United States
Department of
Agriculture

Forest
Service

December
2021

Gardner Allotment Analysis

Nogales Ranger District, Coronado National Forest
Santa Cruz and Pima Counties, Arizona

Township 19 S, Range 16 E, Sections 28 and 32—34
Township 20 S, Range 15 E, Sections 13 and 14
Township 20 S, Range 16 E, Sections 2-5, 7, 8, 15-22 and 28

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Table of Contents

Tables

Figures

1. PURPOSE AND NEED FOR ACTION

Background

This Environmental Assessment (EA) describes a Forest Service proposal to authorize grazing on the Gardner grazing allotment in the Santa Rita Mountains, Coronado National Forest (CNF), Nogales Ranger District, Santa Cruz and Pima Counties, Arizona. The EA analyzes and discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and the no action alternative. The purpose of the EA analysis is to determine if the impacts of the proposed action may be significant enough to warrant the preparation of an Environmental Impact Statement (EIS).

Federal actions such as the authorization of grazing must be analyzed to determine potential environmental consequences pursuant to the *National Environmental Policy Act (1969)* (NEPA) and the *Rescission Act* (*P.L 104-19, 1995*). Supporting documentation, including more detailed analyses of project area resources and records of public participation, is on file in the project planning record which is available upon request from the Nogales Ranger District Office in Nogales, Arizona.

Purpose and Need for Action

The purpose of this project is to incorporate the elements of the Coordinated Resource Management Plan (CRMP) into the proposed authorization of livestock grazing on the Gardner Allotment and to ensure the allotment continues to be managed in accordance with the Coronado National Forest Land and Resource Management Plan objectives and desired conditions. National Forest System lands provide an important source of livestock forage. The *Multiple-Use Sustained Yield Act (1960)* and the *National Forest Management Act (1976)* designate domestic livestock grazing as one of many activities that should be considered when balancing the multiple uses on National Forest System lands. It is Forest Service policy to make forage from lands suitable for grazing available to livestock operators (FSM 2202.1, FSM 2203.1). The Gardner grazing allotment includes land identified in the Forest Plan as suitable for grazing.

There is a need to authorize a change from seasonal to yearlong use. This would allow resource managers the flexibility to better manage the allotment. With the incorporation of the CRMP, an extra 27 pastures encompassing 9,491 acres would be added into the overall management of the Gardner allotment. This does not mean that the allotment would be grazed yearlong, it means that more flexibility for the overall management would be allowed.

There is a need to increase Animal Unit Months (AUMs) to 2,800 to allow managers to better manage the allotment and run one herd throughout the allotment. The new permit under the proposed action would allow for 2,800 AUMs on the National Forest. The new permit would show 2,800 AUMs to have the flexibility to make changes annually as conditions warrant. There is a need to improve livestock management and distribution through the construction of several new livestock watering facilities in multiple pastures.

Existing Condition

The Gardner grazing allotment is located on the Nogales Ranger District, east of the Santa Rita Mountains. Figure 1, shows the project area. The Gardner Allotment lies in the Major Land Resource Areas (MLRA) of 41-1AZ Mexican Oak-Pine Forest & Oak Savannah and the 41-3AZ Semi desert Grassland. Ecological sites within each MLRA are; 41-1AZ: Loamy Slopes, Clay loam Upland, Loamy Upland, Loamy Bottom and Limy Upland. The majority of Gardner Canyon is a Loamy Bottom, sub-irrigated ecological site but acreage of this site is relatively small so it was mapped as a Loamy Bottom. 41-3AZ: Clayey Swale, Clayloam Upland, Loamy Upland, Limy Upland, Limy Upland, deep and Loamy Bottom.

Utilization monitoring indicates use is generally light to moderate, averaging less than 45% in key areas. Range ecological condition and trend were evaluated on the allotment in 2014 and 2016. In 2009, the majority of transects read were on private land.

Table 1. shows the actual use for the Gardner Allotment over the past five years. It also shows the total acres and the capable acres for the allotment, what the permitted AUMs (Animal Unit Months) is currently, and the current Season of Use.

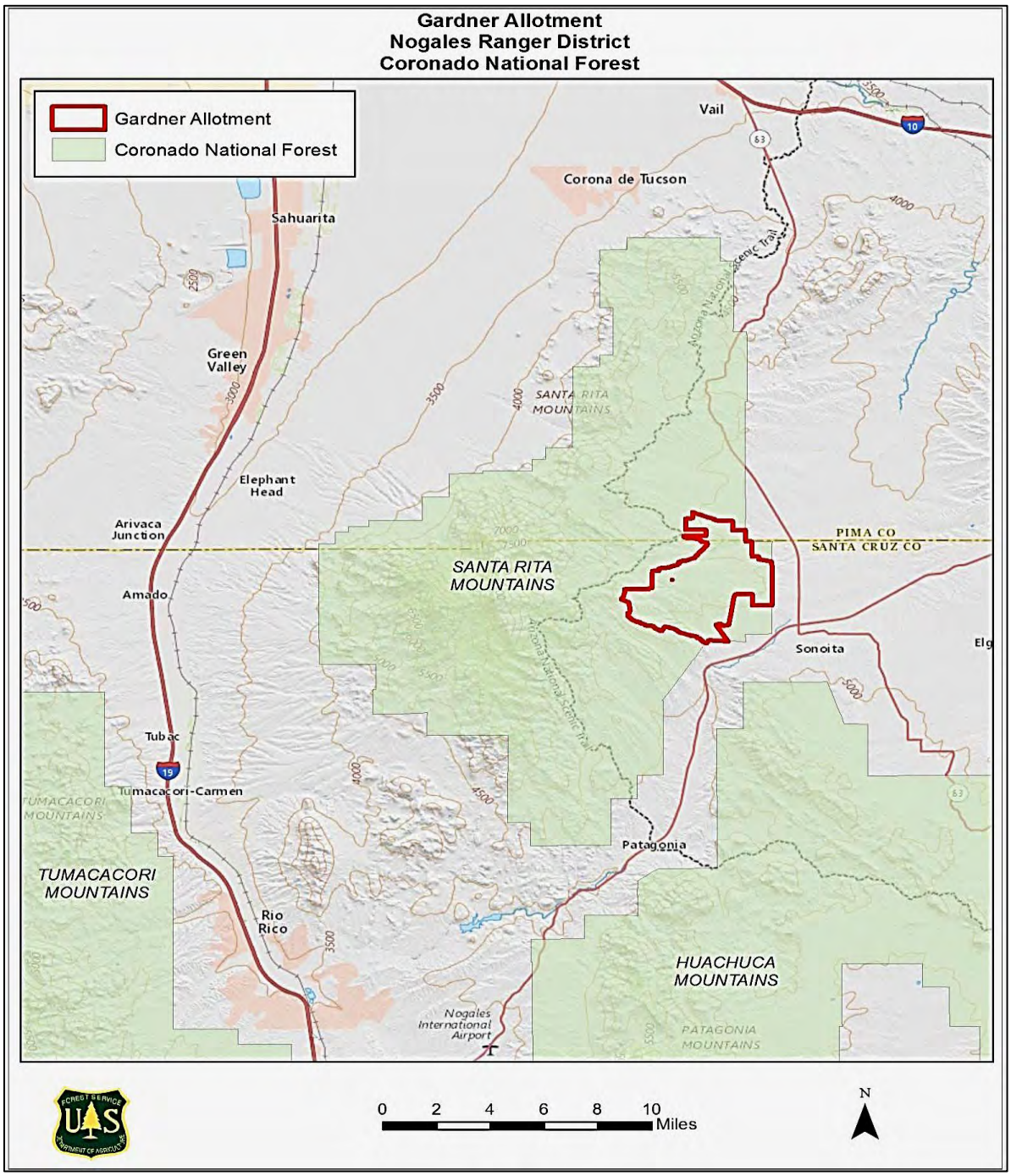
Table 1. Season of use, permitted numbers, and stocking levels for the past 5 years

	Gardner Allotment
Total Acres	10,271 Acres
Capable Acres[1]	8,367 Acres
Permitted Numbers	211 cow/calf
Season of Use	06/01-10/31 and 12/1-2/28
(AUMs)[2]	1,686
2015-2016 (AUMs)	1,447
2014-2015 (AUMs)	1,358
2013-2014 (AUMs)	1,598
2012-2013 (AUMs)	1,094
2011-2012 (AUMs)	1,145

[1] Capable acres are defined as areas under 40% slope and capable of producing 100 lbs per acre of forage. Areas considered “not capable” primarily consist of steep slopes in upper elevations of the allotment. No grazing capacity is assigned to non-capable areas.

[2] Animal Unit Months are calculated by multiplying the number of livestock grazed by the number of months grazing occurs.

Figure 1. Project Area



Range conditions on the Gardner Allotment are improving or are static as shown in Table 2. Monitoring data collected in 2016 demonstrates that the majority of the allotment is in mid to high ecological condition. Approximately 60% of the allotment is in high ecological condition with the remaining 40% in mid ecological condition. Comparisons with past data show upward or static trends in both vegetation and soil condition. Soil condition was assessed in 2016 using NRCS (Natural Resource Conservation Service) soil health indicators.

Satisfactory is the highest rating and indicates that the site is fully functioning with respect to hydrology, soil stability, and biotic integrity.

Table 2: Condition on forest allotment

	2014		2016	
Transect	**Veg**	**Soil**	**Veg**	**Soil**
C2	Moderately-High	Satisfactory	High	Satisfactory
C4	High	Satisfactory	High	Satisfactory
KA1			Moderately-High	Satisfactory
KA2	Moderately-High	Satisfactory	Moderately-High	Satisfactory
KA3			High	Satisfactory
KA11	Moderately-High	Satisfactory	Moderately-High	Satisfactory
KA12	Moderately-High	Satisfactory	Moderately-High	Satisfactory
KA15	High	Satisfactory	N/A	N/A
KA16	High	Satisfactory	N/A	N/A

Forest Plan Consistency and Management Direction

This EA is based upon background information about the allotment including current and past inventory and monitoring data and the desired conditions of resources on the allotment. This information is derived from direction and guidelines in the 2018 Coronado National Forest Land and Resource Management Plan (Forest Plan), related to desired resource conditions and rangeland management, and from resource specialists' knowledge of the allotment. The Forest Plan and related documents can be found at: https://www.fs.usda.gov/detail/coronado/landmanagement/planning/?cid=fswdev7_018702.

The Forest Plan provides guidance for the management of multiple-use activities that occur within the CNF. There are objectives, standards, guidelines, and management area direction relevant to the project and desired conditions for resources such as vegetation, watersheds, riparian areas, soils and wildlife. Grazing is one of the many uses allowed on the Forest and the project area is consistent with the Forest Plan and determined suitable and capable for grazing.

Standards and Guidelines

The Standards, Guidelines and Desired Conditions come from the Forest Plan starting on page 90:

Standards

1. New issuance, renewal, modification, and management of grazing permits shall comply with the Coronado National Forest's "Stockpond and Aquatic Habitat Management and Maintenance Guidelines for the Chiricahua Leopard Frog." Additionally, for the San Rafael Valley and surrounding areas, permits shall comply with the Coronado National Forest's "Stockpond Management and Maintenance Plan for the Sonoran Tiger Salamander."
2. In areas occupied by lowland leopard frogs, stock ponds would be managed according to the general guidance, as applicable, from the Coronado National Forest's "Stock Pond and Aquatic Habitat Management Guidelines for Chiricahua Leopard Frog."

Guidelines

1. Forage utilization should be based on site-specific resource conditions and management objectives, but in general should be managed at a level corresponding with light to moderate intensity (15 to 45 percent of current year's growth). Exceptions may be allowed in order to meet objectives related to scientific studies, fuels reduction, invasive plant control, or other targeted grazing or site-specific objectives.
2. Burned areas should be given sufficient deferment from grazing, especially during the growing season, to ensure plant recovery and vigor.
3. Construction or reconstruction of livestock fencing and replacement of non- permeable fencing where wildlife movement is restricted should be consistent with the appropriate state wildlife agency standards for safe passage of wildlife and/or species-specific fencing guidelines developed at the local or regional level.
4. Grazing management practices should be designed to maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological zone. Additionally, grazing management should retain ground cover sufficient for the forage and cover needs of native wildlife species.
5. Within riparian areas, structures used to manage livestock should be located and used in a way that does not conflict with riparian functions and processes.
6. Treatments for restoring rangelands should emphasize the use and perpetuation of native plant species.
7. Grazing intensity, frequency, occurrence, and period should provide for growth and reproduction of desired plant species while maintaining or enhancing habitat for wildlife.
8. Management practices to achieve desired plant communities should consider protection and conservation of known cultural resources, including historical sites, prehistoric sites, and plants of significance to Native American peoples.

