FREEPORT-McMoRan

Land and Water Department
Phoenix Corporate Office
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Phoenix, AZ 85004

March 11, 2020

Tonto National Forest
Attn: Forest Planner
2324 E. McDowell Road
Phoenix, AZ 85006

SUBMITTED VIA US MAIL, CARA UPLOAD AND EMAIL:
SM.FS.Tontoplan@usda.gov

Re: *Comment for the Tonto National Forest Draft Land Management Plan and Draft Environmental Impact Statement*

Dear Sir or Madam:

Freeport-McMoRan Inc. and Freeport-McMoRan Miami Inc. (collectively, "Freeport") respectfully submits these comments on the Tonto National Forest Draft Land Management Plan ("Plan") and associated Draft Environmental Impact Statement ("DEIS") released by the Tonto National Forest ("TNF") on December 13, 2019. Freeport respectfully requests that TNF consider these comments during the development of a revised Plan and EIS, as the Plan could significantly impact the business of not only Freeport but the entire mining industry in Arizona.

STATEMENT OF INTEREST

Freeport is a natural resources company headquartered in Phoenix, Arizona and is the world's largest publicly traded copper producer, the world's largest producer of molybdenum and a significant gold, oil and natural gas producer. Freeport's assets include resources and operations located on public lands in the Western United States, including in Arizona.

The production of primary metals is highly sensitive to local production cost variables because primary metals are fungible commodities. Freeport's products inherently must be mined, refined, and manufactured into end-products, and ultimately become essential ingredients for myriad products (for example, copper ore becomes copper cathode which becomes refined copper billets which become copper wire, a staple in many manufactured products). Small changes in regulatory burdens or costs at individual steps in the production process can impose a

significant economic toll on subsequent manufacturers and customers that rely on Freeport's products, and compel them to seek other (potentially foreign) supplies. Therefore, the roles that Freeport's products have in the chain of commerce underscore the importance of the primary mining and metals industry in the U.S. and Arizona, and the importance of prioritizing regulatory reform and cost reductions for that industry.

Freeport currently has five open pit copper mines operating in Arizona which contain over 30 billion pounds of copper reserves, and like many other mining companies, continuously explores for additional copper resources including areas that are within the Tonto National Forest ("Tonto"). Freeport owns and operates the Miami Mine and Smelter, which is surrounded by the Tonto. The Plan revisions therefore have the potential to significantly impact Freeport's current and future operations. Accordingly, Freeport has been involved since the beginning of the review process for the Plan revisions and will continue to participate as the final Plan is developed.

Per the TNF website, "The Tonto has a rich history of producing copper, gold, silver, lead, zinc, uranium, molybdenum, manganese, asbestos, mercury and many other metals and minerals. This history spans over 150 years and includes 38 mineral districts with recorded production."[1] Freeport remains committed to a collaborative partnership with the TNF, as both the TNF and Freeport share a long and productive history in Gila County and have both contributed to the prosperity of the region.

COMMENTS

1. Adoption of the Comments from the Arizona Mining Association.

Freeport joins in and supports the comments on the Plan and DEIS submitted by the Arizona Mining Association ("AMA"). Freeport is one of the founding members of the AMA and is committed to the AMA's mission to advocate sound public policies that promote a prospering, responsible and safe mining industry.

2. Comments on the Plan.

As a key tool in guiding management of the Tonto, we appreciate that the Plan affirms the distinctive role and contributions that mineral exploration and extraction have in regard to the productivity of the Tonto. The Tonto has many highly mineralized areas and the administration of mineral exploration and extraction is a very important role for the TNF. It is vital for the mineral industry that the Plan components are equally consistent in recognizing the value that the minerals productivity of the Tonto affords present and future generations. The 2012 Land

[1] https://www.fs.usda.gov/wps/portal/fsinternet/cs/detail/!ut/p/z1/04_Sj9CPykssy0xPLMnMz0vMAfIjo8zijQwgwNHCwN_DI8zPyBcqYKAfjlVBmA9cQRQx-g1wAEci9eNREIXf-HD9KH0CHtDHb4KfR35uqn5BbmhohEGWCQCHVD_f/dz/d5/L2dBISEvZ0FBIS9nQSEh/?position=Welcome.Html&pname=Tonto%20National%20Forest-%20About%20the%20Forest&ss=110312&navtype=BROWSEBYSUBJECT&pnavid=null&navid=170000000000000&ttype=detail&cid=fsbdev3_018924 (last accessed March 11, 2020).

Management Planning Rule[2] requires that the Forest Service revise forest land management plans to be consistent with the Multiple-Use Sustained-Yield Act of 1960 ("MUSYA")[3]; not affect "valid existing rights established by statute or legal instrument;"[4] and to "comply with all applicable laws and regulations...."[5] However, some of the Plan components conflict with these requirements, particularly with respect to the standards and guidelines set forth in the Plan, which may impose a "constraint on project and activity decisionmaking"[6] that prohibits activities otherwise permissible and protected under the MUSYA and other applicable laws.

In general, Freeport is primarily concerned with 4 issues presented by the Plan revisions: 1) the potential impacts the new Plan components (objectives, standards, guidelines, etc.) may impose on its ability to explore and operate in the Tonto; 2) the precedent the Plan will set for other forest plans in mining areas; 3) the potential impacts to private property interests, including water rights, and operations in close proximity to the Tonto; and 4) the expanding scope of TNF's asserted authority over groundwater.

In addition to our suggested language changes to the Plan provided in the "redline" version included herein (Attachment A), the Plan components of concern, and our specific comments on these provisions, are presented below.

p.13, *Required Plan Content*, first paragraph:

The U.S. Forest Service ("USFS") land management planning regulations provide in pertinent part that forest land management plans "[i]dentify watershed(s) that are a priority for maintenance or restoration."[7] There is no mention in the regulations of impaired or at-risk watersheds and the concept of impaired or at risk watersheds should be removed from the Tonto Plan.

p. 36, SU-G-01: *Utility corridors and communications sites should utilize existing facilities, sites, and corridors unless new sites can provide better social, economic, and ecological benefits.*

This guideline's reference to "better social, economic, and ecological benefits" is ambiguous. How would this be determined for utility corridors and communications sites? What are the factors relevant to making such evaluations? Would the applicant or TNF make these determinations? It is also not clear that this type of evaluation is authorized by the applicable special use permit regulations. This guideline should be deleted.

