

Implementation of the Travel Management Rule

Invasive Species Specialist Report

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for:

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Contents

Introduction.....	1
Invasive Aquatic Species.....	1
Invasive Plant Species.....	1
I. Analysis Question to be Answered.....	2
II. Current Condition – Applicable Laws, Regulations and Policy.....	2
Current Condition – Invasive Aquatic Species.....	2
Current Condition – Invasive Plant Species.....	3
III. Methodology and Assumptions.....	7
Methodology.....	7
Relative Risk Analysis.....	7
Assumptions.....	8
IV. Effects Common to All Alternatives.....	8
Effects to Invasive Aquatic Species Common to All Alternatives.....	8
Effects to Invasive Plant Species Common to all Alternatives.....	8
V. Effects by Alternative (includes plant and aquatic invasive species).....	9
Alternative B (no action).....	10
Alternative C.....	10
Alternative D.....	10
Alternative E.....	11
Alternative F.....	11
Alternative G.....	11
References Cited.....	15

Tables

Table 1. Invasive species location, year and action taken.....	6
Table 2. Summary of alternatives/key elements.....	9

Introduction

Executive Order 13112 (February, 1999) established the Invasive Species Council and authorizes the Forest Service to conduct invasive species management activities through the use of relevant programs and authorities. The Forest Service relies on this Order to provide the basis for labeling certain organisms as invasive. The term invasive species is defined by this order as a species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human, animal or plant health. These invasive species include terrestrial or aquatic species including insects, animals, plants and pathogens including seeds, eggs, spores or any other biological material capable of propagating that species.

“According to both economic and environmental analysis, the best way to address harm from invasive species is to prevent their introduction. In turn, the most effective way to prevent introductions is to close the pathways through which non-native species enter the U.S.” (“Status and Trends in State Invasive Species Policy,” 2010. Environmental Law Institute, Chapter II.) This concept is also applicable to the landscape at smaller scales such as individual states, counties, tribal lands, National Parks and National Forests as well as private land.

Pathways are the means by which species are transported from one location to another. Natural pathways include wind, water, wildlife and other forms of dispersal in which a specific species have developed morphological and behavioral characteristics to employ. Man-made pathways are those pathways which are created or enhanced by human activity and consist of two types. The first type is intentional as in deliberate movement of living seeds, plants or animals. The second type is unintentional as in ship ballast, soil associated with nursery stock, importation of fruits and vegetables, the international movement of people, local recreational and commercial associated activities. In these and countless other unintentional pathways the movement of invasive species is an indirect by-product of our activities.

Invasive Aquatic Species

Aquatic invasive species are organisms that occur in aquatic, riverine, or wetland environments. Many of these species come from outside of the US however some are native to other parts of the country and have been introduced into areas where they are not considered endemic. When established, these species threaten native populations by altering habitat, affecting diversity, providing the risk for genetic alteration, changing distribution patterns of native species and threatening overall ecosystem balance and relative health. Pathways for these introductions can include but certainly are not limited to vehicular and water vessel transportation, water transfer, fishing bait releases, aquaria releases, and stocking with non-native fish.

Invasive Plant Species

The term invasive plant species is often used interchangeably with noxious weeds. Whether introduced intentionally or unintentionally these plant species demonstrate an incredible ability to establish and spread in a variety of landscape conditions. They are prolific reproducers through seed production, roots, and rhizomes, and reproductive parts are disseminated in a variety of ways including wind, water, animals, people and associated activities. As in aquatic invasive species, when established, these species threaten native populations by altering habitat, affecting diversity, providing the risk for genetic alteration, changing distribution patterns of native species and threatening overall ecosystem balance and health. Many times these species out compete native vegetation for water, nutrients and space displacing entire native plant communities. They often have an environmental advantage over native species in that they arrive in new areas unaccompanied by their natural predators that would normally keep populations in check thus presenting an ominous risk to overall ecosystem health.

I. Analysis Question to be Answered

What effects will changes to the current transportation system on the Gila National Forest, for motorized dispersed camping, motorized big game retrieval, cross country travel and identified areas for recreational ATV and motorcycle use have on the introduction, establishment and spread of invasive species?

II. Current Condition – Applicable Laws, Regulations and Policy

Numerous laws, regulations and policies addressing invasive species management are in place at the International, National, State, County and community levels. Some of these are listed below however this report does not include all that are applicable to invasive species.

Forest Service Manual 2900 – Invasive Species Management amendment No: 2900-2001-1, Zero Code sets forth National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from invasive species. This chapter identifies Forest Service authority and direction to manage aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens) on all areas of National Forest.

