Rangelands, Forage, and Grazing

Rangelands are grasslands, shrublands, forests and woodlands, wetlands, and deserts that can be grazed by domestic livestock or wild animals. Livestock grazing can be used to manage rangelands by harvesting forage to produce livestock, changing plant composition, or reducing fuel loads. Sustainable and productive rangelands are one of the key ecosystem services on the Tonto National Forest. Rangelands contribute to a traditional western way of life and are essential for the survival of many small ranching operations. Rangelands and the associated range improvements (e.g., ponds, troughs, fences, corrals, windmills) provide scenery and recreational (e.g., hunting, wildlife viewing) opportunities to the public and provide habitat for numerous species.

Affected Environment

Livestock grazing began on the area now known as the Tonto National Forest in the late 1800s. Heavy grazing was occurring in the 1880s, and livestock numbers reached their peak about 1900, with an estimated 1.5 to 2 million head grazing the area now known as Tonto National Forest.

Mostly cattle grazed the Tonto although some sheep, goats, and hogs have utilized the rangelands in addition to native ungulates. A harsh drought in 1904, followed by new supervision by the Forest Service in 1905, reduced the number of cattle by 80 to 90 percent to 150 to 200,000 head. Cattle numbers have continued to be reduced; approximately 25,000 cattle were permitted in 2013. Current levels of grazing are discussed below.

Many of the early accounts of the vegetative communities indicate early overgrazing substantially altered the composition of the plant communities now present. According to interviews and early diaries documented by Fred Croxen, in 1926, tall grass grew abundantly, and riparian areas were vegetated with woody species and maintained by beaver (Croxen 1926). There was little mention of gullying or erosion. Trees and woody shrubs were cut down with hopes of producing additional forage. Some areas have since recovered, while other areas were permanently altered due to soil loss. See "Riparian" section for more details.

In addition to overgrazing, climate has played a key role in the rangeland conditions on the Tonto National Forest. The University of Arizona described climatic trends in Arizona from 1895 to 2002. According to their study of existing recorded data, there were drought periods from the late 1890s to early 1900s, 1947 to 1976, and 1998 to present (their report was published in 2004). Wet periods were from 1925 to 1946 and 1977 to 1995. All of this appears to be tied into the Pacific decadal oscillation related to ocean surface temperatures. There is additional aridity in the Southwest due to the ongoing regional warming trend (Gutzler and Robbins 2010, Seager et al. 2007). Though there is agreement in temperature forecasts, there is uncertainty as to how that might affect precipitation in Arizona (Sprinkle 2014). When rainfall decreases, or when there is increased aridity due to warmer temperatures, some species go dormant or die off completely. Forage production and vegetation diversity is reduced.

Current Condition of Rangelands

The Forest Service uses a permit system to administer grazing of National Forest System lands. Rangelands are divided up into logical grazing units called allotments. Allotment boundaries often follow topographical features such as ridgelines or creeks and may or may not be fenced entirely. Grazing permit holders, or permittees, own the livestock and additional private "base" property and graze the same allotment year to year. The permits are held by individuals, families, corporations, and other legal entities established by state law. Most allotments on the Tonto National Forest have only one permittee each, although a few have more than one permittee sharing the same allotment. Allotments are further subdivided into pastures, and most allotments (except for very small allotments) follow some kind of rotational grazing system where cattle are moved through different pastures as the year progresses. Allotment and pasture boundaries can be changed administratively as needed. Many allotments have been merged or combined over the years, while other pastures have been split or exchanged between allotments.

Nearly the entire Tonto National Forest is within a grazing allotment with a few exceptions near Roosevelt Lake and the City of Payson. Currently, the Tonto is divided into 106 cattle allotments and 1 sheep driveway. The Heber-Reno sheep driveway starts on the Sitgreaves National Forest near Heber, Arizona and crosses the Tonto to allow sheep to be trailed to winter grazing areas near Mesa, Arizona. The Apache-Sitgreaves National Forest administers the driveway permit which has seen reduced use in recent years. The cattle allotments range in size from 600 to 188,000 acres. Ninety-seven of the allotments are active, meaning they have a permit issued to a permittee. Eight allotments are vacant (the permit was waived back to the Tonto National Forest without preference, and a new permit has not been issued). One allotment was formally retired from grazing and listed as closed in the current forest plan. Some active allotments have entire pastures or areas that are in non-use for various reasons from fire or drought to protection of endangered species. Other permits that have non-use still authorize grazing the entire allotment at reduced numbers. The Tonto staff uses adaptive management to adjust livestock numbers, class (cow/calf, yearling, bull, dry cow), pasture timing, and grazing intensity to respond to changing environmental or social and economic needs. In some years, full permitted numbers are authorized, and other years less numbers are authorized to respond to changed conditions such as drought or fire. Annual meetings occur each year where annual operating instructions are developed to implement the next year's grazing system.

