying of herbicides into fish bearing waters, the Proposed Action is anticipated to have little direct effect on federally listed fish species.

The potential affects to fish and fish habitat from the drift of herbicides into water is also expected to be minimal because the chemical application requirements do not allow spraying under windy conditions and because of established buffers for riparian areas. This combined with the guidelines for the types of chemicals that may be applied within riparian areas is expected to prevent any direct, indirect or cumulative affects to fisheries resources or water quality from chemical drift.

Of the herbicides proposed for use, the following herbicides would potentially result in negative health effects to fish if sprayed directly into aquatic habitats: glyphosate and triclopyr BEE. Furthermore, the following herbicides would potentially result in negative health effects to aquatic invertebrates (a food source for the federally listed fish species) if sprayed directly into aquatic habitats: glyphosate (the more toxic formulation) and triclopyr BEE.

In all other scenarios (including upland scenarios with 2,4-D, glyphosate, imazapyr, or triclopyr), negative health effects to fish species predicted by ERAs would result from accidental spray of terrestrial herbicides into bodies of water.

Selection of adjuvants and tank mixes is under the control of BLM land managers, and it is recommended that land managers follow all label instructions and abide by any warnings. In general, adjuvants compose a relatively small portion of the volume of herbicide applied; however, selection of adjuvants with limited toxicity and low volumes is recommended to reduce the potential for the adjuvant to influence the toxicity of the herbicide.

Indirect Effects. Herbicides that target aquatic and riparian vegetation may indirectly affect federally listed fish species by removing plants in or adjacent to aquatic habitats. However, herbicide applications often affect non-target vegetation in these habitats as well, some of which may provide necessary habitat components for federally listed fish species, such as cover and food. Mortality of plants that provide key habitat for aquatic species would be expected to have short-term effects on the Gila topminnow, Gila chub, and desert pupfish, which feed on aquatic plants or rely on overhanging vegetation for cover. These effects would typically last only until the next growing season, but would be expected to last longer if large riparian plants were lost as a result of herbicide spraying.

Herbicide treatments could also reduce the number of invertebrates available. This could cause a reduction in food availability, which could result in a decline of the federally listed fish populations present in the vicinity of the treatment site. However, such a scenario is unlikely due to the buffers required to protect the federally listed fish species would also protect prey items in the habitat. Furthermore, any negative effects that did occur would be temporary in nature.

Conservation Measures

Conservation Meausures Common to all Treatment Activities

- Contact the USFWS and coordinate weed treatment projects in areas where listed and proposed fishes are present and inside critical habitat.
- Avoid stream crossing and other weed treatment activities during spawning season for listed and proposed fishes.

Conservation Measures for Site Access and Fueling/Equipment Maintenance

For treatments occurring in watersheds with federally listed fish species or designated critical habitat:

- Consult at the project level when stream crossing is necessary in critical habitat or occupied habitat.
- Where federally listed fish species occur, consider ground-disturbing activities on a case by case basis, and implement SOPs to ensure minimal erosion or impact to the aquatic habitat. Do not conduct biomass removal (harvest) activities that will alter the timing, magnitude, duration, or spatial distribution of peak, high, and low flows outside the range of natural variability.
- **Within riparian areas**, do not drive vehicles off established roads; do not land helicopters except in emergencies.
- **Outside riparian areas**, do not drive vehicles off established roads on slopes steeper than 20%.
- **Within 150 feet of wetlands or riparian areas**, do not fuel/refuel equipment, store fuel, or perform equipment maintenance (locate all fueling and fuel storage areas, as well as service landings outside protected riparian areas).
- Prior to helicopter fueling operations, prepare a transportation, storage, and emergency spill plan and obtain the appropriate approvals; for other heavy equipment fueling operations use a slip-tank not greater than 250 gallons; prepare spill containment and cleanup provisions for maintenance operations.
- To prevent transfer of aquatic invasive species, diseases and parasites, thoroughly clean and dry all equipment and personal protective gear prior to entering another aquatic site.

Conservation Measures Related to Revegetation Treatments

- Do not hydromulch within 300 feet of critical habitat or habitat occupied by federally listed fish. This precaution will limit adding sediments and nutrients and increasing water turbidity.

Conservation Measures Related to Herbicide Treatments

- Maintain equipment used for transportation, storage, or application of chemicals in a leak-proof condition.
- Do not store or mix herbicides, or conduct post-application cleaning within 0.5 mile of critical habitat or habitat occupied by federally listed fish.
- Ensure that trained personnel monitor weather conditions at spray times during application.
- Strictly enforce all herbicide labels.
- Follow all instructions and SOPs to avoid spilling or direct spraying herbicides into aquatic habitats.
- Do not broadcast spray within 100 feet of open water when wind velocity exceeds 5 mph.
- Do not broadcast spray if precipitation is occurring or is expected within 24 hours.
- Do not broadcast spray if air turbulence is sufficient to affect the normal spray pattern.
- Do not broadcast spray in upland habitats within 0.5 mile of aquatic habitat that contains federally listed species when the potential exists for runoff from the treated area into the aquatic habitat.
- Use only herbicides approved for use in aquatic systems when treating weeds in riparian areas, 100-year floodplains, or Designated Critical Habitat for federally listed fish species.
- Treat the smallest area that will achieve the desired level of weed control.
- Use the typical application rate, rather than the maximum application rate, whenever practicable based on the weed species, site conditions, application method, and desired level of weed control.

The special restrictions and buffer distances provided below are based on the information provided by ERAs and are designed to provide protection to threatened, endangered, proposed, and candidate (TEPC) aquatic species. Observe the following buffers or restrictions on application methods for specific herbicides:

- Do not use terrestrial formulations of glyphosate or triclopyr BEE to treat aquatic vegetation where federally listed aquatic species or their key prey species occur or may occur.
- Do not use imazapyr to treat upland sites with the potential for transport by runoff or aerial drift into streams, ponds, or lakes where federally listed aquatic species or their key prey species occur or may occur.
- Do not broadcast spray glyphosate or triclopyr BEE by either aerial or ground methods to treat upland sites adjacent to aquatic habitats that support or may support federally listed aquatic species or their key prey species.
- Do not use glyphosate formulations that include R-11 and either avoid formulations with the surfactant POEA or use the formulation with the lowest amount of POEA available.

Conservation Measures Related to Biological Control Treatments using Livestock

For treatments in **watersheds** that support federally listed aquatic species or in critical habitat:

- Where terrain permits, locate stock handling facilities, camp facilities, and improvements at least 300 feet from lakes, streams, and springs.
- Construct exclosure fences if needed to prevent livestock from entering streams, or riparian areas surrounding streams, occupied by federally listed fish.
- Educate stock handlers about at-risk aquatic species and how to minimize negative effects to the species and their associated habitat.
- Employ appropriate dispersion techniques to range management, including judicial placement of salt blocks, troughs, and fencing, to prevent damage to riparian areas but increase weed control. Equip each watering trough with a float valve.

- Do not conduct weed treatments involving domestic animals within riparian areas.
- Conduct treatments in such a way that they will not result in overgrazing and subsequent erosion and overland transport of sediments into streams occupied by federally listed fish.
- Do not locate troughs, storage tanks, or guzzlers within 300 feet of critical habitat or streams occupied by federally listed aquatic species.

Conservation Measures Related to Mechanical Treatments
Note: these measures apply only to treatments occurring in watersheds that support federally listed fish species or in unoccupied habitat critical to species recovery (including but not limited to critical habitat, as designated by USFWS.

Outside riparian areas in watersheds with federally listed fish species or designated critical habitat:
- Conduct soil-disturbing treatments only on slopes of 20% or less, where feasible and preferably outside of the monsoon season.
- Do not conduct log hauling activities on native surface roads prone to erosion, where feasible.

Within riparian areas in these watersheds, more protective measures will be required to avoid negatively affecting federally listed aquatic species or their habitat:
- Do not use vehicles or heavy equipment, except when crossing at established crossings.
- Do not conduct the following ground disturbing activities: disking, drilling, chaining, mowing and plowing.
- Do not use equipment in perennial channels or in intermittent channels with water, except at crossings that already exist. Avoid crossing channels during breeding seasons to prevent or minimize damage to egg masses.
- Where necessary to protect streambanks, leave suitable quantities (to be determined at the local level) of excess vegetation and slash on site, or revegetate with native species.

Conservation Measures Related to Pile Burning

- Do not carry out pile burning activities within 300 feet of designated critical habitat for federally listed aquatic species or within 300 feet of a water body containing federally listed aquatic species.
- Prior to burning slash piles within one mile of critical habitat for federally listed aquatic species or within 300 feet of a water body containing federally listed aquatic species, evaluate the potential effects to northern Mexican gartersnakes, and if the activity may affect the species initiate consultation with the USFWS.

In addition, the PDO will follow all SOPs and mitigation measures in Appendix B and will develop and implement additional conservation measures, as necessary, during project-level analysis and implementation.

3.3.7 Cumulative Impacts

Potential cumulative adverse effects may result from the continued increase of ground disturbing activities on state and private lands such as mining, construction, and OHV use. Vectors for weed dispersal such as vehicles, recreationists, livestock, and wildlife would continue to be present, spreading weed disseminules to new sites. New weeds that invade PDO from adjacent lands would be subject to treatment under the Proposed Action and invasion of weeds occurring within the PDO would be curtailed as weed populations are controlled or eradicated. These would result in cumulatively improved habitat conditions for acuña cactus within and adjacent to BLM-administered lands in the PDO.

Ongoing livestock grazing on state and private lands could impact federally listed fish species and other aquatic organisms. Livestock could indirectly through erosion and degradation of water quality, loss of forage and cover.

Fish species could be indirectly harmed by activities occurring on non-federal lands adjacent to public lands. For example, herbicides applied to nearby agricultural lands or rangelands could drift onto public lands and harm federally listed fish species. In addition, there could be impacts to water quality from wildfire associated with activities occurring off of public lands.

The Proposed Action alternative in conjunction with past, present, and foreseeable future actions would have short–term increase in sediment and erosion to treated drainages caused by more intensive mechanical and chemical treatments. These areas would be subject to erosion until native vegetation becomes re-established. However, the cumulative effects of weed treatments would result in long–term benefits to aquatic resources and habitats compared to existing conditions through control, eradication, and containment of weeds. This would result in cumulatively improved habitat conditions for federally listed species within and adjacent to BLM-administered lands within the PDO.

3.3.8 Determination of Effects for Fishes

With application of the conservation measures, SOPs, and mitigation measures discussed above and in the appendices, the Proposed Action ***May Affect, but is not Likely to Adversely Affect*** desert pupfish, Gila chub and Gila topminnow. If spikedace are re-introduced into the Agua Fria River in the future, the Proposed Action ***May Affect, but is not Likely to Adversely Affect*** spikedace.

With application of the conservation measures, SOPs, and mitigation measures discussed above and in the appendices, the Proposed Action ***May Affect, but is not Likely to Adversely Affect*** designated critical habitat for Gila chub.

4.0 Effects Determination Summary for All Species

Table 4 presents a summary of effects determination for all species discussed.

Table 4. Summary of determination of effects on federally listed, candidate and proposed species, and their designated and proposed critical habitats (C. H.) within PDO if treatments are carried out in occupied or critical habitat.