The Gila National Forest Land and Resource Management Plan 1986 as amended does not provide specific guidance for Invasive Species however current and proposed Invasive Species Management activities meet the intent of the plan.

The New Mexico Aquatic Invasive Species Management Plan, 2008 was developed to meet the requirements of the federal Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 and the National Invasive Species Act of 1996 which require development of state and regional management plans to control Aquatic Invasive Species (AIS). The goal of the New Mexico Plan is “the potentially harmful ecologic, economic, and social impacts resulting from the presence of Aquatic Invasive Species in New Mexico are precluded or minimized through prevention and management of introduction, population growth, and dispersal into, within, and from New Mexico.” House Bill 0467, The Aquatic Invasive Species Control Act (2009) allows the New Mexico Department of Game and Fish and its partners to take actions to protect New Mexico waters from negative impacts of aquatic invasive species.

Statutes directing management for invasive species in New Mexico include the New Mexico Department of Agriculture Noxious Weed Act, and Harmful Plant Act of 1978 which provide guidelines for quarantines and inspections. New Mexico State Executive Order 00-22, 2000 sets forth direction for executive agencies to coordinate efforts for integrated invasive species management. Coordinated Weed Management Areas (CWMAs) in New Mexico are an essential part to management of invasive species and participate in cooperation to: inventory, manage, prevent, and eradicate whenever possible, plants designated as noxious, pursuant to the New Mexico Department of Agriculture Noxious Weed Control Act of 1978. The Gila National Forest works cooperatively with Southwestern New Mexico Cooperative Weed Management Area (Grant and Hidalgo Counties), and Socorro and Sierra Counties providing integrated weed management through education, prevention, and treatment of invasive plant species on a local basis.

Current Condition – Invasive Aquatic Species

The New Mexico Aquatic Invasive Species Management Plan (NMAISC 2008) identifies four priority levels for management of aquatic species much like “Class A, B, or C” classes of priority for Invasive Plants.

Priority Class 1 are aquatic species not known to occur in the wild in New Mexico but have a high potential to invade and for which there are limited or no known management techniques. Appropriate

management for this class includes prevention of introductions and eradication of pioneering populations. Currently there are no known populations of Class 1 aquatic invasive species within the project area.

Priority Class 2 aquatic species are present and established in New Mexico, but with impacts that may be mitigated or controlled through appropriate management. These species can be managed by actions that involve mitigation of impact, control of population size, and prevention of dispersal to other waterbodies. Currently one site of purple loosestrife (priority class 2) has been identified in the project area and is hand pulled and monitored annually.

Priority Class 3 represent aquatic species that are firmly established throughout New Mexico and that may have both ecological and economic impacts, but feasible management techniques are not currently available. These species warrant further evaluation to determine the extent of their distribution and effort to prevent introduction to new water bodies. This list includes four species of nonnative crayfish which have been introduced to New Mexico. Crayfish occurring in the project area most likely include some or all of these four species. Bullfrogs are also included in Priority Class 3 and are present throughout the project area wherever suitable habitat exists.

Priority Class 4 species are not present in New Mexico and are currently considered to have a low potential to invade and establish, either because of physiological or dispersal limits. These species warrant proactive measures to prevent their importation or introduction into the State.

Common pathways that have most likely contributed to aquatic invasive species presently in the project area include non-native fish stocking, transport by fishing gear, boats and vehicles, or fishing bait releases. Management of aquatic invasive species falls under many of the same Laws and Regulations as invasive plant species as stated above. Additionally, specific to the Gila National Forest – past activities addressing aquatic invasive species have included – working cooperatively with NMDGF to curtail stocking waters with non-native fish species and participating in projects with the goal of reducing existing non-native fish populations. The Gila NF also follows Interagency Guidance for Fire Operations – Preventing Spread of Aquatic Invasive Organisms Common to the Southwestern Region (2009). This comprehensive document provides fire operational guidelines for Aquatic Invasive Species Prevention and Equipment Cleaning, focuses on prevention and is based on the premise that aquatic invasive species could be present in all waters; therefore providing precautions for all waterways regardless if invasive aquatic species have been documented or not.

