Gould's Wild Turkey
(Meleagris gallopavo mexicana)
Recovery Plan

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1.0 Introduction

This recovery plan for Gould's wild turkey (*Meleagris gallopavo mexicana*; hereafter Gould's turkey) was developed under the authority of the New Mexico Wildlife Conservation Act (WCA). The New Mexico Department of Game and Fish (NMDGF) is directed under the WCA to develop recovery plans for species listed as threatened or endangered by the State [17-2-40.1 NMSA 1978]. To the extent practicable, each recovery plan should be developed to achieve the following objectives:

- restoration and maintenance of viable populations of the listed species and its habitat to the extent that the species may eventually be downlisted
- avoidance or mitigation of adverse social or economic impacts resulting from recovery actions (if indicated)
- identification of social or economic benefits and opportunities of recovery actions (if indicated)
- use of existing resources and funding to implement the overall plan

As directed by the WCA, public information meetings were held on 21 June 2016 in Las Cruces, New Mexico, and 22 June 2016 in Silver City, New Mexico. An Advisory Committee was formed that includes representatives of the U.S. Forest Service, Bureau of Land Management, National Wild Turkey Federation, Malpai Borderlands Group, and NMDGF. See Appendix 6.1 for a list of committee members.

The organization of this recovery plan is based on Graves (2002). Section 1 provides an introduction, including the authority of the Plan. Section 2 includes background information on natural history, historical perspective, habitat assessment, and population trends. Section 3 contains the goal for the recovery of Gould's turkey, accompanying objective, issues affecting recovery, and strategies for addressing those issues.

1.1 EXECUTIVE SUMMARY

This is a recovery plan for Gould's turkey (*Meleagris gallopavo mexicana*), developed under the authority of the New Mexico Wildlife Conservation Act (WCA). Recovery plans, as mandated under the WCA, are long-term conservation and management strategies that are intended to restore and maintain viable populations of the species and its habitat. Gould's turkey is the largest subspecies of wild turkey in North America. It occurs in association with Madrean Evergreen Woodland habitat, and its core range lies within Mexico's Sierra Madre Occidental. In New Mexico, Gould's turkey inhabits

the Peloncillo, Animas, and San Luis mountains, Hidalgo County. Chief threats to this subspecies in New Mexico include wildfire, lack of water sources, overgrazing by livestock (cattle), hybridization with non-native turkeys, habitat loss due to fuelwood and beargrass harvesting, and poaching. Key recommendations for recovery of this species are to maintain and enhance limiting habitat components, augment populations as necessary, and collaborate with land managers and private stakeholders to minimize threats identified on a site-specific basis.

1.2 RECOMMENDED CITATION

New Mexico Department of Game and Fish. 2016. Gould's Wild Turkey (*Meleagris gallopavo mexicana*) Recovery Plan. New Mexico Department of Game and Fish, Wildlife Management Division, Santa Fe, New Mexico. 30 p.

1.3 ADDITIONAL COPIES

Additional copies of the Recovery Plan may be obtained from:

New Mexico Department of Game and Fish
P. O. Box 25112
Santa Fe, NM 87504
(505) 476-8038

2.0 Background

Section 2.0 consists of background information on distribution, status, habitat requirements, biology, and ecology of Gould's turkey. This information provides the basis of assessing current status, threats to persistence, and the most effective strategies for recovering the species.

2.1 NATURAL HISTORY

2.1.1 Taxonomy

The wild turkey (*Meleagris gallopavo*) is classified in the order Galliformes, Family Phasianidae, subfamily of Meleagridinae. There are five subspecies of *M. gallopavo*, of which Gould's is the largest and southernmost. Gould's turkey is the most genetically divergent and least genetically diverse of the subspecies, and its range is isolated from neighboring subspecies by areas of unsuitable desert and grassland habitat (Mock et al. 2002). The first recorded specimen of Gould's turkey (collected in Mexico) was described by Gould (1856) as exceeding the largest specimens of the North American turkeys, with "shorter legs and a considerably larger and more broadly expanded tail, conspicuously zoned with brown and black, and terminated with white; the tail-coverts

are very profusely developed, largely tipped with white, and bounded posteriorly with a narrow line of black, their basal portions being rich metallic bronze."

2.1.2 Description

Wild Turkey: The largest gamebird in the United States, wild turkeys stand between 76.2 cm – 101.6 cm tall, and weigh 3.5-13.5 kg (McRoberts et al. 2014). Turkeys are characterized by strong feet and legs, short rounded wings, a short, fowl-like beak, ten primary wing feathers, and a large crop. The head and neck are mostly bare (sparsely feathered on hens and juveniles), with small bumps on the skin called caruncles. Body plumage is velvety black, with an iridescent sheen. The feathers of the breast and upper back are black tipped on gobblers and buff tipped on hens. Wing feathers are dark, and boldly barred with white.

Wild turkeys are sexually dimorphic, with distinct differences between males and females relative to physical appearance, size, and weight. Mature males are much showier, have more prominent caruncles on their neck, and a snood on their forehead they distend while displaying. Males normally develop a bony spur on the backside of the lower leg, while females typically do not. Males sprout a tuft of hair-like fibers (called a beard) from the upper midline of the breast, and around 10% of hens in most studies do so as well. Gobblers have red, white, or blue colored heads, while heads of hens are typically darker and duller in color.

Gould's Subspecies: While Gould's turkey most closely resembles the Merriam's subspecies (*M. g. merriami*), its body feathers are more iridescent than Merriam's. It can most readily be distinguished from other subspecies by the distinctive white terminal band on the tail feathers and the tail rump coverts. Spurs on Gould's turkeys are small or sometimes lacking.

2.1.3 Distribution

Worldwide: Wild turkeys had been extirpated throughout much of their historical range by the early 1900s due to over-exploitation and habitat change. Since WWII, however, the species has been successfully translocated to a majority of its historical range (Kennamer et al. 1992, McRoberts and Wallace 2014), and wild turkeys now occur from central Mexico northward through suitable habitat in all 48 states of the continental United States and into southern Canada (Figure 1). Introduced populations also occur in Hawaii.