Approximately 25,000 cattle were permitted in 2015. Cattle authorized each year can vary from the permitted number following adaptive management and around 11,000 head of cattle were authorized to graze throughout the year on the Tonto. The Tonto National Forest is one of the few national forests that permits year-long grazing on the majority of allotments. Because central Arizona typically receives very little snow, livestock are able to graze on National Forest System lands year-round, unlike most other national forests where deep snow inhibits year-round grazing. Over 170,000 animal unit months were authorized to graze under a term grazing permit. An animal unit month is a measure of the amount of forage an animal uses each month. It is based on the amount of forage a 1,000 pound cow consumes each month and adjusted for other kinds and classes of livestock (for example, cow/calf pair, yearling, bull, sheep, or horse). Authorized grazing is substantially lower than permitted grazing, authorizing only about 58 percent of permitted animal unit months in 2015 due to the reasons listed above. These figures do not include the potential capacity of the 8 vacant allotments. In 2015, the Tonto National Forest authorized non-use for either resource protection or permittee personal convenience for over 7,000 head of cattle, more than 125,000 animal unit months.

There are 85 term grazing permit holders. This number varies as permits are waived and reissued. Several of the permittees hold more than one grazing permit and run multiple herds or use one allotment for part of the year and move to another allotment later.

The types of livestock operations permitted on the forest are primarily cow-calf ranches, operations where a permanent herd of mother cows and bulls are kept by a rancher to produce calves for later sale. Some permits have yearling carryover (meaning additional forage is authorized once a calf has reached 6 months old but has not been sold yet) and/or yearling stocker options (when additional forage is available, the rancher may purchase additional young cattle to graze and grow. Some permits also include ranch horses or mules. As with most cattle operations in the west, Tonto National Forest ranch operations have

operated since the late 1800s. All grazing permits are tied to a privately owned "base property" which the Tonto National Forest has defined as at least 10 acres of land with livestock handling facilities. Most permittees are dependent entirely on Federal grazing permits due to the scarcity of private lands in Arizona.

Environmental Effects⁵¹

Effects Common to All Alternatives

The desired conditions, which are applicable to all alternatives, direct managers to maintain rangelands and manage for quality forage. Livestock grazing allows for healthy diverse plant communities, satisfactory soil conditions, and sustains the quality of wildlife habitat (GRZ-DC-03). Given this, grazing management in all alternatives would balance grazing with protection of the rangeland resource using an adaptive management approach to deal with fluctuations in available forage due to weather and other resource drivers and stressors.

Improved range condition would increase ecological resiliency and function by restoring proper structure and function through rangeland restoration, thereby improving soil stability and condition, hydrologic function, and biotic communities.

Eligible Wild and Scenic Rivers

Domestic livestock grazing would be managed to protect identified river values. Existing structures may be maintained. New facilities may be developed to facilitate livestock management so long as they maintain the values for which a river was found eligible or suitable. The additional eligible segments are not expected to change currently permitted livestock activities in those areas. Some new facilities may require additional design criteria (type of materials, colors, screening) in order to maintain the outstandingly remarkable river values.

Designated Wild and Scenic Rivers

Grazing is currently not authorized in the designated portions of Fossil Creek or Verde River but the river plans allow for authorization of grazing to occur. Livestock grazing and constructed range improvements within the river corridor, if authorized, are not to impact the river segment's outstandingly remarkable values and are consistent with the river segment's classification.

Designated Wilderness and Inventoried Roadless Areas

Designated wilderness would be managed according to current plan direction and would continue to allow grazing and construction and maintenance of range improvements following the Congressional Grazing Guidelines in the Wilderness Act. Designated wilderness does not effect livestock grazing.