Desired Conditions

The CNF provides forage for grazing in support of domestic livestock production as a viable, sustainable economic activity. Communities surrounding the CNF benefit from the interactions of livestock production activities with other economic sectors, and from the social, cultural, and ecological values tied to conservation ranching.

Domestic livestock grazing does not move the landscape away from the desired composition and structure of plant communities. Rangeland ecosystems are diverse, resilient, and functioning within a healthy, sustainable landscape in the face of a changing climate. Areas that are grazed have stable soils, functional hydrology, and biotic integrity, while supporting healthy, diverse populations of native wildlife.

By supporting livestock production on working landscapes with an extensive, low impact land use, the CNF contributes to preserving large areas of unfragmented open space. These open spaces sustain biological diversity and ecological processes and help to preserve the rural cultural heritage of southeastern Arizona and southwestern New Mexico.

Management Approaches

1. Following the monitoring protocols found in the Forest Service's Southwestern Region "Rangeland Management Training Guide," "Technical Interagency Guide," and "Principles of Obtaining and Interpreting Utilization Data on Rangelands."
2. Collaborating with permittees, other agencies, University of Arizona Cooperative Extension, and other stakeholders to develop consistency in monitoring protocols and to leverage resources to accomplish landscape-scale monitoring.
3. Reviewing current management of each active allotment at a minimum prior to the reissuance of an expiring permit to identify consistency with current grazing authorization decisions (completed according to National Environmental Policy Act requirements).
4. Annually meeting with permittee to discuss timing, intensity, duration, and frequency of livestock use, as well as infrastructure needs.
5. Establishing, where feasible, grass reserves to help facilitate restoration work, while providing for permittee considerations.

Coordinated Resource Management

Coordinated Resource Management (CRM) is a stakeholder consensus decision-making process. Stakeholders are any interested party with a stake in the consequences of the decision. In this process, the stakeholders make decisions by consensus, rather than by traditional voting and majority rule.

As outlined in the Arizona Coordinated Resource Management Handbook and Guideline, consensus, as defined by various CRM practitioners, means, "The group makes decisions collaboratively. There is no voting, and everyone needs to be able to live with the decision— or discussion continues until they can. Although all participants may not agree 100% with all aspects of the decision, all participants support the whole decision 100%." The CRM process helps people manage natural resources in a productive, environmentally-friendly, and economical manner for the long term. It is a coalition-building process which involves those using the resources in the decision-making about those resources. Thus, CRM integrates local wisdom and technical expertise, while taking advantage of group synergy.

This does not allow the Coronado National Forest to authorize activities outside of policies, regulations, or the Forest Plan. While the CRMP helps build a collaborative effort amongst

stakeholders, the Allotment Management Plan still guides management on the allotment and the Forest Plan outlines the standards and guidelines to ensure that management is aligned with the desired conditions of the CNF. The CRMP can outline future improvements on the forest or other types of management, but nothing can be carried forward without proper analysis through the NEPA process.

On February 19, 2010, the Nogales Ranger District voluntarily entered into the CRM process with the Vera Earl Ranch Inc. (Permittee for the Gardner Allotment). The intent is to manage the various land ownerships in a cooperative and coordinated approach. This allows all resource managers the flexibility to manage the allotment. With the incorporation of the Coordinated Resource Management Plan in accordance with the Forest Plan, an additional 27 pastures encompassing 9,491 acres have been added into the overall management of livestock grazing for this allotment. Pasture rotation would be planned at the beginning of each grazing year and may be continually modified in response to changing resource conditions with the objective of not grazing any one pasture during consecutive growing seasons.

Future Review of the Decision

In accordance with Forest Service Handbook direction, an interdisciplinary review of the decision would occur within 10 years, or sooner if conditions warrant. If this review indicates that management is meeting standards and achieving desired condition, the existing management activities would be allowed to continue. If monitoring demonstrates that objectives are not being met or new information indicates effects not previously considered, a new proposed action would be developed and appropriate NEPA analysis would occur.

Public Involvement

Prior to developing proposed actions, Forest staff met with the permittees on the allotments to identify management objectives and strategies. The proposal was listed in the Schedule of Proposed Actions (SOPA) in August 2017, and was provided to the public and other agencies for comment during a 30 day scoping period initiated on August 11, 2017. Three comment letters were received in response to the scoping notice. At the same time, CNF consulted with twelve tribes with ancestral ties to lands now managed by CNF.

Issues

The Forest Service categorized comments received into issues and non-issues. Issues are defined as a concern or debate about the effects of the proposal. Issues can be further categorized as key issues (significant issues used to develop alternatives to the proposed action) and other issues (concerns that are addressed through mitigation measures or project design). The effects analysis is built around the identified issues. Comments not considered issues to analyze in this EA were identified as those that were: 1) outside the scope of the proposed action and thus irrelevant to the decision being made; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) conjectural and not supported by scientific or factual evidence[3]. An analysis of the issues and scoping responses is included in the Project Record.

[3] The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…"

Key Issues
No issues were identified that could not be addressed through mitigation or project design modification.

2. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the management of the Gardner grazing allotment. This section presents the alternatives in comparative form, in order to define the differences between each alternative and provide a clear basis for choice among options by the decision maker and the public. Mitigation and monitoring measures incorporated into the alternatives are also described.

Alternatives Eliminated From Detailed Study

Continue Current Management: Under this alternative, there would be no change in allotment management. This alternative was not analyzed in detail since it does not meet the need to manage resources in a manner that achieves Forest Plan objectives and desired conditions. The alternative would not increase management flexibility through the formal implementation of adaptive management and is not in line with the CRMP.

Alternatives Considered in Detail

Alternative 1- No Action/No Grazing
Under this alternative, grazing would not be authorized and use of the allotment by domestic livestock would be discontinued. Permittees would be given up to one year from the date of the NEPA-based decision to remove livestock from the allotment. Existing structural improvements would remain in place but would not be maintained. Improvements contributing to resource protection or enhancement, such as water developments important for wildlife, would be maintained where feasible using other program funds. Periodic inspection of structural improvements would be used to determine whether maintenance or removal is needed. Removal or maintenance of improvements would be authorized by a separate decision. Where necessary, maintenance of allotment boundary fences would be reassigned to adjacent permittees with the understanding that livestock are to be kept off of the allotment.

Alternative 2- Proposed Action
The Forest's Proposed Action is to authorize continued livestock grazing on the Gardner Allotment with modifications. The Proposed Action consists of four components: **authorization, improvements, management practices/design features, and monitoring** – and would be implemented using an adaptive management strategy.

1. Authorization

Grazing would be authorized on the allotment under the following terms and conditions:

- **Duration and timing of grazing.** Grazing would be authorized on the allotment using rotational grazing in order to incorporate growing season rest or deferment to allow for

grazed plant recovery. On the allotment, the sequence and timing of pasture moves and the timing of entry and exit from the allotment would be based on monitoring of range readiness, ecological condition, water availability, and utilization. Use would occur primarily in the non-growing season. Where growing season use occurs, pastures used in one year would be rested or deferred the following growing season to provide for plant regrowth and recovery.

- **Intensity of grazing.** Grazing intensity, while combined with other forms of implementation and effectiveness monitoring (see monitoring section below), can help guide management decisions to meet desired conditions. Grazing intensity across the forest is described as forage utilization on key forage species. Forage utilization would be managed at a level corresponding to light to moderate intensity (30-45% annual utilization in key areas) to provide for grazed plant recovery, increased herbage production and retention of herbaceous litter to protect soils and provide forage and cover for wildlife (Holechek et. al, 2004)[4]. While utilization monitoring often occurs annually, it's the long term view of that monitoring that guides management decisions. Reviews of stocking rate studies supports this practice as its recommended that grazing intensities guideline are target over 5-10 year periods to account for climatic variables (Holechek and Galt, 2000). However, consistent patterns of annual utilization in excess of 45% of key species in key areas would be used as a basis to modify management practices or take administrative actions necessary to reduce utilization in subsequent grazing seasons. The following administrative actions would be necessary to implement the decision to authorize grazing.
- **Permit issuance.** New 10-year term grazing permits would be issued for the allotment for the numbers and terms identified below and in Table 1. The term grazing permit would identify the number, kind, and class of livestock authorized and the season of use as required by Forest Service policy (FSM 2231.11). Permits would also identify the total animal unit months (AUMs[5]) authorized for the permit. The number and class of livestock and season of use would be allowed to vary depending on resource conditions and management objectives, provided that annual use does not exceed the total AUMs

[4] Based on numerous grazing intensity studies, Holechek (2004) identifies light to moderate grazing as 32-43 percent average use of primary forage species. These averages are based on pasture-wide utilization averaged over time. The Forest Service monitors utilization based on the use of key forage species in key areas. Key areas are selected to be representative of management effectiveness over the entire pasture. For the purposes of monitoring, an annual use guideline of 30-45 percent of key species in key areas will be used to monitor use in all pastures, which, combined with growing season rest or deferment, should insure pasture-wide *average* use of less than 45 percent.

[5] An animal unit month (AUM) is a measure of the amount of *forage* required by a 1000 lb cow or its equivalent for one month based on a daily allowance of 26 lbs. of dry forage per day (Society for Range Management 1998, USFS 1997). It is not synonymous with animal month (or head-month), which is an expression of one month's *occupancy* of the range by an animal. The amount of forage consumed varies based on the size and class of livestock consuming the forage. In general, forage consumption increases with increasing size of the animal using the forage. A cow/calf pair will typically consume more forage than a cow without a calf; a yearling will consume less. Thus an area of rangeland with the capacity to support a certain number of mature cows will likely support relatively fewer cow/calf pairs (or bulls or other larger animals) or relatively more yearlings (or other smaller animals) over the same period of time. The concept of animal unit conversion factors is incorporated into production and utilization studies accomplished by the Forest and is useful for comparing initial capacities on allotments for different classes of livestock. With the forage requirement of a mature cow as the base (1 AUM), the Forest Service Handbook defines a cow/calf pair as 1.32 AUM and a yearling as 0.7 AUM (FSH 2209.15(28)). Ultimately, however, range capacity can be variable and stocking is determinedon an annual basis in response to actual use monitoring and current forage conditions.

authorized. Such changes would be documented and authorized in annual operating instructions. Grazing permits would be issued within 90 days of final agency action following the NEPA analysis and disclosure and the decision to authorize grazing [FSH 2209.13(94) and R3 Supplement 2209.13-2007- 1].

  - **Change from current management.** Changes in management are summarized below. Changes are largely intended to promote adaptive management or allow for more flexibility for pasture deferments to avoid use during the same period in consecutive years throughout the entire allotment. On the Gardner Allotment the number of animal unit months (AUMs) would increase from 1,686 AUMs to 2,800 AUMs. The current permit is for 211 cattle (cow/calf) for 8 months (6/1-10/31 and 12/1-2/28) which equals 1,686 AUMs. The new permit under the proposed action would allow for 2,800 AUMs on the National Forest. The CRM planned use is for 300 Animal Units Yearlong encompassing private, National Forest, and BLM lands. The Gardner Allotment would change from being permitted for seasonal use to yearlong use. This would allow resource managers the flexibility to better manage the allotment. This does not necessarily mean that the allotment would be grazed yearlong, it means that there will be more flexibility by facilitating better rotational grazing at any time of the year for the overall management of the allotment. In any management scheme, yearlong or seasonal use, the proposed guidelines for the intensity, duration and timing of grazing would remain intact.

- **Allotment Management Plans.** Consistent with Forest Service manual guidance (FSH 2209.13, 94), a new allotment management plan (AMP) would be developed for the allotment and would be incorporated into the term grazing permit issued. The AMP would specify the goals and objectives of management, management strategies, range improvements and monitoring requirements and would incorporate an adaptive management strategy described below. The use of the coordinated resource management plan (CRMP) would begin, and such management would be encouraged where the presence of intermingled ownership is conducive to more flexible management.
- **Annual Operating Plans.** On an annual basis, the Forest and permittee would jointly prepare annual plans, referred to as Annual Operating Instructions (AOI), prior to each grazing year. The AOI would set forth:
  - The maximum permissible grazing use authorized on the allotment for the current grazing season and the number, class and kind of livestock, and the timing and duration of use.
  - The planned sequence of grazing in pastures on the allotment, or the management prescriptions and monitoring that would be used to make changes.
  - Structural and non-structural improvements to be constructed, reconstructed, or maintained and who is responsible for these activities.
  - Allowable use or other standards to be applied and followed by the permittee to properly manage livestock.
  - Monitoring for the current season that may include, among other things, documentation demonstrating compliance with the terms and conditions in the grazing permit, AMP and AOI.