Species Name	Federal Status	Determination
Mammals		
Sonoran pronghorn *Antilocapra americana sonoriensis*	Endangered	May Affect, Not Likely to Adversely Affect
Lesser long-nosed bat *Leptonycteris curasoae yerbabuenae*	Endangered	May Affect, Not Likely to Adversely Affect
Birds		
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Endangered	May Affect, Not Likely to Adversely Affect
Southwestern Willow Flycatcher C. H.	Designated	May Affect, Not Likely to Adversely Affect
Western Yellow-billed Cuckoo *Coccyzus americanus occidentalis*	Threatened	May Affect, Not Likely to Adversely Affect
Western Yellow-billed Cuckoo C. H.	Proposed	May Affect, Not Likely to Adversely Affect
Yuma Clapper Rail	Endangered	May Affect, Not Likely to Adversely

Species Name	Federal Status	Determination
Rallus longirostris yumanensis		Affect
Reptiles		
Sonoran desert tortoise *Gopherus morafkai*	Candidate	May Affect, Not Likely to Adversely Affect
Northern Mexican gartersnake *Thamnophis eques megalops*	Threatened	May Affect, Not Likely to Adversely Affect
Northern Mexican gartersnake C. H.	Proposed	May Affect, Not Likely to Adversely Affect
Fishes		
Desert pupfish *Cyprinodon macularius*	Endangered	May Affect, Not Likely to Adversely Affect
Gila chub *Gila intermedia*	Endangered	May Affect, Not Likely to Adversely Affect
Gila chub C. H.	Designated	May Affect, Not Likely to Adversely Affect
Gila topminnow *Poeciliopsis occidentalis occidentalis*	Endangered	May Affect, Not Likely to Adversely Affect
Spikedace *Meda fulgida*	Endangered	May Affect, Not Likely to Adversely Affect
Plants		
Acuña cactus *Echinomastus erectocentrus* var. *acunensis*	Endangered	May Affect, Not Likely to Adversely Affect
Acuña cactus C. H.	Proposed	May Affect, Not Likely to Adversely Affect

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APPENDIX A: Herbicides and Adjuvants Approved for Use on BLM-Administered Lands in Arizona

The BLM would also be able to use new active ingredients that are developed in the future if: 1) they are registered by the EPA for use on one or more land types (e.g., rangeland, aquatic, etc.) managed by the BLM; 2) the BLM determines that the benefits of use on public lands outweigh the risks to human health and the environment; and 3) they meet evaluation criteria to ensure that the decision to use the active ingredient is supported by scientific evaluation and NEPA documentation. These evaluation criteria are discussed in more detail in the PEIS (Appendix E of BLM 2007a).

Herbicides Approved for Use on BLM-Administered Lands in Arizona
Updated September 1, 2011

	Herbicides Approved for Use on BLM Lands in Accordance with the			
	17 Western States PEIS ROD and Oregon EIS ROD*			
				Update September 1, 2011
ACTIVE INGREDIENT	**STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD**	**TRADE NAME**	**MANUFACTURER**	**EPA REG. NUMBER**
2,4-D	AK, AZ, CA, CO, ID, MT, ND,	Agrisolution 2,4-D LV6	Agriliance, L.L.C.	1381-101
	NE, NM, NV, OK, OR, SD, TX,	Agrisolution 2,4-D Amine 4	Agriliance, L.L.C.	1381-103
	UT, WA, WY	Agrisolution 2,4-D LV4	Agriliance, L.L.C.	1381-102
		2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19
		2,4-D LV 4	Albaugh, Inc./Agri Star	42750-15
		Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22
		2,4-D LV 6	Albaugh, Inc./Agri Star	42750-20
		Five Star	Albaugh, Inc./Agri Star	42750-49
		D-638	Albaugh, Inc./Agri Star	42750-36
		Alligare 2,4-D Amine	Alligare, LLC	81927-38
		2,4-D LV6	Helena Chemical Company	4275-20-5905
		2,4-D Amine	Helena Chemical Company	5905-72
		2,4-D Amine 4	Helena Chemical Company	42750-19-5905
		Opti-Amine	Helena Chemical Company	5905-501
		Barrage HF	Helena Chemical Company	5905-529
		HardBall	Helena Chemical Company	5905-549
		Unison	Helena Chemical Company	5905-542
		Clean Amine	Loveland Products Inc.	34704-120
		Low Vol 4 Ester Weed Killer	Loveland Products Inc.	34704-124
		Low Vol 6 Ester Weed Killer	Loveland Products Inc.	34704-125
		Saber	Loveland Products Inc.	34704-803
		Salvo	Loveland Products Inc.	34704-609
		Savage DS	Loveland Products Inc.	34704-606
		Aqua-Kleen	Nufarm Americas Inc.	71368-4
		Aqua-Kleen	Nufarm Americas Inc.	228-378
		Esteron 99C	Nufarm Americas Inc.	62719-9-71368
		Weedar 64	Nufarm Americas Inc.	71368-1
		Weedone LV-4	Nufarm Americas Inc.	228-139-71368
		Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14
		Weedone LV-6	Nufarm Americas Inc.	71368-11
		Formula 40	Nufarm Americas Inc.	228-357
		2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95
		Platoon	Nufarm Americas Inc.	228-145
		WEEDstroy AM-40	Nufarm Americas Inc.	228-145
		Hi-Dep	PBI Gordon Corp.	2217-703
		2,4-D Amine	Setre (Helena)	5905-72
		Barrage LV Ester	Setre (Helena)	5905-504
		2,4-D LV4	Setre (Helena)	5905-90
		2,4-D LV6	Setre (Helena)	5905-93
		Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA
		Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125
		Salvo LV Ester	UAP-Platte Chem. Co.	34704-609
		2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120
		Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124
		Savage DS	UAP-Platte Chem. Co.	34704-606
		Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2
		Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3
		Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4
		Amine 4	Wilbur-Ellis Co.	2935-512
		Lo Vol-4	Wilbur-Ellis Co.	228-139-2935
		Lo Vol-6 Ester	Wilbur-Ellis Co.	228-95-2935
		Base Camp Amine 4	Wilbur-Ellis Co.	71368-1-2935
		Broadrange 55	Wilbur-Ellis Co.	2217-813-2935
		Agrisolution 2,4-D LV6	Winfied Solutions, LLC	1381-101
		Agrisolution 2,4-D Amine 4	Winfield Solutions, LLC	1381-103
		Agrisolution 2,4-D LV4	Winfield Solutions, LLC	1381-102

	Herbicides Approved for Use on BLM Lands in Accordance with the			
	17 Western States PEIS ROD and Oregon EIS ROD*			
				Update September 1, 2011
ACTIVE INGREDIENT	**STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD**	**TRADE NAME**	**MANUFACTURER**	**EPA REG. NUMBER**
2,4-D	AK, AZ, CA, CO, ID, MT, ND,	Agrisolution 2,4-D LV6	Agriliance, L.L.C.	1381-101
	NE, NM, NV, OK, OR, SD, TX,	Agrisolution 2,4-D Amine 4	Agriliance, L.L.C.	1381-103
	UT, WA, WY	Agrisolution 2,4-D LV4	Agriliance, L.L.C.	1381-102
		2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19
		2,4-D LV 4	Albaugh, Inc./Agri Star	42750-15
		Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22
		2,4-D LV 6	Albaugh, Inc./Agri Star	42750-20
		Five Star	Albaugh, Inc./Agri Star	42750-49
		D-638	Albaugh, Inc./Agri Star	42750-36
		Alligare 2,4-D Amine	Alligare, LLC	81927-38
		2,4-D LV6	Helena Chemical Company	4275-20-5905
		2,4-D Amine	Helena Chemical Company	5905-72
		2,4-D Amine 4	Helena Chemical Company	42750-19-5905
		Opti-Amine	Helena Chemical Company	5905-501
		Barrage HF	Helena Chemical Company	5905-529
		HardBall	Helena Chemical Company	5905-549
		Unison	Helena Chemical Company	5905-542
		Clean Amine	Loveland Products Inc.	34704-120
		Low Vol 4 Ester Weed Killer	Loveland Products Inc.	34704-124
		Low Vol 6 Ester Weed Killer	Loveland Products Inc.	34704-125
		Saber	Loveland Products Inc.	34704-803
		Salvo	Loveland Products Inc.	34704-609
		Savage DS	Loveland Products Inc.	34704-606
		Aqua-Kleen	Nufarm Americas Inc.	71368-4
		Aqua-Kleen	Nufarm Americas Inc.	228-378
		Esteron 99C	Nufarm Americas Inc.	62719-9-71368
		Weedar 64	Nufarm Americas Inc.	71368-1
		Weedone LV-4	Nufarm Americas Inc.	228-139-71368
		Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14
		Weedone LV-6	Nufarm Americas Inc.	71368-11
		Formula 40	Nufarm Americas Inc.	228-357
		2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95
		Platoon	Nufarm Americas Inc.	228-145
		WEEDstroy AM-40	Nufarm Americas Inc.	228-145
		Hi-Dep	PBI Gordon Corp.	2217-703
		2,4-D Amine	Setre (Helena)	5905-72
		Barrage LV Ester	Setre (Helena)	5905-504
		2,4-D LV4	Setre (Helena)	5905-90
		2,4-D LV6	Setre (Helena)	5905-93
		Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA
		Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125
		Salvo LV Ester	UAP-Platte Chem. Co.	34704-609
		2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120
		Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124
		Savage DS	UAP-Platte Chem. Co.	34704-606
		Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2
		Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3
		Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4
		Amine 4	Wilbur-Ellis Co.	2935-512
		Lo Vol-4	Wilbur-Ellis Co.	228-139-2935
		Lo Vol-6 Ester	Wilbur-Ellis Co.	228-95-2935
		Base Camp Amine 4	Wilbur-Ellis Co.	71368-1-2935
		Broadrange 55	Wilbur-Ellis Co.	2217-813-2935
		Agrisolution 2,4-D LV6	Winflied Solutions, LLC	1381-101
		Agrisolution 2,4-D Amine 4	Winfield Solutions, LLC	1381-103
		Agrisolution 2,4-D LV4	Winfield Solutions, LLC	1381-102

ACTIVE INGREDIENT	STATES WITH APPROVAL BASED UPON CURRENT EIS/ROD	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
Glyphosate	AK, AZ, CA, CO, ID, MT, ND,	Aqua Star	Albaugh, Inc./Agri Star	42750-59
	NE, NM, NV, OK, OR, SD, TX,	Forest Star	Albaugh, Inc./Agri Star	42570-61
	UT, WA, WY	GlyStar Gold	Albaugh, Inc./Agri Star	42750-61
		Gly Star Original	Albaugh, Inc./Agri Star	42750-60
		Gly Star Plus	Albaugh, Inc./Agri Star	42750-61
		Gly Star Pro	Albaugh, Inc./Agri Star	42750-61
		Glyphosate 4 PLUS	Alligare, LLC	81927-9
		Glyphosate 5.4	Alligare, LLC	81927-8
		Glyfos	Cheminova	4787-31
		Glyfos PRO	Cheminova	67760-57
		Glyfos Aquatic	Cheminova	4787-34
		ClearOut 41 Plus	Chem. Prod. Tech., LLC	70829-3
		Accord Concentrate	Dow AgroSciences	62719-324
		Accord SP	Dow AgroSciences	62719-322
		Accord XRT	Dow AgroSciences	62719-517
		Accord XRT II	Dow AgroSciences	62719-556
		Glypro	Dow AgroSciences	62719-324
		Glypro Plus	Dow AgroSciences	62719-322
		Rodeo	Dow AgroSciences	62719-324
		Showdown	Helena Chemical Company	71368-25-5905
		Mirage	Loveland Products Inc.	34704-889
		Mirage Plus	Loveland Products Inc.	34704-890
		Aquamaster	Monsanto	524-343
		Roundup Original	Monsanto	524-445
		Roundup Original II	Monsanto	524-454
		Roundup Original II CA	Monsanto	524-475
		Honcho	Monsanto	524-445
		Honcho Plus	Monsanto	524-454
		Roundup PRO	Monsanto	524-475
		Roundup PRO Concentrate	Monsanto	524-529
		Roundup PRO Dry	Monsanto	524-505
		Roundup PROMAX	Monsanto	524-579
		Aqua Neat	Nufarm Americas Inc.	228-365
		Credit Xtreme	Nufarm Americas Inc.	71368-81
		Foresters	Nufarm Americas Inc.	228-381
		Razor	Nufarm Americas Inc.	228-366
		Razor Pro	Nufarm Americas Inc.	228-366
		GlyphoMate 41	PBI/Gordon Corporation	2217-847
		AquaPro Aquatic Herbicide	SePRO Corporation	62719-324-67690
		Rattler	Setre (Helena)	524-445-5905
		Buccaneer	Tenkoz	55467-10
		Buccaneer Plus	Tenkoz	55467-9
		Mirage Herbicide	UAP-Platte Chem. Co.	524-445-34704
		Mirage Plus Herbicide	UAP-Platte Chem. Co.	524-454-34704
		Gly-4 Plus	Universal Crop Protection Alliance, LLC	72693-1
		Gly-4 Plus	Universal Crop Protection Alliance, LLC	42750-61-72693
		Gly-4	Universal Crop Protection Alliance, LLC	42750-60-72693
		Glyphosate 4	Vegetation Man., LLC	73220-6-74477
		Agrisolutions Cornerstone	Winfield Solutions, LLC	1381-191
		Agrisolutions Cornerstone Plus	Winfield Solutions, LLC	1381-192
		Agrisolutions Rascal	Winfield Solutions, LLC	1381-191
		Agrisolutions Rascal Plus	Winfield Solutions, LLC	1381-192
Glyphosate +		Landmaster BW	Albaugh, Inc./Agri Star	42570-62
2,4-D		Campaign	Monsanto	524-351
		Landmaster BW	Monsanto	524-351