Inventoried roadless areas (IRA's) allow for grazing to occur and livestock improvements to be installed and maintained. IRA's do not effect livestock grazing.

Existing Research Natural Areas

Grazing is currently not authorized in existing research natural areas. This is not changing by alternative and would have no difference in effects.

⁵¹ Information on assumptions and methods used for this analysis can be found in Volume 2 of the DEIS, Appendix B.

Apache Leap Special Management Area

Apache Leap Special Management Area is closed to grazing in the current plan and would continue to be closed to grazing. This area has only been grazed incidentally in the past due to topography. It is closed to grazing but has no effect to permitted livestock grazing due to the terrain and vegetative composition.

Alternative A Effects

Alternative A continues current management direction to balance livestock numbers with forage capacity. Under Alternative A, there are no specific Plan components for vegetation management Forest-wide. Due to this, there would most likely be no change in livestock management from current management practices. Because Alternative A lacks emphasis on restoration, the range condition would be expected to continue to decline gradually through increasing tree encroachment of grasslands and increasing woody species canopy cover. Rangelands under Alternative A would also continue to have altered fire return intervals and uncharacteristic fire intensities when fire does occur. Effects are summarized below.

- Existing grazing permits would continue to be reissued. Grazing levels would remain similar to today's levels. There would be no immediate effect to ranchers, although over time if rangelands lose productivity, permitted numbers would be reduced.
- The Sierra Ancha Experimental Forest would continue to prohibit grazing within the experimental forest boundaries, including the pastures that have historically been grazed as part of the Armer and A-Cross/Black Mesa allotments.
- Proposed Research Natural Areas would continue to restrict grazing in these areas. Grazing is not currently occurring in the areas so there would be no effect to permitted livestock grazing.
- Updated plan direction for other resource areas is similar to current plan direction or requirements found in site-specific allotment management and is not expected to change livestock management significantly.

Alternative B Effects

Alternative B utilizes adaptive management to balance livestock numbers with resource conditions. As allotments become vacant, they will be evaluated for conversion to forage reserve, closure, or grant to a current or new permittee (GRZ-O-02).

Effects to livestock grazing management are expected from the following resource areas:

- Watersheds and Water Resources: Updated desired conditions for Watersheds and Water Resources include supporting multiple uses including grazing. Current and future range management is expected to continue the stable to upward trend of watersheds related to livestock grazing. Guidelines concerning developing groundwater to support livestock needs should provide adequate water and help disperse livestock across uplands, improving overall rangeland conditions.
- Riparian Areas and RMZ: An increased focus on improving riparian conditions will improve the rangeland resource. Updated plan direction related to woody and herbaceous species is within the range commonly selected for site-specific allotment planning and should not increase or decrease currently permitted grazing levels across the Forest. See plan component "annual operating instructions should schedule pasture use to achieve 50 percent utilization of current year's growth on riparian woody/browse species and 50 percent utilization of herbaceous vegetation within the riparian management zone" (RMZ-G-05). Restrictions designed to maintain or restore riparian areas could change pasture use schedules, shorten duration of use, and reduce grazing intensity in some areas. These restrictions would have the potential to decrease currently permitted livestock

numbers, but it may be possible to mitigate any reductions in permitted livestock by developing infrastructure (new water sources, fences) to utilize currently unused rangelands and spreading use outside focused riparian areas.

- Vegetation and Wildland Fire: Updated plan components related to each ERU would improve vegetative conditions, increasing the amount of forage available for livestock and other herbivores. Treating areas with fire also has the potential to increase forage following recovery. But wildland fire may also destroy critical range infrastructure such as fences and water pipelines. Replacing infrastructure destroyed by fire burning it can be expensive, and in some instances pastures may not be able to be used again until the infrastructure has been replaced.
- Updated plan direction for other resource areas is similar to current plan direction or requirements found in site-specific allotment management and is not expected to change livestock management significantly.