[2] 36 CFR §219.
[3] 16 USC §§528-231.
[4] 36 CFR §219.1(d).
[5] 36 CFR §219.1(f).
[6] 36 CFR §219.7(e)(1)(iii) & (iv).
[7] 36 CFR §219.7(f)(i).

p. 37, SU-MA-04: *Utilize special use authorization terms and conditions as a means of protecting water dependent resources on the forest.*

It is not clear what "water dependent resources" means. Moreover, the terms and conditions that may be included in special use permits ("SUPs") are specifically set forth in the applicable regulations.[8] TNF's implementation of this management approach must be consistent with, and cannot conflict with, the applicable regulations, or state water rights. It is not clear that this use of SUPs is authorized.

p. 39, GRZ, 3rd par., last sentence: *Allotment and pasture boundaries are changed administratively as needed.*

Allotment and pasture boundary changes could potentially impact grazing or other multiple use operations. The Plan should state that stakeholder input will is obtained before boundary changes are made.

p. 54, MMAM-DC-01: *Mining and mineral activities comply with law, regulation, and policy in the development of minerals. Minimize adverse environmental impacts to surface and groundwater resources, watershed and forest ecosystem health, wildlife and wildlife habitat, scenic character, and other desired conditions applicable to the area.*

The inclusion of "surface and groundwater resources, watershed and ecosystem health, wildlife and wildlife habitat, scenic character and other desired conditions applicable to the area" is more expansive than the regulations that govern mining operations on the Tonto.[9] The applicable regulations refer repeatedly to the environmental impacts on "surface resources," and limiting impacts where "practical" or "feasible." This desired condition should be limited consistent with the applicable regulations.

p. 54, MMAM-DC-02: *Reclaimed mining and mineral sites provide for public safety and the protection of forest resources. They possess a resilient forest ecosystem suitable to permanent post mining landform.*

"Resilient forest ecosystem" is not defined and its meaning is unclear, and not based on any regulatory requirement. Reclamation requirements are also specifically set forth in the Part 228 regulations. This desired condition should be deleted as redundant.

p. 55, MMAM-DC-03: *Mineral materials on National Forest lands are available to the public and to local, State, and Federal government agencies where reasonable protection of, or mitigation of effects on, other resources is assured, and where removal is not prohibited*

This statement is confusing and an inaccurate statement of the law. The Forest Service's Minerals regulations state: "the United States mining laws … which confer a statutory right to

[8] 36 CFR §251.56.
[9] 36 CFR §228.

enter upon the public lands to search for minerals, shall be conducted so as to minimize adverse environmental impacts on the National Forest System surface resources."[10] This desired condition should not conflict with applicable regulations.

p. 55, MMAM-DC-05: *Abandoned and inactive mines disturbed by past mineral exploration and mine development have been returned to stable conditions and do not pose health, safety, or environmental hazards.*

"Abandoned and inactive" should be defined as meaning facilities that are closed without plans of reactivation.

p. 55, MMAM-S-02: *Required reclamation activities shall be designed to establish resilient post-mining ecosystems consistent with the pre-disturbance Ecological Response Unit (ERU), or to an ERU identified as achievable to the post-mining landscape condition.*

This standard is inconsistent with the mining law and applicable regulations, many existing Plans of Operations, and state reclamation standards. In addition, ERU is often not practical or feasible (as recognized in MMAM-G-03). Also, "resilient post-mining ecosystems" is not defined and is not a regulatory requirement. This standard should be deleted.

p. 55, MMAM-S-03: *All exploration drill holes and water production or monitoring wells reasonably incident to mining operations or required mitigation and monitoring measures shall be abandoned in accordance with current state and federal regulations and attested to by an independent licensed Professional Engineer or Geologist on site during the abandonment.*

"Independent" should be eliminated, as this adds significant cost to hire independent contractors. Internal engineers or geologists should be able to attest to abandonment.

p. 55, MMAM-G-02: *Placer mining should avoid damaging riparian vegetation, degrading water quality, and negatively impacting channel stability.*

This guideline is confusing and an inaccurate statement of the law. The applicable regulations state: "the United States mining laws … which confer a statutory right to enter upon the public lands to search for minerals, shall be conducted so as to minimize adverse environmental impacts on the National Forest System surface resources."[11] This guideline should not be inconsistent with the applicable regulations.

p. 55, MMAM-G-03: *Reclamation of surface disturbance associated with large-scale mineral activities should be implemented to return sites to other productive uses (e.g., solar energy production) where reclamation to*

[10] 36 CFR §228.1.
[11] 36 CFR §228.1.

original or other appropriate Ecological Response Unit is impracticable due to impacts of the action. For example, solar energy production on large sites.

The return of mine sites to other productive uses is not required by the applicable reclamation regulations.[12] This guideline should not be more stringent than or inconsistent with applicable regulations. This guideline should be deleted.

p. 55, MMAM-G-04: *Surface reclamation and revegetation plans for smaller scale mineral activities, such as drilling programs or smaller scale open pits, should plan for a natural species succession appropriate to the reclaimed landform and vegetative community for the identified Ecological Response Unit.*

The reference to "natural species succession" is vague and not required by law and should be modified or deleted.

p. 55, MMAM-G-05: *Reclamation should be carried out concurrently with mining operations and in logical succession throughout the operational sequence.*

Concurrent reclamation is rarely feasible in hard rock mining. This guideline should be restricted to future, non-hard rock projects where practicable only.

p. 55, MMAM-G-06: *Abandoned mine features (e.g., adits, shafts, and stopes) should be closed unless they are determined to contain habitat for at-risk species or contain cultural resources. Gating should be considered an alternative to destruction in these instances.*

"Abandoned" should be defined as meaning facilities that are closed without plans of reactivation.

p. 56, MMAM-MA-01: *Consider the use of sites for mineral collection areas during the development of a reclamation plan.*

This management approach is vague and should be better defined *e.g.* mineral collection by who? when? for what purpose? Also, safety issues are likely to be significant and should be included as a consideration.

p. 56, MMAM-MA-02: *Use operating and reclamation plans to protect and restore surface resources through the phased introduction and monitoring of pioneer and successor species for vegetative communities. Utilize adaptive management principles to ensure effective reclamation.*

[12] 36 CFR §228.8(g).

Any implementation of this MA should be restricted to future projects, MPOs and reclamation plans, as opposed to existing approvals, and only to the extend authorized by the Part 228 reclamation regulations.

p.56, MMAM-MA-04: *Seek opportunities to work with proponents to expand knowledge of local natural resources (e.g., proactive data collection and sharing and development of conservation measures).*

Who does TNF consider to be "proponents" and what is meant by "proactive data collection and sharing"? What kind of conservation measures does TNF envision?

p.58, RD-G-01: *New motorized routes or areas should not be constructed in areas designated as Primitive in the Recreation Opportunity Spectrum (ROS), or current protocol.*

This guideline does not give due consideration to mineral exploration and mining activities. Access to unpatented mining claims cannot be restricted under the 1872 Mining Law and applicable case law. This guideline should be limited to non-mining uses.

p.58, RD-MA-02: *Prioritize decommissioning of roads that impact flow regimes, are redundant routes, cause mass movement of soils and sediment, are built within the riparian management zone, or have substantial negative impacts to at-risk species*.

Similarly, this management approach does not give due consideration to mineral exploration and mining activities. Access to unpatented mining claims cannot be restricted under the 1872 Mining Law and applicable case law. This guideline should be limited to non-mining uses.

p.62, LA-G-09: *The Forest should proactively respond to threats to federally owned property rights (e.g., encroachment, trespass).*

What is meant by "proactively respond to threats"?

pp.97-100, *Riparian Ecological Response Units (RERU):*

The USFS land management planning regulations do not address or refer to "riparian ecological response units." The Plan describes these areas as "mapped riparian areas that describe dominant riparian plant communities" and then lists the specific plant communities from the September 2013 Regional Riparian Mapping Project.[13] Although there is a reference to mapping, no mapping is provided as part of the draft Plan for "riparian ecological response units" making it difficult to fully evaluate the impacts of this portion of the draft Plan.