**Refer to the complete label before considering the use of any herbicide formulation. Label changes can impact the intended use through, for example, the creation or elimination of Special Local Need (SLN) or 24(c) registrations; changes in application sites, rates, and timing; and county restrictions.*

Adjuvants Approved for Use on BLM-Administered Lands in Arizona
Updated September 1, 2011

Adjuvants Approved for Use on BLM Administered Lands				
				Update: September 1, 2011
Adjuvant Class	**Adjuvant Type**	**Trade Name**	**Manufacturer**	**Comments**
Surfactant	Non-ionic	Agrisolutions Preference	Agriliance, LLC.	WA Reg. No. 1381-50011
		A-90	Alligare, LLC	
		Aqufact	Aqumix, Inc.	
		Brewer 90-10	Brewer International	
		Baron	Crown (Estes Incorporated)	
		N.I.S. 80	Estes Incorporated	
		Inlet	Helena Chemical Company	CA Reg. No. 5905-50099-AA
		Spec 90/10	Helena Chemical Company	
		Optima	Helena Chemical Company	CA Reg. No. 5905-50075-AA
		Induce	Setre (Helena)	CA Reg. No. 5905-50066-AA
			Helena Chemical Company	CA Reg. No. 5905-50091-AA
		Activator 90	Loveland Products Inc.	CA Reg. No. 34704-50034-AA
		LI-700	Loveland Products Inc.	CA Reg. No. 34704-50035
				WA Reg. No. AW36208-70004
		Spreader 90	Loveland Products Inc.	WA Reg. No. 34704-05002-AA
		UAP Surfactant 80/20	Loveland Products Inc.	
		X-77	Loveland Products Inc.	CA Reg. No. 34704-50044
		Elite Platinum	Red River Specialties, Inc.	
		Red River 90	Red River Specialties, Inc.	
		Red River NIS	Red River Specialties, Inc.	
		Cornbelt Premier 90	Van Diest Supply Co.	
		Cornbelt Trophy Gold	Van Diest Supply Co.	
		Spray Activator 85	Van Diest Supply Co.	
		R-900	Wilbur-Ellis	
		Super Spread 90	Wilbur-Ellis	WA Reg. No. AW-2935-70016
		Super Spread 7000	Wilbur-Ellis	CA Reg. No. 2935-50170
				WA Reg. No. AW-2935-0002
		Agrisolutions Activate Plus	Winfield Solutions, LLC	CA Reg. No. 9779-50004-AA
				WA Reg. No. 1381-09001
		Agrisolutions Preference	Winfield Solutions, LLC	WA Reg. No. 1381-50011

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant (cont.)	Spreader/Sticker	Agri-Trend Spreader	Agri-Trend	
		TopFilm	Biosorb, Inc.	
		Bind-It	Estes Incorporated	
		Surf-King PLUS	Crown (Estes Incorporated)	
		CWC 90	CWC Chemical, Inc.	
		Cohere	Helena Chemical Company	CA Reg. No. 5905-50083-A
		Attach	Loveland Products Inc.	CA Reg. No. 34704-50026
		Bond	Loveland Products Inc.	CA Reg. No. 36208-50005
		Tactic	Loveland Products Inc.	CA Reg. No. 34704-50041-AA
		Widespread Max	Loveland Products Inc.	CA Reg. No. 34704-50061
				WA Reg. No. 34704-09001
		Nu-Film-IR	Miller Chem. & Fert. Corp.	
		Nu Film 17	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50021-AA
		Nu Film P	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50022-AA
		Lastick	Setre (Helena)	
		Insist 90	Wilbur-Ellis	
		R-56	Wilbur-Ellis	CA Reg. No. 2935-50144
	Silicone-based	SilEnergy	Brewer International	
		Silnet 200	Brewer International	
		Bind-It MAX	Estes Incorporated	
		Thoroughbred	Estes Incorporated	
		Aero Dyne-Amic	Helena Chemical Company	CA Reg. No. 5905-50080-AA
		Dyne-Amic	Helena Chemical Company	CA Reg. No. 5095-50071-AA
		Kinetic	Setre (Helena)	CA Reg. No. 5905-50087-AA
		Freeway	Loveland Products Inc.	CA Reg. No. 34704-50031
				WA Reg. No. 34704-04005
		Phase	Loveland Products Inc.	CA Reg. No. 34704-50037-AA
		Phase II	Loveland Products Inc.	
		Silwet L-77	Loveland Products Inc.	CA Reg. No. 34704-50043
		Elite Marvel	Red River Specialties, Inc.	
		Sun Spreader	Red River Specialties, Inc.	
		Sylgard 309	Wilbur-Ellis	CA Reg. No. 2935-50161
		Syl-Tac	Wilbur-Ellis	CA Reg. No. 2935-50167

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-based	Crop Oil Concentrate	Alligare Forestry Oil	Alligare, LLC	
		Brewer 83-17	Brewer International	
		Majestic	Crown (Estes Incorporated)	
		Agri-Dex	Helena Chemical Company	CA # 5905-50094-AA
		Crop Oil Concentrate	Helena Chemical Company	CA Reg. No. 5905-50085-AA
		Power-Line Crop Oil	Land View Inc.	
		Crop Oil Concentrate	Loveland Products Inc.	
		Maximizer Crop Oil Conc.	Loveland Products Inc.	CA Reg. No. 34704-50059
				WA Reg. No. 34704-08002
		Herbimax	Loveland Products Inc.	CA Reg. No. 34704-50032-AA
				WA Reg. No. 34704-04006
		Red River Forestry Oil	Red River Specialties, Inc.	
		Red River Pacer Crop Oil	Red River Specialties, Inc.	
		Cornbelt Crop Oil Concentrate	Van Diest Supply Co.	
		Cornbelt Premium Crop Oil Concentrate	Van Diest Supply Co.	
		R.O.C. Rigo Oil Conc.	Wilbur-Ellis	
		Mor-Act	Wilbur-Ellis	CA Reg. No. 2935-50098
		Agrisolutions Prime Oil	Winfield Solutions, LLC	CA Reg. No. 979-50002-AA
		Agrisolutions Superb HC	Winfield Solutions, LLC	WA Reg. No. 1381-06003
	Methylated Seed Oil	MSO Concentrate	Alligare, LLC	
		SunEnergy	Brewer International	
		Sun Wet	Brewer International	
		Premium MSO	Helena Chemical Company	
		Methylated Spray Oil Conc.	Helena Chemical Company	
		MSO Concentrate	Loveland Products Inc.	CA Reg. No. 34704-50029-AA
		Elite Supreme	Red River Specialties, Inc.	
		Red River Supreme	Red River Specialties, Inc.	
		Sunburn	Red River Specialties, Inc.	
		Sunset	Red River Specialties, Inc.	
		Cornbelt Base	Van Diest Supply Co.	
		Cornbelt Methylates Soy-Stik	Van Diest Supply Co.	
		Hasten	Wilbur-Ellis	CA Reg. No. 2935-50160
				WA Reg. No. 2935-02004
		Super Spread MSO	Wilbur-Ellis	
		Agrisolutions Destiny HC	Winfield Solutions, LLC	WA Reg. No. 1381-09002

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-Based (cont.)	Methylated Seed Oil + Organosilicone	Inergy	Crown (Estes Incorporated)	
	Vegetable Oil	Noble	Estes Incorporated	
		Amigo	Loveland Products Inc.	CA Reg. No. 34704-50028-AA
				WA Reg. No. 34704-04002
		Elite Natural	Red River Specialities	
		Competitor	Wilbur-Ellis	CA Reg. No. 2935-50173
				WA Reg. No. AW-2935-04001
Fertilizer-based	Nitrogen-based	Quest	Setre (Helena)	CA Reg. No. 5905-50076-AA
		Quest	Helena Chemical Company	CA Reg. No. 5905-50076-AA
		Actamaster Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50006
		Actamaster Soluble Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50001
		Dispatch	Loveland Products Inc.	
		Dispatch 111	Loveland Products Inc.	
		Dispatch 2N	Loveland Products Inc.	
		Dispatch AMS	Loveland Products Inc.	
		Flame	Loveland Products Inc.	
		Cornbelt Gardian	Van Diest Supply Co.	
		Cornbelt Gardian Plus	Van Diest Supply Co.	
		Bronc	Wilbur-Ellis	
		Bronc Max	Wilbur-Ellis	
		Bronc Max EDT	Wilbur-Ellis	
		Bronc Plus Dry EDT	Wilbur-Ellis	WA Reg. No.2935-03002
		Agrisolutions Alliance	Winfield Solutions, LLC	CA Reg. No. 1381-50002-AA
				WA Reg. No.1381-05005
		Agrisolutions Class Act NG	Winfield Solutions, LLC	WA Reg. No. 1381-01004
		Agrisolutions Corral AMS Liquid	Winfield Solutions, LLC	WA Reg. No. 1381-01006
		Bronc Total	Wilbur-Ellis	
		Cayuse Plus	Wilbur-Ellis	CA Reg. No. 2935-50171
Special Purpose or Utility	Buffering Agent	Buffers P.S.	Helena Chemical Company	CA Reg. No. 5905-50062-ZA
		Spray-Aide	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50006-AA
		Oblique	Red River Specialties, Inc.	
		Tri-Fol	Wilbur-Ellis	CA Reg. No. 2935-50152