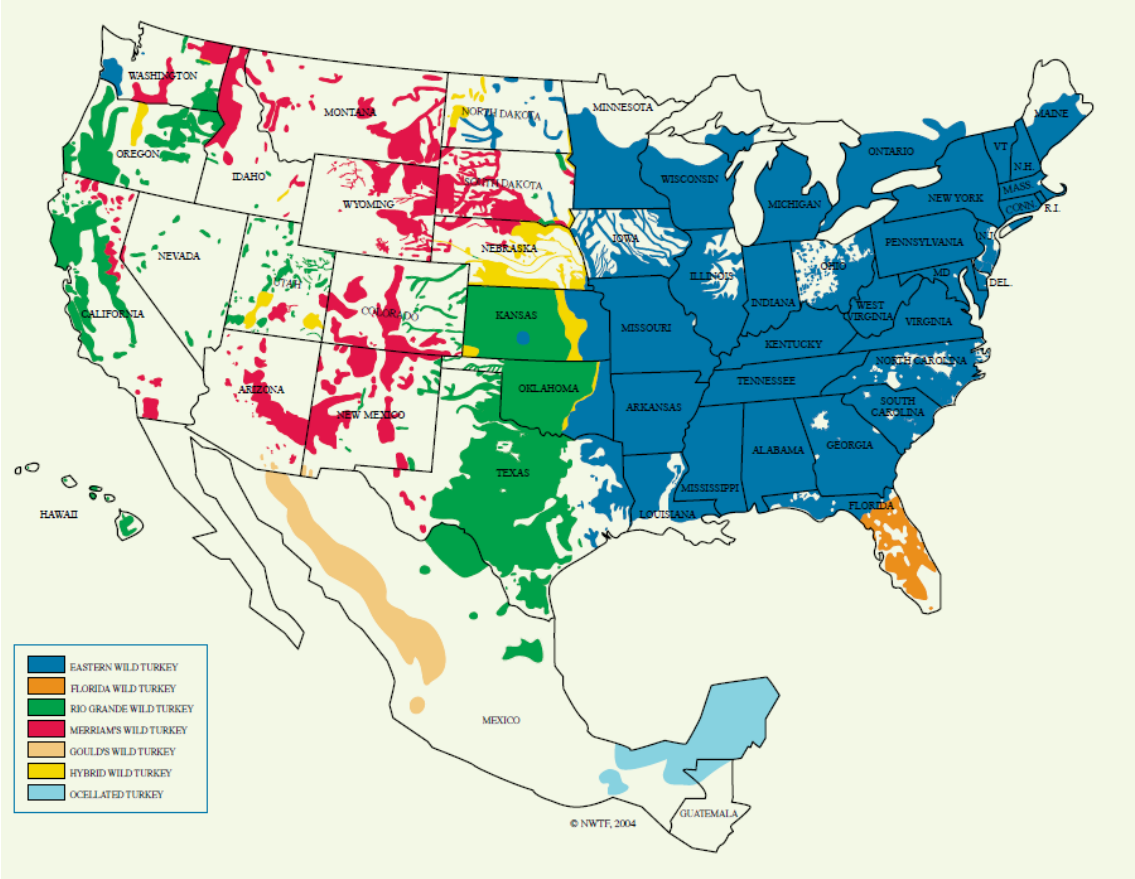

Figure 1. Current distribution of wild turkey subspecies in North America (National Wild Turkey Federation).

Gould's Subspecies: Historically, the Gould's subspecies ranged from southeastern Arizona and southwestern New Mexico to northern Jalisco and Hidalgo in Mexico (Ligon 1946, Ridgway and Friedmann 1946), with the core range along the Sierra Madre Occidental. It has been postulated that the range has likely contracted due to habitat changes (McRoberts et. al 2014). In New Mexico, Gould's turkeys occupied several mountain ranges along the Mexico border (Ligon 1946). Presently, it occurs in the Peloncillo, Animas and San Luis mountain ranges and the intervening Animas Valley in southern Hidalgo County (Ridgway and Friedmann 1946). The core of its range in New Mexico, as currently understood, includes: (1) the Peloncillo Mountains from Guadalupe Canyon north to Skeleton Canyon; (2) the Animas Mountains from Deer Creek north to Indian and Double Adobe Creeks; (3) the San Luis Mountains where they extend into New Mexico from Mexico; and (4) along Animas Creek in the middle Animas Valley (Figure 2).