[13] Regional Riparian Mapping Project (Southwestern Region), p4. USFS. September 2013, revised May 2014.

However, consistent with the USFS land management regulations,[14] USFS guidance,[15] and the definition of "riparian area" under state law,[16] "riparian ecological response units" can only be located in close proximity and contiguous to a lake, perennial and intermittent stream, or open water wetland. This should be specifically clarified in the Plan. If this is not clarified, or if TNF intends for this concept to apply to plant communities not located in close proximity to a lake, perennial and intermittent stream, or open water wetland, then this entire section should be removed because it attempts to impose riparian management requirements beyond the area envisioned to be subject to potential riparian management issues under the applicable regulations.

p.106, WAT-DC-02: *Water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, maintains or moves ecological conditions to low departure from reference conditions and meets the needs of downstream water users.*

A simple statement that water quality on the Tonto will meet or exceed applicable state water quality standards is inappropriate and creates expectations that will not be achievable in every circumstance. Such a statement also is not consistent with the recognition in state and federal laws and regulations that there may be natural or human-caused conditions that will impact the ability of a water to meet applicable standards.[17] It is also unclear what is meant by "maintain or moves ecological conditions…" and "needs of downstream users."

p. 107, WAT-O-06: *Acquire state based water rights for instream flow use for at least two streams threatened with dewatering, supporting highly valued resources (e.g., threatened or endangered species, species of conservation concern) or containing unique qualities (e.g., a*

[14] 36 CFR §219.8(a)(3)(ii)) (stating that land management "[p]lans must establish width(s) for riparian management zones around all lakes, perennial and intermittent streams, and open water wetlands, within which the plan components required by paragraph (a)(3)(i) of this section [specifying certain factors to be considered for maintaining or restoring riparian values within the riparian management zones] will apply, giving special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams and lakes") (emphasis added).

[15] A System for Mapping Riparian Areas in The Western United States, p6. USFS, revised August 2019 (defining "riparian areas" as "plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies") (emphasis added). *See also,* Regional Riparian Mapping Project (Southwestern Region), p4. USFS, September 2013, revised May 2014; and https://www.fws.gov/wetlands/other/Riparian-Product-Summary.html.

[16] ARS §§37-1101(10) (addressing state claims to streambeds) & 45-101(7) (addressing water rights). In both of these statutes, "riparian area" is defined as "a geographically delineated area with distinct resource values, that is characterized by deep-rooted plant species that depend on having roots in the water table or its capillary zone and that occurs within or adjacent to a natural perennial or intermittent stream channel or within or adjacent to a lake, pond or marsh bed maintained primarily by natural water sources. Riparian area does not include areas in or adjacent to ephemeral stream channels, artificially created stockponds, man-made storage reservoirs constructed primarily for conservation or regulatory storage, municipal and industrial ponds or man-made water transportation, distribution, off-stream storage and collection systems."

[17] 40 CFR §131.10(g); ARS §49-232(D); Ariz. Admin. Code (AAC) R18-11-104(H), R18-11-106, R18-11-118 & R18-11-119.

perennial stream in the Sonoran Desert) within each ten year period.

The TNF acquiring state-based water rights as a means of protecting "highly valued resources" is misleading as the priority date of these new uses would be junior to most water users with older claims. This objective is also likely to involve TNF in ongoing water rights litigation, which should not be a desired objective. This objective was also included in the draft Groundwater Directive proposed by the Forest Service in 2014, and subsequently abandoned in the face of public opposition. For the same reasons that the draft Groundwater Directive was abandoned, this objective should be deleted.

p. 107, WAT-S-02: *New wells on National Forest System lands and pipelines across National Forest System lands shall only be authorized where the water removed and/or transported by these facilities would not adversely impact springs, wetlands, riparian areas, surface flows, and other groundwater dependent ecosystems on National Forest System lands.*

This standard is problematic for several reasons and should be deleted. It is not clear what "groundwater dependent ecosystems" means. It is also not clear what nexus a pipeline transporting water across TNF lands has to do with forest ecosystems where the pipeline water originates off TNF land. Moreover, the terms and conditions that may be included in special use permits or plans of operations are specifically set forth in the applicable regulations.[18] TNF's implementation of this standard must be consistent with, and cannot conflict with, the applicable regulations. The applicable regulations do not prohibit any adverse impact to the environment, but rather require damage be minimized, often "to the extent practicable," or they require compliance with existing federal or state standards, which do not impose an absolute prohibition any adverse environmental impacts. This standard is also derived from the abandoned draft Groundwater Directive. For all of these reasons, we suggest deleting this standard.

p. 107, WAT-G-01: *When existing groundwater wells are proposed for improvement, adverse impacts to groundwater dependent ecosystems (e.g., wetlands, riparian areas, springs, streams, and fens) should be evaluated, and measures to eliminate, mitigate, or reduce impacts should be implemented.*

Improvements to existing groundwater wells should not trigger any analysis of adverse impacts to "groundwater dependent ecosystems" or mitigation measures. Also, "groundwater dependent ecosystems" is unclear and could refer to all ecosystems. This guideline could result in the denial of an authorization to improve an existing groundwater well and could create an undue burden on necessary and simple improvements such as repairs, changes in well functions, or others. The evaluation of improvement proposals should be done according to existing laws and guidelines. This guideline is also derived from the abandoned draft Groundwater Directive. This guideline should be deleted.

[18] 36 CFR §§228 & 251.

p. 108, WAT-G-03: *New wells on National Forest System lands and pipelines across National Forest System lands should avoid adversely impacting nearby wells on adjoining private lands.*

It is not clear what an evaluation of adverse impacts of new wells on TNF lands on nearby wells on adjoining lands would entail under this guideline. It is also not clear that TNF has authority to require this type of evaluation, and this guideline appears to exceed TNF's authority to regulate surface resources. This guideline is also derived from the abandoned draft Groundwater Directive. This guideline should be deleted.

p. 108, WAT-G-06: *New or reconstructed roads and motorized routes, infrastructure, recreation sites, or similar constructed facilities should not be located within floodplains or within 300 feet of water resource features (e.g., perennial and intermittent streams, springs, wetlands, and riparian areas), except where necessary for stream crossings or to provide for resource protection to avoid the long-term adverse impacts associated with the occupancy and modification of floodplains and water resource features.*

This guideline is unclear in several respects. How is "floodplain" defined? What is the basis of the 300-foot limit? What is a "water resource feature"? This guideline should clarify that it does not apply to the maintenance of existing roads, or reconstruction of permitted improvements that may need to be rebuilt due to damage, age, etc. Further, access to unpatented mining claims cannot be restricted under the 1872 Mining Law and applicable case law. This guideline should be limited to non-mining uses.

p.109, WAT-MA-08: *Manage groundwater and surface water on National Forest System lands as a hydraulically connected system.*

This management approach reflects a policy statement included in the abandoned draft Groundwater Directive and should be deleted for the same reasons the Forest Service abandoned the draft Groundwater Directive.

pp.110-113, *Riparian Areas, Seeps, Springs, Wetlands, and Riparian Management Zones (RMZ)*:

This section includes references to ponds and ephemeral drainages. These references are not consistent with the definition of "riparian area" under state law,[19] USFS land management regulations specifying that riparian protection or management is limited to areas that border lakes, perennial or intermittent streams, or open water wetlands,[20] as well as USFS guidance.[21]

[19] ARS §§37-1101(10) & 45-101(7).
[20] 36 CFR §219.8(a)(3)(ii).
[21] A System for Mapping Riparian Areas in The Western United States, p6. USFS. Revised August 2019; Regional Riparian Mapping Project (Southwestern Region), p4. USFS, September 2013, revised May 2014; and https://www.fws.gov/wetlands/other/Riparian-Product-Summary.html.