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose	Colorants	Hi-Light	Becker-Underwood	
or Utility - cont.		Hi-Light WSP	Becker-Underwood	
		Spray Indicator XL	Helena Chemical Company	
		Marker Dye	Loveland Products Inc.	
		TurfTrax	Loveland Products Inc.	
		TurfTrax Blue Spray Indicator	Loveland Products Inc.	
		BullsEye	Milliken Chemical	
		Signal	Precision	
		SPI-Max Blue Spray Marker	PROKoZ	
		Elite Splendor	Red River Specialities, Inc.	
	Compatibility/	E Z MIX	Loveland Products Inc.	CA Reg. No. 36208-50006
	Suspension	Support	Loveland Products Inc.	WA Reg. No. 34704-04011
	Agent	Blendex VHC	Setre (Helena)	
	Deposition Aid	Cygnet Plus	Brewer International	CA Reg. No. 1051114-50001
		Poly Control 2	Brewer International	
		CWC Sharpshooter	CWC Chemical, Inc.	
		Grounded	Helena Chemical Company	
		Grounded - CA	Helena Chemical Company	CA Reg. No. 5905-50096-AA
		ProMate Impel	Helena Chemical Company	
		Pointblank	Helena Chemical Company	CA Reg. No. 52467-50008-AA-5905
		Strike Zone DF	Helena Chemical Company	CA Reg. No. 5905-50084-AA
		Compadre	Loveland Products Inc.	CA Reg. No. 34704-50050
				WA Reg. No. 34704-06004
		Intac Plus	Loveland Products Inc.	
		Liberate	Loveland Products Inc.	CA Reg. No. 34704-50030-AA
				WA Reg. No. 34704-04008
		Reign	Loveland Products Inc.	CA Reg. No. 34704-50045
				WA Reg. No. 34704-05010
		Weather Gard	Loveland Products Inc.	CA Reg. No. 34704-50042-AA
		Mist-Control	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50011-AA
		Sustain	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50015-AA
		Exit	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50014-AA
		Elite Secure Ultra	Red River Specialties, Inc.	
		Secure Ultra	Red River Specialties, Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose	Deposition Aid - cont.	Sta Put	Setre (Helena)	CA Reg. No. 5905-50068-AA
or Utility - cont.		Agripharm Drift Control	Walco International	
		Bivert	Wilbur-Ellis	CA Reg. No. 2935-50163
		Coverage G-20	Wilbur-Ellis	
		Crosshair	Wilbur-Ellis	
		EDT Concentrate	Wilbur-Ellis	
		Agrisolutions Interlock	Winfield Solutions, LLC	
	Defoaming Agent	Defoamer	Brewer International	
		Foambuster Max	Helena Chemical Company	
		Fighter-F 10	Loveland Products Inc.	
		Fighter-F Dry	Loveland Products Inc.	
		Unfoamer	Loveland Products Inc.	CA Reg. No. 34704-50062
				WA Reg. No. 34704-09002
		Foam Fighter	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50005-AA
		Red River Defoamer	Red River Specialities, Inc.	
		Foam Buster	Setre (Helena)	CA Reg. No. 5905-50072-AA
		Cornbelt Defoamer	Van Diest Supply Co	
		No Foam	Wilbur-Ellis	CA Reg. No. 2935-50136
	Diluent/Deposition Agent	Improved JLB Oil Plus	Brewer International	
		JLB Oil Plus	Brewer International	
		Hy-Grade I	CWC Chemical, Inc	
		Hy-Grade EC	CWC Chemical, Inc	
		Red River Basal Oil	Red River Specialties, Inc.	
		In-Place	Wilbur-Ellis	CA Reg. No. 2935-50169
		W.E.B. Oil	Wilbur-Ellis	CA Reg. No. 2935-50166
				WA Reg. No. AW 2935-70023
	Foam Marker	Align	Helena Chemical Company	
		Red River Foam Marker	Red River Specialties, Inc.	
		R-160	Wilbur-Ellis	
	Invert Emulsion Agent	Redi-vert II	Wilbur-Ellis	CA Reg. No. 2935-50168
	Tank Cleaner	Wipe Out	Helena Chemical Company	
		All Clear	Loveland Products Inc.	

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose	Tank Cleaner cont.	Tank and Equipment Cleaner	Loveland Products Inc.	
or Utility - cont.		Red River Tank Cleaner	Red River Specialties, Inc.	
		Kutter	Wilbur-Ellis	
		Neutral-Clean	Wilbur-Ellis	
		Combelt Tank-Aid	Van Diest Supply Co.	
	Water Conditioning	Rush	Crown (Estes Incorporated)	
		AccuQuest WM	Helena Chemical Company	
		Hel-Fire	Helena Chemical Company	
		Blendmaster	Loveland Products Inc.	
		Choice	Loveland Products Inc.	CA Reg. No. 34704-50027-AA
				WA Reg. No. 34704-04004
		Choice Xtra	Loveland Products Inc.	
		Choice Weather Master	Loveland Products Inc.	CA Reg. No. 34704-50038-AA
		Elite Imperial	Red River Specialities, Inc.	
		Combelt N-Tense	Van Diest Supply Co.	
		Climb	Wilbur-Ellis	CA Reg. No. 2935-50181
				WA Reg. No. 2935-09001
		Cut-Rate	Wilbur-Ellis	

APPENDIX B: Standard Operating Procedures, Best Management Practices, Mitigation Measures, and Monitoring

Standard Operating Procedures for General Vegetation Treatments

Standard operating procedures and treatment methods will be used to achieve desired future conditions for vegetation management. BLM policies and guidance for public land treatments will be followed in implementing all treatment methods. Many guidelines are provided in BLM Handbook H-1740-1, Renewable Resource Improvement and Treatment Guidelines and Procedures (1987); in BLM Arizona's Standards for Rangeland Health and Guidelines for Grazing Administration (1997); in BLM programmatic documents such as Environmental Impact Statement for Vegetation Treatments, Watersheds and Wildlife Habitats on Public Lands Administered by the BLM in the Western United States, Including Alaska (1991) and Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, Programmatic Environmental Impact Statement (2007a); and in other general and specific program policy, procedures, and standards pertinent to implementation of renewable resource improvements. The standard approaches to manual, chemical, mechanical, biological, and fire treatment methods are described in detail below. The specific methods applied would depend on area-specific management objectives with an assessment of environmental impacts.

Standard Operating Procedures for Manual Vegetation Treatment

Hand-operated power tools and hand tools are used to cut, clear, or prune herbaceous and woody plants. In manual treatments workers do the following:

- cut plants above ground level,
- pull, grub, or dig out plant root systems to prevent later sprouting and regrowth,
- scalp at ground level or remove competing plants around desired vegetation, and
- place mulch around desired vegetation to limit the growth of competing vegetation.

Hand tools such as the handsaw, axe, shovel, rake, machete, grubbing hoe, mattock (combination of axe and grubbing hoe), brush hook, and hand clippers are used in manual treatments. Axes, shovels, grubbing hoes, and mattocks can dig up and cut below the surface to remove the main roots of plants such as prickly pear and mesquite that have roots that can quickly resprout in response to surface cutting or clearing. Workers also may use power tools such as chainsaws and power brush saws.

Although manual vegetation treatment is labor intensive and costly, compared to prescribed burning or herbicide application, it can be extremely species selective and can be used in areas of sensitive habitats or areas that are inaccessible to ground vehicles. Manual treatment of undesired plants would be used on sites where fire (prescribed or naturally ignited) is undesirable or where significant constraints prevent widespread use of fire as a management tool. These sites comprise a range of vegetation communities or habitat types. They include areas where there may be wildlife concerns, yet it is deemed beneficial to remove trees, shrubs, or other fuel-loading vegetation. Manual vegetation treatments cause less ground disturbance and generally remove less vegetation than prescribed fire or mechanical treatments.

Standard Operating Procedures for Mechanical Vegetation Treatment

Mechanical vegetation treatments employ several different types of equipment to suppress, inhibit, or control herbaceous and woody vegetation. The goal of mechanical treatments is to kill or reduce the cover of undesirable vegetation and thus encourage the growth of desirable plants. BLM uses wheeled tractors, crawler-type tractors, mowers, or specially designed vehicles with attached implements for mechanical vegetation treatments. Mechanical equipment is used to reduce fuel hazards in accordance with BLM established procedures. Re-seeding after mechanical treatments is important to help ensure that desirable plants and not weedy species will become established on the site. Mechanical treatment and reseeding should occur at a time to best control the undesirable vegetation and encourage the establishing of desirable vegetation. The best mechanical method for treating undesired plants in a particular location depends on the following factors:

- characteristics of the undesired species present, such as plant density stem size, woodiness, brittleness, and resprouting ability,
- need for seedbed preparation, revegetation, and improved water infiltration rates,
- topography and terrain,
- soil characteristics such as type, depth, amount and size of rocks, erosion potential, and susceptibility to compaction,
- climatic and seasonal conditions, and
- potential cost of improvement as compared to expected results.

Bulldozing consists of a wheeled or crawler tractor with a heavy hydraulic controlled blade. Bulldozers push over and uproot vegetation and leave it in windrows or piles. Bulldozing is best adapted to removing scattered stands of large brush or trees. Several different kinds of blades can be used, depending of the type of vegetation and goals of the project. The disadvantage of bulldozing is that is disturbs soil and may damage non-target plants.

Disk plowing in its various forms can be used for removing shallow-rooted herbaceous and woody plants. Disk plows should only be used where all of the vegetation is intended to be killed. Several different kinds of root plows are specific for certain types of vegetation. In addition to killing vegetation, disk plowing loosens the soil surface to prepare it for seeding and to improve the rate of water infiltration. The disadvantage of disk plowing is that it may be expensive and usually kills all species. Also, plowing is usually not practicable on steep slopes (> 35-45 percent slope) or rocky soil. Plant species that sprout from roots may survive.

Vegetation is chained and cabled by dragging heavy anchor chains or steel cables hooked to tractors in a U-shape, half circle, or J-shaped manner. Effective on rocky soils and steep slopes, chaining and cabling are best used to control non-sprouting woody vegetation such as small trees and shrubs. Desirable shrubs may be damaged in the process. This control method normally does not injure herbaceous vegetation. It is cost effective because it can readily treat large areas. The chains or cables also scarify the soil surface in anticipation of seeding desirable species. The disadvantage is that weedy herbaceous vegetation can survive this treatment.

Various tractor attachments are used for mowing, beating, crushing, chopping, or shredding vegetation, depending on the nature of the plant stand and goals of the project. The advantage in using this type of equipment is that selective plants may be targeted to achieve specific goals. For example, mowing is effective in reducing plant height to a desirable condition, and mowing usually does not kill vegetation. Mowing is more effective on herbaceous than woody vegetation.

On the other hand, a rolling cutter leaves herbaceous vegetation but can kill woody nonsprouting vegetation by breaking stems at ground level. Mowing, beating, crushing, chopping, or shredding usually does not disturb soil. Rocky soil and steep slopes may limit the use of this equipment. Debris management after a mechanical treatment is critical in fuels reduction projects. Vegetation material that is left on a site will dry and may become more hazardous than before the treatment. Herbaceous material is usually not a problem because it will decompose relatively fast, depending on soil moisture, ambient humidity, and temperature. Woody vegetation should be piled and burned under acceptable fire management practices.

Standard Operating Procedures for Biological Vegetation Treatment

Biological control using cattle, sheep, or goats would be applied to treatment areas for short periods. In using grazing animals as effective biological control measures, several factors will be considered:

- target plant species present,
- size of the infestation of target plant species,
- other plant species present,
- stage of growth of both target and other plant species,
- palatability of all plant species present,
- selectivity of all plant species present by the grazing animal being considered for use,
- availability of that grazing animal within the treatment site area,
- type of management program that is logical and realistic for the treatment site, and
- potential impacts to native wildlife and their habitat.

Standard Operating Procedures for Prescribed Burning (Pile Burning)

Prescribed burning is the planned application of fire to wildland fuels in their natural or modified state, under specific conditions of fuels, weather, and other variables, to allow the fire to remain in a predetermined area and to achieve site-specific fire and resource management objectives. Treatments would be implemented in accordance with BLM's procedures in Prescribed Fire Management (BLM 2000).

Before conducting a prescribed burn, a written plan must be prepared. The plan must:

- consider existing conditions (amount of fuel, fuel moisture, temperatures, terrain, weather forecasts), and
- name the people responsible for overseeing the fire.

Prescribed fire process steps:

<u>Phase One</u>: Information/assessment includes the following:

- determining the area to be treated,
- inventorying and assessing site-specific conditions (live and dead vegetation densities, dead and down woody fuel loadings, soil types),
- analyzing historic and present fire management,
- identifying resource objectives from land use plans

<u>Phase Two</u>: Prescribed fire plan development includes the following:

- developing the site-specific prescribed fire plan to BLM's standards,
- reviewing the plan, and
- obtaining plan approval from local BLM's field office administrators.

<u>Phase Three</u>: Implementation includes the following:

- preparing the prescribed fire boundary to ensure that the fire remains within prescribed boundaries,

- preparing the site, which may include building firelines, and improving vehicle routes and wildlife and stock trails by limbing trees and clearing debris, and
- igniting the fire according to the plan's prescribed parameters.

Phase Four: Monitoring and evaluation includes assessment and long-term monitoring of the fire treatment to ensure that the prescribed fire has met the objectives of the approved prescribed fire plan.