Current Condition – Invasive Plant Species

Four categories of noxious weeds are identified for the State of New Mexico by the New Mexico Department of Agriculture. These classes include: Class A, B, C and “Watch” invasive species. In the most current list as of April 2009, approximately 21 species were identified as Class A category, 10 species as Class B category, 6 species as Class C category, and 8 species as Watch List category. Many of these same invasive plant species are also addressed in detail in three statewide additional publications: the 1999 New Mexico’s Invasive Weeds (Lee 1999), the 2006 Troublesome Weeds of New Mexico (Renz and Sholedice 2006), and the 2007 Roadside Weed Management (Harper-Lore et al. 2007).

Class A weeds, all of which are non-native to New Mexico, are species currently not present or have limited distribution. These are the highest priority for prevention and eradication. Four of these species have been known to occur on the Gila National Forest. Purple loosestrife, scotch thistle, spotted knapweed and yellow starthistle sites have been identified, and are currently treated and monitored by FS personnel.

Class B weeds, species limited to portions of the state, are species that should be treated as Class A weeds in non-infested areas but should have management plans developed and designed to contain the infestation and stop further spread in areas of severe infestations. Species in this class known to occur on the Gila National Forest include musk thistle, and tree of heaven.

Class C weeds, species that are wide-spread, are species that should have management decisions determined at the local level based on feasibility of control and level of infestations. Species in this class known to occur on or immediately adjacent to the Gila National Forest include salt cedar, bull thistle, Russian olive, and Siberian elm. Of these species salt cedar and bull thistle are currently being treated within the project area.

A “**Watch List**” is also used to identify species of concern in the state, and have the potential to become problematic. These species include crimson fountaingrass, giant cane, meadow knapweed, pampas grass, quackgrass, Sahara mustard, spiny cocklebur, and wall rocket. More data is needed to determine if these species should be listed, and when encountered should be documented and the appropriate authorities contacted. Currently these species have not been documented on the Gila National Forest.

The Gila National Forest invasive species management program tiers to several analyses and documents. In 1999, an Environmental Assessment (EA) was completed for Noxious Weed Management on the Gila National Forest, specifically to meet the requirements of the Federal Noxious Weed Act (1975). In 2000, a second EA was completed for Noxious Weed Management on the Gila National Forest to implement a forest-wide noxious weed control program in cooperation with private landowners and other federal, state, and county agencies. This program focuses on controlling and eradicating small infestations of specific species of noxious weeds. In 2006, a third EA was completed for Noxious Weed Management on the Gila National Forest, specifically to address saltcedar infestations along the West, East, Middle and Gila Rivers and its tributaries within Catron and Grant Counties, New Mexico.

The Gila National Forest Noxious Weed Management Program was implemented with the 1999 EA and focuses on four major areas: (1) prevention, (2) detection, (3) control, and (4) cooperation. Prevention is the most cost effective approach to combating invasive species and includes pro-active approaches such as weed free hay requirements, inventory after fires, inventory at high use areas such as campgrounds, trailheads and dispersed camping areas and education and development of public awareness. Early detection is imperative in order to implement immediate and specific actions to eradicate invasives before they become established and/or spread. This is accomplished on the Gila NF through continual unofficial inventories. When invasive species are identified they are reported, verified and scheduled for treatment as needed. Control or immediate action is necessary because a rapid response reduces the time and energy required to keep populations under control. Monitoring after treatment is also part of the management strategy. Gila NF personnel including trail and fire crews, range specialists, biologists and others participate in the overall invasive species management activities including inventory, monitoring and treatment. Cooperation with Federal, state, counties, and weed control districts allows for collaboration to work towards common goals in managing invasive species.

As stated above, invasive plant species known to occur within the analysis area include bull thistle, cheatgrass, musk thistle, purple loosestrife(aquatic), Russian olive, salt cedar, scotch thistle, Siberian elm, spotted knapweed, tree of heaven, and yellow starthistle. For more information on each species refer to the “1999 New Mexico’s Invasive Weeds,” and “2006 Troublesome Weeds of New Mexico” in the Appendices. Some of these species were intentionally introduced into the area for ornamental values, while others were introduced unintentionally. Many invasive species are generally associated with ground disturbance on utility corridors, roads, trails, developed campgrounds, timber sale areas, prescribed and uncharacteristic fires, and developed rangeland structural improvements such as stock ponds and