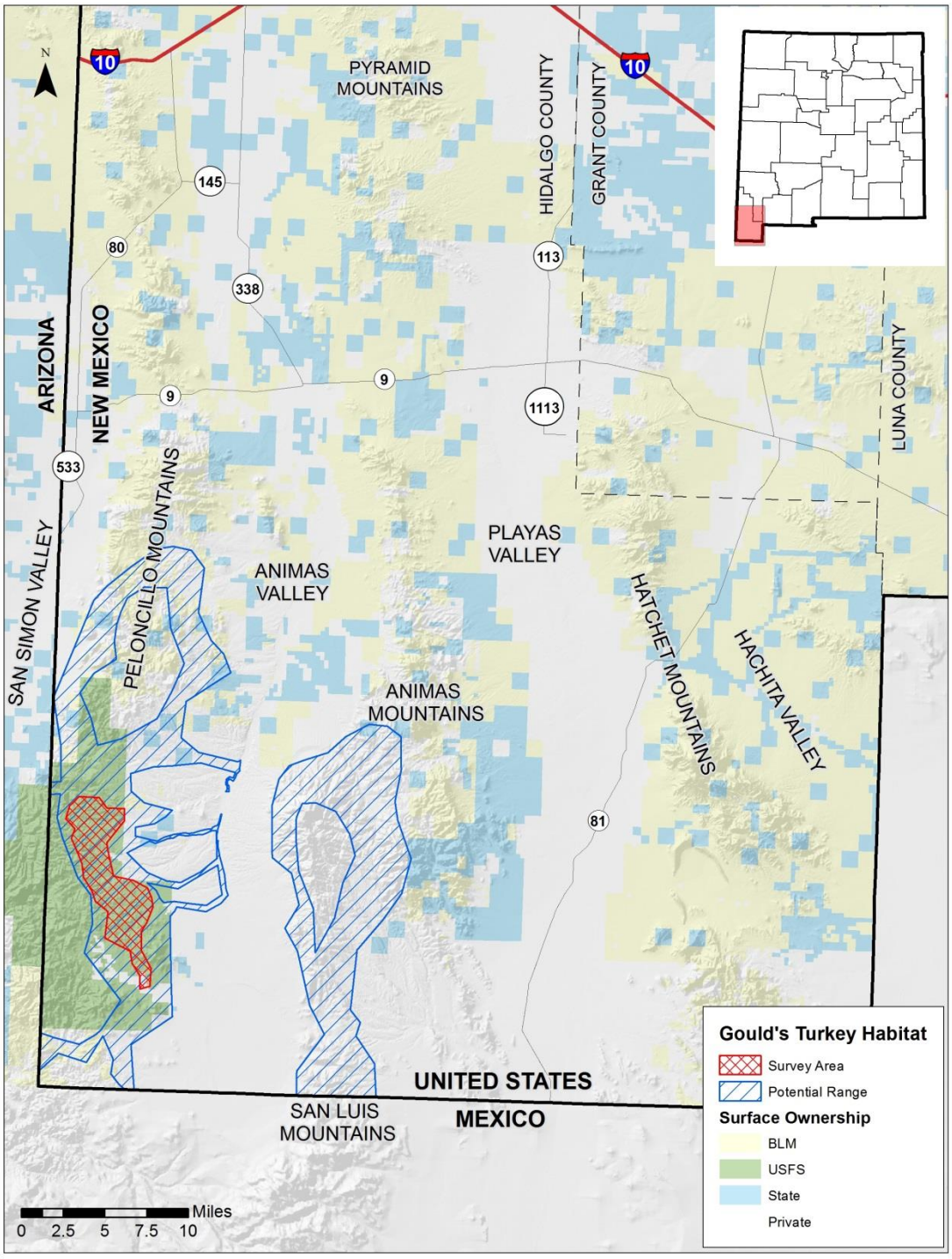

Figure 2. Potential range of Gould's turkey in New Mexico, and area currently surveyed during spring gobbler counts.

2.1.4 Habitats Requirements

Brown (1989) described Gould's turkey habitat as Madrean Evergreen Woodland, a community characterized by evergreen oak (*Quercus* spp.), juniper (*Juniperus* spp.), piñon (*Pinus* spp.*)* and Chihuahuan pine (*Pinus leiophylla*) woodlands with grassy understories and open grass savannas habitats. Gould's turkeys concentrate their activities in pine-oak forested canyons and adjacent slopes, and in riparian areas dominated by cottonwood (*Populus* spp.) and sycamore (*Platanus wrightii*) trees. Important habitat components include water, tall trees for roosting, mast producing shrubs and trees, and beargrass. Zornes and Schemnitz (1993) estimated that Gould's turkeys need a minimum area of 5000 ha to fulfill annual requirements.

Nesting. Wild turkeys are ground nesters, and seek areas with tall, dense, vegetation clumps for nest construction. Nests are often on steep slopes, and at the base of a shrub, tree, or downed log. Surrounding vegetation is often at least 0.5 m high. Hens scratch a shallow depression in the soil to use as the nest site. They often select or create an open lane for escape and movements to and from the nest (Zornes and Schemnitz 1993).

Brood Rearing. Hens with broods forage in open areas with productive grass and forb vegetation and enough bare ground to allow for easy movement. Insects are a key component of poult's diet, and forest openings and wet meadows generally have higher insect abundance and diversity. Reliable water sources are also important for brood rearing. Brood-rearing habitats tend to be less than 0.5 km from a consistent source of freestanding water (Zornes 1993). Studies of brood habitat selection in the Peloncillo Mountains found that hens with broods preferred areas where herbaceous biomass was between 400-1100 kg/ha (Zornes and Schemnitz 1993). Additionally, Zornes and Schemnitz (1993) estimated that ideal brood habitat was <30 m from escape cover, which is important to poult survival before they are able to fly. Escape cover consists of dense trees and shrubs, and clumps of beargrass or other tall grasses. Hens with pre-flight poults select ground roosting sites with more ground cover and greater visual obstruction from predators (McRoberts et al. 2014).

Roosting. Availability of suitable roost trees is an important component of wild turkey habitat, and is a limiting factor for Gould's turkey in New Mexico. Roost trees utilized by Gould's turkey in the Peloncillo Mountains typically are open crowned, overmature, and have horizontal branches (Zornes and Schemnitz 1993). Chihuahuan pine is used most frequently, with oaks, sycamores, and cottonwoods utilized when available. York (1991)

reported that the number of roost trees at each roost site ranged from 1-28 trees in Peloncillo Mountains, and that the average height of roost trees utilized by Gould's turkeys was 16.9 meters, with a diameter at breast height of 58.3 cm. Roost sites require suitable launching and landing sites, thus roost trees are often located in juxtaposition to an opening (Zornes and Schemnitz 1993). Additionally, it is important that escape cover is present in the vicinity of these openings for use by turkeys approaching and leaving the roost. Optimal distance from roosts to escape cover for Gould's turkeys in the Peloncillo Mountains was <100 m (Zornes and Schemnitz 1993). Wild turkeys may utilize different roost sites in the winter than are selected in the summer. Zornes and Schemnitz (1993) recommended that there should be at least two suitable roost sites available to turkeys in each square kilometer of potential habitat.

Wintering. Mast-producing trees and shrubs, as well as grasses, are utilized as winter forage by turkeys. Winter feeding habitats typically include a combination of juniper, oak, piñon pine, grasses, and manzanita (*Arctostaphylos* spp.) (Zornes and Schemnitz 1993). Heavily utilized feeding areas in the Peloncillos had ≥75 hard mast trees/ha, and mast producing shrub cover between 20%-50% (Zornes and Schemnitz 1993). Additionally, large seeded grasses were dominant or co-dominant in the understory vegetative stand.

2.1.5 Food Habitats

Wild turkeys utilize a wide variety of vegetation as food sources. Approximately 50 plant species were identified in an analysis of Gould's turkey feces in the Peloncillo Mountains (York 1991). Mast-producing trees and shrubs are particularly important food sources for turkeys (Table 1). In the Peloncillos, alligatorbark juniper (*Juniperus deppeana*), pointleaf manzanita (*Arctostaphylos pungens*), sumac (*Rhus* spp.) oak (*Quercus* spp.), border piñon (*Pinus discolor*), and canyon grape (*Vitis arizonica*) are found in the feces of Gould's turkeys, with percentage representation based on their annual abundance. Gould's turkeys also eat a variety of grass seeds, the primary grasses being pinyon ricegrass (*Piptochaetium fimbriatum*), sideoats grama (*Bouteloua curtipendula)*, Orcutt's threeawn (*Aristida schiedeana*), and barnyard grass (*Echinochloai* spp.). Insects are an important food source for poults; grasshoppers and March flies (*Bibionidae* spp.) are commonly consumed. Turkey diets vary seasonally, primarily in accordance with available forage (Table 1 and Figure 3).