Standard Operating Procedures for Herbicide Use

Resource Element	Standard Operating Procedure
General See 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*).	• 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 degradates, 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 will 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 http://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

Resource Element	Standard Operating Procedure
	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

Resource Element	Standard Operating Procedure
	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 a water 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 or hay 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, needed to maintain desirable vegetation on the treatment site.
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 offsite 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	• 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

Resource Element	Standard Operating Procedure
Management) and 6780 (Habitat Management Plans)	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. • Avoid using glyphosate formulations that include the adjuvant R-11 in aquatic ecosystems and either avoid using formulations with the surfactant POEA or seek to use the formulation with the lowest amount of POEA available to reduce risks to amphibians and aquatic organisms.
Threatened, Endangered, and Sensitive Species See Manual 6840 (Special Status Species)	• Survey for special status species before treating an area. Consider effects to special status species when designing 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.

Best Management Practices for Weed Prevention

This list incorporates many suggested practices under many types of land management operation types and is designed to allow managers to pick and choose those practices that are most applicable and feasible for each situation.

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, 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 practicable, 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-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 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, re-establish 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.
- 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 ROW, and other areas of disturbed soils.

Mitigation Measures for Vegetation Treatments

Resource Element	Mitigation Measures
Air Quality	None Proposed
Soil	None Proposed
Water Resources*	Establish appropriate (herbicide-specific) buffer zones to downstream water bodies, habitats, and species/populations of interest. Consult ERAs for appropriate buffer zones, which can vary based on the type of plant, and application method.
Wetlands and Riparian Areas	See mitigation for Water Resources and Quality and Vegetation.
Vegetation**	• Minimize the use of terrestrial herbicides in watersheds with down-gradient ponds and streams if potential impacts to aquatic plants are of concern. • Establish appropriate (herbicide specific) buffer zones around downstream water bodies, habitats, and species/populations of interest. Consult the ERAs for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios. • To protect special status plant species, implement all conservation measures for plants presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment*.
Fish and Other Aquatic Organisms***	• Limit the use of terrestrial herbicides in watersheds with characteristics suitable for potential surface runoff that have fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) used. • To protect special status fish and other aquatic organisms, implement all conservation measures for aquatic animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Biological Assessment*. • Establish appropriate herbicide-specific buffer zones for water bodies, habitats, or fish or other aquatic species of interest. Consult individual ERAs for more specific information on appropriate buffer distances. • Avoid using the adjuvant R-11® in aquatic environments and either avoid using glyphosate formulations containing the surfactant POEA or seek to use formulations with the least amount of POEA to reduce risks to aquatic organisms.
Wildlife**	• To minimize risks to terrestrial wildlife, do not exceed the typical application rate for applications of triclopyr, where feasible. • Minimize the size of application areas, where practical, when applying 2,4-D to limit impacts to wildlife, particularly through contamination of food items. • Where practical, limit glyphosate to spot applications in rangeland and wildlife habitat areas to avoid contamination of wildlife food items. • Avoid using the adjuvant R-11® in aquatic environments, and

Resource Element	Mitigation Measures
	either avoid using glyphosate formulations containing POEA, or seek to use formulations with the least amount of POEA, to reduce risks to amphibians. • To protect special status wildlife species, implement all conservation measures for terrestrial animals presented in the *Vegetation Treatments on Bureau of Land Management Lands in 17Western States Programmatic Biological Assessment*.

*See Appendix C of the National PEIS, Table C-16(http://www.blm.gov/wo/st/en/prog/more/veg_eis.html) for appropriate buffer zones, which can vary based on the type of plant, and application method.
**See Tables 4-12 and 4-14 in Chapter 4 of the National PEIS (http://www.blm.gov/wo/st/en/prog/more/veg_eis.html) for appropriate buffer zones, which can vary based on the type of plant, and application method.
*** Consult the ecological risk assessments (ERAs) in Appendix C of the National PEIS http://www.blm.gov/wo/st/en/prog/more/veg_eis.html) for more specific information on appropriate buffer distances under different soil, moisture, vegetation, and application scenarios.

Monitoring

The BLM has prepared numerous guidance and strategy documents to aid field personnel in developing and implementing monitoring plans and strategies (PEIS Appendix D; BLM 2007a). Monitoring would be used to ensure that vegetation management SOPs and mitigation measures are adopted and implemented appropriately and determined to be effective at established intervals and standards for monitoring and evaluating land management actions approved in the land use plans for the HFO and LSFO. Monitoring strategies would vary in time and space depending on the species and would be used as an adaptive process that would continually build upon past monitoring results. During preparation of implementation plans, treatment objectives, standards, and guidelines would be stated in measurable terms, where feasible, so that treatment outcomes can be measured, evaluated, and used to guide future treatment actions.

APPENDIX C: Summary of Effects to Threatened, Endangered, and Proposed Species as a Result of Exposure to Herbicides, as Predicted By Risk Assessments

Summary of Effects[1] to Terrestrial Threatened, Endangered, and Proposed Plant Species as a Result of Off-site Drift from Aerial Applications of Herbicides, as Predicted By Risk Assessments

Herbicide	Ground Application	Aerial Application
2,4-D	Not addressed in ERA.	Not addressed in ERA.
Bromacil	Negative effects within 1,200 feet.	N/A (herbicide would not be applied aerially).
Chlorsulfuron	Negative effects within 1,200 feet.	Negative effects within 1,400 feet.
Clopyralid[2]	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[3].	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[3].
Dicamba	Negative effects within 25 feet.	Negative effects within 25 feet.
Diflufenzopyr	Low boom, typical application rate: negative effects within 100 feet. Low boom, maximum application rate: negative effects within 900 feet. High boom: negative effects within 900 feet.	N/A (herbicide would not be applied aerially).
Diquat	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects within 1,000 feet.	Negative effects within 900 feet.
Diuron	Negative effects within 1,100 feet.	N/A (herbicide would not be applied aerially).
Fluridone	Effects uncertain.	Effects uncertain.
Glyphosate[2]	Typical application rate: negative effects within 50 feet. Maximum application rate: negative effects within 300 feet.	Negative effects within 300 feet.
Hexazinone	Typical application rate: negative effects within 300 feet. Maximum application rate: negative effects within 900 feet.	Not addressed in ERA.
Imazapic	No negative effects predicted (distances of 25 feet and greater considered).	Helicopter, typical application rate: No negative effects predicted (distances of 100 feet and greater considered). Helicopter, maximum application rate; or plane, typical application rate: Negative effects within 300 feet. Plane, maximum application rate: negative effects within 900 feet.
Imazapyr[2]	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[3].	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[3].
Metsulfuron methyl[2]	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[3].	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[3].

(Continued) Summary of Effects[1] to Terrestrial Threatened, Endangered, and Proposed Plant Species as a Result of Off-site Drift from Aerial Applications of Herbicides, as Predicted By Risk Assessments

Herbicide	Ground Application	Aerial Application
Overdrive®	Low boom, typical application rate: negative effects within 100 feet. Low boom, maximum application rate: negative effects within 900 feet. High boom: negative effects within 900 feet.	N/A (herbicide would not be applied aerially).
Picloram[2]	Typical application rate: negative effects within 900 feet[3]. Maximum application rate: negative effects beyond 900 feet[3].	Typical application rate: negative effects beyond 900 feet[3]. Maximum application rate: negative effects beyond 900 feet[3].
Sulfometuron methyl	Negative effects within 1,500 feet.	Negative effects within 1,000 feet.
Tebuthiuron	Low boom, typical application rate: negative effects within 25 feet. Low boom, maximum application rate: negative effects within 50 feet. High boom, typical application rate: negative effects within 50 feet. High boom, maximum application rate: negative effects within 900 feet.	N/A (herbicide applied in granular form and drift would be minimal).
Triclopyr acid[2]	Typical application rate: negative effects within 300 feet. Maximum application rate: negative effects beyond 900 feet[3].	Typical application rate: negative effects within 500 feet. Maximum application rate: negative effects beyond 900 feet[3].
Triclopyr BEE[2]	Typical application rate: negative effects within 300 feet. Maximum application rate: negative effects beyond 900 feet[3].	Typical application rate: negative effects within 500 feet. Maximum application rate: negative effects beyond 900 feet[3].

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No negative effects predicted" indicates that ERAs did not predict risks to TEP terrestrial plants under the modeled scenario at the typical or maximum application rate.

[2] For these chemicals, ground application scenarios for off-site drift considered use of a low boom only.

[3] For these chemicals, the ERAs did not model spray drift out to a distance at which there would be no risks to TEP plants; therefore, a conservative buffer distance of ½ mile is assumed.

N/A = Not applicable.

Note: The ERAs provided information about the closest distance for which negative effects were predicted. Buffer distances in this table were determined by extending this distance far enough to sufficiently reduce the likelihood of negative effects to TEP plant species. To be conservative, in most cases the buffer extends out to the first modeled distance from the application site for which no risks were predicted based on a programmatic-level assessment. Local BLM field offices would be able to use interactive spreadsheets developed for the ERAs to input site-specific characteristics (e.g., soil type, precipitation, vegetation type, treatment method) to develop more precise, and potentially shorter, distances at which effects could occur.

Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Aquatic Threatened, Endangered, and Proposed Plant Species as a Result of Off-site Drift of Herbicides, as Predicted By Risk Assessments

Herbicide[2]	Ground Application	Aerial Application
2,4-D	Not addressed in ERA.	Not addressed in ERA.
Bromacil	Low boom, typical application rate: negative effects within 100 feet. Low boom, maximum application rate: negative effects within 900 feet. High boom: negative effects within 900 feet.	N/A (herbicide would not be applied aerially).
Chlorsulfuron	No negative effects predicted (distances of 25 feet and greater considered).	Typical application rate: no negative effects predicted (distances of 100 feet and greater considered). Maximum application rate: negative effects within 300 feet.
Clopyralid[2]	No negative effects predicted.	No negative effects predicted.
Dicamba	No negative effects predicted (distances of 25 feet and greater considered).	N/A (herbicide would not be applied aerially).
Diflufenzopyr	No negative effects predicted (distances of 25 feet and greater considered).	N/A (herbicide would not be applied aerially).
Diuron	Low boom, typical application rate: negative effects within 900 feet. Low boom, maximum application rate: negative effects within 1,100 feet. Maximum application rate: negative effects within 1,100 feet.	N/A (herbicide would not be applied aerially).
Glyphosate	No negative effects predicted.	No negative effects predicted.
Hexazinone	Typical application rate: negative effects within 300 feet. Maximum application rate: negative effects beyond 900 feet.	Not addressed in ERA.
Imazapic	No negative effects predicted (distances of 25 feet and greater considered).	Typical application rate: no negative effects predicted (distances of 100 feet and greater considered). Maximum application rate: negative effects within 300 feet.
Imazapyr[3]	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[4].	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[4].
Metsulfuron methyl[3]	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[4].	Typical application rate: negative effects within 900 feet. Maximum application rate: negative effects beyond 900 feet[4].
Overdrive®	No negative effects predicted (distances of 25 feet and greater considered).	N/A (herbicide would not be applied aerially).
Picloram	No negative effects predicted.	No negative effects predicted.
Sulfometuron methyl	Negative effects within 900 feet.	Negative effects within 1,500 feet.
Tebuthiuron	No negative effects predicted (distances of 25 feet and greater considered).	N/A (herbicide would not be applied aerially).

(Continued) Summary of Effects[1] to Aquatic Threatened, Endangered, and Proposed Plant Species as a Result of Off-site Drift of Herbicides, as Predicted By Risk Assessments

Herbicide[1]	Ground Application	Aerial Application
Triclopyr acid[3]	Typical application rate: no negative effects predicted. Maximum application rate: negative effects beyond 900 feet[4].	Typical application rate: no negative effects predicted. Maximum application rate: negative effects beyond 900 feet[4].
Triclopyr BEE[3]	Typical application rate: negative effects within 300 feet. Maximum application rate: negative effects beyond 900 feet[4].	Typical application rate: negative effects within 500 feet. Maximum application rate: negative effects beyond 900 feet[4].

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No negative effects predicted" indicates that ERAs did not predict risks to TEP aquatic plants under the modeled scenario at the typical or maximum application rate.

[2] Note that only terrestrial herbicides are considered for this analysis.