Using adaptive management, actual numbers of livestock may vary based on the class of livestock, the duration of use, and climatic conditions. Grazing systems may also be modified as needed to meet stated management objectives.

2. Improvements

Several structural improvements (waters) are currently proposed for the allotment considered in this analysis. Future monitoring may identify the need for additional improvements. In this case, the need for, and site-specific effects of, each additional improvement would be evaluated as described under *Adaptive Management*, below.

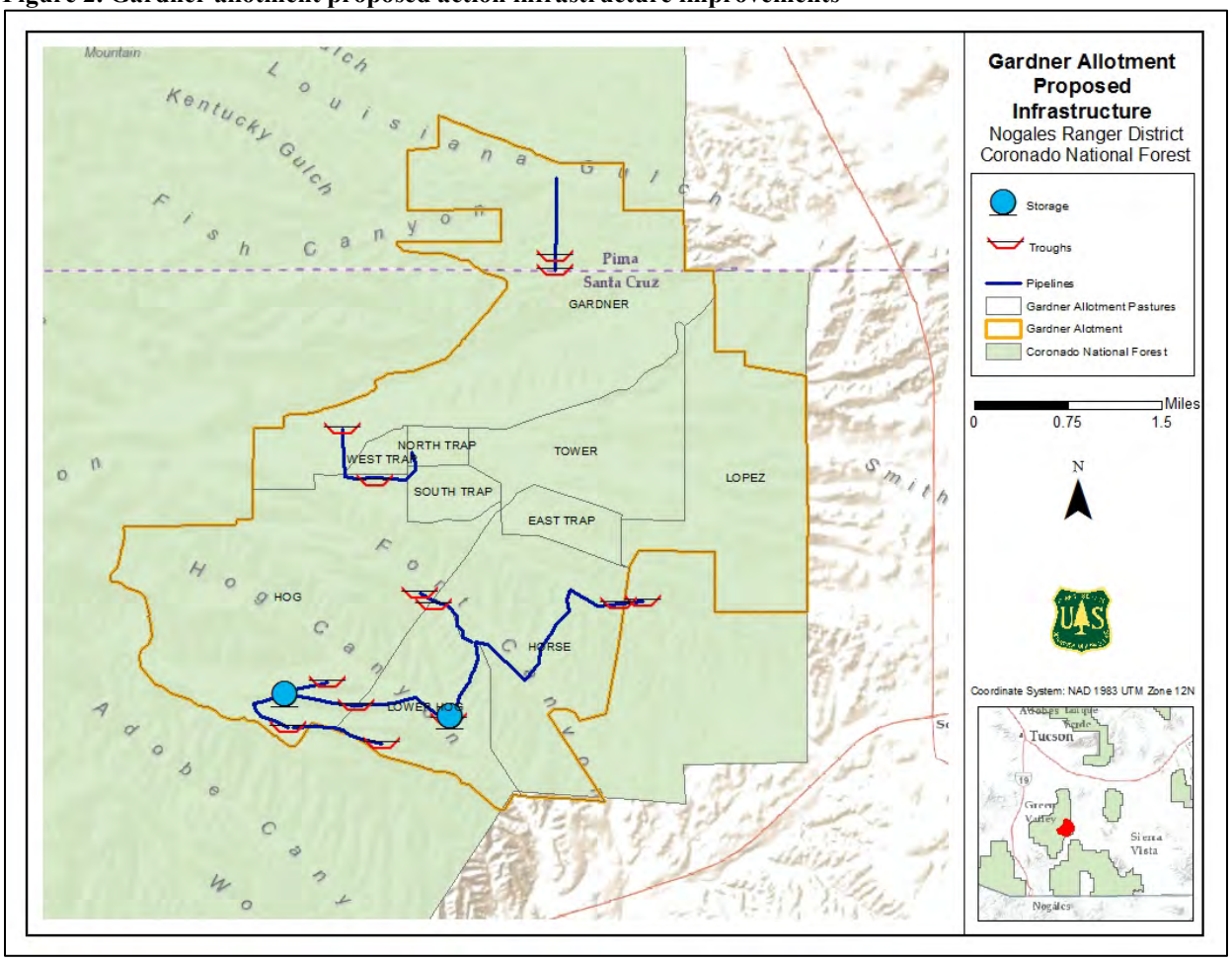
Approximately 1.25 miles of pipeline are proposed to go through the North Gardner Pasture. Two drinkers would be placed along the fence line that separates North Gardner and Gardner pasture. One drinker would be in each pasture. This improvement is to help provide a reliable water source in those pastures and to promote better distribution.

Approximately 2 miles of pipe are proposed to go through the North Upper Hog pasture and the Bull Pasture. A drinker would be placed in the North Upper Hog pasture and in the Bull pasture to help provide reliable water in these pastures and to promote better distribution.

Approximately 4 miles of pipeline, 2- 5,000 gallon water storage tanks, and 7 drinkers would be placed in the Lower Hog, Horse and Upper Hog Pastures collectively. This would help provide reliable water in these pastures and promote better distribution.

The responsibility for maintenance of range improvements is assigned to the permittee in the terms and conditions of each grazing permit (FSM 2244.03). Maintenance activities include the repair of fences and water facilities, cleaning of stock ponds and other actions necessary to maintain the improvement in serviceable condition necessary to serve the purpose intended. On an annual basis, responsibilities for repair and maintenance of existing improvements would be identified in the AOI(s). See Figure 2 for proposed improvements.

Figure 2. Gardner allotment proposed action infrastructure improvements



3. Management Practices/Design Features

To mitigate resource impacts, the following measures would be implemented. These practices have been demonstrated to be successful when used on similar projects and are considered effective at reducing environmental impacts. They are consistent with applicable Forest Plan standards and guidelines, Best Management Practices, and the terms and conditions and conservation measures of applicable U.S. Fish and Wildlife Service Biological Opinions. Implementation of the mitigation measures and design criteria is intended to preclude the occurrence of potentially significant environmental impacts.

Soil, Water, and Vegetation – the objective is to mitigate effects of livestock grazing and facility construction through the use of Best Management Practices (FSH 2509.22) and adaptive management. Practices include, but are not limited to, the following:

- Utilization of key upland herbaceous forage species in key areas would be managed to achieve the goal of light to moderate grazing as a pasture average. The objective is to protect plant vigor, increase herbaceous residue needed for soil protection and to increase herbage producing ability of forage plants. A utilization guideline of 30-45% use of key species in key areas would be implemented to achieve this objective.

- Management practices would be used to achieve proper distribution or lessen the impact on sensitive areas. Practices include herding, salting, and controlling access to waters. Salt would be placed on good feed, one quarter to one half mile from waters, and salting locations would be moved annually. Placement of liquid or bulk supplements would require prior approval of the District Ranger.
    - No hay would be placed on Forest lands in order to minimize the introduction of invasive or exotic seeds.

Wildlife – the objective is to mitigate impacts to wildlife from livestock grazing and from disturbance associated with maintenance and construction of range facilities.

- All water developments would include wildlife access and escape ramps. Waters would be kept available to wildlife year round.
- All new and reconstructed fencing would be built to Forest Plan standards (Forest Plan, p. 35) to provide for wildlife passage through the fence. At a minimum, this would be a 4-strand fence with smooth bottom wire 16 inches off of the ground and a total height of 42 inches or less.
- In the event that the need for new range improvements is identified, projects would be designed to avoid the destruction of agaves. If impacts to agaves are unavoidable, the Forest would insure that no more than 1% of agaves within 800 meters of a project are impacted. The objective is to avoid impacts to lesser long-nosed bat food resources.
- In the event that the need for new range improvements is identified, all proposed range improvements would be evaluated by a qualified wildlife biologist for effects to threatened, endangered or sensitive species prior to any ground-disturbing activities. Facilities would be designed and constructed to have no adverse effect on listed species.
- Within areas meeting the definition of high quality Montezuma quail habitat, herbaceous vegetation would be managed to maintain a minimum of 6 inches of herbaceous stubble height, which is generally interpreted as less than 45% utilization of key herbaceous species. The objective is to provide herbaceous vegetation as cover for quail and other wildlife.
- The Forest would implement the Forest's Stockpond and Aquatic Habitat Management and Maintenance Guidelines for the Chiricahua leopard frog (*Rana chiricahuensis*). The objectives are 1) to minimize short-term impacts to frogs while allowing maintenance activities that maintain occupied habitats, and 2) to protect shoreline and emergent vegetation and to improve water quality.

Heritage Resources – The objective is to protect heritage resources (historic and prehistoric sites) from direct or indirect impacts caused by ground-disturbing activities associated with the construction of range facilities and to monitor the effects of cattle grazing on sites to ensure that adverse effects are not occurring. In general, these measures include the following:

- The new range facilities that are proposed, have been surveyed by qualified personnel for heritage resources. Facilities would be built or modified to avoid impacts to heritage sites. If unrecorded sites are discovered during the course of project implementation, activities would cease and the Forest or District Archeologist would be notified.

- Range facilities, would be located so as to avoid concentrations of livestock on identified heritage resource sites.
- No salting would occur within or adjacent to identified heritage sites.
- If impacts from grazing (e.g. excessive trampling, cattle rubbing against and knocking down standing features) begin to occur to heritage sites, measures would be taken (e.g. fencing) to protect them.

4. Monitoring

The objective of monitoring is to determine whether management is being properly implemented and whether the actions are effective at achieving or moving toward desired conditions. The forest separates rangeland monitoring into the two categories: Effectiveness Monitoring and Implementation Monitoring. These two types of monitoring are needed to interpret effects of management on rangelands. As effectiveness monitoring provides the long-term trend and data associated with various attributes related to upland vegetation and riparian areas, the implementation monitoring helps evaluate the uses, actions, and/or stressors that took place on the same benchmark sites and the surrounding areas. Assumptions can be made by using the data from these two data sets to help determine why certain attributes in long term monitoring are or are not changing over time, and thus inform decision making in adaptive management.

Effectiveness monitoring includes measurements to track condition and trend of upland and riparian vegetation, soil, and watersheds. Monitoring will be done following procedures described in the interagency technical reference[6] and the Region 3 Rangeland Analysis and Training Guide.[7] This data is interpreted to determine whether management is achieving desired resource conditions, whether changes in resource condition are related to management, and to determine whether modifications in management are necessary. Effectiveness monitoring will occur at five to ten year intervals, or more frequently if deemed necessary. Examples of effectiveness monitoring measurements include, but are not limited to plant frequencies by species, relative plant compositions by species, point ground cover, riparian evaluations and transects (repeat photography, bank stability measurements, channel gradient and cross section mapping, vegetation cover by species, age class inventory by species and/or proper functioning condition assessments), soil and watershed condition assessments, plant community similarity index assessments, and repeat photography. Monitoring occurs at established permanent monitoring points.

Implementation monitoring will occur on an ongoing basis and will include, but not be limited to, such things as forage utilization measurements, livestock counts, and range improvement inspections. An allotment inspection will include all of the aforementioned attributes along with field observations such as cattle behavior and distribution description, grazing permit compliance checks, invasive species populations, soil and watershed conditions, recreation uses, wildlife observations, and general resource conditions.

Utilization measurements are made following procedures found in the Interagency Technical

[6] Sampling Vegetation Attributes, Interagency Technical Reference. 1996. Cooperative Extension Service, USDA Forest Service and Natural Resources Conservation Service, and USDI Bureau of Land Management.

[7] Rangeland Analysis and Management Training Guide. 1997. USDA Forest Service, Southwestern Region.

Reference[8] and with consideration of the Principles of Obtaining and Interpreting Utilization Data on Southwest Rangelands (Smith et al 2016). Utilization will be monitored on key forage species, which are perennial grasses that are palatable to livestock. At a minimum monitoring will include use in key areas[9], but may include monitoring outside of key areas. Utilization on non-grass species (forbs, shrubs and trees) may also be measured if appropriate for the site. Utilization may be monitored both during the grazing season (seasonal use) and at the end of the growing season (annual utilization). The Nogales District Range Staff Officer and the permittees will be responsible for monitoring livestock grazing utilization. Over time, changes in resource conditions or management may result in changes in livestock use patterns. As livestock use patterns change, new key areas may be established and existing key areas may be modified or abandoned in cooperation with the permittee(s).