There should be no suggestion or implication in the Plan that riparian areas extend into ephemeral drainages. Any suggestion that riparian areas and associated management protections extend into ephemeral streams or drainages is contrary to USFS land management planning regulations and USFS guidance as well as applicable state law. Further, the word "pond" should not be used when referring to potential southwestern riparian ecosystems. Use of this word, without appropriate qualification, suggests that riparian ecosystems and areas could be located in proximity to man-made stock ponds and other similar pond-like features that should not be considered as having the potential to create a riparian ecosystem requiring protection under the USFS land management planning regulations.

p. 112, RMZ-O-01: *Complete restoration projects on 200 – 500 acres of riparian areas rated as nonfunctioning and functioning-at-risk (Proper Functioning Condition or similar protocol) during each 10-year period, with emphasis on priority 6th code watersheds.*

The references to "restoring" habitat or riparian areas, or aquatic ecosystems, etc. are ambiguous. Does the TNF have guidance on this type of restoration? What point in time is used as the baseline/target? What data does TNF have to support this restoration concept? Also, how are "nonfunctioning and functioning-at-risk" areas defined?

p. 112, RMZ-S-01: *All projects in riparian areas shall identify and delineate the riparian management zone.*

Who is responsible for this delineation? These costs should not be imposed on the applicant.

pp. 114-117, Wildlife, Fish, and Plants (WFP):

The USFS land management planning regulations require the responsible USFS official to determine whether plan components to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area will provide the ecological conditions necessary to "contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area."[22] If the responsible USFS official determines that the plan components addressing terrestrial and aquatic ecosystems and watersheds are insufficient to protect species, then species-specific plan components must be included in the plan, as long as such components are within the authority of the USFS.[23] A "species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area."[24]

[22] 36 CFR §219.9(b)(1).
[23] *Id.* §219.9(b)(1), (2).
[24] Id. §219.9(c).

It is not clear in the body of the draft Plan that species-specific plan components are necessary to be included in the Tonto Land Management Plan in accordance with the applicable regulations. This should be clarified in a modified version of the Plan. If this determination cannot be made, then any species-specific plan components, including guidelines and standards, should be removed from the Plan.

Further, while the draft Plan suggests that 51 species of conservation concern have been identified in the Tonto, it is not clear in the Plan how each of these species meet the regulatory definition of "species of conservation concern" including a determination that best available scientific information indicates substantial concern about each species' capability to persist over the long-term in the plan area. This additional point should be clarified in the Plan and species removed from the species of conservation concern list that do not meet the regulatory definition.

p. 125 Air Quality (AQ), paragraph 4: *In addition to the Class I areas already discussed, the TNF includes four other wilderness areas designated after 1977: Hellsgate, Salome, Four Peaks, and Salt River Canyon.*

The Plan state that four wilderness areas - Hellsgate, Salome, Four Peaks, and Salt River Canyon - are managed as Class I areas. Is there a legal obligation for TNF to manage them as Class I areas?

p.125, AQ-DC-05: *Visibility in designated wilderness areas (Class I and sensitive Class II areas) is free of anthropogenic (human-caused) impacts.*

It is impossible to have any area be free of anthropogenic impacts because of international and interstate transport of air pollutants. This desired condition is completely unrealistic and should be deleted.

p.126, AQ-MA-01: *Work with agencies, organizations, Tribes, and other entities to actively pursue actions designed to reduce the impacts of pollutants from sources within and outside the Forest.*

The Forest Service does not have the jurisdictional authority to pursue actions against sources outside the Forest.

p. 127, Chapter 3. Management Areas Plan Direction:

Understanding the challenging role of the TNF in "balancing conflicting resource needs and providing for comprehensive multi-use management"[25] in its drafting of the Plan, we are concerned by the vast expansions being proposed to the various management areas. The Tonto currently has eight (8) designated wilderness areas encompassing 602,421 acres,[26] and two (2) designated wild & scenic river segments of approximately 57.3 miles.[27] The Plan identifies, at

[25] The Plan, p6.
[26] Ibid., pp5 & 128.
[27] Ibid., p135.

minimum, an additional 11 recommended wilderness areas encompassing another 43,206 acres,[28] and 20 eligible wild and scenic rivers segments totaling approximately 128 miles.[29] Even though these expansions have yet to be officially designated, the Plan sets out standards and guidelines specific to these areas "until such time as the area designated"[30] or "until a suitability determination has been made whether or not to recommend them for inclusion…"[31]

Furthermore, currently there are three statutorily designated management areas in the Tonto: wilderness areas, wild and scenic river, and national scenic trails.[32] There are also six existing administratively designated management areas in the Tonto: critical habitat, experimental forest, inventoried roadless areas, national recreation trails, research natural areas, and significant caves. The Plan proposes to establish an additional four administratively designated management areas: Lakes and Rivers Management Area, Apache Leap Special Management Area, research natural areas, and recommended botanical areas.[33] The Plan components for these management areas are either in addition to or may differ from forestwide management by: "constraining an activity where forestwide direction does not; constraining an activity to a greater degree than forestwide direction; or providing for an exception to forestwide direction, when forestwide direction is in conflict with the management emphasis of the management area."[34] FMI is concerned that an overlay of all these designated, recommended and eligible areas and features of the forest encompass much of the forest and can greatly restrict other multi-use activities.

p.134, RWMA-S-04: *Sales or extraction of common variety minerals shall not be permitted in recommended wilderness areas.*

This standard should be deleted as it is contrary to the MUSYA which stipulates that "[n]othing herein shall be construed so as to affect the use or administration of the mineral resources of national forest lands or to affect the use or administration of Federal lands not within national forests;"[35] and the Wilderness Act of 1964 which states that "[n]othing in this chapter shall prevent within national forest wilderness areas any activity, including prospecting, for the purpose of gathering information about mineral or other resources, if such activity is carried on in a manner compatible with the preservation of the wilderness environment."[36]

p.135, DWSRMA-S-02: *Sales or extraction of common variety minerals shall not be authorized in wild and scenic rivers.*

This standard should be deleted as it too conflicts with the MUSYA and with Wild and Scenic Rivers Act of 1968 which stipulates that "[n]othing in this chapter shall affect the applicability of

[28] Ibid., p173 at Appendix A, Figure A-2.
[29] Ibid., p137.
[30] Ibid., p133.
[31] Ibid., p137
[32] Ibid., p127.
[33] Ibid., p127.
[34] Id.
[35] 16 USC §528.
[36] 16 USC §1133(d)(2).

the United States mining and mineral leasing laws within components of the national wild and scenic rivers system…"[37]

p.144, RNBAMA-S-01: *Sales or extraction of common variety minerals shall not be authorized in designated or recommended research natural areas and botanical areas.*