pipelines. However invasive species can also be dispersed cross country through a variety of other vectors in non-disturbed or by way of natural dissemination through wind and water, or inadvertently through recreational activities, including non-motorized and motorized vehicle travel. It is well known that vehicle travel can have a very serious impact on invasive plant species dispersal, establishment and spread. In a Montana study, a vehicle driven through a dense stand of spotted knapweed picked up several thousand seeds. Only 10% of these weed seeds remained in the undercarriage of the vehicle after 10 miles of travel. The rest were scattered along the 10 mile route. (“Biology and Management of Noxious Rangeland Weeds,” Sheley and Petroff 1999.) Another study from Montana State University, 2007-2009, found that more seeds were found on vehicles driven off road than on unpaved roads. This study also revealed that ATVs picked up approximately 15 times more seeds off-trail than on-trail in the fall, and approximately 80 times more seeds off-trail than on-trail in early summer. Wildlife and livestock also play a role in invasive species dispersal by ingesting mature weed seeds that can pass through the rumens and remain viable; and provide transport in the hooves, fur or other body parts.

Invasive plant species within the Gila NF are not well established on the landscape especially when compared to many other western United States National Forests, especially those to the far west and northwest of New Mexico. However, for the identified populations present in the project area, treatment techniques are determined using a number of factors, including the biology of the target weed species, composition of associated and surrounding vegetation, soils, water, aquatic species wildlife concerns, and potential effects to the human environment. Treatment options include manual or mechanical such as grubbing, pulling or cutting seed heads, and chemical or herbicide spot application. After a risk assessment, herbicides are used to gain control over new and established weed infestations where other treatment methods have proven unsuccessful. Once an infestation is reduced in size and density, non-herbicide tools are used as a secondary follow-up treatment where feasible and practical. Refer to the Environmental Assessment for Noxious Weed Management Gila National Forest June 2000 in the project record for more detailed information in managing specific invasive plant species. Table 1 illustrates invasive species management activities from 2004 to the present, by district on the Gila National Forest.

Table 1. Invasive species location, year and action taken

District	Species	Site Name	Acres/mi	Date	Treatment/Comments
Black Range	Bull thistle	Taylor Creek	9 ac/26	2011	9 ac treated; 26 ac inventoried; 24 ac identified for inventory
	Bull thistle	Beaver Creek	62 ac/143 ac	2011	62 ac treated; 143 ac inventoried
	Bull thistle		15 ac	6/5/2007	herbicide
Quemado					
Glenwood	Bull thistle	East Fork Gila R.	36 ac	2010	Bull thistle project RAC funded and included private land not reflected in this table.
	Bull thistle	BS Canyon			
(Burn Area)	25 ac	2010	Herbicide treatment		
	Salt cedar	San Francisco River	30 mi +	2011	Inventory-found one small infestation
Wilderness	Purple loosestrife	Roberts Lk	2 ac	2004	Hand pull
	Purple loosestrife	Roberts Lk	1 ac	8/15/2006	Hand pull
	Purple loosestrife	Roberts Lk	3 ac	9/1/2007	Hand pull/monitored annually
	Purple loosestrife	Roberts Lk	1 ac	8/2008	Hand pull/monitored annually
	Purple loosestrife	Roberts Lk	1 ac	8/2009	Hand pull/monitored annually
	Purple loosestrife	Roberts Lk	1 ac	8/2010	Hand pull/monitored annually
	Purple loosestrife	Roberts Lk		2011	None found
	Purple loosestrife	Roberts Lk		2012	None found
Reserve	Salt cedar	East Fork	140 ac	9/20/2007	Cut trees/treat stumps with herbicide
	Salt cedar	Gila River	1,871 ac	6/1/2008	Cut trees/treat stumps with herbicide
	Salt cedar	Gila River	618	4/22/2009	Cut trees/treat stumps with herbicide
	Salt cedar	Gila River	1200	7/01/2010	Note 90% reduction in populations
	Spotted knapweed	Negrato fire base	15 ac	2004	Hand pulled/grubbed
	Salt cedar	San Francisco River	34 ac	10/30/2006	Hand pulled/grubbed/continue to monitor
	Salt cedar	San Francisco River	478 ac	10/17/2007	Hand pulled/grubbed/continue to monitor
	Spotted knapweed	Negrato fire base	5 ac	8/5/2008	Hand pulled/grubbed/continue to monitor