[3] For these chemicals, risks to terrestrial TEP plant species are used to represent risks to aquatic TEP plant species, except for the typical application rate of triclopyr acid (because no risks were associated with direct spray). For these chemicals, ground application scenarios for off-site drift considered use of a low boom only.

[4] For these chemicals ERAs did not model spray drift out to a distance at which there would be no risks to TEP plants; therefore, a conservative buffer distance of ½ mile is assumed.

N/A = Not applicable.

Note: The ERAs provided information about the closest distance for which negative effects were predicted. Buffer distances in this table were determined by extending this distance far enough to sufficiently reduce the likelihood of negative effects to TEP plant species. To be conservative, in most cases the buffer extends out to the first modeled distance from the application site for which no risks were predicted based on a programmatic-level assessment. Local BLM field offices would be able to use interactive spreadsheets developed for the ERAs to input site-specific characteristics (e.g., soil type, precipitation, vegetation type, treatment method) to develop more precise, and potentially narrower buffers.

Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Threatened, Endangered, and Proposed Plants as a Result of Surface Runoff of Herbicides, as Predicted by Risk Assessments

Herbicide	Effects to Terrestrial TEP Plants	Effects to TEP Aquatic Plants
2,4-D	Not addressed in ERA.	Not addressed in ERA.
Bromacil	Maximum application rate: negative effects in areas with clay soils and where annual precipitation is greater than 50 inches per year. Typical application rate: negative effects in areas with clay soils and where annual precipitation is greater than 100 inches per year.	Negative effects where precipitation is greater than 5 inches per year.
Chlorsulfuron	No negative effects predicted.	Sand and clay soils: negative effects where precipitation is greater than 10 inches per year. Loam soils: negative effects where precipitation is greater than 50 inches per year.
Clopyralid	Clay soils: negative effects where annual precipitation is greater than 10 inches per year.	No negative effects predicted.
Dicamba	Maximum application rate: negative effects in areas with clay soils and where annual precipitation is greater than 200 inches per year.	Clay soils: negative effects where precipitation is greater than 100 inches per year. Loam and sand soils: negative effects where precipitation is greater than 25 inches per year.
Diflufenzopyr	Clay soils: negative effects where annual precipitation is greater than 10 inches per year. Silt loam, silt, and clay loam soils: negative effects where precipitation is greater than 25 inches per year.	No negative effects predicted.
Diuron	Clay and clay loam soils: negative effects where annual precipitation is greater than 25 inches per year. Loam soils: negative effects where annual precipitation is greater than 150 inches per year.	Negative effects where precipitation is greater than 5 inches per year.
Glyphosate	No negative effects predicted.	No negative effects predicted.
Hexazinone	Not addressed in ERA.	No addressed in ERA.
Imazapic	No negative effects predicted.	Sand: negative effects where precipitation is greater than 10 inches per year. Clay and clay loam soils: negative effects where precipitation is greater than 25 inches per year. Loam soils: negative effects where precipitation is greater than 50 inches per year.

Summary of Effects[1] to Threatened, Endangered, and Proposed Plants as a Result of Surface Runoff of Herbicides, as Predicted By Risk Assessments

Herbicide	Effects to Terrestrial TEP Plants	Effects to Non-target Aquatic Plants
Imazapyr	Clay soils: negative effects where annual precipitation is greater than 10 inches. Loam soils: negative effects where annual precipitation is greater than 50 inches.	No negative effects predicted.
Metsulfuron methyl	Clay soils: negative effects where annual precipitation is greater than 10 inches. Loam soils: negative effects where annual precipitation is greater than 50 inches.	No negative effects predicted.
Overdrive®	Clay soils: negative effects where annual precipitation is greater than 10 inches. Silt loam, silt, and clay loam soils: negative effects where annual precipitation is greater than 25 inches.	Clay soils: negative effects where annual precipitation is greater than 10 inches per year. Sand, silt loam, silt, and clay loam soils: negative effects where annual precipitation is greater than 25 inches per year. Loam soils: negative effects where annual precipitation is greater than 150 inches per year (maximum application rates only).
Picloram	Clay soils: negative effects where annual precipitation is greater than 10 inches. Loam soils: negative effects where precipitation is between 50 and 200 inches per year.	No negative effects predicted.
Sulfometuron methyl	Clay soils: negative effects where annual precipitation is greater than 5 inches per year. Silt loam, silt, and clay loam soils: negative effects where precipitation is greater than 25 inches per year.	Clay soils: negative effects where annual precipitation is greater than 5 inches. Sand soils: negative effects where annual precipitation is greater than 10 inches per year. Loam soils: negative effects where annual precipitation is greater than 25 inches.
Tebuthiuron	Clay, silt loam, silt, and clay loam soils: negative effects where annual precipitation is greater than 25 inches per year.	Sand: negative effects where annual precipitation is greater than 5 inches. Other soil types: negative effects where annual precipitation is greater than 10 inches.
Triclopyr acid	Clay and loam soils: negative effects where annual precipitation is greater than 20 inches. Sand: negative effects where annual precipitation is greater than 25 inches.	No negative effects predicted.
Triclopyr BEE	Clay soils: negative effects where annual precipitation is greater than 10 inches per year. Loam and sand soils: negative effects where annual precipitation is greater than 5 inches.	Negative effects under certain site conditions (e.g., in areas with clay soils and moderate to high annual rainfall).

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No negative effects predicted" indicates that ERAs did not predict risks to TEP plants under the modeled scenario at the typical or maximum application rate.
Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Threatened, Endangered, and Proposed Fish from Exposure to Herbicides in Ponds, as Predicted By Risk Assessments

Herbicide	Direct Spray	Off-site Drift	Spill	Surface Runoff
2,4-D	No effects	Not addressed in ERA	Negative effects	No effects
Bromacil	Negative effects	No effects	Negative effects	Negative effects
Chlorsulfuron	No effects	No effects	No effects	No effects
Clopyralid	No effects	Not addressed in ERA	Negative effects	No effects
Dicamba	No effects	No effects	No effects	No effects
Diflufenzopyr	No effects	No effects	No effects	No effects
Diquat[2]	Negative effects	NA	Negative effects	NA
Diuron	Negative effects	Negative effects (maximum application rate)	Negative effects	Negative effects
Fluridone[2]	No effects	NA	Negative effects	NA
Glyphosate	Negative effects (maximum application rate; typical and maximum rates using more toxic formulation)	Not addressed in ERA	Negative effects	No effects
Hexazinone	No effects	Not addressed in ERA	Not addressed in ERA	No effects
Imazapic	No effects	No effects	No effects	No effects
Imazapyr	No effects	Not addressed in ERA	Negative effects	No effects
Metsulfuron methyl	No effects	Not addressed in ERA	Negative effects (maximum application rate)	No effects
Overdrive®	No effects	No effects	No effects	No effects
Picloram	Negative effects	Not addressed in ERA	Negative effects	No effects
Sulfometuron methyl	No effects	No effects	No effects	No effects
Tebuthiuron	No effects	No effects	Negative effects	No effects
Triclopyr acid	No effects[3]	Not addressed in ERA	Negative effects	No effects
Triclopyr BEE	Negative effects	Not addressed in ERA	Negative effects	Negative effects (maximum application rate)

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. Unless otherwise indicated, "negative effects means ERAs predicted risks at both typical and maximum application rates. "No effects" indicates that ERAs did not predict risks to TEP fish under the modeled scenario at typical or maximum application rates.

[2] Diquat and fluridone are used to control aquatic weeds; direct application into a pond or stream is a typical use. Off-site drift and surface runoff scenarios do not apply, since these herbicides would not be applied in upland areas.

[3] For this herbicide, "direct spray" also considers a normal aquatic application directly into the water column.

NA = Not applicable.

Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Threatened, Endangered, and Proposed Fish from Exposure to Herbicides in Streams, as Predicted By Risk Assessments

Herbicide	Direct Spray	Off-site Drift	Spill[2]	Surface Runoff
2,4-D	No effects	Not addressed in ERA	Negative effects	No effects
Bromacil	Negative effects	No effects	Negative effects	No effects
Chlorsulfuron	No effects	No effects	No effects	No effects
Clopyralid	No effects	Not addressed in ERA	Negative effects	No effects
Dicamba	No effects	No effects	No effects	No effects
Diflufenzopyr	No effects	No effects	No effects	No effects
Diquat[3]	Negative effects	NA	Negative effects	NA
Diuron	Negative effects	Negative effects (maximum application rate)	Negative effects	Negative effects
Fluridone[3]	Negative effects (maximum application rate)	NA	Negative effects	NA
Glyphosate	Negative effects (maximum application rate; typical and maximum rates using more toxic formulation)	Not addressed in ERA	Negative effects	No effects
Hexazinone	No effects	Not addressed in ERA	Not addressed in ERA	No effects
Imazapic	No effects	No effects	No effects	No effects
Imazapyr	No effects	Not addressed in ERA	Negative effects	No effects
Metsulfuron methyl	No effects	Not addressed in ERA	Negative effects (maximum application rate)	No effects
Overdrive®	No effects	No effects	No effects	No effects
Picloram	Negative effects	Not addressed in ERA	Negative effects	No effects
Sulfometuron methyl	No effects	No effects	No effects	No effects
Tebuthiuron	No effects	No effects	Negative effects	No effects
Triclopyr acid	No effects[4]	Not addressed in ERA	Negative effects	No effects
Triclopyr BEE	Negative effects	Not addressed in ERA	Negative effects	Negative effects (maximum application rate)

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. Unless otherwise indicated, "negative effects" means ERAs predicted risks at both typical and maximum application rates. "No effects" indicates that ERAs did not predict risks to TEP fish under the modeled scenario at typical or maximum application rates.
[2] Since the BLM ERAs did not assess the risks associated with spills into a stream, results for spills into a pond are presented here.
[3] Diquat and fluridone are used to control aquatic weeds; direct application into a pond or stream is a typical use. Off-site drift and surface runoff scenarios do not apply, since these herbicides would not be applied in upland areas.
[4] For this herbicide, "direct spray" also considers a normal aquatic application directly into the water column.
NA = Not applicable.
Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Threatened, Endangered, and Proposed Aquatic Invertebrates from Exposure to Herbicides in Ponds, as Predicted By Risk Assessments

Herbicide	Direct Spray	Off-site Drift	Spill	Surface Runoff
2,4-D	No effects	Not addressed in ERA	Negative effects	No effects
Bromacil	No effects	No effects	Negative effects	No effects
Chlorsulfuron	No effects	No effects	No effects	No effects
Clopyralid	No effects	Not addressed in ERA	Negative effects	No effects
Dicamba	No effects	No effects	No effects	No effects
Diflufenzopyr	No effects	No effects	No effects	No effects
Diquat[2]	Negative effects	NA	Negative effects	NA
Diuron	Negative effects	Negative effects (maximum application rates)	Negative effects	Negative effects
Fluridone[2]	Negative effects (maximum application rate)	NA	Negative effects	NA
Glyphosate	Negative effects (more toxic formulation)	Not addressed in ERA	Negative effects	No effects
Hexazinone	No effects	Not addressed in ERA	Not addressed in ERA	No effects
Imazapic	No effects	No effects	No effects	No effects
Imazapyr	No effects	Not addressed in ERA	Negative effects (maximum application rate)	No effects
Metsulfuron methyl	No effects	Not addressed in ERA	No effects	No effects
Overdrive®	No effects	No effects	No effects	No effects
Picloram	No effects	Not addressed in ERA	Negative effects	No effects
Sulfometuron methyl	No effects	No effects	No effects	No effects
Tebuthiuron	Negative effects	No effects	Negative effects (helicopter spill only)	Negative effects (predominantly at maximum application rate)
Triclopyr acid	No effects[3]	Not addressed in ERA	Negative effects	No effects
Triclopyr BEE	Negative effects	Not addressed in ERA	Negative effects	No effects

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. Unless otherwise indicated, "Negative effects" means ERAs predicted risks at both typical and maximum application rates. "No effects" indicates that ERAs did not predict risks to TEP aquatic invertebrates under the modeled scenario at typical or maximum application rates.