Permittees will be encouraged to participate in monitoring activities. Records of livestock numbers, movement dates and shipping records will be kept by the permittees and will be provided to the District Range Staff annually.

Adaptive Management

Adaptive management uses the documented results of management actions (monitoring) to continually modify management in order to achieve specific objectives, which are identified under *Desired Conditions* in Chapter 1. Adaptive management provides the flexibility to adjust livestock numbers and the timing of grazing so that use is consistent with current productivity and is meeting management objectives. Under the adaptive management strategy proposed, the specific number of livestock authorized annually, specific dates for grazing, class of animal, and modifications in pasture rotations may be administratively modified as determined to be necessary and appropriate, based on implementation and effectiveness monitoring. However, such changes would not exceed the limits for timing, intensity, duration and frequency authorized in the NEPA-based analysis and decision.

Administrative changes would be documented and implemented in the AOI, AMP and/or the term grazing permit.

Adaptive management also includes monitoring and analysis to determine whether identified structural improvements are necessary or need to be modified. In the case that changing circumstances require physical improvements or management actions not disclosed or analyzed herein, further interdisciplinary review would occur. The review would consider the changed circumstances and site-specific environmental effects of the improvements in the context of the overall project. Based on the results of the interdisciplinary review, the Ranger would determine whether correction, supplementation, or revision of the EA is necessary in accordance with

[8] Utilization Studies and Residual Measurements. Interagency Technical Reference. 1996. Cooperative Extension Service, USDA Forest Service and Natural Resources Conservation Service, and USDI Bureau of Land Management. Revised 1999.

[9] A key area is a portion of rangeland selected because of its location, use or grazing value as a monitoring location for grazing use, range condition and trend. Key areas are usually ¼ to 1 mile from water, located on productive soils on level to intermediate slopes where prescribed use will occur first. They are 5 acres or more in size. Properly selected key areas will reflect the overall acceptability of current management.

Forest Service Handbook direction at FSH 1909.15(18) and FSH 2209.13(96.1), or whether further analysis under NEPA is required.

3. ENVIRONMENTAL CONSEQUENCES

This chapter summarizes the physical, biological, social and economic environments of the affected project area and the potential effects to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives. The chapter is organized by resource. Within each section, the affected environment is briefly described, followed by the environmental consequences (effects) if implementing each alternative.

Past, Present & Reasonably Foreseeable Actions

Cumulative effects are the past, present and reasonably foreseeable future actions that add to the direct and indirect effects considered in this EA. The following activities have been identified as potentially contributing to the effects analyzed herein. These activities and occurrences have contributed incrementally to changes in ecological conditions in the project area and may continue to influence conditions in the project area over the term of the project. Foreseeable future actions are those for which a proposed action has been approved or those proposed for NEPA analysis in the future. Other possible future actions are considered too speculative to include in this analysis.

Historic Grazing. Livestock grazing has occurred within the analysis area for over 100 years. In the late 1800s, widespread unregulated grazing resulted in erosion, heavy surface runoff, flooding and down-cutting of streams throughout the southwest. Livestock consumption of herbaceous fine fuels, combined with active fire suppression beginning in the early 1900's has likely contributed to a decreased fire frequency and subsequent invasion of many grasslands by woody plants. The effects of these activities and events are still evident in the project area. The proposed action is designed to correct the effects of historic management, but these effects would likely continue to influence resource conditions, especially soil condition, for the foreseeable future.

Rosemont Mine. This would have an effect on air quality, scenic resources, vegetation, water, soils, habitat, fugitive dust, airborne contaminants, noise, loss of vegetation and habitat, increased erosion, wildlife displacement, contaminated runoff to streams and groundwater, increased risk of introduction or spread of invasive species.

Gardner Brush Control, Cienega FireScape and Apache Prescribed Fire. These projects would have an effect on vegetation for short period of time, air quality during actual prescribed fire, they will improve Forest health and vigor by returning shrub encroached areas to grasslands and improve wildlife habitat.

Human Activities. Authorized activities in the project area include camping, hiking, hunting, wildlife watching and vehicle use on surfaced and unsurfaced roads. Impacts from these

activities are short term and primarily consist of minor ground disturbance in popular camping areas and minor wildlife disturbance in popular bird watching spots.

There are several undeveloped recreational facilities (campgrounds) in the project area. Portions of the area show substantial evidence of trailing by undocumented aliens and/or drug traffickers. The effects of these activities include accumulations of trash, creation of wildcat foot and vehicle trails and vandalism of range improvements, especially fences. In addition, the area has seen a substantial but unquantified increase in vehicle traffic related to interdiction efforts on the part of the U.S. Border Patrol and other enforcement agencies. The effects of border crossing activities are largely outside of the control of the Forest Service and the permittees, but they are likely to require additional efforts to maintain improvements and keep to a rotation schedule.

These facilities and activities would continue to result in short term and relatively minor effects to soils and hydrology and wildlife, especially where activities are concentrated in drainage bottoms. However, because no significant direct or indirect effects of the proposed action and alternative are anticipated, neither of the alternatives is expected to contribute significant cumulative effects.

Spatial and Temporal Bounds for Cumulative Effects

The spatial bounds of cumulative effects on wildlife and soil condition is the watershed area in which the allotment is located. For vegetation, the bounds are the project area/allotment. Temporal bounds for cumulative effects on all resources is ten years which is the term of the proposed grazing permit.

Wildlife Condition

Affected Environment

For analysis of proposed action effects, species of wildlife and rare plants are typically grouped by categories derived from law. Threatened and endangered species and any critical habitats for them are analyzed in accordance with the 1973 Endangered Species Act of 1973, as amended, or ESA; they are herein collectively referred to as ESA species. Under the ESA, federal agencies are to work to conserve endangered and threatened species (section 7b) and to use their authorities to further the purposes of the Act (section 7a), i.e., species recovery.

Sensitive species listed by the Regional Forester are analyzed in accordance with Forest Service Manual 2670 because there may be a concern about their status and the potential for them to decline and become listed under the ESA; they are herein referred to as RFSS. Management indicator species, identified during forest plan development, are analyzed in accordance with requirements of the 1976 National Forest Management Act (NFMA) in terms of how proposed actions affect their viability across the NFMA unit (i.e., the National Forest); they are herein referred to as MIS.

A Biological Assessment (BA) was prepared for all ESA species which would be impacted by the grazing on the CNF, and species known to occur or that are predicted to occur within the project area are analyzed here. These ESA species, critical habitat, as applicable, and determination of effects are shown in the table below. For more detail, see the BA located in the

Project Record. The BA is currently under review by the U.S. Fish and Wildlife Service for their concurrence of determinations as noted in the table below.

Species presence or potential to be present was determined via The U.S. Fish and Wildlife Service's Information for Planning and Conservation (IPaC November 2, 2021), Arizona Game and Fish Department's Natural Heritage Data Management System (HDMS 2018), and Forest Service project records. A list of threatened and endangered species that may occur in the project area was transmitted by USFWS on November 2, 2021.

Proposed Action Alternative

Table 3. Determination of effects for federally listed species

Scientific Name	Common Name	Status	Species Determination	Critical Habitat Determination
Lithobates chiricahuensis	Chiricahua Leopard Frog	LT	LAA	None in AA
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	LAA	NLAA
Strix occidentalis lucida	Mexican spotted owl	LT	NLAA	NLAA
Panthera onca	Jaguar	LE	NLAA	NLAA
Leopardus pardalis	Ocelot	LE	NLAA	No Critical Habitat
Gila intermedia	Gila chub	LE	NLAA	None in AA
Thamnophis eques megalops	Northern Mexican gartersnake	LT	LAA	None in AA
Lilaeopsis schaffneriana var, recurve	Huachuca water-umbel	LE	NLAA	None in AA

LT = listed threatened, LE = listed endangered, NLAA = may affect, not likely to adversely affect, LAA = may affect, likely to adversely affect

Chiricahua Leopard Frog

Determination: The proposed action **may affect, and is likely to adversely affect**, CLF and its designated critical habitat for the following reasons:

- Livestock grazing and management activities occur in occupied or likely to be occupied habitat.
- Eggs, tadpoles, and metamorphosing Chiricahua leopard frog (CLF) may suffer direct mortality or injury through trampling by cattle along the perimeter of occupied habitat.
- Direct mortality or injury of frogs may occur at livestock tanks where maintenance activities result in disturbance to occupied stocktanks.
- Maintenance activities and range improvements may increase the spread and viability of harmful nonnative species.

Conservation Measures:

- Implement the Stockpond Management Plan.
- Notify permit holders and Range Staff of the operational procedures in CLF and Sonoran tiger salamander (STS) Recovery Plans to minimize take from the introduction of non-native species and disease contamination.
- Work with AGFD, New Mexico Department of Game and Fish (NMDGF) and USFWS to translocate CLF to suitable sites in the Forest, emphasizing the enhancement of metapopulation dynamics and long-term population persistence.
- Work with AGFD, NMDGF and USFWS to begin an aggressive program to control nonnative aquatic organisms on the Forest, particularly bullfrogs, fish in the families Centrarchidae and Ichtaluridae, and crayfish.

Yellow-billed Cuckoo (Western DPS)

Determination: The proposed action **may affect, and is likely to adversely affect**, YBCU and is **may effect, but is not likely to adversely affect** its designated critical habitat for the following reasons:

- The Coronado shall avoid the construction or repair of any range improvements within YBCU breeding habitat during the YBCU breeding season (June 15 – September 15) that could result in disturbance to breeding YBCUs.

YBCU eat invertebrates that may rely on grasses and forbs as well as those that rely on resources provided by trees; therefore, the biomass removed by livestock grazing is likely to have minor effects on the prey items of, and hence, YBCU.

Mexican Spotted Owl

Determination: The proposed action **may affect but is not likely to adversely affect** the MSO and MSO DCH.

The rationale for this determination for the species is in italics below each criteria:

1. No human disturbance or construction actions associated with the livestock grazing will occur in PACs during the breeding season (exceptions may occur where recent surveys indicate non-breeding or infer absence), and

   All construction activities associated within active grazing allotments do not occur during MSO breeding season in PACs. All of these activities are authorized in the Annual Operating Instructions (AOIs) for each allotment. The AOIs provide specifications and site specific detail for these activities including timing of work to be completed.

2. Livestock grazing and livestock management activities within PACs in the action area will be managed for levels that maintain or enhance prey availability, maintain potential for beneficial surface fires while inhibiting the potential for destructive stand-replacing fire, and to promote natural and healthy riparian, meadow, and upland plant communities including their functional processes, and

   Light to moderate grazing intensity will maintain/enhance prey availability, maintain potential for beneficial surface fires while inhibiting the potential for destructive stand-replacing fire, and promote natural and healthy riparian, meadow, and upland plant

communities including their functional processes. The proposed action will not significantly alter key habitat components for MSOs or their prey base.

3. Within protected and recovery habitat, forage utilization is maintained at conservative levels (i.e., light to moderate grazing intensity within owl habitat).

   Forage utilization is based on site-specific resource conditions and management objectives, but in general is managed at a level corresponding to light to moderate intensity (15 to 45 percent of current year's growth).

The rationale for this determination for the MSO DCH includes:

1. Livestock grazing and livestock management activities within designated critical habitat is managed for levels that provide a wide range of tree and plant species, including hardwoods, adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration , the woody and herbaceous vegetation necessary for cover for rodent prey species, the residual biomass that will support prescribed natural and ignited fires that would reduce the risk of high-severity, stand-replacing wildfire in the forest, and regeneration of riparian trees, and

   Light to moderate grazing intensity will maintain/enhance prey availability, maintain potential for beneficial surface fires while inhibiting the potential for destructive stand-replacing fire, and promote natural and healthy riparian, meadow, and upland plant communities including their functional processes. The proposed action will not significantly alter key habitat components for MSOs or their prey base.

2. Within protected and recovery habitat (2012 recovery plan, first revision), forage utilization will be maintained at conservative levels (i.e., light to moderate grazing intensity within owl habitat).

   Forage utilization is based on site-specific resource conditions and management objectives, but in general is managed at a level corresponding to light to moderate intensity (15 to 45 percent of current year's growth).

Jaguar/Jaguar Critical Habitat

Determination: The proposed action **may affect, but is not likely to adversely affect** jaguar and designated jaguar critical habitat.

The rationale for this determination for the species is in italics below each criteria:

1. Grazing and livestock management activities will not significantly disturb jaguars or reduce cover, water, or prey and will not increase noise or lighting within jaguar habitat, therefore, the effects are determined to be discountable and/or insignificant.