Updated plan direction for specific management areas may change permitted livestock grazing:

- Updated plan direction for the Sierra Ancha Experimental Forest would allow grazing to resume in a portion of the Sierra Ancha Experimental Forest that was restricted in the current plan (EFMA-S-03). These areas were historically grazed as part of the Armer and A-Cross/Black Mesa allotments. Permitted animal unit months would not be increased, but cattle would be allowed to disperse over a larger area in the full allotments than in the previous plan and graze pastures that straddle the Tonto and Sierra Ancha Experimental Forest boundaries. Few impacts are expected to resources, as the grazing restrictions were only enforced recently after a more strict reading of the current plan. Grazing had occurred since its inception on these specific pastures and would resume only in the previously grazed areas, which would not affect any currently installed research plots according to Sierra Ancha Experimental Forest staff.
- The Lakes & Rivers Management Area would restrict grazing within the management area. The Lakes & Rivers Management Area would not affect any currently open active allotments. Portions of 5 currently vacant allotments (Sears Club-Chalk Mountain, St. Clair, Bartlett, Superstition, and Reavis) would not be authorized for grazing. Removing portions of these vacant allotments might cause the entire allotment to be unusable as a grazing allotment. This is most impactful on the allotments along the Verde River. By removing access to water, in order to reissue the permit, new water would have to be developed to support livestock grazing. Also rotations that cross the river would be prohibited unless specifically authorized in future NEPA, reducing management options.
- Recommended wilderness areas would be managed similar to current plan direction for designated wilderness and would continue to allow grazing and construction and maintenance of range improvements.
- Proposed research natural areas and botanical areas would restrict grazing in these areas similar to already designated research natural areas. The two proposed botanical areas are in locations already excluded from grazing or are in areas with little forage potential. The management of these areas will have little to no effects on grazing. Many of the proposed research natural areas are similar to the areas in alternative A and grazing has already been excluded from those areas.

Effects to grazing levels would remain similar to today's levels; some changes could occur, as vacant allotments are permitted or closed and some specific instances of livestock reductions may occur due to an increased emphasis on riparian health. Overall rangeland health should improve at the second fastest, but alternative C may provide for faster improvement due to more livestock removal.

Alternative C Effects

Under alternative C, currently vacant open allotments would be closed. As allotments become vacant, they will be evaluated for conversion to forage reserve, closure, or grant to a current or new permittee. Effects are summarized below.

Additional effects to livestock grazing management is expected from the following resource areas:

 Riparian areas and riparian management zones: Riparian areas identified as non-functioning would be restricted from all uses, regardless of cause, until recovery is achieved. Entire pastures or whole allotments may be required to be rested from grazing to comply with new riparian restrictions. Depending on individual circumstances including geography and existing infrastructure, these restrictions could require reductions or in some instances complete removal of livestock from identified areas, reducing authorized AUM's and potentially causing some ranches to go out of business. It may be possible to exclude livestock from smaller riparian zones using fencing or other strategies rather than excluding livestock from large areas in some instances. In these cases, the effect to livestock numbers, timing, and rotation would be minimal.

- Vegetation and wildland fire: An emphasis on using fire to treat vegetative communities could increase available forage to livestock and other herbivores, but would be expected to produce a smaller increase than Alternative B due to only using fire without mechanical methods. Fire may also destroy critical range infrastructure such as fences and water pipelines. Replacing infrastructure destroyed by fire burning it can be expensive, and in some instances pastures may not be able to be used again until the infrastructure has been replaced, reducing authorized animal unit months.
- Although the acres of recommended wilderness would increase over alternatives A, B, and D, they would still be managed similar to current plan direction and would continue to allow grazing and construction and maintenance of range improvements, having little effect to grazing permit holders.
- Wildlife: As allotments are closed, maintenance of range improvements would stop. Improvements would either be removed or decommissioned. Removal of or stopping maintenance of improvements such as water developments that wildlife have become accustomed to may result in less wildlife in specific areas.
- Proposed research natural areas and botanical areas would restrict grazing in these areas similar to already designated Research Natural Areas. The two proposed botanical areas are in locations already excluded from grazing or are in areas with little forage potential. The management of these areas will have little to no effects on grazing. Many of the proposed Research Natural Areas are similar to the areas in Alternative A and grazing has already been excluded from those areas.
- There would be no Lakes & Rivers Management Area, so there would be no additional grazing restrictions in that corridor.
- Updated plan direction for other resource areas is similar to current plan direction or requirements found in site-specific allotment management and is not expected to change livestock management significantly.

Future authorized grazing levels would be reduced as vacant allotments are closed. As additional allotments become vacant, they will be evaluated for conversion to forage reserve, closure, or grant to a current or new permittee. Additional restrictions on riparian areas may necessitate additional reductions in grazing use levels. Overall rangeland health should improve fastest of the 4 alternatives due to closure of vacant allotments. Alternative C would cause the most ranchers to potentially reduce their herds or go out of business.