This standard should be deleted for the reasons provided in our comment regarding p.134, RWMA-S-04.

p.149, NTMA-S-05: *Sales or extraction of common variety minerals (e.g., limestone and gravel) shall not be authorized within the Arizona National Scenic Trail corridor.*

This standard is contrary to the MUSYA, especially as it is unclear as to what constitutes the "trail corridor" area. The reference to "trail corridor" is concerning as it is not statutorily defined, and yet, is used by TNF to arbitrarily regulate activities on, near, adjacent to or even miles from the trail. Therefore, we recommend this standard be deleted.

p.150, NTMA-G-08: *To protect visual quality, special use authorizations for new communication sites, utility corridors, and renewable energy sites should not be allowed within visible foreground (up to 0.5 miles) and middle ground viewshed (up to four miles) of national trails.*

This viewshed protection distance is excessive, arbitrary, and not authorized by law or regulation, and has been chosen by TNF without consultation with a Trail Advisory Council, as required by the National Trails System Act.[38]

p.150, NTMA-G-10: *If management activities result in short-term impacts to the visual quality along the Arizona National Scenic Trail, mitigation measures should be included (e.g., screening, feathering, and other scenery management techniques) at key locations (e.g., vistas) within and adjacent to the trail corridor.*

Similarly, this guideline is arbitrary in that "trail corridor" is not statutorily defined and it is unclear how "adjacent to the trail corridor" is to be determined.

p.151, NTMA-G-16: *To protect or enhance the scenic qualities of the Arizona National Scenic Trail, management activities should be consistent with Visual Quality Objectives of Preservation or Retention within the foreground of the trail (up to 0.5 miles either side).*

[37] 16 USC §§528 and 1280(a).
[38] 16 USC §1244(d).

Similarly, this half-mile designation is not authorized by law, is arbitrary, and has been chosen by TNF without consultation with a Trail Advisory Council, as required by the National Trails System Act.[39]

p.151, NTMA-MA-05: *Encouraging trail partners and volunteers to assist in the planning, development, maintenance, and management of the trail, where appropriate and as consistent with the Arizona National Scenic Trail Comprehensive Plan.*

The TNF has indicated that it is coordinating with the group leading the Arizona National Scenic Trail Comprehensive Management Plan. While this "group" ought to be the statutorily required Trail Advisory Council, the Forest Service has yet to appoint anyone to the Arizona National Scenic Trail Advisory Council. We are certainly very curious to know who this "group" is with which the TNF is coordinating to develop plan components regulating activities in and around the Arizona National Scenic Trail. Without proper consultation with the Arizona National Scenic Trail Advisory Council, which has yet to be appointed, the plan components stipulating to the visual qualities and management activities of the trail corridor are premature and arbitrary, especially as The Arizona National Scenic Trail Comprehensive Plan has yet to be properly developed with the Advisory Council's input.

3. Comments on the Draft EIS. Our comments on the Draft EIS are provided below. Suggested language changes are also included in the "redline" version included herein (Attachment B).

Volume 1

p.27, *Riparian Management Areas*: The second sentence refers to "non-functioning and functioning-at-risk" riparian areas- are these terms defined anywhere? If not, a definition should be included.

In this paragraph and elsewhere in the DEIS, "restoring" is used with reference to habitat, riparian areas, aquatic ecosystems, etc. Is there a definition of "restoring"? Is there any guidance on this concept as used in this context? A number of issues are unclear, including the point in time against which current conditions will be evaluated; the data relied upon to establish and support the desired conditions; and the feasibility of restoration without the complete removal of human activity. As indicated in the attached redline, we suggest changing this term to "improving"/"improvement" as applicable, which provides a more realistic and attainable goal.

p. 27, *Issue 4: Economics*: The first sentence refers to "adaptive management to address potential ecological changes with the potential to alter the provision of ecosystem services." What this means in general and in the context of water management is unclear. Some elaboration and additional details explaining or providing examples of "adaptive management" and "potential ecological changes with the potential to alter the provision of ecosystem services" would be helpful and facilitate public review and comment.

[39] 16 USC §1244(d).

p. 223, *Effects Common to All Alternatives*, 4th paragraph:

> *In the minerals section of all alternatives, there is a standard that ensures reclamation of mineral areas to restore resource impacts (MM-S-01). Throughout the plan, standards and guidelines in resource sections for scenery, watershed, soils, cultural resources, vegetation, and wildlife resources require that these resources are protected or effects are mitigated during projects, which would include salable mineral projects.*

This standard is somewhat misleading. USFS should be clear that its "standards" in the plan cannot conflict with applicable regulations, and the regulations involve a balancing of factors. For example, the applicable regulations require operations "where feasible" to "minimize adverse environmental impacts."[40] Scenic values are protected "to the extent practicable."[41] Fisheries and wildlife habitat protection measures must be "practicable."[42] Reclamation requirements are required "where practicable."[43]

We suggest amending the 1st sentence of the excerpt above to state "… standard that addresses reclamation of mineral areas consistent with applicable regulations." We suggest amending the 2nd sentence of the excerpt above to state "… wildlife resources require certain protection measures consistent with applicable regulations, which would include salable mineral projects."

pp. 412-413, *Water Quantity-Surface Water*: In paragraphs 2 and 4, several references are made to discharge data with periods ending in 2014. Each should be updated through 2018 as this additional data is now readily available.

p. 421, 1st paragraph: The base flow for Pinal Creek at Inspiration Dam may be influenced by water treatment plant discharges and not groundwater inflow. Have all of the data sources in this section been verified to differentiate for alternative inflows where urban influences exist unrelated to groundwater inflow?

p. 425, *Effects Common to All Alternatives*: The fifth bullet refers to "Acquiring instream flow water rights for streams vulnerable to dewatering." This is misleading because the priority date for any new uses would be junior to most water users with older claims. This limitation on this alternative action should be noted in this section.

p. 426, *Alternative A Effects*: The second paragraph refers to management direction on groundwater stewardship. The Forest attempted to institute a "Directive on Groundwater Resource Management" in 2014, but eventually abandoned that effort. Many of the commenters accurately identified the lack of authority to manage groundwater resources, especially as the "Directive" attempted to expand what authority it does have off of forest lands. Simply put, the Forest Service lacks the broad authority over groundwater resources on NFS lands. That

[40] 36 CFR §228.8.
[41] 36 CFR §228.8(d).
[42] 36 CFR §228.8(e).
[43] 36 CFR §228.8(g).

authority is dependent on the nature of the water rights associated with a particular federal reservation (i.e., a particular National Forest) and the extent to which the federal reserve rights associated with that reservation extend to groundwater. The extent and nature of those claims are to be determined (by virtue of the McCarren Amendment) through the state court proceeding in the Gila River General Stream Adjudication, which has yet to adjudicate either the Salt or Verde River system.

p. 437, *Mining Activities*: The third sentence ends with "are likely to occur in the future." This should be deleted or amended to say "may occur" or something similar.

p. 438: The first paragraph states: "The overall cumulative impact of population growth is to make it more challenging to achieve desired conditions for watershed health and supporting multiple uses without long-term decline in ecological conditions because of the added pressure to resources associated with increases in population." This needs to be clarified. Does "population growth" refer to on-Forest or off? …

Volume 3

p.7, *Water Quantity – Surface Water*: The first sentence of this section refers to an "Ecological Sustainability Analysis" – where is this document located?