Table 1. Seasonal rankings of the 10 most utilized food items (1985-1991) of Gould's turkeys in the Peloncillo Mountains. Adapted from York (1991).

Common Name	Latin Name	Ranking of Importance to Diet				
		Winter	Spring	Summer	Fall	Average
Alligator juniper	*Juniperus deppeana*	1	1	2	2	1
Pointleaf manzanita	*Arctostaphylos pungens*	2	3	1	3	2
Pinyon ricegrass	*Piptochaetium fimbriatum*	3	5	3	1	3
Mustard species	*Brassicaceae sp.*	6	2	5	6	4
Sideoats grama	*Bouteloua curtipendula*	4	4	9	4	5
Insects		7	8	4	5	6
Border piñon	*Pinus discolor*	5	7	6	10	7
Yellow nutsedge	*Cyperus esculentus*	9	6	10	7	8
Oak species	*Quercus sp.*	10	9	7	9	9
Canyon grape	*Vitis arizonica*	8	10	8	8	10

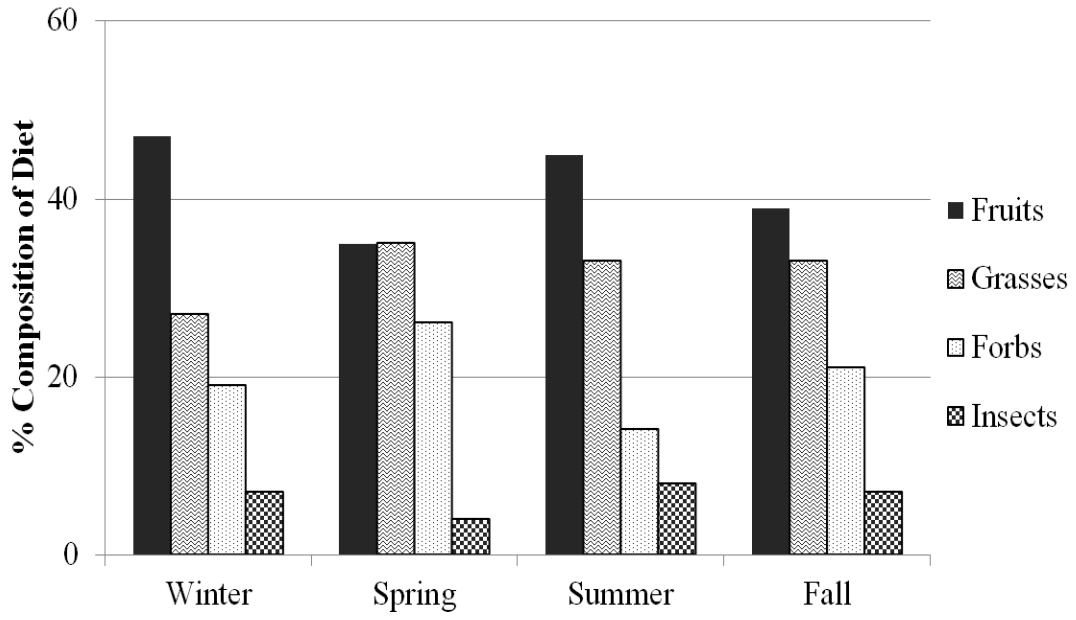

Figure 3. Percent composition of grasses, forbs, fruits, and insects found seasonally in Gould's turkey fecal samples collected 1985-1991 in the Peloncillo Mountains. From York (1991).

2.1.6 Behavior

Breeding. Wild turkeys have a polygamous mating system, wherein a single male typically mates with many females. Male turkeys strut and gobble to attract hens. Strutting males walk around unmated females while fanning their tail feathers out vertically, lowering their wings to drag the ground, puffing out their back feathers, and pressing their head backwards into their back feathers (Yarrow 2009). Males often make drumming sounds while strutting. Male turkeys fight to establish dominance, and often only dominant males mate. Receptive females perform a courtship bow prior to copulation, after which the female frees herself, runs a few meters, shakes, and preens (McRoberts et al. 2014). Females provide all parental care, from egg laying and incubation to raising the poults. During the breeding season, turkeys are widely dispersed through the landscape, as males range to find mates or defend territories and females search for a nesting location.

Flocking. Wild turkeys are highly gregarious, forming flocks at various times of the year. Breeding season flocks usually are comprised of reproductively successful hens and their poults. Autumn and winter flocks tend to be segregated by sex and age, with gobbler flocks segregated from flocks of hens and poults. Juvenile males (jakes) separate from hens late in the fall and form winter flocks. Winter flocks begin to disintegrate as breeding behavior increases in the spring.

Roosting. Wild turkeys roost in trees at night for protection against ground predators. Turkeys often use the same roost sites nightly, and may rotate sites seasonally. To access roosts in the evening, turkeys take a running start and launch themselves into flight towards a roost tree. They tend to use the upper half of a large tree as a roosting location. Turkeys typically roost in flocks, particularly during the winter. About a half hour before sunrise, they begin yelping and gobbling, and soar out of the tree into an opening (McRoberts et al 2014). Hens with broods that are unable to fly roost on the ground and spread their wings and tails over the chicks to protect them from precipitation and low temperatures.

2.1.7 Reproductive Biology

Wild turkeys begin strutting and gobbling to attract females as early as January, and breeding behavior peaks between March and June. Courtship occurs primarily in the morning, typically between sunrise and 0900 hrs. Breeding males are often accompanied by a suite of hens. Most copulations occur from late March and through April. Clutch sizes range from 4 to 17 eggs, with hens laying an egg approximately every 1.5 days. Eggs tend to be pale buff or buffy white and are marked with red-brown or pinkish spots. The average length of incubation is 28 days, but may range from 25-31

days (McRoberts et al. 2014). During incubation, hens leave the nest in the morning and/or afternoon to briefly feed. Females may attempt to renest if the first nest is lost, a behavior that is more typical in adult than immature hens. A second round of copulation may occur into May, with nesting initiated late May into June.