   Site specific resource conditions and management objectives will be used to result in light to moderate forage utilization, which will not result in clearing of habitat, destruction of riparian areas, or fragmentation. Grazing activities will not increase noise or lighting within jaguar habitat.

2. Livestock management activities will not permanently disrupt connectivity corridors within the U.S. and between the U.S. and Mexico.

Structural range developments such as water developments are assessed and evaluated for potential species' impacts prior to construction approval/implementation. While the majority of such proposals is of minor consequence, any perceived impedance to jaguar movement will cause a proposal to be redesigned, relocated, and/or rejected.

The rationale for this determination for jaguar critical habitat includes:

1. Livestock grazing and management activities will be insignificant or discountable with no measurable effect on the primary constituent elements of the physical and biological features necessary for all jaguar life history processes.

   Light to moderate forage utilization will not result in habitat fragmentation, clearing, or destruction, therefore maintaining connectivity to Mexico (PCE 1), adequate levels of prey species (PCE 2), and canopy cover (PCE 4). Range improvements, such as water developments, will maintain water resources (PCE 3). Grazing activities will have no effect on landscape ruggedness (PCE 5), elevation (PCE 6), or population density (PCE 7).

Ocelot

Determination: The proposed action **may affect, but is not likely to adversely affect** ocelot.

The rationale for this determination for the species is in italics below each criteria:

1. Grazing and livestock management activities will not significantly disrupt ocelots or reduce cover, water, or prey and will not increase noise or lighting within ocelot habitat, therefore, the effects of the action are discountable or insignificant.

   Effects associated with livestock grazing and range improvements are very limited. Effects to habitat from livestock grazing under current management systems and forage utilization are minimized and/or eliminated when light to moderate forage utilizations are implemented.

2. Livestock management activities will not significantly disrupt connectivity corridors within the U.S. and between the U.S. and Mexico.

   Site specific resource conditions and management objectives will be used to result in light to moderate forage utilization, which will not result in clearing of habitat, destruction of riparian areas, or fragmentation. Structural range developments such as water developments are assessed and evaluated for potential species' impacts prior to construction approval/implementation. While the majority of such proposals is of minor consequence, any perceived impedance to ocelot movement will cause a proposal to be redesigned, relocated, and/or rejected.

Gila Chub

Determination: The proposed action **may affect, but are not likely to adversely affect** Gila Chub or their designated critical habitat for the following reasons:

- Livestock grazing has the potential to impact the Gila chub or their habitat, often through riparian and vegetation removal as well as trampling of streambanks. Vegetation removal can affect aquatic habitat by increasing water temperatures through removal of shade whereas trampling can change important structural components such as overhanging banks, run, riffle, and pool habitats.

- No grazing occurs in occupied Gila Chub habitat on the Coronado National Forest. Sabino, Bear, and Romero canyons nor their watersheds are within grazing allotments.
- Potential downstream effects of grazing could result in increased sedimentation off forest in habitats Gila Chub occur. The potential downstream effects would occur differently depending upon the distance from the forest boundary due to the buffering effect of intervening habitat. The nearest Gila Chub critical habitat is the Empire Gulch Unit, approximately five miles to the northeast.
- Gila Chub and designated critical habitat occur off forest in portions of O'Donnell Canyon that are upstream of CNF managed lands. O'Donnell Canyon allotment is in mid to high similarity index with static or improving Ecological Conditions. The downstream segment of this creek is within a fenced enclosure in the Post Canyon Allotment designed to keep livestock out of the creek. Post Canyon allotment is in mid to high similarity index with static or improving Ecological Conditions.
- Similarly, Turkey Creek supports Gila Chub and Critical Habitat upstream of CNF managed lands, but the downstream portions are on the Chuney Allotment, which is inactive.

Conservation Measures:

- Implement the Stockpond Management Plan

Northern Mexican Gartersnake

Determination: The proposed action **may affect and is likely to adversely affect** the northern Mexican gartersnake for the following reasons:

- Grazing will adversely affect the amount and complexity of bank vegetation that may expose gartersnakes to increased predation, especially harmful nonnatives like bullfrogs. A decrease in bank vegetation may also negatively affect populations of gartersnake's native prey base.
- Implementation of the stockpond management plan, including limiting livestock access to stockponds and introducing native species, should help reduce the negative effects from livestock grazing.

Conservation Measures:

- Implement the Stockpond Management Plan.
- Notify permit holders and Range Staff of the operational procedures in the Chiricahua leopard frog (CLF) and Sonoran tiger salamander (STS) Recovery Plans to minimize take from the introduction of non-native species and disease contamination.
- Work with AGFD, New Mexico Department of Game and Fish (NMDGF) and USFWS to translocate CLF to suitable sites in the Forest, emphasizing the enhancement of metapopulation dynamics and long-term population persistence.
- Work with AGFD, NMDGF and USFWS to begin an aggressive program to control nonnative aquatic organisms on the Forest, particularly bullfrogs, fish in the families Centrarchidae and Ichtaluridae, and crayfish.

Regional Forester Sensitive Species
Eighty-two species on the Regional Forester's list were identified as occurring, or having the potential to occur within the project area. For these species, the proposed action will either have no effect or not lead to a downward trend in populations of Forest Service sensitive species in or around the action area which would cause a species to become threatened or endangered; justifications are provided within the wildlife specialist report located within the project record.

Vegetation Condition

Affected Environment
Grazing by domestic livestock may impact vegetation by changing the mix of species in the plant community being grazed (vegetation composition), by changing the density and frequency of perennial forage plants, and by changing the vigor of the grazed plants.
Rangeland condition is an expression of the degree to which the composition, frequency and vigor of plants in a community resemble the climax plant community for that site.
Measurements of these three vegetation parameters are used to place range sites into vegetation condition classes that reflect the relative effects of grazing on vegetation.
The project area falls within the Mexican Oak-Pine Woodland and Oak Savannah Land Resource Unit (41-1 AZ) and Range Woodlands Land Resource Unit (41-3 AZ) as defined by the Natural Resource Conservation Service. The reference range sites used to describe the potential natural community for the purpose of determining rangeland condition include Sandyloam Uplands, Clayloam Uplands, Loamy Uplands, Limy Slopes, Shallow Hills and Volcanic Hills in the 12-16 and 16-20 inch zones. Rangeland vegetation was assessed in 2016 by the Forest Service using the dry weight rank methodology. Monitoring results are summarized below.

Data collected at permanent monitoring locations indicate that the allotment is in 10% high similarity with upward trend, 90% mid similarity with stable trend. Soil condition: 100% satisfactory condition in areas that were sampled. Indicators of soil condition such as the amount of bare ground and litter show positive trends, but vegetation composition is unlikely to change.

Environmental Consequences
Alternative 1
Monitoring indicates that most sites within the project area are at or near their ecological potential. Under *Alternative 1* woody species would likely continue to suppress condition, because a shift in species composition is needed for some areas to reach high condition. Thus many areas would probably remain in fair condition in the absence of more intensive management such as burning or mechanical treatment that would open up the canopy. On open loamy upland sites, residual plant material, both standing and in the form of litter, would be expected to increase in the absence of grazing. Additional organic material is expected to provide soil protection, increase soil water holding capacity and decrease evaporation. In terms of indirect effects, additional herbaceous material in the understory would provide fine fuels that would allow fire to play a more natural role in the area. The re- establishment of a more natural fire regime may reduce the density of woody species such as juniper, pinyon pine and oak that currently suppress herbaceous production.

Alternative 2
Provide flexibility to adjust to changing forage conditions. Proposed utilization objectives of 30-45% in uplands should maintain plant density and vigor over the term of the analysis, especially if use occurs primarily during the dormant season. Moderate use proposed is expected to leave sufficient residual biomass to protect soils and provide herbaceous fuels to carry fire. Annual growing season rest on the pastures and regular rest or deferment should allow for growth and reproduction of perennial grasses each summer.

Management alone may not be sufficient to result in significant changes, since a shift in species composition would be necessary. An impact to vegetation would happen while water improvements are being constructed however that impact will be of a short time frame and vegetation will quickly recover after installation has occurred.

Cumulative Effects
Past, present and foreseeable future projects or actions that have affected or will affect the project area. They include grazing, water developments, prescribed and natural fires, wildfire suppression, road construction, recreation and fuels management. The cumulative effects analysis applies to both the No Action and the Modified Proposed Action.

Fuel Wood Collection – Generally the prescription is coordinated with other resource areas to help benefit ecological condition. There can be a short term effect from cross country travel leading to soil compaction and loss and or trampling of vegetation; however these effects are generally short term and discussed in the effects analysis for this project and they will not contribute to cumulative effects.

Grazing Permit Reauthorization, Greaterville, Debaud, Rosemont and Thurber Allotments
Grazing is managed across the district to forest plan standards. The effects to vegetation by livestock grazing is generally short term and conducted in a sustainable way that promotes high to moderately high ecological conditions. The allotments have existed on the district for the past 100+ years with the current existing road system. Vegetation monitoring transects across the district have resulted in overall conditions that meet or are moving toward forest plan standards. Grazing management does not contribute to the cumulative effects of the project.

Gardner Brush Control, Cienega Firescape and Apache Prescribed Fire – These individual scale vegetation management projects can effect vegetation by removing or reducing woody plants and removing herbaceous plants. These effects are generally conducted with a prescription that would encourage ecological condition of the project area. Some projects do require cross country travel which can lead to soil compaction and trampling of vegetation. These are generally short term effects, and they are usually minimized by implementing best management practices for utilizing vehicles off roads. Furthermore the purposes of these projects are to promote restoration of vegetation resources on a landscape scale. The short term effects of the implementing of these projects do not contribute to the cumulative effects of the project.

Development and use of Unauthorized Routes – These actions can effect vegetation by removing or trampling vegetation, However, these actions are managed and maintained to standard while implementing best management practices to reduce impacts to vegetation. The purposes of such activities are conducted to promote proper water drainage on roads and trails, which benefits the vegetation resource. This activity does not contribute to the cumulative effects of the project.

Rosemont Mine, Construction and Operation and associated activities – Has been analyzed in an Environmental Impact Statement and its effects are still being analyzed. In general these projects can effect vegetation by compacting soil and removing or trampling vegetation. The project would also reclaim disturbed areas to mitigate effects to vegetation.

Border Patrol Use- Border patrol sometimes do require cross country travel which can lead to soil compaction and trampling of vegetation. These are generally short term effects, and they are usually minimized by implementing best management practices for utilizing vehicles off roads.