[2] Diquat and fluridone are used to control aquatic weeds; direct application into a pond or stream is a typical use. Off-site drift and surface runoff scenarios do not apply, since these herbicides would not be applied in upland areas.

[3] For this herbicide, "direct spray" also considers a normal aquatic application directly into the water column.

NA = Not applicable.

Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Threatened, Endangered, and Proposed Aquatic Invertebrates From Exposure to Herbicides in Streams, as Predicted By Risk Assessments

Herbicide	Direct Spray	Off-site Drift	Spill[2]	Surface Runoff
2,4-D	No effects	Not addressed in ERA	Negative effects	No effects
Bromacil	Negative effects (maximum application rate)	No effects	Negative effects	No effects
Chlorsulfuron	No effects	No effects	No effects	No effects
Clopyralid	No effects	Not addressed in ERA	Negative effects	No effects
Dicamba	No effects	No effects	No effects	No effects
Diflufenzopyr	No effects	No effects	No effects	No effects
Diquat[3]	Negative effects	NA	Negative effects	NA
Diuron	Negative effects	Negative effects	Negative effects	Negative effects
Fluridone[3]	Negative effects	NA	Negative effects	NA
Glyphosate	Negative effects (more toxic formulation)	Not addressed in ERA	Negative effects	No effects
Hexazinone	No effects	Not addressed in ERA	Not addressed in ERA	No effects
Imazapic	Negative effects (maximum application rate)	No effects	No effects	No effects
Imazapyr	No effects	Not addressed in ERA	Negative effects (maximum application rate)	No effects
Metsulfuron methyl	No effects	Not addressed in ERA	No effects	No effects
Overdrive®	No effects	No effects	No effects	No effects
Picloram	No effects	Not addressed in ERA	Negative effects	No effects
Sulfometuron methyl	No effects	No effects	No effects	No effects
Tebuthiuron	Negative effects	No effects	Negative effects (helicopter spill only); airplane applications not evaluated.	No effects
Triclopyr acid	No effects[4]	Not addressed in ERA	Negative effects	No effects
Triclopyr BEE	Negative effects	Not addressed in ERA	Negative effects	No effects

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No effects" indicates that ERAs did not predict risks to TEP aquatic invertebrates under the modeled scenario at the typical or maximum application rate.
[2] Since the BLM ERAs did not assess the risks associated with spills into a stream, results for spills into a pond are presented here.
[3] Diquat and fluridone are used to control aquatic weeds; direct application into a pond or stream is a typical use. Off-site drift and surface runoff scenarios do not apply, since these herbicides would not be applied in upland areas.
[4] For this herbicide, "direct spray" also considers a normal aquatic application directly into the water column.
Note: "Negative effects" means ERAs predicted risks at both typical and maximum application rates, unless otherwise indicated.
NA = Not applicable.
Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Threatened, Endangered, and Proposed Terrestrial Invertebrates from Dermal Exposure to Herbicides, as Predicted by Risk Assessments

Herbicide	Direct Spray	Level of Risk[2]	Dermal Contact with Sprayed Vegetation	Level of Risk[2]
2,4-D	Negative effects	Typical rate: M Maximum rate terrestrial: M Maximum rate aquatic: H	Negative effects	Typical rate: L Maximum rate terrestrial: L Maximum rate aquatic: M
Bromacil	Negative effects	Typical rate: L Maximum rate: L	No effects	--
Chlorsulfuron	No effects	--	No effects	--
Clopyralid	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Dicamba	No effects	--	No effects	--
Diflufenzopyr	No effects	--	No effects	--
Diquat	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Diuron	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Fluridone	No effects	--	No effects	--
Glyphosate	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Hexazinone	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Imazapic	No effects	--	No effects	--
Imazapyr	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Metsulfuron methyl	No effects	--	No effects	--
Overdrive®	No effects	--	No effects	--
Picloram	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Sulfometuron methyl	No effects	--	No effects	--
Tebuthiuron	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Triclopyr acid	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Triclopyr BEE	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No effects" indicates that ERAs did not predict risks to TEP terrestrial invertebrates under the modeled scenario at typical or maximum application rates.

[2] L = Low risk; M = medium risk; H = high risk; and N/A = ERAs did not predict risk at this application rate.

Note: Diquat and fluridone are aquatic herbicides that would not be used by the BLM in terrestrial applications. For 2,4-D, the maximum terrestrial application rate, rather than the maximum aquatic application rate, is the maximum rate that would be used in terrestrial applications.

Sources: Ecological risk assessments for herbicides (Syracuse Environmental Research Associates, Inc. 2001; ENSR 2005a-j).

Summary of Effects[1] to Threatened, Endangered, and Proposed Terrestrial Vertebrates from Dermal Exposure to Herbicides, as Predicted By Risk Assessments

Herbicide	Direct Spray	Level of Risk[2]	Dermal Contact with Sprayed Vegetation	Level of Risk
2,4-D	Negative effects	Typical rate: M Maximum rate terrestrial: M Maximum rate aquatic: H	Negative effects	Typical rate: L Maximum rate terrestrial: L Maximum rate aquatic: M
Bromacil	No effects	--	No effects	--
Chlorsulfuron	No effects	--	No effects	--
Clopyralid	Negative effects	Typical rate: L Maximum rate: L	No effects	--
Dicamba	No effects	--	No effects	--
Diflufenzopyr	No effects	--	No effects	--
Diquat	No effects	--	No effects	--
Diuron	No effects	--	No effects	--
Fluridone	No effects	--	No effects	--
Glyphosate	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Hexazinone	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Imazapic	No effects	--	No effects	--
Imazapyr	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Metsulfuron methyl	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Overdrive®	No effects	--	No effects	--
Picloram	Negative effects	Typical rate: L Maximum rate: L	No effects	--
Sulfometuron methyl	No effects	--	No effects	--
Tebuthiuron	No effects	--	No effects	--
Triclopyr acid	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L
Triclopyr BEE	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No effects" indicates that ERAs did not predict risks to TEP terrestrial vertebrates under the modeled scenario at typical or maximum application rates.

[2] L = Low risk; M = medium risk; H = high risk; N/A = ERAs did not predict risk at this application rate.

Note: Diquat and fluridone are aquatic herbicides that would not be used by the BLM in terrestrial applications. For 2,4-D, the maximum terrestrial application rate, rather than the maximum aquatic application rate, is the maximum rate that would be used in terrestrial applications.

Sources: Ecological risk assessments for herbicides (ENSR 2005a-j; Syracuse Environmental Research Associates, Inc. 2001).

Summary of Effects to Threatened, Endangered, and Proposed Herpetofauna From Ingestion of Food Contaminated by Herbicides, as Predicted By Risk Assessments

Species	Food (During Terrestrial Stage)	Summary of Effects[1]
Desert slender salamander	Arthropods	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from clopyralid or imazapyr at the maximum application rate.
Sonora tiger salamander[2]	Invertebrates, fish, amphibians, and small mammals	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from bromacil, clopyralid, or imazapyr at the maximum application rate.
Chiricahua leopard frog	Invertebrates	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from clopyralid or imazapyr at the maximum application rate.
Wyoming toad	Insects	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from clopyralid or imazapyr at the maximum application rate.
California tiger salamander	Invertebrates	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from clopyralid or imazapyr at the maximum application rate.
Arroyo toad	Invertebrates	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from clopyralid or imazapyr at the maximum application rate.
California red-legged frog	Invertebrates	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from clopyralid or imazapyr at the maximum application rate.
Coachella valley fringe-toed lizard	Arthropods	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from clopyralid or imazapyr at the maximum application rate.
Desert tortoise	Herbaceous plants	Negative effects from 2,4-D, diquat, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from bromacil, clopyralid, diuron, imazapyr, or tebuthiuron at the maximum application rate.
New Mexican ridge-nosed rattlesnake[1]	Vertebrates and invertebrates	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from bromacil, clopyralid, or imazapyr at the maximum application rate.
Giant garter snake[2]	Fish, vertebrates, and invertebrates	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from bromacil, clopyralid, or imazapyr at the maximum application rate.
Blunt-nosed leopard lizard[2]	Insects and lizards	Negative effects from 2,4-D, diquat, diuron, glyphosate, hexazinone, or triclopyr at the typical application rate; negative effects from bromacil, clopyralid, or imazapyr at the maximum application rate.

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS.
[2] For these species, the ERA for hexazinone did not address exposure via ingestion of small mammals and other vertebrates.
Sources: Ecological risk assessments for herbicides (ENSR 2005a-j; Syracuse Environmental Research Associates, Inc. 2001).

Summary of Effects to Threatened, Endangered, and Proposed Birds from Ingestion of Food Contaminated by Herbicides, as Predicted By Risk Assessments

Herbicide	Ingestion of Invertebrate Prey		Ingestion of Vegetation		Ingestion of Small Vertebrate Prey[1]		Ingestion of Fish	
	Effect[2]	Risk Level[3]	Effect	Risk Level	Effect	Risk Level	Effect	Risk Level
2,4-D	Negative effects	Typical rate: H Maximum rate terrestrial: H Maximum rate aquatic: H	Negative effects	Typical rate: M Maximum rate terrestrial: H Maximum rate aquatic: H	Negative effects	Typical rate: L Maximum rate terrestrial: L Maximum rate aquatic: M	Negative effects	Typical rate: H Maximum rate terrestrial: H Maximum rate aquatic: H
Bromacil	No effects	--	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Chlorsulfuron	No effects	--	No effects	--	No effects	--	No effects	--
Clopyralid	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--	No effects	--
Dicamba	No effects	--	No effects	--	No effects	--	No effects	--
Diflufenzopyr	No effects	--	No effects	--	No effects	--	No effects	--
Diquat	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: L Maximum rate: H	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Diuron	Negative effects	Typical rate: L Maximum rate: L	Negative effects	Typical rate: N/A Maximum rate: M	Negative effects	Typical rate: L Maximum rate: L	No effects	--
Fluridone	No effects	--	No effects	--	No effects	--	No effects	--
Glyphosate	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: L Maximum rate: L	No effects	--	No effects	--
Hexazinone	Negative effects	Typical rate: M Maximum rate: M	Negative effects	Typical rate: L Maximum rate: M	Unknown[4]	Unknown	Negative effects	Typical rate: L Maximum rate: M

Herbicide	Ingestion of Invertebrate Prey		Ingestion of Vegetation		Ingestion of Small Vertebrate Prey[2]		Ingestion of Fish	
	Effect	Risk Level[3]	Effect	Risk Level	Effect	Risk Level	Effect	Risk Level
Imazapic	No effects	--	No effects	--	No effects	--	No effects	--
Imazapyr	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--	No effects	--
Metsulfuron methyl	No effects	--	No effects	--	No effects	--	No effects	--
Overdrive®	No effects	--	No effects	--	No effects	--	No effects	--
Picloram	No effects	--	Negative effects	Typical rate: N/A Maximum rate: L (chronic risk only)	No effects	--	No effects	--
Sulfometuron methyl	No effects	--	No effects	--	No effects	--	No effects	--
Tebuthiuron	No effects	--	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--	No effects	--
Triclopyr acid	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: L Maximum rate: M	No effects	--	No effects	--
Triclopyr BEE	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: L Maximum rate: M	No effects	--	No effects	--

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No effects" indicates that ERAs did not predict risks to TEP birds under the modeled scenario at the typical or maximum application rate.
[2] Only ERAs for 2,4-D, clopyralid, glyphosate, metsulfuron methyl, picloram, and triclopyr assessed risks to carnivorous birds. For all other herbicides, carnivorous mammals were used as surrogates when completing risk assessments.
[3] L = Low risk; M = medium risk; H = high risk; and N/A = ERAs did not predict risks at this application rate.
[4] Unknown = ERAs did not assess risks to birds for this herbicide via this exposure pathway.
Sources: Ecological risk assessments for herbicides (ENSR 2005a-j; Syracuse Environmental Research Associates, Inc. 2001).