District	Species	Site Name	Acres/mi	Date	Treatment/Comments
Silver City	Yellow starthistle	Gila bird area	4 ac	8/30/2006	Hand pulled/continue to monitor annually
	Salt cedar	Gila River	1300 ac	5/23/2008	Trees cut/stumps treated w/herbicide
	Salt cedar	Gila River	1000 ac	6/1/2008	Trees cut/stumps treated w/herbicide
	Salt cedar	Gila River	622 ac	5/1/2009	Trees cut/stumps treated w/herbicide
	Salt cedar	Gila River	1200 ac	5/1/2010	Trees cut/stumps treated w/herbicide
	Salt cedar	Gila River	350 ac	5/1/2011	Trees cut/stumps treated w/herbicide
	Salt cedar	Gila River	400 ac	5/1/2012	Trees cut/stumps treated w/herbicide
Fire Inventories		Bear Fire		2006-2007	Invasive Plant Inventory for 2 years
		Skates Fire		2006	Invasive Plant Inventory
		Reserve Complex		2006	Invasive Plant Inventory
Forest Wide Inventory				1997	Inventory of high risk areas – trailheads, campgrounds, fire areas, road sides, helispots, fire camps, etc.

III. Methodology and Assumptions

The project area includes all National Forest System lands within the administrative boundary of the Gila National Forest.

Methodology

The effects analysis for invasive species is based on the amount of relative risk for invasive species to become introduced, established and spread in the project area as associated with each alternative in terms of authorized travel routes in miles, and open cross country travel available in acres, as compared to the current situation (Alternative B). The analysis also considers roads available for motorized travel by alternative that are located within known infestations or in riparian areas and the number of stream crossings for each alternative. It is very improbable to attribute the amount of invasive species distribution or presence to any one of the many vectors. This analysis attempts to demonstrate the change in miles or acres of authorized motorized vehicle routes by alternative, relative to the risk for invasive species introduction, establishment and spread through this pathway only, while recognizing there are many other pathways as well. Other pathways are discussed in the introduction and cumulative effects section of the specialists report. The alternatives discussion below includes effects of the alternatives to both invasive plants and invasive aquatic species.

Relative Risk Analysis

This analysis uses a relative risk method of assessing differences between alternatives. Relative risk is considered the potential impact that can result from one action (alternative) measured against the potential impact that might result from a different action (alternative) or no action (alternative).

Assumptions

General assumptions are listed in Chapter 3 of the FEIS. There is limited data to support invasive species information across the project area as there has not been a forest wide invasive species inventory since 1997 (GNF Noxious Weed Survey, 1997). This survey focused on 12 species in high risk areas and only along primary forest roads. Consequently GIS data and mapping of invasive species occurrences across the landscape are deficient with the exception of those listed in Table 1. Other than specific projects relating to fire activities, range improvement and upland and riparian vegetation restoration projects, range analysis and those described in the above table, we do not know the extent of other possible populations that could exist in those areas lacking inventories.

For this reason it is assumed invasive plant species have the potential to exist along all un-inventoried riparian areas, roadways and out across the landscape; although this assumption is most likely overstated. It is also assumed bullfrogs are present wherever their habitat exists, and that all water bodies likely have some type of aquatic invasive species present such as crayfish and non-native fish.

Because of the limitations posed by the lack of data, and the assumptions above, the analysis provided here is a relative risk assessment of each of the action alternatives as compared to the No Action or current management alternative, Alternative B.

IV. Effects Common to All Alternatives

Effects to Invasive Aquatic Species Common to All Alternatives

Invasive aquatic species in the analysis area include American bullfrog, crayfish and various non-native freshwater fish. Natural movement of these established species through connected waterways will most likely continue to occur to a certain degree throughout the project area regardless of the alternative. Authorized travel routes with all alternatives would also allow for a certain degree of risk for transporting these species within the analysis area. Recreational sites such as lakes, boat launches, fishing areas and associated activities will remain open pathways for aquatic invasive species regardless of the alternative chosen. Invasive species management efforts by the Gila NF to prevent, identify and manage aquatic invasive species will continue under all alternatives. Being one of many vectors for invasive species introduction, establishment and spread, the fewer authorized travel routes for motorized vehicle travel equates to less risk for this activity to contribute to the introduction, establishment and spread of invasive aquatic species which is common to all action alternatives to a certain extent.

Effects to Invasive Plant Species Common to all Alternatives

The risk for invasive plant species to be introduced and spread by various pathways and vectors throughout the analysis area will remain to a certain degree with all alternatives. Established roadbeds even if untraveled will take many years to re-vegetate (if at all) and could remain optimal sites for certain species of invasive plants to establish and spread. Some degree of authorized open travel routes, (with the exception of Alt E which does not allow for any motorized dispersed camping or big game retrieval) will remain with all alternatives providing certain degrees of risk for seed dispersal by motorized travel associated with these routes and open areas. Known infestations of invasive species along currently motorized routes such as salt cedar on the East Fork of the Gila River, the San Francisco River and bull thistle along Beaver Creek, will continue to be inventoried, treated and monitored regardless of the alternative chosen. Pathways including animals, wind, water and human activities will continue to disperse invasive plant species across the landscape to a certain degree regardless of the alternative. Invasive species dispersal opportunities at high impact areas such as campgrounds and trailheads will also continue to a certain extent regardless of the alternative.