Turkey poults are equipped with an egg tooth that is shed soon after emergence from the egg. Poults hatch with a coat of downy feathers that are tawny on the head and chest, and brown on the back and wings. Poults are precocial and imprint on the hen at hatching. Within a few hours of hatching, the hen leads the brood away from the nest. Hens feed poults for the first day, but chicks also peck at food items while following the hen. Most poults are capable of flight within two weeks after hatching, and begin to roost with hens within the first three weeks.

2.1.8 Movement

Wild turkeys typically walk when moving about the landscape, but run or fly short distances when startled. Because of their large size, flight is often commenced by a few short steps, followed by several hops and a leap upward (McRoberts et al. 2014). Flights are typically a few hundred meters at most, though some turkeys have been observed to fly over 2 km. Turkeys have been noted to make large-scale movements between seasonal ranges or while dispersing. Birds primarily make these long-distance movements by walking. Often seasonal ranges are separated by <8 km, but distances as great as 65 km have been reported (McRoberts et al. 2014). Dispersing juveniles have been reported to travel up to 50 km.

Gould's turkeys in the Peloncillo Mountains have been documented moving up to 10 km between seasonal ranges, though this sample is limited and it is unknown if they travel further. Translocated Gould's turkeys have also been observed to make large movements. Several birds that were translocated from Arizona to the Peloncillo Mountains were found to have moved >10 km from the release location. One male moved over 25 km from the release site before it was harvested in Sonora, Mexico.

2.1.10 Predators

In the Peloncillo Mountains, common predators include bobcat, mountain lion, coatimundi, black bear, coyote, and grey fox (York 1991). Wild turkey eggs and poults are the most vulnerable life stages to predation. Poult mortality is greatest in the first two weeks after hatching, before chicks are able to fly into roost trees (McRoberts et al 2014). Predation rates on Gould's turkeys in New Mexico are unknown.

2.1.11 Population Ecology

Wild turkey population growth rates are a function of recruitment, female survival, and mortality factors. Hen survival is influenced by predation rates during nesting and on hunting mortality. Climate variables, such as temperature and precipitation, affect nest success and brood survival. Increased precipitation can increase nest loss to olfactory predators, and nests can be lost to flooding during periods of heavy rainfall (McRoberts et al. 2014). Forage availability and insect production also fluctuates with temperature and precipitation, affecting survival of both poults and adults.

2.1.12 Associated Species

Other species found in similar habitat that would benefit from habitat protection and improvement on behalf of Gould's turkey include but are not restricted to Mexican chickadee, magnificent hummingbird, Arizona woodpecker, yellow-nosed cotton rat, Apache squirrel, Coues deer, white-nosed coati, Sonoran mud turtle, ridge-nosed rattlesnake, green rat snake, mountain skink, Yarrow's spiny lizard, and striped plateau lizard (Brown 1994).

2.1.13 Threats

Several potential threats, both historical and current, have been identified for Gould's turkey populations in New Mexico (Schemnitz 1992, NMDGF 2016).

Fire: Whereas low to moderate intensity fires can provide significant benefits to Gould's turkey habitat, severe wildfire can pose a significant threat. High intensity fires can cause soil damage, kill roost trees, temporarily destroy wet meadow habitat, and kill mast producing plants. Much of the Peloncillo Mountain range is in Fire Regime Condition Class 2 (USDA 2012*a*), in which *"the risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals, resulting in moderate changes to one or more of the following: fires size, intensity and severity, and landscape patterns."* Comprehensive fire management planning and implementation by federal and state agencies in collaboration with private landowners in southeastern Arizona and the bootheel region of New Mexico has significantly reduced the potential for high-intensity fires in recent decades. Over the past 25 years, the Malpai Borderlands Group (Curtin 2002) has been successful in restoring periodic low intensity fire as a key ecosystem process (Allen 2006, Gottfried and Allen 2009). More than 100,000 acres of the Coronado National Forest and adjacent public and private lands in the Peloncillo Mountains have been burned at least once either by using prescribed fire as a management tool or by allowing natural or accidental fires in pre-designated areas to burn and be managed for ecosystem

restoration rather than having been immediately suppressed (Ben Brown[1], personal communication).

Overgrazing by Livestock: Overgrazing by domestic livestock can potentially degrade nesting habitat quality (Hall et al. 2007) and reduce forage availability for Gould's turkeys in New Mexico. By contrast, grazing that is appropriately managed can have a positive impact on habitats and be a sustainable use of National Forest lands. The Malpai Borderlands Group (Curtin 2002, Allen 2006) has contracted with independent range management consultants to ensure that each of the Coronado National Forest grazing allotments is monitored. Most of these allotments have been monitored on a three-year schedule for more than a decade. Monitoring reports are filed with the Douglas Ranger District. Despite recent drought conditions, all are reported to be at least in mostly good ecological condition, with small areas estimated to be fair (Ben Brown, personal communication). In the recent past, many of these allotments have received no use for one to several years.

Lack of Water Sources: There are no permanent lakes or streams in the Peloncillo Mountains, and very few natural springs (Schemnitz and Potter 1984, USDA 2006). Free-standing water is essential to wild turkeys, and may be a limiting factor for potential range expansion by Gould's turkeys in New Mexico. Stock tanks and drinkers have been constructed in various locations, but some are inaccessible to turkeys or may be dry during certain times of the year. Cattle troughs on private ranches are in some cases provide reliable water sources for Gould's turkeys.

Hybridization: Hybridization with domestic turkeys potentially poses a threat to the genetic integrity and fitness of the Gould's subspecies (York 1991). Although historically present on at least one ranch in the southern Peloncillo Mountains, domestic turkeys are presently reported to be absent from the Gould's turkey range in New Mexico (Ben Brown, personal communication).

Habitat Disturbance: Habitat disturbance[2] can potentially present a localized threat to Gould's turkeys in the Peloncillo Mountains. The majority of the turkey habitat in the Peloncillos is on public land managed by the U.S. Forest Service for multiple uses,

[1] Ben Brown, Ph.D., Science Coordinator, Malpai Borderlands Group, Animas, NM.

[2] Feral hogs apparently are rare in the bootheel region and are therefore not presently considered a threat to Gould's turkey. Given their proclivity for habitat disturbance, however, a control program should be developed and implemented if they become more numerous.

including limited harvesting of fuelwood and beargrass under permit; both activities were more widespread historically, and appear to be of minor concern at present.

Poaching:
Levels of illegal killing of Gould's turkeys in the Peloncillo Mountains and elsewhere in its range in New Mexico are unknown. Poaching may negatively impact Gould's turkey population growth in New Mexico, and enforcement is difficult due to the area's remoteness.