Alternative D Effects

Under alternative D, all vacant allotments would be granted to new or current permittees. This would increase the levels of permitted grazing on every ranger district. In addition, if an allotment becomes vacant in the future, the district would work to grant it and maintain current grazing levels. Effects are summarized below.

Additional effects to livestock grazing management is expected from the following resource areas:

Riparian Areas and riparian management zones: An increased focus on improving riparian conditions will improve the rangeland resource, but slower than alternative B or alternative C. Restrictions designed to maintain riparian areas may change pasture use schedules, shorten duration, and reduce grazing intensity in some areas. However, these restrictions would be expected to have less impact on livestock grazing management than alternative B or alternative C. These

restrictions would have the potential to decrease currently permitted livestock numbers, but it may be possible to mitigate any reductions in permitted livestock by developing infrastructure (new water sources, fences) to utilize currently unused rangelands and spreading use outside focused riparian areas.

- Vegetation and wildland fire: Effects would be similar to alternative B, but may increase available forage to livestock and other herbivores even more with additional mechanical restoration emphasis.
- The Lakes & Rivers management area would restrict grazing within the management area. The Lakes & Rivers management area would not affect any open active allotments. Portions of 5 currently vacant allotments (Sears Club-Chalk Mountain, St. Clair, Bartlett, Superstition, and Reavis) would not be authorized for grazing. Removing portions of these vacant allotments might cause the entire allotment to be unusable as a grazing allotment. This is most impactful on the allotments along the Verde River. By removing access to water, in order to reissue the permit, new water would have to be developed to support livestock grazing. Also rotations that cross the river would be prohibited unless specifically authorized in future NEPA, reducing management options.
- Recommended research natural areas and botanical areas are not proposed in alternative D. Grazing could be permitted in areas where it is currently not authorized such as Three Bar, increasing the levels of permitted grazing.
- Updated plan direction for other resource areas is similar to current plan direction or requirements found in site-specific allotment management and is not expected to change livestock management significantly.

Permitted grazing levels may increase slightly over currently authorized levels as open vacant allotments are granted to new permittees. Some areas previously not grazed such as Three Bar could be authorized for grazing. Overall rangeland health would improve by achieving new desired conditions, but improvement would be slower than alternative B and C.

Cumulative Effects

The area for this level of analysis includes adjacent national forests, Bureau of Land Management, State, tribal, and private land. It is reasonably foreseeable that livestock grazing would continue on these lands. Time boundary for this analysis is the expected duration of the revised forest plan, 10-15 years.

Fires from adjacent lands can escape and spread onto the Tonto National Forest. If they do, it could lead to temporary grazing exclusions and impact ranching operations by requiring the permittee to find new forage or remove all or part of the livestock.

Much of the adjacent lands accessible to grazing livestock are fenced or agreements to facilitate cross boundary grazing exists. It is possible for unauthorized livestock (cattle, horses, sheep, and goats) to enter the Tonto National Forest, either through damaged fences, open gates, or unfenced boundaries. Any effect to Tonto rangelands would likely be minimal as unauthorized livestock should be removed promptly after identifying them⁵².

Ongoing and Reasonably Foreseeable Actions

In terms of reasonably foreseeable future actions, this analysis has attempted to include, specific to rangeland resources, projects for which upcoming actions are known and can be meaningfully analyzed.

⁵² For additional cumulative environmental consequences, see the Socioeconomics in a following section of this DEIS.

What will not be analyzed are projects that are inevitable and known, but which have not yet developed proposed actions.

It is likely that grazing will continue throughout the area. It is also reasonable to assume that there will be vegetative manipulations such as burning, prescribed cutting, and brush removal that will likely increase available livestock forage, and grazing opportunities for the local communities surrounding the Forest. It is also reasonable to assume that some amount of woody encroachment will also continue throughout the analysis area.

Because of its negative impacts to herbaceous plant production, woody plant encroachment can be considered a threat to livestock production (Sholes and Archer 1997). If we work with our partners across boundaries to design and perform restoration treatments, more of the Forest and adjacent lands could be changed into a more open canopy condition, returning fire to a more natural regime, and increasing the quality and quantity of forage.