All alternatives with the exception of Alternative B restrict motorized cross country travel, reduce miles of roads open to the public, and put restrictions on off road motorized dispersed camping and off road motorized big game retrieval to certain degrees. Being one of many vectors for invasive species introduction, establishment and spread, the fewer authorized travel routes for motorized vehicle travel equates to less risk for this activity to contribute to the introduction, establishment and spread of invasive plant species which is common to all action alternatives to a certain extent. Invasive species management efforts by the Gila NF to inventory, prevent, control or eradicate, and monitor invasive plant species will continue under all alternatives.

V. Effects by Alternative (includes plant and aquatic invasive species)

The magnitude of effects of motorized travel to these invasive species specific to each alternative can be related to the different levels of motorized travel routes authorized and acres associated with motorized dispersed camping, stream crossings and motorized big game retrieval as proposed in each alternative. Fewer motorized travel routes, equates to less risk for dispersal, establishment and spread of invasive species due to this pathway.

Table 2. Summary of alternatives/key elements

Key Elements	B	C	D	E	F	G
Miles of roads currently open to the public	4,613	4,272.3	2,975.5	2,318.1	3,362.7	3,333.5
Miles of open motorized trails (<50" wide – ATV trails)	15.8	204.6	125	0.0	178.9	178.6
Miles roads closed	0	144	1,233.4	1,866.4	877.8	907.6
Miles/Acres open for motorized dispersed camping	No limit 2.4+ mil.	1,523.6 108,179.8	1,177.6 84,387.9	0.0 0.0	1,434.4 101,915.7	1,315.5 94,008.1
Acres motorized big game retrieval	2.4+ mil.	2,078,665.8	84,387.9	0.0	1,506,576.3	94,008.1
Big game species	All species	Elk, deer, bear, lion, javelina, pronghorn	Deer and Elk	0	Elk only	Deer and Elk
Acres motorized cross country travel	2.4+ mil.	0	0	0	0	0
Total number of stream crossings (not including ephemeral)	967	882	631	489	805	788
Miles/Acres motorized routes within riparian habitat	299 mi 443 ac	308 mi 441 ac	222 mi 330 ac	182 mi 273 ac	260 mi 382 ac	254 mi 374 ac
San Francisco River/Dry Creek/Little Dry Creek	SF above Mule Creek open; Big Dry open.	SF M& camp from 180 to Mule Creek.	LD & BD M; SF NM. Access camping areas at the confluence of BD & SF; no river crossings.	Close SFR & end BD access at Estes Well	SF M from 180 to Mule Creek. Camp from 180 to confluence of SF & BD	Same as Alt. D

SF= San Francisco River

M=Motorized

NM=Non-motorized

LD= Little Dry

BD=Big Dry

Effects (including cumulative) resulting from the analysis of these alternatives are expected to last into the future for at least five years.

Alternative B (no action)

Under this alternative authorized motorized travel routes within the analysis area would continue at the current level on all Gila Forest System lands. Currently the GNF travel management system provides for unlimited motorized cross-country routes for big game retrieval for all species, which would be basically year round access due to sequential hunting seasons, unlimited motorized dispersed camping and numerous stream crossings. Motorized routes in riparian corridors and at stream crossings can alter native habitat through disturbance of vegetation, compaction and streambank alteration providing optimum habitat for invasive species, increasing the risk for establishment. Alternative B allows for the maximum access through motorized routes in the project area, therefore the risk for introduction, establishment and spread through this pathway would be expected to continue at the current rate, which is most likely at a higher level than the action alternatives. All other alternatives restrict authorized travel routes, limit motorized cross country travel for big game retrieval and dispersed camping, and reduce stream crossings to certain degrees therefore reducing the risks.