2.2 HISTORICAL PERSPECTIVE

2.2.1 Habitat Trends

Grazing has been the primary land use of the Peloncillo Mountains since the mid-1800s (Schemnitz and Potter 1984). Large cattle companies ran cattle in the area during the late 1800s, and the land was subsequently divided into smaller homestead ranches (Schemnitz and Potter 1984). Goats as well as cattle grazed the landscape during the homesteading period. There was region-wide documentation of overgrazing in Southeast Arizona and Southwestern New Mexico (Allen 1989).

The U.S. Forest Service received approval to establish Peloncillo Forest Reserve in 1906, and in 1908 it was combined with the Chiricahua National Forest (USDA 2012*b*). The Chiricahua National Forest later combined with the Coronado National Forest in 1917. With the acquisition of the new land, the Forest Service began to subdivide ranges into allotments, and each time a permit was reissued the permitted livestock numbers were reduced by 10% (Allen 1989). In 1947, the first Forest-wide range capacity estimate was produced, and though livestock numbers were being reduced, range conditions had continued to decline (Allen 1989). In 1975, a range analysis found that 42% of the Coronado National Forest was being overgrazed. The development of the Coronado National Forest Plan in 1986 in concert with the formation of the Malpai Borderlands Group during the 1990s has resulted in significant improvements to range conditions in the Peloncillo Mountains (see Section 2.1.13).

2.2.2 Population Trends

Gould's turkeys were first reported from New Mexico in the San Luis Mountains by Mearns and Holzner, in 1892 (Bohl and Gordon 1958). Ligon (1946) speculated that there were Gould's in the Animas Mountains until 1908, after which he thought that the turkeys were extirpated from New Mexico. Gould's turkeys were reported from the

Peloncillo Mountains in 1957 (Bohl and Gordon 1958) and again in 1982 (Schemnitz and Zeedyk 1982).

Gould's turkeys were studied intensively in New Mexico under NMDGF contracts from 1982 to 1996. Estimates for the Peloncillo Mountains population during that period fluctuated from fewer than 20 up to approximately 75 birds, with some modest increasing trends (Schemnitz and Potter 1984, Willging 1987, Figert 1989, York 1991). Recent (2016) spring surveys on public land in the Peloncillo Mountains in the Coronado National Forest (considered the 'core area' for Gould's turkey distribution in New Mexico) detected 97 birds on several surveyed routes (see Section 2.3).

The subspecies currently occupies two other mountain ranges in New Mexico, the Animas and San Luis. The Animas lies entirely within private land and has not been adequately surveyed by NMDGF in 20 years, with the last recorded estimate in 1997 at 50 birds (Zeedyk 1997). The northern tip of the San Luis Mountains extends into the United States from Mexico, and the majority of this range is private land. This range supports a population of unknown size, and is contiguous with tracts of available habitat south of the border. It is likely immigration/emigration occurs between the three mountain ranges during years of favorable conditions.

2.2.3 Use and Demand Trends

The wild turkey is a popular game species, and is hunted throughout a majority of its range. Gould's subspecies is of particular interest to avid turkey hunters looking to complete their Royal Slam (all five U.S. subspecies) or World Slam (Royal Slam plus the ocellated turkey, *M. ocellata*). Currently, Gould's turkeys can be harvested in Mexico, Arizona, and New Mexico. New Mexico has a very low harvest, with two enhancement tags being issued each year since 2009. The tags allow for each hunter to harvest one bearded male in the spring. The money raised from auctioning and raffling Gould's turkey enhancement tags is used for habitat enhancement, conservation, and protection. New Mexico hunters have shown a particular interest in increasing the number of tags permitted for Gould's turkeys in the state.

2.2.4 Past Management

Regulatory Actions: Gould's turkey was listed in 1975 as a New Mexico Group II endangered species under the New Mexico Wildlife Conservation Act. Gould's turkey recovery was also listed as a National Wild Turkey Federation priority in 1985.

Habitat Improvement: The U.S. Forest Service, in collaboration with NMDGF and the National Wild Turkey Federation, has undertaken several habitat projects to enhance

Gould's turkey habitat in the Peloncillo Mountains. One such project, funded by Gould's turkey hunting license sale, involved reducing fuel loads around known turkey roost sites. This project lowered the risk of habitat loss through wildfire events and provided improved access to roost trees for turkeys. Additionally, several riparian management projects have been completed.

Population Augmentation: To augment the current New Mexico population, 60 Gould's turkeys were transplanted from southeastern Arizona to the Peloncillo Mountains between February 2014 and February 2016, as part of an agreement with Arizona Game and Fish Department to trade Gould's turkey for pronghorn. All released birds were marked with patagial wing tags. In addition, NMDGF deployed 27 VHF backpack transmitters on transplanted turkeys (15 in 2015, 12 in 2016) to generate information on dispersal and mortality rates.

Coronado National Forest Plan: The Coronado National Forest Land and Resource Management Plan (USDA 1986, as amended) identifies the following goals for its range, wildlife, soil, and water programs on the Forest, all of which have the capacity to maintain and positively influence Gould's turkey habitat:

- *To restore rangeland to at least moderately high ecological condition (70% to 75% of potential production, fair range condition) with stable soil and a static to upward trend.*
- *Produce livestock products consistent with other resources and uses.*
- *Eliminate grazing from areas not capable of supporting livestock without significant detriment to range or other resources.*
- *Balance permitted grazing use with grazing capacity.*
- *Provide habitat for wildlife populations consistent with the goals outlined in the Arizona and New Mexico Department of Game and Fish Comprehensive Plans and consistent with other resource values.*
- *Provide for ecosystem diversity by at least maintaining viable populations of all native and non-native wildlife, fish and plant species through improved habitat management.*
- *Improve the habitat of and protection for local populations of Threatened and Endangered species to meet the goals of the Endangered Species Act.*
- *Provide a favorable flow of water in quantity and quality for off-forest users by improving or maintaining all watersheds to a satisfactory or higher level.*

2.3 POPULATION ASSESSMENT

There are no reliable estimates of Gould's turkey population sizes in New Mexico either historically or currently. Lack of access to private land has precluded survey work in the Animas and San Luis mountains and in Animas Valley[3]. In the Peloncillo Mountains, spring gobbler surveys (counts of birds on established routes) provide minimum population size data for two intervals over the last 34 years. Many variables, including weather, interannual differences in breeding phenology, route coverage, and observer acuity affect these counts, making it difficult to reliably discern trends. From 1982 to 1996, counts of the minimum number of Gould's turkeys in the Peloncillo Mountains fluctuated from fewer than 20 to approximately 75 birds, with a slightly increasing trend (Schemnitz and Potter 1984, Willging 1987, Figert 1989, Schemnitz et al. 1990, York 1991). More recently, spring surveys in the core habitat in the Peloncillo Mountains from 2006 to 2016 have yielded counts that range from 18 to 97 birds. The recent population augmentation likely is reflected in the higher counts of 2015 and 2016 (Table 2).