Watershed Condition

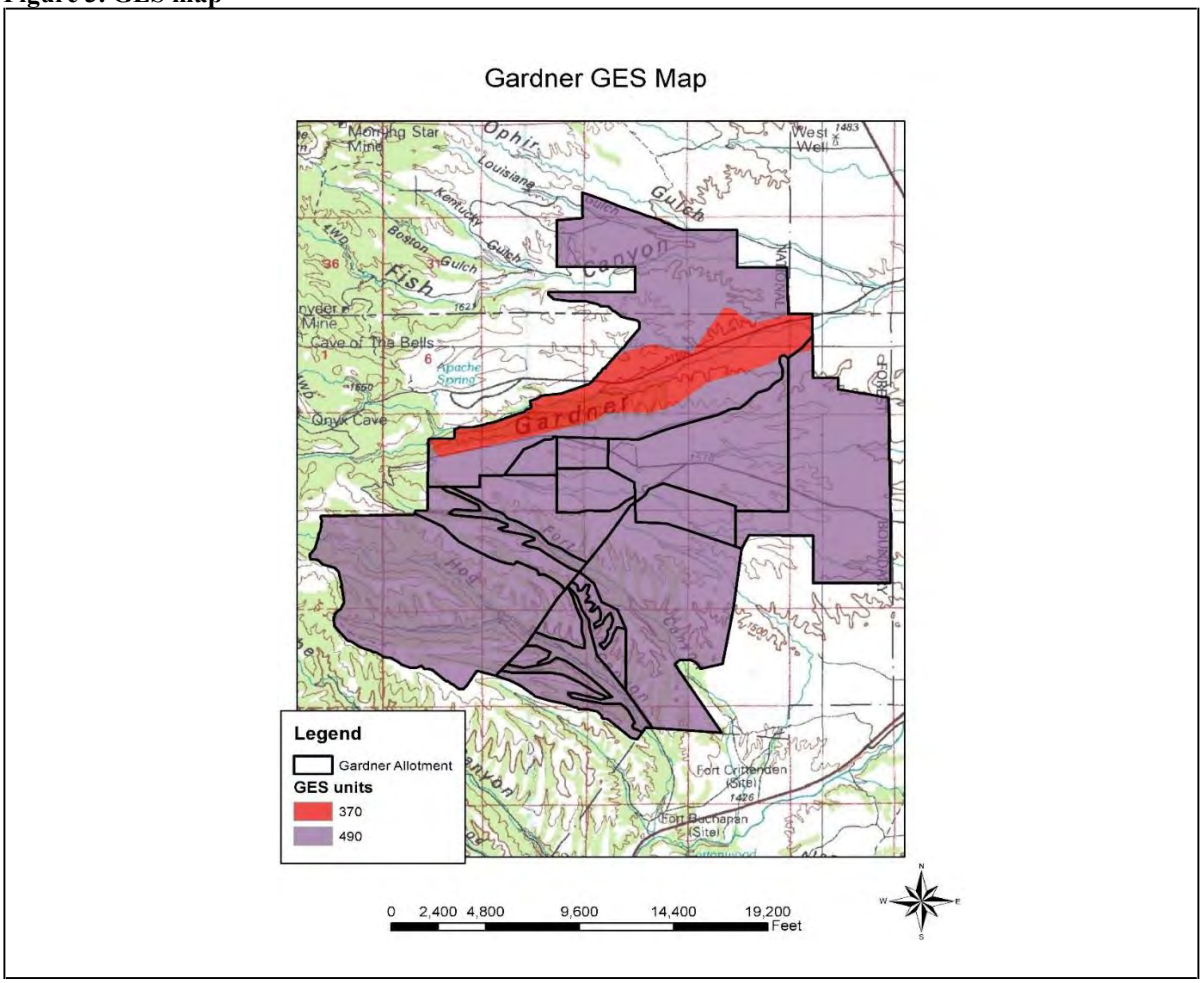
Soils, Water Quality and Quantity, Riparian Areas and Air Quality

Affected Environment

Soils:

A General Ecosystem Survey (GES) is an ecological unit inventory that was completed by the Forest Service in 1991 and covers the entire allotment area (USDA, 1991). GES maps soils, climate, geology, potential natural vegetation and topography. It also provides various map unit interpretations such as erosion hazard. Though the GES is a broad scale inventory at 1:250,000, it is the best survey currently available for the Forest. The Terrestrial Ecological Unit Inventory and associated ecological and soil interpretations are available for many forests throughout the Southwest Region (mapped at 1:24,000 scale). However, the inventory process is not complete for the CNF. The GES units that encompasses the project area are 490 and 370. See map below.

Figure 3. GES map



GES unit 490 encompasses the majority of the allotment area. Unit 370 encompasses Gardner Canyon and surrounding shallow slopes. See Table 1 below regarding the properties of these GES units.

Table 4. General ecosystem survey units descriptions

GES UNIT	Average Slope %	Surface Texture/ Modifier	Soil Depth	Erosion Hazard
490	15% - 40%	Sandy Loam/ Cobbly to Very Cobbly	Deep	Moderate to Severe
370	0-15%	Sandy Loam/Very Gravelly to Extremely Gravelly	Deep	Slight

Erosion hazard depends on slope gradient, depth of soil and characteristics of drainage. High gradient slopes have more risk to surface wash than low gradient slopes, and deep soils have more risk to landslips and gully erosion than shallow soils. Unit 490 has moderate to severe erosion risk as it typically occupies large fans of sand and conglomerate with significant slopes that may be prone to gullies. Unit 370 follows a major drainage, and is characterized by shallow slopes with sandy textured soils. Due to the shallow slopes, erosion hazard is slight on the uplands. Of course, the drainage itself is subject to flood flows, with erosion and sediment deposition occurring from these flows.

Although livestock are not specifically excluded from steeper slopes, they are not likely to be present. This is due to lack of forage and excessive slope, though some incidental grazing may occur.

Range condition data collected in 2016 demonstrates that the majority of the allotment is in mid to high ecological condition. Approximately 60% of the allotment is in high ecological condition with the remaining 40% in mid ecological condition. Comparisons with data collected in the past indicate a static or upwards trend in range and soil condition.

Soil condition was assessed in 2014 and 2016 using Natural Resources Conservation Service (NRCS) soil health indicators. Satisfactory is the highest rating and indicates that the soil is functioning properly with respect to hydrology, soil integrity, and biotic integrity. Soil condition was satisfactory at all sampled locations, which represent areas typical to the grazing system. However, although no soil test sites were found to have impaired or unsatisfactory soils, that doesn't mean that 100% of the allotment area is satisfactory. This is because it is not possible to visit everywhere within the allotments. Also, some areas of limited extent, and not representative of a pasture as a whole, are more heavily utilized by livestock, such as near water sources. It can be expected that compaction and lack of vegetation has led to a degradation of soil condition in these areas. However, for the most part, the soil test locations can generally be considered an indication of how soils are doing overall on the grazing allotment.

Soil is affected by the livestock walking on the soil and consuming forage. When livestock grazing is done in an unmanaged fashion or at high-intensity and long duration, it results in:

- Compaction of soils from hoof action, resulting in a platy structure, reduced water infiltration into the soil, reduced ability to exchange gases, and the formation of dense horizons where root penetration is difficult.
- Destabilization of soils, especially on the banks of streams.
- Consumption of too much vegetation exposes the soil to raindrop impacts and overland flows of water, leading to soil crusting, accelerated erosion, and a general loss of stability. Downstream water quality can be impacted.
- The reduced cover results in a loss of soil organic matter and a loss of soil productivity, which leads to a loss of soil microbes that recycle nutrients.

Some studies have found that managed grazing can be beneficial to the land by:

- Breaking up dense, rank vegetation through hoof action, which can improve the health, palatability and forage production of grass species (Savory 1988).

- Stimulating plant production, which can produce more above-ground biomass that would be available for litter.
- Some hoof action reduces compaction by breaking up the surface crust and preparing the soil for seeds and plants. The hoof action mixes around the organic materials and "plants" the seeds by burying them. (Savory and Parsons 1980, Savory 1988).

Water Quantity

The project is located within the 5th code watersheds of 1505030201 (Cienega Creek Watershed) and 1505030102 (Sonoita Creek Watershed). Streams in the project area have surface water flowing only periodically. The streams appear as blue lines on USGS topographic quadrangle maps. These streams are the ephemeral and intermittent tributaries to more major streams and drainages and are commonly dominated by upland vegetation and less commonly by riparian vegetation. Larger drainages, such as Gardner Canyon, commonly have longer duration and higher magnitude flows and may have more sections where groundwater is shallow. As such, they often tend to have more riparian vegetation as compared to smaller, more ephemeral drainages. According to US Army Corp of Engineers (2013), ephemeral, intermittent and perennial streams are defined as follows:

- Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.
- Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.
- Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

There are existing water developments on the Gardner allotment. However, more are needed to improve grazing distribution. When livestock water is in short supply or unavailable in an area, it prevents livestock utilization of those areas, and therefore concentrates grazing where water is more readily available. This can cause increased utilization in areas where water is present, and underutilization where water is limited or unavailable. Where possible and when water can be placed to support it, greater livestock distribution is desired to ensure a uniform, lighter grazing utilization. Wells on private land will be the water supply for the planned pipelines and livestock watering facilities on the Gardner allotment.

Summer rainfall is characterized by localized thundershowers that generally occur from July through September. These rainfall events can be more intense than winter storms but are generally of shorter duration and smaller aerial extent. Winter rainfall is characterized by more widespread, gentle showers that generally occur from December through March.

The average precipitation for the nearby Patagonia area is about 17 inches. This is according to the Western Region Climate Center at http://www.wrcc.dri.edu/summary/Climsmaz.html for data recorded from 1921-2015. The US Climate Data website at www.usclimatedata.com www.usclimatedata.com does not have precipitation data for Patagonia, but has data for Elgin. According to that website, average precipitation in Elgin is about 18 inches.

Water Quality

The way that land is used may impact the water quality in a watershed. Historic uses on public lands were primarily grazing, recreation, wood cutting and historic mining. Current use is predominantly grazing and recreation.

Cattle grazing can have impacts to water quality, including increased water turbidity. A degradation in soil condition due to compaction or vegetation loss can reduce the time that water sits on the land (water residence time). This decrease of water residence time limits the ability of the soil to absorb and filter water. More water runs off of the soil surface, carrying soil, debris, and other contaminants with it. Turbidity of water courses increases. Turbidity is a gauge of water quality. The higher the turbidity, the more suspended contaminants that the water course is carrying. Sediment-laden water can be carried down drainage channels during storm events, and eventually reach more major streams. However, with current and planned grazing utilization at light to moderate on the allotment area, this will help to reduce these potential grazing effects. Monitoring data has shown that soil condition has remained satisfactory where grazing utilization has been light to moderate.

Water quality in the state is assessed by the Arizona Department of Environmental Quality (ADEQ). Categories used by ADEQ for describing the status of water quality in the states' rivers, streams and lakes are identified in Table 2 below.

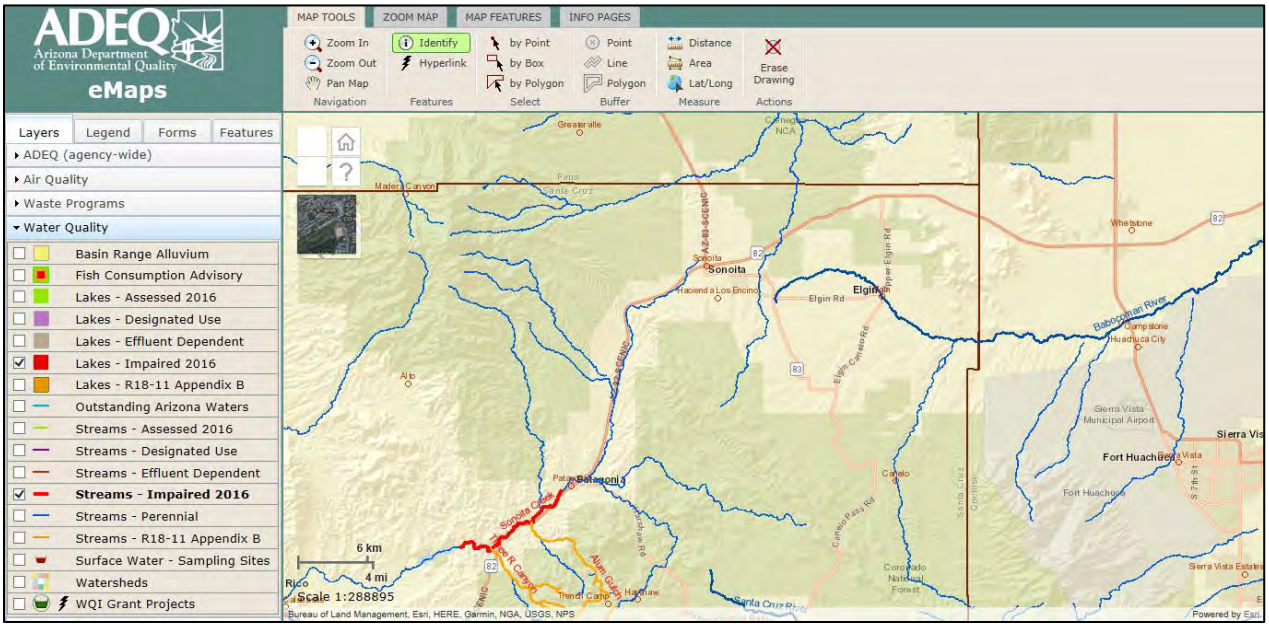
Table 5. Water quality categories

Category	Definition
1	Attaining all designated uses
2	Attaining some designated uses, and no use is threatened or impaired
3	Insufficient or no data and information to determine if any designated use is attained
4	Impaired or threatened for one or more designated uses but a Total Maximum Daily Load (TMDL) analysis is not necessary because:
4A	A TMDL has already been completed
4B	Other pollution control requirements are reasonably expected to result in attainment of the water quality standard
4C	The impairment is caused by pollution but not a pollutant, or
4N	The impairment is solely by natural conditions (an Arizona list only)
5	Impaired or threatened for one or more designated uses by a pollutant, and a TMDL needs to be developed or revised

No streams within the allotment or immediately draining from the allotment have been determined to be impaired by ADEQ. However, some of the allotment drains towards Sonoita Creek. There is a section of Sonoita Creek that is monitored and has been determined to be

impaired, near the town of Patagonia. That section is impaired due to zinc and low dissolved oxygen. It is not likely that the Gardner allotment is a significant contributor to this water quality impairment due to the nature of the impairment and the minerology and mining history of the Patagonia area. See map below which can be found at http://gisweb.azdeq.gov/arcgis/emaps/?topic=impaired.