The second sentence of this section states that "*Some additional data* has been incorporated into the trend discussions of Chapter 3" (emphasis added) – what specific data is referred to?

p. 7, *Water Quantity – Groundwater*: The second sentence of this section states that "No Modeling was conducted for the environmental consequences analysis." This indicates that all comments made in the Draft Plan regarding groundwater impacts (declining water levels, etc.) are subjective and not based on fact and hence should either be removed or qualified in the body of the document and not simply stated here which could be missed by a significant number of people.

CONCLUSION

Freeport appreciates TNF's effort to solicit public comment on the Draft Plan and Draft EIS and appreciates TNF's consideration of these comments. We look forward to working with the agency and other stakeholders as the Plan is finalized.

Please do not hesitate to contact me directly for questions or concerns regarding our comments.

Francis R. McAllister Jr.
Vice President, Land and Water
Freeport-McMoRan Inc.

Attachment A

United States Department of Agriculture

Tonto National Forest
Draft Land Management Plan

Coconino, Gila, Maricopa, Pinal, and Yavapai Counties, Arizona

Forest Service Tonto National Forest MB-R3-12-05 November 2019

Required Plan Content

Priority watersheds: Every plan must identify watersheds that are a ~~impaired or at risk for~~ priority for maintenance or restoration. See the Watershed and Water Resources section in Chapter 2. Forestwide Plan Direction.

Distinctive Roles and contributions: Every plan must describe the roles and contributions of the forest plan area to ecological, social, and economic sustainability within the broader landscape. See Chapter 1. Introduction.

Monitoring program: Every plan must include a plan monitoring program. Monitoring information enables the responsible official to determine if a change in plan components or other plan content that guide management of resources on the forest plan area may be needed. See Chapter 4. Monitoring.

Proposed probable and possible future actions: Every plan must describe proposed and possible actions that may occur during the life of the forest plan in the plan area. Possible actions are not a commitment to do work, but possible actions which could be performed to move toward desired conditions and objectives. See Appendix B. Proposed Probable and Possible Future Actions.

Optional Forest Plan Content

Management approaches and associated information do not offer plan direction, but describe an approach or strategy to manage the unit to achieve a desired condition. Management approaches often convey how plan components work together to achieve the desired condition. They may also describe context, intent, priorities, partnership opportunities or coordination activities, needs to surveys, inventories or assessments, or approaches to risk and uncertainty. Not every resource topic area may have an associated management approach heading. Changes to management approaches do not require plan amendments.

Background and/or description and associated information do not offer plan direction, but give a brief sense of the history and/or description of the resource topic area being addressed, as of the writing of the plan. The background and description information also provide a context for the desired conditions identified as part of a plan component.

Other sources of information include existing laws, regulations, policies, memorandums of understanding and other guidance that will be incorporated into the forest plan. These sources are important in designing projects and activities to achieve desired conditions. Many are posted on the Tonto National Forest website www.fs.usda.gov/goto/tontoplan as a stand-alone document and are also available in the project record.

Plan Codes

The plan uses a coding system to reference plan components more easily and to determine where the plan components apply. Codes consist of a series of letters and numbers to establish what resource area and plan component is being referenced. The coding is structured in an AA-BB-CC-## format.

The first series of letters reference a specific resource area (e.g., ERU for ecological response units or REC for recreation), see table 1. The middle two series of letters reference the sub-resource (level 2 and level 3) of the specific resource area, if present. These can include lands of specific character or use type (e.g., DES for desert ecosystems or DIS-WB for dispersed recreation water-based) found within the resource. The last series of letters reference the type of plan component (e.g., **DC** for desired condition, **O** for objective, **S** for standard, and **G** for guideline). Each code then ends with a number that aligns with the individual plan component to differentiate between similar type plan components. All plan components have an associated code, but it is important to note that they may not include every series of letters within the coding structure.

Water-Based Recreation (REC-DIS-WB)

Water-based recreational opportunities on the Tonto National Forest attract visitors and provide benefits to people at local and regional scales. The Tonto National Forest offers a variety of water-based and on-shore activities adjacent to rivers, streams and reservoirs. Water features provide the physical settings for many different outdoor recreation activities – creeks and rivers for swimming, fishing, kayaking, canoeing, rafting, and tubing; and reservoirs for fishing, motor boating, jet skiing, water skiing, and wakeboarding. Six of the ten largest lakes/reservoirs contained entirely in the state are found on the Forest. Visitors from across the state travel to Mogollon Rim area streams (e.g., Fossil Creek, East Verde River, Tonto Creek, Canyon Creek), the Salt River Lakes (Roosevelt, Apache, Canyon, and Saguaro), and the Verde River Lakes (Bartlett and Horseshoe) to experience water-based recreation.

Water for recreation is one of the key ecosystem services provided by the Tonto National Forest. The plan components for Water-Based Recreation and Watersheds and Water Resources help provide this service for the future. See Chapter 1. Introduction for more information about key ecosystem services.

Refer to the full Recreation, Developed Recreation, and Dispersed Recreation sections in Chapter 2. Forestwide Plan Direction and the Lakes and Rivers Management Area in Chapter 3. Management Areas Plan Direction for additional applicable plan direction.

Desired Conditions (REC-DIS-WB-DC)

01 Water based recreation provides social, cultural, and economic benefits to the public.

02 Visitation levels do not result in overcrowding and provide safety for visitors while remaining consistent with other resource desired conditions for the use area.

03 Locations for designated water access points and developed sites reflect user demands and water accessibility.

04 Sustainable water-based recreation opportunities are provided on the Tonto, while riparian areas remain largely undisturbed from long-term recreational impacts (e.g., camping and access points) with the exception of the Lakes and Rivers Management Area.

05 Buoys, boat launches, and/or docks provide safe conditions.

Guidelines (REC-DIS-WB-G)

01 Management activities should take measures to prevent and/or minimize the spread of aquatic parasites, invasive species, or disease (e.g., Quagga mussel or whirling disease).

Management Approaches for Water Based Recreation

01 Coordinate with Arizona Game and Fish Department to manage boating opportunities (e.g., boat registration, facilities, and enforcement) on the Forest.

02 Work with the State of Arizona, Bureau of Reclamation, and Salt River Project to monitor water quality and ensure water quality standards for direct human contact are not being violated where such standards are applicable.

03 Work with partners and stakeholders to help manage for the safety of water based recreation and ensure ample opportunities for the future.

Recreational Shooting (REC-DIS-RS)

Recreational shooting is defined as any shooting other than in lawful pursuit of game that is carried out in a safe manner, does not cause resource damage, and does not result in litter. This includes discharging a firearm, air rifle, or gas gun, including paint ball guns. Restrictions on recreational shooting do not limit

Standards (SU-S)

01 Activities that include visits to archaeological sites shall identify the site locations in the special use authorization and follow Leave No Trace ethics as outlined in the Operating Plan.

02 Conflicting uses will not be authorized in communication sites, transportation, or utility corridors.

03 Authorizations for utilities must incorporate requirements for road construction, reconstructions, reclamation, and maintenance that minimize resource damage (e.g., dust abatement, preventing the spread of invasive weeds).