Alternative C

This alternative provides for the highest number of miles of open motorized travel routes when compared with all action alternatives. Miles of authorized ATV trails with this alternative is significantly higher than all other alternatives. There are fewer miles of open roads closed with this alternative as compared to all other alternatives, with the exception of alternative B. Although somewhat limited, dispersed motorized camping opportunities remain quite high with this alternative. Big game motorized retrieval with this alternative is limited to within "1 mile" of open forest and county roads and also state and federal highways for big game species that include deer, elk, bear, lion, javelina and pronghorn within the analysis area. Because this alternative allows for the above species of big game retrieval, season of use could be year around due to subsequent hunting seasons; therefore acres available for motorized big game retrieval under this alternative is very similar to Alternative B. The number of stream crossings and routes through riparian habitat is higher with this alternative than the action alternatives. The increased acres for motorized big game retrieval with this alternative as compared to Alternatives D, E, F and G could increase the risk for introduction, establishment and spread of invasive species through this activity due to more acres available and a longer time frame of access due to big game species and associated season. In summary, effects to invasive species introduction, establishment and spread due to open travel routes with Alternative C would be very similar to those of Alternative B and when compared with the other alternatives (with the exception of Alternative E) would allow for the second largest amount of potential for invasive plant and aquatic species introduction, establishment and spread within the analysis area due to motorized travel routes.

Alternative D

This alternative allows for fewer miles of roads open to the public than all other alternatives with the exception of Alternative E, and the fewest miles of open ATV trails with the exception of Alternative B. The number of miles of open roads closed is similar to those as identified in Alternative E. Access for game retrieval (deer and elk only), and motorized dispersed camping would both be limited to "300 feet" either side of open roads, which is significantly lower in number as compared to all alternatives with the exception of E. Fewer ATV trails would equate to less risk for invasive species introduction, establishment and spread by ATV routes. Motorized travel within riparian areas and at stream crossings is more restrictive with this alternative than all others, with the exception of alternative E. In general, with

the exception of alternative E, Alternative D as compared to all other alternatives would provide the least amount of potential for invasive species introduction, establishment and spread by motorized travel.

Alternative E

This alternative proposes the highest degree of change when compared to the No Action Alternative (Alternative B) and all action alternatives for all the key elements. Under this alternative, fewer miles of roads are open to the public; there are no motorized trails, and the highest number of miles open roads to be closed. In addition there would be no areas open to motorized dispersed camping and no motorized off road access to big game retrieval for any species. This alternative also allows for the fewest number of stream crossings and motorized routes within riparian areas. Overall this alternative provides the least risk for invasive plant and aquatic species to be introduced, established and spread due to motorized travel routes as compared to all other alternatives.

Alternative F

Alternative F proposes a reduction in miles of roads currently open to the public from the amount in alternatives B and C but an increase over alternatives D and E. Miles of road closed is lower in this alternative from all others with the exception of alternatives B and C. Dispersed camping is limited to 300 feet within open routes, however big game retrieval is proposed at ½ mile from each side of designated open roads, county roads, and State and Federal highways but for retrieving elk only. The difference in acres available to motorized travel with the ½ mile restriction as compared to 300ft is significant and poses a higher risk for invasive species introduction, establishment and spread, to a significant degree by vehicles when comparing to D, E and G. Stream crossings and miles of motorized routes are also increased when compared to D, E and G. This alternative has similar effects as alternative G with the exception of the increased authorized travel/acres for big game retrieval. Alternative F would have a lower overall potential for invasive plant and aquatic species introduction, establishment and spread due to motorized open routes, big game retrieval opportunities and stream crossings as compared to Alternatives B and C but a higher risk than D, E and G.

Alternative G

Alternative G, as proposed is similar to Alternative F in that miles of roads open to the public, miles of motorized trails, miles of closed roads, dispersed camping opportunities, stream crossings and motorized routes within riparian areas are all either the same or very comparable in miles and/or acres. The major difference between F and G is in the acres available for motorized big game retrieval and season of use. Alternative G available acres is significantly lower, however the season of use is for elk and deer rather than just elk, as in Alternative F which lengthens the hunting season usually by 15 days. There is most likely not a significant difference in the effects of these two different seasons. However the decrease in total available acreage with Alternative G reduces the risk for motorized big game retrieval to provide a pathway for invasive species introduction, establishment and spread as compared to Alternatives B, C and F. Stream crossings and miles of motorized routes within riparian areas are higher than in alternatives D and E but reduced as compared to B and C and F. In summary, implementation of alternative G would reduce the risk of invasive species introduction, establishment and spread as compared to all alternatives with the exception of alternatives D and E.