Table 2. Results of the annual Gould's turkey (*Meleagris gallopavo mexicana*) spring surveys in the Coronado National Forest, 2006-2016, Hidalgo County, New Mexico. Surveys typically are conducted early in April.

Year	# Turkeys Observed	# Marked Turkeys	Males Observed	Females Observed	Unknowns Observed
2006	18		7	11	
2007	23		14	9	
2008	41		25	16	
2009	45		26	19	
2010	46		3		43
2011*	N/A				
2012**	18		11	6	1
2013	21		14	7	
2014	55	12			55
2015	73	6	25	36	12
2016	97	10	13	22	55

** The spring 2011 was cancelled to inclement weather (high winds, rain and sleet).*

*** The 2012 survey occurred much later in the spring (mid-May) when gobbling had begun to diminish, hens were in the process of nesting, and the enhancement hunt had been conducted.*

[3] Cursory counts of wintering flocks in the Animas and San Luis Mountains in ca. 2005 totaled more than 150 birds (Ben Brown, personal communication).

2.4 ECONOMIC IMPACTS

Negative Impacts: Under the provisions of the Wildlife Conservation Act, with the exception of its own properties, NMDGF does not have authority to prevent habitat-altering activities that might have an adverse effect on state-listed species, or to require activities that would benefit the species. Actions proposed to achieve recovery of Gould's turkey must be coordinated with stakeholders, including federal land management agencies, and any actions that would be carried out on private lands would require the voluntary cooperation of the landowner.

Positive Impacts: From 2009 through 2016, annual enhancement license revenues generated by NMDGF from auctioning a single Gould's turkey tag averaged $3,175 and from raffling a single tag averaged $4,356. Recovery of Gould's turkey populations should allow us to begin offering public tags, which would provide more hunting opportunities while generating additional income for NMDGF.

3.0 Recovery and Management Strategy

Gould's turkey populations are extant in all three sky island ranges that comprised their historical range in New Mexico – the Peloncillo, Animas, and San Luis mountains. Persistence of these populations depends largely on maintenance and enhancement of water sources, tall trees for roosting, suitable brood rearing areas, and continued regeneration of mast-producing trees and shrubs. Well managed riparian areas – which contain the majority of feeding, roosting, and brood-rearing habitats – are critical to Gould's turkey continued survival in the state. In addition, there may be unoccupied but suitable habitat within the historic range of this subspecies where translocations may be warranted for initial establishment.

Due to land ownership patterns, management strategies proposed under this recovery plan focus on the Peloncillo Mountains where the majority of public lands within historical range occur. Gould's turkey is well-established in the Peloncillo range, and opportunities exist to coordinate with the federal agencies and private landowners to protect and enhance habitat. NMDGF believes that, with appropriate management inputs, the amount of suitable and potentially suitable Gould's turkey habitat in the Peloncillo Mountains is sufficiently extensive to support a viable population of Gould's turkeys. The Department will continue to support and encourage landowners in the Animas and San Luis ranges to maintain and or enhance Gould's turkey habitats and populations.

Goal:
Ensure the long-term persistence of Gould's turkey within its historical range in New Mexico.

Objective:
Maintain a total population of at least 175 Gould's turkeys in the Peloncillo Mountains either through natural processes alone or in combination with periodic strategic augmentation.

Objective Parameters:
Objective parameters are performance measures that are designed to assist in achieving the objectives of the recovery plan. Recovery objectives are likely to have been met when:

- Population survey and monitoring methods and protocols have been developed to better characterize population distribution and trends.
- The full extent of suitable or potentially suitable Gould's turkey habitat in the Peloncillo Mountains has been identified and mapped.
- Unoccupied portions of the suitable range have been evaluated for their potential to support a translocated flock if natural colonization seems unlikely.

- Limiting habitat components, such as roost sites, water sources, and brood-rearing habitat have been evaluated and mapped.
- Current threats to limiting habitat components have been identified and managed, as feasible, to minimize negative impacts to habitat and population viability.
- Specific habitat enhancement projects have been identified, prioritized, and implemented where feasible and warranted.

Issue 1 - Population Monitoring

NMDGF has conducted spring gobbler surveys annually in the Peloncillo Mountains since 2006. Gobbler surveys are useful for evaluating turkey distribution but are less reliable as indices of population trend, as many uncontrolled variables affect these counts. Because precise population estimates for wild turkeys are notoriously difficult to obtain, most conservation and management programs employ two or more survey techniques for monitoring. There is general consensus that winter flock counts conducted at or near roost sites have the greatest potential for monitoring population trends and obtaining minimum population numbers (Healy and Powell 1999).

Strategy 1. Design and implement a Gould's turkey survey program for the Peloncillo Mountains that achieves the stated objective of this recovery plan.

Strategy 2. Evaluate the potential for and value of conducting aerial winter roost site monitoring of Gould's turkey populations in the Animas Mountains, San Luis Mountains, and Animas Valley. Five-year intervals likely would suffice for monitoring these populations.

Issue 2 – Identification and mapping of additional Gould's turkey habitat areas in the Peloncillo range

Strategy 1. Continue to assess and refine mapping of suitable Gould's turkey habitat areas. Investigate previously unsurveyed or inadequately surveyed portions of the Peloncillo Mountains for habitat suitability or for potential suitability in conjunction with well-designed enhancement projects.

Issue 3 – Maintain and enhance important habitat features.

Field studies conducted during the 1980s and early 1990s identified and mapped many of the critical and limiting habitat features in the Peloncillo range and recommended sets of specific habitat improvement projects. The majority of feeding, roosting, and brood rearing sites of Gould's turkeys are in riparian habitats. Limiting habitat elements identified during the 1980s-1990s included: (1) roost sites, (2) water features, and (3) brood-rearing habitat (Zornes and Schemnitz 1993, Schemnitz and Zornes 1995). Since that time, NMDGF biologists have added to the mapping of important habitat features,

and have worked with personnel from Coronado National Forest on various habitat improvement and restoration projects.