04 Roads, utilities, and communication sites are required to co-locate in existing or small rights-of-way to minimize the footprint on natural resources (e.g., using only existing access roads would reduce soil compaction, utilizing existing communication facilities would decrease visual impacts).

05 Authorized boat tours for watercraft in excess of 25 feet long shall be limited to one per reservoir.

06 Requests for new authorizations or expansion of existing services and/or permitted areas will be evaluated on a case-by-case basis using the criteria for new commercial public services. Preference will be given to existing permit holders who are in compliance with their existing permits.

07 All river-running outfitter and guide authorizations will be restricted to no more than two groups entering the Upper Salt River Canyon Wilderness per day.

Guidelines (SU-G)

~~01 Utility corridors and communications sites should utilize existing facilities, sites, and corridors unless new sites can provide better social, economic, and ecological benefits.~~

02 Organized recreation events and noncommercial group uses authorized under special use permit should be limited to designated National Forest System trails and roads, suitable developed sites and group sites, and pre-disturbed areas that can provide safety for participants and the public. Authorizations should promote responsible land use (e.g., Leave No Trace ethics and pack-it-in pack-it-out).

03 Special use activities that negatively impact the experience of other visitors should be scheduled outside of high-use periods.

04 Special use permits should not authorize camping at cultural sites, trailheads (except those trailheads with designated dispersed sites), sensitive species areas, or interpretive sites.

05 Non-motorized watercraft uses on the Lower Salt River should be managed to utilize all existing developed water access points and provide equal opportunity to multiple businesses.

06 Utility and transmission line corridors should be designed to blend with the existing character of the landscape.

Management Approaches for Special Uses

01 Consider authorizing recreation special use permits for high-demand outfitting and guiding activities based on the results of a capacity study, to be re-evaluated as needed. Utilize available tools to increase administrative efficiencies (e.g., statewide outfitting and guiding authorizations, regional teams, and modernization efforts).

02 Work cooperatively with the Arizona Game and Fish Department to manage fishing and hunting outfitting and guiding operations, recreation events, and tournaments.

03 Continue to administer existing recreation special use permits to assure compliance and to assure that a quality public service is provided consistent with Forest Service desired conditions for the use area.

04 Utilize special use authorization terms and conditions as a means of protecting water dependent resources on the forest to the extent such conditions are specifically authorized by applicable regulations and do not conflict with or impinge upon state water rights.

05 When applicant objectives can be met outside of designated wilderness, consider authorizing activities in locations outside of wilderness before authorizing locations within wilderness areas.

Mining, Minerals, and Abandoned Mines (MMAM)

Minerals of economic interest are classified as leasable, salable, or locatable. Coal, oil shale, oil and gas, phosphate, potash, sodium, geothermal resources, and all other minerals that may be acquired under the Mineral Leasing Act of 1920 (30 U.S.C. 181), as amended, are referred to as leasable minerals. Common varieties of sand, stone, gravel, pumicite, and clay that may be acquired under the Materials Act of 1947 (30 U.S.C. 601–604) are considered salable minerals or mineral materials. Minerals that are not salable or leasable (e.g., gold, silver, copper, tungsten, uranium, et al) are referred to as locatable minerals. Locatable mineral deposits include most metallic mineral deposits and certain nonmetallic and industrial minerals. Locatable minerals are subject to the Mining Law of 1872 (30 U.S.C. 22, *et seq*), as amended. Locatable minerals can be claimed, explored, and mined on public lands under the Mining Law of 1872. The Forest Service follows regulations under 36 CFR 228, Subpart A for locatable minerals, to minimize adverse impacts on National Forest System surface resources. It is Forest Service policy to administer responsible, environmentally sound energy and mineral development and reclamation on the Tonto National Forest.

Locatable mineral resources occur on all ranger districts with several active locatable mines on Globe Ranger District.

No leasable mineral authorization or applications are currently located within the Tonto National Forest. The potential for development of fluid minerals is low; the geologic depositional environment is not conductive to hydrocarbon generation.

Salable materials found on forest include sand and gravel, decomposed granite, and building stone. The Tonto provides opportunity for local communities to extract these materials at the discretion of the authorizing officer (forest supervisor or district ranger, as appropriate). Currently, the Arizona Department of Transportation and other local government agencies have permits to use mineral materials from National Forest System lands. There are provisions in the regulations to allow for public access to small quantities of mineral materials for personal use at the discretion of the authorizing officer. Regulation allows for commercial sales of mineral material; however, we do not currently have active commercial mineral material sites.

Abandoned mine lands occur throughout the forest. Abandoned mines are the remains of former mining operations. The Forest Service's Abandoned Mine Lands program identifies mine features posing a danger to the public, which are prioritized and identified for closure or remediation. The classification as abandoned applies when there are no entities or individuals left operating the mining activity or who have financial ties to the mine. The significance of this classification is that for most abandoned sites there is no money from the original operators available to clean up the sites. Although occasionally a responsible party can be found to contribute funds toward cleanup, the major burden falls on the Forest Service to finance cleanup and remediation. Bats and other wildlife are known to use abandoned mine features for habitat.

Desired Conditions (MMAM-DC)

01 Mining and mineral activities comply with law, regulation, and policy in the development of minerals. Minimize adverse environmental impacts to surface and groundwater resources, watershed and forest ecosystem health, wildlife and wildlife habitat, scenic character, and other desired conditions applicable to the area.

02 ~~Reclaimed mining and mineral sites provides for public safety and the protection of forest resources. They possess a resilient forest ecosystem suitable to permanent post mining landform.~~

03 Mineral materials on National Forest lands are available to the public and to local, State, and Federal government agencies where reasonable protection of, or mitigation of effects on, other resources is assured, and where removal is not prohibited.

04 Opportunities for rock hounding and mineral collection are available to forest users.

05 Abandoned and inactive mines disturbed by past mineral exploration and mine development have been returned to stable conditions and do not pose health, safety, or environmental hazards.

Objectives (MMAM-O)

01 Initiate at least one environmental review for closure of one or more abandoned or inactive mine(s) every three years.

Standards (MMAM-S)

01 Plans of operation shall be required for all mineral operations that will likely cause significant disturbance of surface resources.

~~02 Required reclamation activities shall be designed to establish resilient post-mining ecosystems consistent with the pre-disturbance Ecological Response Unit (ERU), or to an ERU identified as achievable to the post-mining landscape condition.~~

03 All exploration drill holes and water production or monitoring wells reasonably incident to mining operations or required mitigation and monitoring measures shall be abandoned in accordance with current state and federal regulations and attested to by a~~n independent~~ licensed Professional Engineer or Geologist on site during the abandonment.

Guidelines (MMAM-G)

01 Mineral materials (e.g., sand and gravel) should not be removed from the riparian management zone without adequate engineering controls to protect surface waters. Requests for personal and commercial mineral material sales should be considered where consistent with other resource desired conditions.

02 Placer mining should avoid damaging riparian vegetation, degrading water quality, and negatively impacting channel stability.

~~03 Reclamation of surface disturbance associated with large-scale mineral activities should be implemented to return sites to other productive uses (e.g., solar energy production) where reclamation to original or other appropriate Ecological Response Unit is impracticable due to impacts of the action. For example, solar energy production on large sites.~~

04 Surface reclamation and revegetation plans for smaller scale mineral activities, such as drilling programs or smaller scale open pits, should plan for a natural species succession appropriate to the reclaimed landform and vegetative community for the identified Ecological Response Unit.