Figure 4. ADEQ map



Watershed Condition

In 2010, a national effort was launched to assess the condition of all 6th code watersheds on National Forest System (NFS) lands. 6th code watersheds are typically 10,000 to 40,000 acres in size. Twelve indicators were assessed including condition of: water quality, water quantity, aquatic habitat, aquatic biota, riparian/wetland vegetation, road and trail network, soil, fire regime or wildfire effects, rangeland vegetation, terrestrial invasive species, forest cover, and forest health. Each indicator was assessed a numerical score of 1 to 3 based on its condition, with 1 meaning good condition, 2 meaning fair condition, and 3 meaning poor condition. See tables 3 and 4 below which show the results of the Watershed Condition Assessment for assessed 6th code watersheds within the project area. The watersheds in the project area include Gardner Canyon, Smith Canyon-Cienega Creek, and Upper Sonoita Creek.

Table 6. Gardner Canyon watershed condition assessment

Indicator	Assessment
Aquatic Biota	Good
Riparian/Wetland Vegetation	Fair
Water Quality	Good
Water Quantity	Fair
Aquatic Habitat	Fair
Roads and Trails	Fair
Soil Condition	Good
Forest Cover	Good

Forest Health	Good
Terrestrial Invasive Species	Fair
Rangeland Vegetation	Fair
Fire Effects/Fire Regime	Poor

Table 7. Smith Canyon – Cienega Creek watershed condition assessment

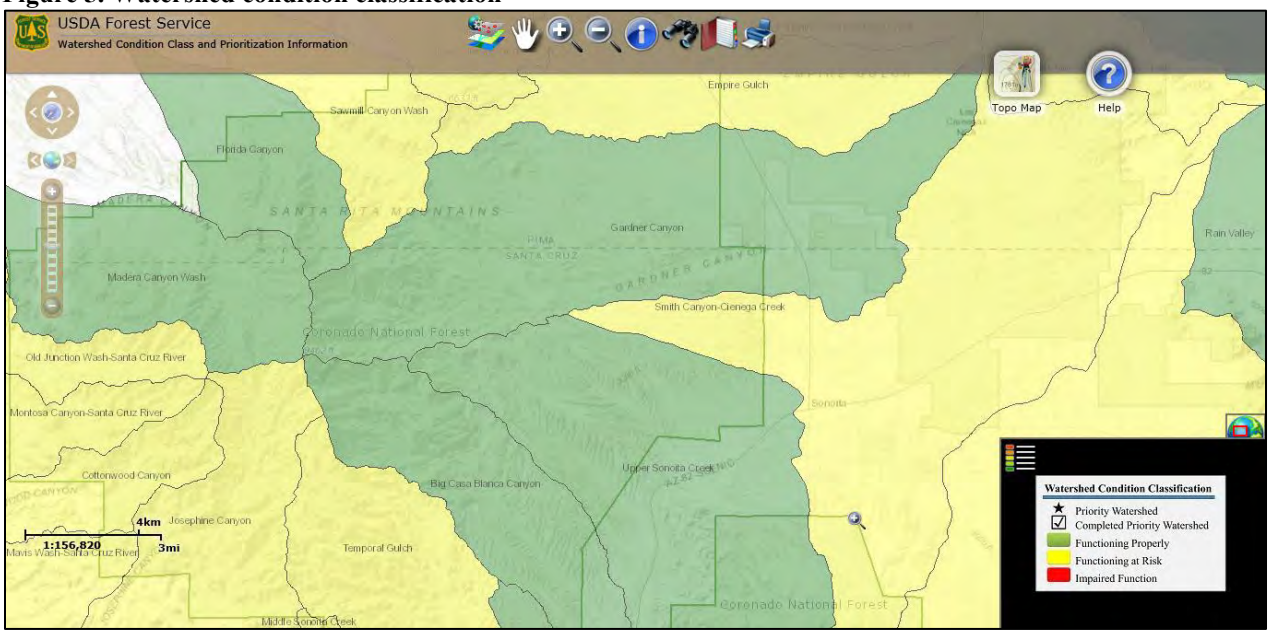
Indicator	Assessment
Aquatic Biota	Poor
Riparian/Wetland Vegetation	Fair
Water Quality	Good
Water Quantity	Fair
Aquatic Habitat	Fair
Roads and Trails	Fair
Soil Condition	Good
Forest Cover	N/A
Forest Health	Good
Terrestrial Invasive Species	Good
Rangeland Vegetation	Good
Fire Effects/Fire Regime	Poor

Table 8. Upper Sonoita Creek watershed condition assessment

Indicator	Assessment
Aquatic Biota	Fair
Riparian/Wetland Vegetation	Good
Water Quality	Good
Water Quantity	Fair
Aquatic Habitat	Fair
Roads and Trails	Fair
Soil Condition	Fair
Forest Cover	Good
Forest Health	Good
Terrestrial Invasive Species	Good
Rangeland Vegetation	Fair
Fire Effects/Fire Regime	Fair

Each 6th code watershed was given an overall rating of Functioning Properly, Functioning at risk, or Functionally Impaired based on the indicator scores discussed in the prior paragraph. The condition of the Gardner Canyon watershed and Upper Sonoita Creek watershed is Functioning Properly. The condition of the Smith Canyon – Cienega Creek watershed is Functioning at Risk due to water quantity, aquatic biota and habitat, fire regime, and roads and trail condition and effects. See map below, which can be found at https://apps.fs.usda.gov/wcatt/

Figure 5. Watershed condition classification



Riparian Areas

Riparian areas occupy approximately one percent of the Area managed by the Southwestern Region of the Forest Service (roughly 22.5 million acres in 11 National Forests and Grasslands in Arizona, New Mexico, and western Oklahoma and Texas) (Lafayette et al., 1996). They have importance disproportionate to their limited extent, especially in the arid Southwest. This importance is a function of their diverse and productive vegetative composition and structure, their linkage between upland and aquatic ecosystems, and their linkage between upper and lower watershed areas. Some of their most important functions include: 1) providing fish and wildlife habitat, 2) improving water quality by filtering and retaining sediment and nutrients transported by runoff from terrestrial uplands, 3) stabilizing stream banks and floodplain surfaces, 4) increasing the volume and duration of base flows by replenishing local alluvial aquifers, and 5) reducing flood flow velocities and filtering sediments and nutrients transported by flood flows during over bank flow events. Brinson et al., (1981) estimates that the percentage of riparian areas that have been altered in the United States range from 70 to 90 percent.

Drainages on the allotment typically have surface water flowing only periodically. These drainages are the ephemeral and intermittent tributaries to more major streams and drainages and are dominated commonly by upland vegetation and less commonly by riparian vegetation. They provide functions relating to water quantity, water quality, flood regime, hydrological connectivity, riparian vegetation and wildlife habitat (Meyer et al., 2003, Levick et al., 2007). In these flow channels, the water table can be shallow in areas or have subsurface flow that sustains small areas or pockets of riparian vegetation.

Springs can provide a riparian habitat that is limited in extent, but can be an “island” habitat for plant and animal species, as well as providing a rare water source in an arid environment. There are no springs noted on the allotment, though there are several tanks. The tanks can provide

water where it may otherwise be scarce in a desert environment and can also provide suitable habitat for plant and animal species.

Air Quality

Class 1 airsheds are granted special protections under the Clean Air Act to ensure that the highest standards of air quality are met. EPA is the agency given primary responsibility for ensuring compliance with the Clean Air Act. Class 1 airsheds typically include wilderness areas, national parks, and national monuments, for which it is highly desirable to have vistas of these areas unobstructed by air quality issues. There are no Class 1 airsheds within or adjacent to the Gardner allotment.

A non-attainment area is any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the National Ambient Air Quality Standards. A maintenance area is an area that was designated non-attainment for one of these standards, but later met the standard. To ensure that air quality in the area continues to meet standards, states are required to develop and implement Maintenance State Implementation Plans. The project area is not located within any non-attainment or maintenance areas for air quality, according to Arizona Department of Environmental Quality (ADEQ) website: http://gisweb.azdeq.gov/arcgis/emaps/?topic=nonattain.

Summary of Effects by Alternative for the Watershed

Design features and mitigating measures

Best management practices (BMPs) as outlined in the 2012 USDA reference "National Best Management Practices for Water Quality Management on National Forest System Lands" will be implemented to ensure detrimental impacts are kept to a minimum for soil, water, and air resources.

For the installation of pipeline, storage tanks, and livestock watering facilities, these include:

- Locate water source developments in such a manner as to avoid or minimize disturbance to riparian areas and streambanks, and erosion and sedimentation to the extent practicable.
- Limit the size of the facility development footprint (area of bare soil with reduced infiltration capacity) to the minimum necessary for efficient operations to the extent practicable.
- Apply soil protective cover on disturbed areas where natural revegetation is inadequate to prevent accelerated erosion before the next growing season.
- Operate equipment when soil compaction, displacement, erosion, and sediment runoff would be minimized.
- Stabilize steep, excavated slopes (through the use of water bars, soil cover, and/or seeding).

For grazing system operation, these BMPs include:

- Use permit authorities to change operations to avoid, minimize, or mitigate adverse effects to soil, water quality, and riparian resources when special circumstances (e.g. drought) occur.

Alternative 1:

Direct and Indirect Effects

The range condition on the allotment is in a stable to upwards trend. Soil condition is satisfactory where measured on the allotment. Existing grazing management has, at least in part, led to these satisfactory results. It is therefore not expected that a lack of livestock on the allotment would significantly improve the soil condition on the majority of the allotment area over what is currently occurring since existing management has already resulted in satisfactory range and soil conditions.

The same can be said for wind erosion effects to air quality on the majority of the allotment area. With sufficient vegetation to hold the soil in place over the majority of the grazed rangeland due to a light to moderate utilization level, not to mention the abundance of rock, it is not expected that the lack of livestock would increase plant productivity in these majority areas to an extent that would significantly improve any wind-blown erosion that may occur in these areas.

Any areas where soil condition has been negatively impacted by grazing, such as may occur in areas of heavier use (such as near a water source for example), would be expected to improve over time. Vegetation productivity and diversity would begin to improve, and soil compaction would lessen over time. With an improvement in soil condition and vegetation productivity, any soil erosion which may be occurring in these areas would be expected to lessen over time. Also, any wind erosion which may occur in these areas due to lack of vegetative cover would be expected to lessen with time as vegetative cover becomes more established and productive.

Any areas of riparian vegetation which may occur on the allotment in places along drainages would be expected to improve in condition with the absence of livestock. These areas can tend to be heavily grazed and trampled if not managed or excluded due to the presence of water and/or lush vegetative growth. Therefore, a lack of livestock will help improve riparian condition where livestock are not excluded from these areas.

However, it is not expected that overall watershed water quality would significantly improve. For one, any areas of higher utilization that may contribute a greater amount of contaminants such as sediment from soil erosion are relatively small as compared to overall allotment size. Secondly, the allotment lacks perennial streams that may be impacted by livestock access.
Most importantly, the existing grazing utilization of light to moderate on the majority of the grazed allotment area leaves plenty of vegetative cover to reduce erosion and runoff into streams during flood events. Therefore, minimal change in water quality is expected through this alternative over what already occurs.

Alternative 2:

Direct and Indirect Effects

Direct and indirect effects over what already occurs would be expected to be minimal since this alternative, as proposed, would have the same grazing utilization levels as already occurs. The forage use levels of light to moderate (30-45%) with a utilization rate of 45% on key species in key areas indicating a need for management modification or administrative actions is the same as the existing situation. So, although the number of cattle permitted to graze will increase, and season of possible use will be extended, the allowed utilization rate will remain the same. Also, although number of cattle, timing, and grazing duration may be changed, they may not exceed that which is defined in the proposed action.

That said, and since grazing utilization will remain unchanged, soil condition would be expected to remain in satisfactory condition over the majority of the allotment area. This is since grazing utilization is not expected to change and since the current grazing utilization has led to range conditions at a stable to upwards trend, indicating that soil conditions are also sustained.

Wind erosion attributed to grazing impacts would also be expected to remain the same, and would be expected to remain minimal. This is since the existing grazing utilization is light to moderate, leaving sufficient vegetation on the majority of the allotment to minimize wind erosion. Soil rock content also tends to be high on the allotment, and rock helps to hold soil in place.