San Francisco River/Dry Creek

Known infestations of Tamarix (Saltcedar) are scattered through-out the San Francisco River corridor from the confluence of Whitewater Creek downstream to the border of Arizona/New Mexico. These infestations are mostly individual small “seedling-like” trees. There are two known areas of tamarix that consist of approximately 1/10th acre and estimated at 100 stems, located along the corridor below the

confluence of Mule Creek. (personal communication with Kendall Brown, Range Staff, Glenwood Ranger District, 2013).

Direct/Indirect Effects

Alternative B leaves the San Francisco River above Mule Creek and also Big Dry Creek open to motorized routes. River crossings are not restricted. Although motorized travel does not directly affect the introduction, establishment and spread of saltcedar (USDA Forest Service 2010), motorized routes in riparian corridors could alter native habitat through reducing vegetative cover that maintain streambank and floodplain stability during flood events, and causing compaction and streambank alteration optimizing invasive species habitat. Because Alternative B is the least restrictive, the risk for invasive species establishment as compared to other alternatives would be highest when compared to the action alternatives.

Alternative C also allows motorized travel for camping along the San Francisco River from Hwy 180 to Mule Creek creating basically the same effects as Alternative B. Effects of invasive species to Dry Creek would be negligible as this alternative does not allow motorized routes in this drainage.

Alternatives D and G are identical and do not allow motorized travel along the San Francisco River nor allow any river crossings, therefore decreasing the risk for habitat alteration and invasive species introduction due to the disturbance factors as described above when compared to Alternatives B and C. However, these alternatives (D and G) would provide increased opportunities for invasive species when compared to Alternative E which closes the entire San Francisco River and Dry Creek to any motorized routes. Effects of Alternative F to invasive species would be similar to those in Alternative B and C as this alternative also allows for motorized travel routes from Hwy 180 to Mule Creek.

In summary, Alternative E provides the least opportunities for invasive species introduction, establishment and spread in, and Alternatives B, C and F would provide the highest risk for invasive species due to motorized routes. Alternatives D and G present a significantly lower risk for invasive species introduction, establishment and spread in the San Francisco River corridor.

Forest Plan Amendment Effects

Amendments 1 thru 6 to the forest plan may have effects because they propose changes in the management of specific areas of the forest. These effects, like those from the proposed action and alternatives, are disclosed as part of the effects analysis above.

Amendment 7 is administrative in nature and not expected to have effects as a result of this project or future projects. This proposed amendment, for the most part, simply updates and provides consistent direction for application of the Forest Plan with the Travel Management Rule.

Cumulative Effects

An assortment of past, present and future ground disturbing activities such as utility corridors, existing roads and travel routes, unlimited non-motorized cross country access, foot trails, developed and dispersed campsites, livestock grazing, timber removal, recreation uses, wildland fire management, road maintenance and developed rangeland structural improvements such as stock ponds and pipelines have all certainly contributed to the introduction, establishment and spread of invasive species and will continue to do so to certain degrees. In addition fuel wood gathering, trail maintenance, high impact areas such as trailheads and camp sites will continue to provide for a certain degree of risk for invasive species introduction, establishment and spread. These types of ground disturbances in conjunction with natural pathways such as wind, water, flood events, and wildlife will continue to some degree in to the future and cumulatively affect the spread of invasive plant and aquatic species within the analysis area. As human

population increases and subsequently an increase in public land use, cumulative effects to the introduction, establishment and spread of invasive species associated with these activities will most likely increase. In addition, untreated invasive species located on private land adjacent to the Gila National Forest will continue to contribute to the introduction, establishment and spread of invasive species on the National Forest if not properly managed.

Implementation of Alternative B towards these cumulative effects would remain at the current level and provides the most risk for the introduction, establishment and spread of invasive species by motorized travel. This is due to allowing more motorized travel routes, no restrictions on cross country travel and the highest number of stream crossings and miles of motorized routes in riparian areas when compared to all other alternatives. Alternative E would contribute the least due to a reduction in motorized travel routes open to the public, elimination of dispersed camping areas and big game retrieval, reduction in miles of motorized riparian routes and a significant reduction in number of stream crossings. Alternatives C, D, F and G would continue to contribute to cumulative effects for invasive species but at a lower level when compared with Alternative B.

In summary, negative cumulative effects are not expected under any alternative. No change would be expected under the No Action Alternative, while positive cumulative effects may occur under all of the action alternatives, based on limiting opportunities for motorized travel, therefore reducing risks of invasive species dispersal, establishment and spread due to this activity across the Forest.

Irreversible and Irretrievable Effects

There would be no irreversible or irretrievable effects to the introduction, establishment and spread of invasive species from implementing any of the proposed alternatives within the project area.

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