Summary of Effects[1] to Threatened, Endangered, and Proposed Mammals From Ingestion of Food Contaminated by Herbicides, as Predicted by Risk Assessments

Herbicide	Ingestion of Vegetation – Small Mammals		Ingestion of Vegetation – Large Mammals		Ingestion of Small Vertebrate Prey		Ingestion of Invertebrate Prey[2]	
	Effect	Risk level[3]	Effect	Risk level	Effect	Risk level	Effect	Risk level
2,4-D	Negative effects	Typical rate: L Maximum rate terrestrial: L Maximum rate aquatic: M	Negative effects	Typical rate: M Maximum rate terrestrial: M Maximum rate aquatic: H	Negative effects	Typical rate: L Maximum rate terrestrial: L Maximum rate aquatic: M	Negative effects	Typical rate: M Maximum rate terrestrial: H Maximum rate aquatic: H
Bromacil	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--
Chlorsulfuron	No effects	--	No effects	--	No effects	--	No effects	--
Clopyralid	No effects	--	Negative effects	Typical rate: L Maximum rate: L	No effects	--	Negative effects	Typical rate: L Maximum rate: L
Dicamba	Negative effects	Maximum rate: L	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: L Maximum rate: L
Diflufenzopyr	No effects	--	No effects	--	No effects	--	No effects	--
Diquat	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: L Maximum rate: M
Diuron	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: H Maximum rate: H	Negative effects	Typical rate: L Maximum rate: L	Negative effects	Typical rate: N/A Maximum rate: L
Fluridone	Negative effects	Typical rate: N/A Maximum rate: L (chronic risk only)	No effects	--	No effects	--	No effects	--
Glyphosate	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: L Maximum rate: M	No effects	--	Negative effects	Typical rate: L Maximum rate: M
Hexazinone	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: L Maximum rate: M	Unknown[4]	Unknown	Negative effects	Typical rate: M Maximum rate: M
Imazapic	No effects	--	No effects	--	No effects	--	No effects	--
Imazapyr	No effects	--	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--	Negative effects	Typical rate: L Maximum rate: L
Metsulfuron methyl	No effects	--	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--	Negative effects	Typical rate: N/A Maximum rate: L
Overdrive®	No effects	--	Negative effects	Typical rate: L Maximum rate: M	No effects	--	No effects	--
Picloram	No effects	--	Negative effects	Typical rate: L Maximum rate: M	No effects	--	Negative effects	Typical rate: L Maximum rate: M
Sulfometuron methyl	No effects	--	No effects	--	No effects	--	No effects	--
Tebuthiuron	Negative effects	Typical rate: N/A Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L	No effects	--	No effects	--
Triclopyr acid	No effects	--	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: L Maximum rate: M
Triclopyr BEE	No effects	--	Negative effects	Typical rate: L Maximum rate: M	Negative effects	Typical rate: N/A Maximum rate: L	Negative effects	Typical rate: L Maximum rate: M

[1] Both acute and chronic effects were considered, and "negative effects" include either acute or chronic effects, or both. For more information on acute vs. chronic effects, please see Appendix C of the PEIS. "No effects" indicates that ERAs did not predict risks to TEP mammals under the modeled scenario at the typical or maximum application rate.
[2] Only the ERAs for 2,4-D, picloram, clopyralid, glyphosate, metsulfuron methyl, and triclopyr assessed risks to insectivorous mammals. For all other herbicides, insectivorous birds were used as surrogates when completing risk assessments.
[3] L = Low risk; M = medium risk; H = high risk; and N/A = ERAs did not predict risk at this application rate.
[4] Unknown = ERAs did not assess risk to birds for this herbicide via this exposure pathway.
Note: Risks to mammals from ingesting contaminated fish are assumed to be the same as those to birds (see Table 6-4).
Sources: Ecological risk assessments for herbicides (ENSR 2005a-j; Syracuse Environmental Research Associates, Inc. 2001).

APPENDIX D: Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects

GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES
ENCOUNTERED ON DEVELOPMENT PROJECTS
Arizona Game and Fish Department
Revised October 23, 2007

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran population of desert tortoises occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm's way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40° Celsius (105° Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site, or alternate burrow, is unavailable within this distance, and ambient air temperature exceeds 40° Celsius (105° Fahrenheit), the Department should be contacted to place the tortoise into a Department-regulated desert tortoise adoption program. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, will also be placed in desert tortoise adoption programs. *Managers of projects likely to affect desert tortoises should obtain a scientific collecting permit from the Department to facilitate temporary possession of tortoises.* Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- These guidelines do not apply to the Mojave population of desert tortoises (north and west of the Colorado River). Mojave desert tortoises are specifically protected under the Endangered Species Act, as administered by the U.S. Fish and Wildlife Service.

- These guidelines are subject to revision at the discretion of the Department. We recommend that the Department be contacted during the planning stages of any project that may affect desert tortoises.

- Take, possession, or harassment of wild desert tortoises is prohibited by state law. Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.

APPENDIX E: Threatened and endangered species on the US Fish and Wildlife Service county lists for Pima, Pinal, Maricopa, Yavapai and Coconino counties that are not affected by the proposed action.

Fish			**Rationale for No Effect Determination**
Common Name	**Scientific Name**	***Status**	
Apache trout	Oncorhynchus apache	T	BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Loach minnow	Tiaroga cobitis	T	BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Gila trout	Oncorhynchus gilae		BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Colorado pikeminnow	Ptychocheilus lucius	E	Extirpated from the Gila River and Colorado River south of Lake Powell. The last known naturally occurring specimen from Arizona was collected in 1969. Small populations exist in the Colorado, Green, Yampa, San Juan, and Gunnison rivers in Utah and Colorado. Experimental nonessential populations have been reintroduced into the Verde and Salt rivers in Yavapai and Gila counties, Arizona. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Razorback sucker	Xyrauchen texanus	E	This species is known only from the Colorado River, Gila River, Salt River and Verde River. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Woundfin	Plagopterus argentissimus	E	The species has been extirpated from almost all of its historical range except the mainstream Virgin River, from Pah Tempe Springs to Lake Mead in northwestern Arizona (Mohave County). BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Bonytail Chub	Gila elegans	E	This species is found only in the Colorado River. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Humpback Chub	Gila cypha	E	This species is found only in the Colorado River outside the planning areas.
Little Colorado Spinedace	Lepidomeda vittata	T	This species is only known from the upper Little Colorado River and its tributaries. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Virgin River Chub	Gila seminuda	E	This species occurs in the Virgin River drainage, outside of the BLM Phoenix District boundary.
Birds			**Rationale for No Effect Determination**
Common Name	**Scientific Name**	**Status**	
Mexican spotted owl	Strix occidentalis lucida	T	This species is known only from National Forest lands within the Phoenix District planning area. This species generally nests in older mixed conifer or ponderosa pine/gambel's oak forests and in steep, wet canyons. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
California Least Tern	Sterna antillarum browni	E	There has been breeding locations documented in Maricopa County on private lands. Transient migrants occur more frequently and have recently been documented in Mohave and Pima counties. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Masked bobwhite	Colinus virginianus ridgewayi	E	This species was extirpated from the United States around 1900. A refuge population and captive rearing was

			established in 1985 at Buenos Aires National Wildlife Refuge in the southern Altar Valley in Pima County, Arizona. In 1996, Buenos Aires' masked bobwhite population was estimated at 300-500. Three very small natural populations still persist in central Sonora, Mexico, consisting of fewer than 1,000 individuals. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
California Condor	Gymnogyps californianus	E	An experimental nonessential population was reintroduced to the Vermillion Cliffs area north of the Grand Canyon. It has never been documented in the vicinity of the 6 scattered parcels of BLM-administered lands in the Phoenix District that lies within the California condor experimental nonessential population area in Coconino County.
Mammals			**Rationale for No Effect Determination**
Common Name	**Scientific Name**	**Status**	
Jaguar	Panthera onca	E	There are no known breeding populations in the U.S. Individuals may cross into Texas, New Mexico, and Arizona. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Mexican gray wolf	Canis lupus baileyi	E	The planning areas are outside the current range of the species. BLM public lands in the Phoenix District do not contain any suitable or occupied habitat for this species.
Ocelot	Leopardus (Felis) pardalis	E	Confirmed sighting of ocelots have been made in Arizona in recent years. Sightings in Pinal and Maricopa County are probably of escaped or released captive animals. The planning areas could include suitable habitat for this species on public lands, however this is no evidence of occupation.
Black-footed Ferret	Mustela nigripes	E	This species is currently known to occur on private lands where it was introduced. Suitable habitat may be associated with prairie dog towns but none occur on BLM-administered lands in the planning areas.
Amphibian and Reptiles			**Rationale for No Effect Determination**
Common Name	**Scientific Name**	**Status**	
Chiricahua leopard frog	Lithobates [Rana] chiricahuensis	T	This species is generally found at higher elevations in Arizona northeast of the planning areas, and has never been documented occurring on BLM-administered lands in the Phoenix District.
Plants			**Rationale for No Effect Determination**
Common Name	**Scientific Name**	**Status**	
Arizona cliffrose	Purshia subintegra	E	This species is known only from tertiary limestone lakebed deposits. No suitable habitat for this species occurs on public lands in the Phoenix District.
Arizona hedgehog cactus	Echinocereus triglochidiatus var. arizonicus	E	This species is known to occur in Gila, and Pinal counties in central Arizona. However there no known or documented populations on public lands. The planning areas could include suitable habitat for this species on public lands, however there is no evidence of occupation.
Fickeisen plains cactus	*Pediocactus peeblesianus var. fickeiseniae*	E	This species occurs on BLM administered land north of Interstate 40. Since treatments will not occur north of Interstate 40 this species will not be affected.
Kearney's blue star	Amsonia kearneyana	E	This species is known to occupy a west-facing drainage in the Baboquivari Mountains, Pima County. However there no known or documented populations on public lands. The planning areas could include suitable habitat for this species on public lands, however there is no evidence of occupation.
Nichol Turk's head cactus	Echinocactus horizonthalonius var.	E	This species is known to occur in Southwestern Pinal and north-central Pima counties**.** The planning areas could

	nicholii		include suitable habitat for this species on public lands, however there is no evidence of occupation.
Pima pineapple cactus	Coryphantha scheeri var. robustispina	E	Pima pineapple cactus is found from 700-1,400 m (2,300-4,500 ft) elevation in Pima and Santa Cruz counties, Arizona and northern Sonora, Mexico. The range extends east from the Baboquivari Mountains to the western foothills of the Santa Rita Mountains. The northernmost boundary is near Tucson. The planning areas could include suitable habitat for this species on public lands, however there is no evidence of occupation.
Huachuca water umbel	Lilaeopsis schaffneriana ssp. recurva	E	There are a number of disjunct localities in Santa Cruz, Cochise, and Pima Counties, Arizona, and Sonora, Mexico. The Phoenix District does not include any suitable habitat for this species on BLM administered public lands.
Brady Pincushion Cactus	Pediocactus bradyi	E	Known only from Marble Canyon Gorge. The current distribution does not include BLM public lands in the Phoenix District.
Navajo Sedge	Carex specuicola	T	The current distribution does not include BLM public lands in the Phoenix District.
San Francisco Peaks Ragwort	Packera franciscana	T	This species is known only from the upper elevations of the San Francisco Peaks. The Phoenix District does not include any suitable habitat for this species on BLM administered public lands.
Sentry Milk Vetch	Astragalus cremnophylax var. cremnophylax	E	This species is known only from Kaibab limestone areas in the vicinity of the Grand Canyon and Marble Gorge outside of lands administered by the BLM Phoenix District.
Siler Pincushion Cactus	Pediocactus sileri	T	This species is found only north and west of the BLM Phoenix District.
Welsh's Milkweed	Asclepias welshii	T	This species is known only from sand dune areas in extreme northern Coconino County and Utah outside of the Phoenix District Office boundary.
Invertebrates			**Rationale for No Effect Determination**
Kanab Ambersnail	Oxyloma haydeni kanabensis	E	This species is found only in Grand Canyon National Park outside of the Phoenix District planning area.

*T = Threatened; E = Endangered;