In places of higher livestock concentration on the allotment, such as that which occurs near water sources, soil condition is more likely to be impacted by soil compaction and lack of vegetation. Soil erosion may also be an issue in these areas, particularly where the slopes are greater, due to lack of vegetative cover, compaction, and disturbed soil. Lack of vegetative cover and disturbed soil condition also increases the potential for wind erosion in these areas. Wind erosion and water-based soil erosion may somewhat worsen over time in these smaller areas since these areas of diminished vegetation and soil condition would continue and possibly worsen and expand with increased livestock numbers using these more heavily utilized areas. However, in pastures where additional water developments will be placed, the installation of these additional water sources would be expected to more evenly distribute livestock among new and existing water sources, decreasing the soil resource damage at any one water source that may otherwise have occurred from increased livestock numbers at a smaller number of water sources. However, the number of these more heavily used areas would increase with the installation of new water sources, therefore potentially increasing the overall area that is impacted by increased soil compaction and lack of vegetation.

Wells located on private land will supply the water for the planned pipelines. As such, water sources on Forest Service lands will not be used to distribute this water, and there will therefore be no redistribution of available water on Forest Service lands.

The installation of the pipeline, tanks, and troughs will cause short term damage to soil resources due to disturbed and exposed soil. The trench area should be monitored closely for water-based

soil erosion, particularly on steeper slopes, and any evidence of this will need to be addressed. Until vegetation re-establishes, there will be an increased potential for soil erosion

from these disturbed areas. In the long term, vegetation will re-establish and diminish the potential for soil erosion. How long this may take will depend on such factors as rainfall, slope, aspect, soil type, and best management practices implemented.

There may be some short term wind erosion from the excavation of a trench for the pipeline and the subsequent burial of the pipeline in the trench. However, this wind erosion is expected to only occur in the short-term during pipeline installation and to be minor in extent. It is not projected that it will affect overall air quality in the area. Also, the use of BMPs as specified within this report, and as otherwise applicable, will help reduce the potential for wind erosion both in the short term and long term. In the long term, establishment of vegetation will also help reduce the potential for wind erosion on the affected area, and should eventually return the affected area to normal or near-normal erosive conditions as existed prior to the excavation.

Areas with riparian vegetation, such as they occur on the allotment, would continue to be grazed. If they are not fenced to exclude livestock grazing or otherwise managed to reduce grazing effects, they will tend to be more heavily utilized and trampled due to the presence of water and/or lush vegetation. Therefore, riparian condition will continue to be negatively impacted in those areas where livestock access is not controlled.

Water quality is not expected to change over what already occurs on the majority of the allotment since the grazing utilization will remain the same. Grazing at light to moderate utilization has kept the range condition at a stable to upwards trend, so it would be expected that runoff and soil erosion would be minimized, maintaining a reduced potential for water quality impacts from grazing.

As for water quality effects from areas of higher utilization, such as any riparian areas from which livestock are not excluded or areas near water sources, it would be expected that lack of vegetation and increased soil compaction would continue to result in an increased potential for soil erosion, particularly where the slopes are greater. However, due to the relative small size of these more heavily utilized areas and the expected relatively small magnitude of the problem, and as compared to the much larger size of the watershed, overall water quality impacts to more significant streams downslope would be expected to be minimal.

Cumulative Effects

Cumulative effects for this analysis will include the 6th code watersheds that contain the allotment area. It can reasonably be expected that activities occurring or that have occurred within these watersheds may have impacts on the allotment area. The grazing permit length is ten years, so the cumulative effects analysis will include projects occurring within the next ten years. Projects, activities, and circumstances occurring in the past will not be analyzed in the cumulative effects analysis since they can reasonably be expected to affect the current environment, which has already been assessed through this report.

Wildland and prescribed fires are major sources of air quality concerns. Prescribed burning and wildland fire affect air quality at the time of the burning. The Arizona Department of Environmental Quality (ADEQ) regulates prescribed burning in the state in accordance with the State Implementation Plan and any prescribed burning in the project area would be coordinated through the ADEQ and would follow the State Implementation Plan. It is not expected that either of the proposed alternatives would have significant additional impacts on air quality from fires.

Wildland and prescribed fires can also have short term impacts on soil resources. Soil erosion can increase in the short term after a fire due to lack of vegetation to hold the soil in place. Also, if the fire gets hot enough, a waxy water-repellant layer can form in the soil in the short term that prevents water from soaking in and causes increased erosion. It is not expected that either of the project alternatives will cause significant additional soil erosion coming off of current or future burned areas, since livestock would be kept off of significantly impacted burned areas until vegetation recovers if the proposed action is selected, and the no action alternative involves no livestock grazing at all.

Wildfire suppression activities, since the establishment of the National Forest (circa 1908), have been contributing to the trend of increased trees and shrubs, with associated decreases in grasses on National Forest land. This change can result in increased soil erosion, depending on the trees and shrubs and their density, since tree and shrub increases tend to cause increases in bare soil due, at least in part, to shading effects. Since soil condition was noted as satisfactory on the allotments, the trend of increased trees and shrubs does not seem to be to such an extent on the allotments that it is impacting the soil condition on the allotments. It is therefore not expected that the implementation of either of the project alternatives would significantly affect soil conditions when considering the effects of wildfire suppression activities.

Invasive exotic plants have moved into the area in places on the allotment. Invasive plant encroachment, depending on the invasive plant, can have impacts on soil condition. Also, depending on the plant, it can cause increases in runoff and erosion. It is not expected that either of the alternatives for this project would have significant additional impacts on watershed resources impacted by invasive plants. The no action alternative, although it would mean no grazing, does not include plans to control invasive plants, so since the nature of invasive plants is to out-compete native plants for resources, it is expected that invasive plants would continue to proliferate and spread unless something else occurs to change this dynamic. The proposed alternative includes grazing utilization planned at light to moderate, which is the same as the current management grazing level, so in consideration of invasive plant encroachment, the proposed action is not expected to significantly additionally contribute to watershed resource impairments caused by invasive plants. Also, where invasive plants result in land management issues, the adaptive management process included in the proposed action can be used to implement management changes to proactively address the issue. The proposed alternative doesn’t include plans to control invasive plants, which again, will continue to proliferate and spread unless something else changes that dynamic.

For the proposed alternative, equipment cleaning and other precautions would need to be taken to reduce the potential to introduce invasive plants into an area through contaminated equipment and other supplies that are brought in for pipeline and watering facility installation.

It is possible that, in the future, additional livestock water developments may be installed. This is unlikely, but it is possible that additional livestock water sources may be considered if the available livestock water situation changes. If the no action alternative is selected, then additional water developments would not be needed since no livestock would be grazed on the allotments. Areas that had been impacted by heavier livestock utilization, such as near water sources, would see improved soil condition over time as the areas stabilize and revegetate. However, even with the no-action alternative, it is possible that water developments may be needed in the future if livestock grazing resumes on the allotments. As far as watershed resources are concerned, and in consideration of the proposed action, these additional livestock water developments may cause short-term increased soil erosion during installation, but would serve to improve livestock distribution, which would improve soil condition over time in more heavily utilized areas.

Rural development in the watersheds in the form of homesteads and private property development has resulted in some loss of vegetation, increased sedimentation and runoff from roads and disturbed areas, and increased groundwater use. It is not expected that the implementation of either of the alternatives for this project will have significant additional impacts on these effects of rural development.

For Additional Information:
For more information, please see the entire Watershed Specialist Report, which is part of the project record.

Heritage Resources

Affected Environment
Cultural resources include archaeological and historical sites, and properties important to maintaining the traditional beliefs and lifeways of local social groups ("traditional cultural properties"). Under Section 106 of the National Historic Preservation Act, the Forest Service has the responsibility, in consultation with the State Historic Preservation Officer, Tribes, and other interested parties, to identify historic properties within the area of potential effect and to determine the effects that the proposal could have on cultural resources.

Prior to the initiation and planning of this project, at least six cultural inventories have been conducted in the Gardner Allotment. These inventories recorded twenty cultural sites inside the project area, including fifteen Native American sites and five historical sites. Nine of the fifteen prehistoric sites have been determined eligible for nomination to the National Register of Historic Places (NRHP), while six are unevaluated. Four historic sites are unevaluated and one is eligible to the NRHP. All unevaluated sites will be treated as eligible for management purposes. The entire Gardner Allotment is located within Ce:wi Duag (Long Mountain), a Traditional Cultural Property (TCP) for the Tohono O'odham Nation, and a place of traditional cultural importance to numerous other Native American Tribes. The Ce:wi Duag TCP is eligible for nomination to the NRHP and encompasses a large portion of the Santa Rita Mountains. Following the protocol set forth in Appendix H, "Standard Consultation Protocol for Rangeland Management," of the Region 3 First Amended Programmatic Agreement Regarding Historic Property Protection and Responsibilities (2003), a Class III cultural resources inventory of

approximately 254 acres was conducted in June of 2017 and July 2018 by Coronado National Forest archaeologists. Surveys focused on areas that could potentially be disturbed by proposed range improvements, as well as inspection of previously recorded sites. The results of these investigations are documented in Cultural Resources Report No. 2018-03-05-67, which determines the proposed action would result in no adverse effects to historic properties. Consultation with the 12 Native American tribes whose ancestral lands are now managed by the CNF, as well as the State Historic Preservation Office (SHPO), will be completed as per the conditions of the Programmatic Agreement prior to the final NEPA decision.

Any additional future improvements or other ground-disturbing management practices would be contingent upon completion of the identification and protection of historic properties and compliance with applicable provisions of the NHPA. Any unanticipated discoveries of archaeological remains during project implementation would require all activities to cease, prompt evaluation of the find by the Forest Archeologist, and additional Tribal and SHPO consultation, as necessary. In addition to the O'odham and the Four Southern Tribes, Ce:wi Duag is a place of traditional cultural importance to numerous other Native American Tribes including the Western Apache, Chiricahua Apache, Hopi, Zuni and Pascua Yaqui (Mehalic 2013).

Environmental Consequences

Under Alternative 1, no direct or indirect effects from livestock grazing on cultural resources would occur following removal of cattle from the allotments. If the No Action Alternative is selected, the proposed improvements would not be built and therefore no cultural resources would have the potential to be affected.

Although the potential for effects to cultural resources exists under Alternative 2, surveys conducted as part of this analysis did not identify ongoing impacts associated with ongoing grazing or range improvements. The areas of potential effects for the proposed range improvements were surveyed for the presence of cultural resources and no cultural resources were identified in these areas. Therefore the proposed action alternative would not directly affect any historic properties. Under this alternative, direct effects would be would be temporary and consist of limited disturbance. Should any significant cultural resources be discovered during project implementation, additional consultation would be required.

Cumulative Effects

The cumulative effects boundary for cultural resources is limited to the area encompassed by the Nogales Ranger District. All previous projects (within the last 20 years) have been completed with a reasonable and good-faith effort to comply with Section 106 of the National Historic Preservation Act. Avoidance of adverse effects to cultural resources is expected for all present and foreseeable projects, with the possible exception of the Rosemont Copper Project. Cumulative effects on cultural resources on the Nogales Ranger District now and into the future may arise as a result of natural disasters and/or accidents, but are not anticipated to occur as the result of project-specific work. Ongoing grazing within the Gardner Allotment would result in no adverse effects to historic properties.

4. CONSULTATION AND COORDINATION

The Forest Service consulted the following Federal, State, local agencies, tribes, and organizations during the development of this environmental assessment. Several individuals not identified specifically below also participated in this process.

FEDERAL, STATE, AND LOCAL AGENCIES:

Arizona State Historic Preservation Office
Arizona Department of Agriculture
Arizona Cooperative Extension Service
USDI Fish and Wildlife Service
Arizona Game and Fish Department
Arizona Department of Environmental Quality
USDA Natural Resource Conservation Service

TRIBES:

Fort Sill Apache Tribe
Mescalero Apache Tribe
San Carlos Apache Tribe
White Mountain Apache Tribe
Ak-Chin Indian Community
Yavapai Apache Nation
Hopi Tribe
Pueblo of Zuni
Tohono O'odham Nation
Pascua Yaqui Tribe
Gila River Indian Community
Salt River Pima-Maricopa Indian Community

OTHERS:

National Wild Turkey Federation
Western Watersheds Project
Forest Guardians
Sky Island Alliance
Center for Biological Diversity
Arizona People for the USA

A list of references for the Gardner Allotment Analysis can be found in the project record.