Strategy 1. Continue to coordinate with Coronado National Forest to protect roost trees and brood-rearing habitats, and to provide water structures in critical areas. Protecting riparian habitat is key to the maintenance and restoration of this subspecies in the Peloncillo Mountains.

Strategy 2. Investigate and identify possibilities for enhancing or creating additional roost sites in otherwise suitable habitat by (a) selective pruning of branches and/or clearing dense understory vegetation that impedes access to potential roost trees, or (b) planting cottonwoods and sycamores at appropriate sites in drainages. [Detailed recommendations and guidelines were provided by Zornes and Schemnitz 1993 (pp. 26-28, 36-38) and Schemnitz and Zornes 1995 (p. 462)].

Strategy 3. Investigate opportunities to develop water sources in areas with otherwise suitable nesting and brood-rearing habitat. [Detailed recommendations and guidelines were provided by Zornes and Schemnitz 1993 (pp. 29, 41-43) and Schemnitz and Zornes 1995 (p. 462)].

Strategy 4. Attempt to increase the quality and quantity of brood-rearing habitat in the Peloncillo Mountains. Evaluate identified brood-rearing sites for potential improvements to grass/forb cover, and investigate opportunities for creating forest openings to provide additional brood-rearing habitat.

Issue 4 – Potential Need for Flock-Specific Information on Ecology and Natural History
Most aspects of wild turkey ecology and natural history are sufficiently well understood for purposes of conservation and recovery planning, and Gould's turkeys in the Peloncillo Mountains were intensively studied from 1982 through 1993 (summarized by Zornes and Schemnitz 1993). In some instances, however, it may be desirable from a management standpoint to better understand movements and habitat use of particular flocks, or survival and dispersal of translocated flocks and individuals.

Strategy 1. As warranted by specific management needs, support radio-telemetry investigations of seasonal habitat use, resource selection, dispersal, movements, and mortality rates.

Issue 5 - Threats to Persistence
We have identified fire, lack of water, overgrazing by livestock, hybridization, poaching, and harvesting of fuelwood and beargrass as potential threats to Gould's turkey populations in New Mexico. Apart from the threat of a catastrophic, stand-replacing wildfire that destroys habitat (particularly roost sites) for a significant proportion of the population, other stressors will tend to be localized, often are temporary, and can be

minimized or reversed through directed management actions developed on a site-specific basis. The threat of catastrophic fire, by contrast, is best minimized by proactive policies that maintain fuel conditions for low risk of high intensity wild fires. Such policies form the basis of the Peloncillo Fire Management Plan, adopted by Coronado National Forest in 2005, with subsequent modifications (Gottfried and Allen 2009).

Strategy 1. Collaborate with USFS and BLM to minimize stressors operating on limiting habitat features such as roost sites, water sources, and brood-rearing habitat on a site-specific basis. Improve access to water where needed.

Strategy 2. Grazing that is appropriately managed can have a positive impact on habitats and can be a sustainable use of national forest lands. Forage utilization should be based on site-specific resource conditions and management objectives.

Strategy 3. As warranted, assist in recommending appropriate areas and species for fuelwood and beargrass harvesting that would enable these activities to continue and at the same time protect and promote Gould's turkey habitat. Targeted fuelwood cutting can reduce fuel loads and assist in creating beneficial openings for Gould's turkeys (Hoffman et al. 1993, Heffelfinger 2000).

Strategy 4. Develop public education materials and signage to alert hunters to the illegality of harvesting Gould's turkeys without a valid tag. As feasible, increase NMDGF law enforcement presence during open hunting seasons.

Issue 6 - Possible need for periodic augmentation and managed recovery.

Transplantations may be needed to establish, re-establish, or augment Gould's turkey occupancy of portions of their range. There may currently be unoccupied portions of the range that appear suitable but where natural colonization seems unlikely. Additionally, it is possible that disease, fire, or extended drought could reduce the Gould's turkey population to a critically low point, and restocking or augmentation may be warranted. It appears that Gould's turkey populations responded positively to recent transplantation efforts (2014-2016) in the Peloncillo Mountains, and augmentation could potentially be utilized as a management technique outside of the core Gould's turkey range in New Mexico.

Strategy 1. Suitable habitat areas that are not occupied by Gould's turkey should be evaluated for likelihood of colonization from existing populations. Transplantations should be considered as warranted.

Issue 7 – Land Ownership/Management Issues

Occupied and potentially occupied Gould's turkey habitats in New Mexico occur on Federal, State, and private lands. Coordination of conservation efforts will allow management entities and other stakeholders to pursue their own goals while

maintaining a path forward to long-term conservation (recovery) of Gould's turkey. The local ranching community can be an enormously positive force in sustaining and expanding Gould's turkey populations in the bootheel region, and NMDGF is solicitous of any willingness on the part of this group to participate in the recovery and management of this species.

Strategy 1. Collaborate with stakeholders, researchers, land managers (public and private), and government agencies to (1) coordinate conservation efforts, (2) coordinate sharing information and data, and (3) facilitate cooperative management and recovery efforts.

Strategy 2. Encourage outreach projects to enable private landowners to maintain and improve Gould's turkey habitat.

Strategy 3. Identify and secure funding to promote the objectives of this recovery plan, including Department funded habitat restoration dollars, Enhancement Licenses, and landowner incentive programs.

Strategy 4. Solicit volunteer assistance for accomplishing recovery objectives, including local chapters of the National Wild Turkey Federation, Sky Island Alliance, and other qualified groups.

Strategy 5. Coordinate management objectives of this recovery plan with other wildlife management activities conducted by NMDGF in the Peloncillo Mountains.

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5.0 Approvals

4/5/17

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Date

4/5/17

Alexandra Sandoval, Director
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4/5/2017

Paul M. Kienzle, Chairman
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Date

6.0 Appendices

6.1 ADVISORY COMMITTEE MEMBERS

Jack Barnitz – Bureau of Land Management, Las Cruces District
Jim Bates – Private Citizen and member of the National Wild Turkey Federation (NWTF)
Ben Brown – Malpai Borderlands Group, Animas
Helen Butt – NWTF, Las Cruces Chapter
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