05 Reclamation should be carried out concurrently with mining operations and in logical succession throughout the operational sequence.

06 Abandoned mine features (e.g., adits, shafts, and stopes) should be closed unless they are determined to contain habitat for at-risk species or contain cultural resources. Gating should be considered an alternative to destruction in these instances.

Riparian Ecological Response Units (RERU)

In order to promote consistency and uniformity when identifying, classifying, and mapping riparian areas, USFS guidance defines "riparian areas" as "plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies."[26] Riparian ecological response units are mapped riparian areas that describe dominant riparian plant communities. This section provides management direction for riparian plant communities present on the Forest and the riparian ecological response unit framework is simply a system of mapping, delineating, and describing riparian plant communities. Mapping methods, ecosystem typing and classification may change based on the best available scientific information, however plan direction will still apply to any new system of riparian ecosystem typing for the forest because the plan direction is broadly described for riparian plant communities on the Forest.

The following riparian ecological response units are present on the Forest: Arizona alder-willow, Arizona walnut, desert willow, Fremont cottonwood-conifer, Fremont cottonwood-oak, Fremont cottonwood/shrub, herbaceous, narrowleaf cottonwood/shrub, ponderosa pine/willow, and sycamore-Fremont cottonwood. See the Regional Riparian Mapping Project report (2013) for a detailed description of each riparian ecological response unit. When using riparian ecological response units or other riparian mapping data for project planning, it should be noted that these classifications represent potential plant associations. Riparian areas are dynamic and can undergo dramatic changes in plant composition and structure, specifically at reach scales, based on short and long-term disturbances (e.g., periodic flood pulses, 100-year flood, drying conditions).

Riparian species composition and community structure is largely influenced by moisture regimes/water availability, disturbance (flood timing, magnitude, and frequency), climate, soils and other landscape features (parent material, geomorphology). Riparian plant species can also have strong influences on stream channel conditions and ecological function, such as the presence of deep rooted woody vegetation that maintain alluvial soils. Because riparian species tend to have specific moisture regimes, the presence or absence of certain species and their wetland indicator scores/category[27~~6~~] can indicate changes in local site conditions and ecological status (e.g., high departure). For example, drying conditions may be evident by the under-representation of wetland-obligate (only found at wetlands) species and increases in facultative-upland or upland species (mostly occur at uplands). A number of riparian species are groundwater dependent (generally requiring shallow groundwater levels), so dominance by upland plants at the riparian zone may indicate a declining water table and or drought conditions.

The spatial scales for describing desired conditions for riparian vegetation is different than upland vegetation. Desired conditions for riparian areas are generally described at the landscape scale that describes conditions across three or more subwatersheds (6th-level hydrologic unit).

Standards and guidelines provide the sideboards necessary to achieve desired conditions. There are a number of potential indicators that can be used in evaluating compliance with a standard or guideline for riparian areas such as seral state diversity, riparian woody regeneration, ground cover or bare ground, the abundance and diversity of facultative and wetland obligate riparian plant species based on site potential, soil conditions, stream channel conditions, and aquatic conditions – these indicators should be considered for the riparian guidelines listed below (RERU-G-1, RERU-G-2, RERU-G-3, and RERU-G-4). This is not an exhausted list as the BASI should inform the consideration of additional indicators. See the Regional Desired Conditions for Riparian and Aquatic Systems guide[28~~7~~] for other applicable indicators and measures. PFC assessments or other similar protocols should be used to evaluate current riparian

[26] A System for Mapping Riparian Areas in The Western United States. p6. USFS. Revised August 2019 (emphasis added). *See also* Regional Riparian Mapping Project (Southwestern Region). p4. USFS. September 2013, revised May 2014 & https://www.fws.gov/wetlands/other/Riparian-Product-Summary.html.

[27~~6~~] Wetland indicator scores are used to designate a plant species' preference for occurrence in a wetland or upland; Obligate-Wetland species almost always occur in wetlands, Facultative-Wetland species usually occur in wetlands but may occur in non-wetlands, Facultative species occur in wetlands and non-wetlands, Facultative-Upland species

used by households, industry, power suppliers, and agriculture, helping to sustain human populations in and around rural communities, towns, and cities in central Arizona – including the greater Phoenix area. The plan components for watersheds and water resources help provide this service for the future. See Chapter 1. Introduction for more information about key ecosystem services.

Water resources on the Forest also contribute to local and regional economies by supporting water based recreation. Six of the largest reservoirs in the state lie within the forest and support thriving water based recreation opportunities. Streams and rivers draining the Mogollon Rim country are popular recreation destinations to escape the summer heat in the Phoenix metropolitan area, The Lower Salt River is also a popular area for water play in the summer. Water for recreation is one of the key ecosystem services provided by the Tonto National Forest. The plan components for Watersheds and Water Resources and Water-Based Recreation help provide this service for the future. See Chapter 1. Introduction for more information about key ecosystem services.

For a list of at-risk species associated with watersheds and water resources see Appendix C. At-Risk Species and Associated Ecological Response Units.

The plan components below apply to watersheds. Refer to the Riparian Areas, Seeps, Springs, Wetlands, and Riparian Management Zones section for additional applicable plan direction.

Desired Conditions (WAT-DC)

01 Watersheds support multiple uses (e.g., timber, recreation, grazing, cultural) with no long-term decline in ecological conditions as measured by the Watershed Condition Framework or an equivalent method and provide high-quality water for downstream communities dependent on them.

02 Unless quality is impacted by natural background conditions, human-caused conditions that cannot be remedied or would cause more environmental damage to correct than to leave in place, a dam, diversion, or other type of hydrologic modification of the water body, or any other similar conditions, ~~W~~water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, maintains or moves ecological conditions to low departure from reference conditions and meets the needs of downstream water users.

03 Watersheds are functioning properly (based on criteria provided in the Watershed Condition Framework or similar current protocol) and they exhibit high geomorphic, hydrologic, and biotic integrity relative to their potential condition. They support the magnitude, frequency, timing and duration of runoff within a natural range of variability and the movement of water and sediment from the surrounding uplands through the channel system sustains the health and function of the channel and riparian corridors as measured by the Watershed Condition Framework, National Riparian Core Protocol (Merritt et al. 2017) or another equivalent method.

04 Ecological components of the watershed (e.g., soil, vegetation, and fauna) are resilient to human activities and natural disturbances (e.g., fire, drought, flooding, wind, grazing, insects, disease, and pathogens), and maintain or improve water quality and riparian and aquatic species habitat as measured by the Watershed Condition Framework or another equivalent method.

05 The effects of climate variability and change are moderated by watershed conditions that support important ecosystem services (e.g., clean water, groundwater recharge, long-term soil productivity, and base flows in streams, springs, and wetlands).

06 Watersheds provide for recharge of aquifers and sustain groundwater quantity and quality.

07 Watershed vegetation exhibits low departure from reference condition of vegetation characteristics (e.g., fuel composition, fire regime, and associated disturbances).

08 Groundwater discharge maintains water table elevation, supports base flows and water temperature in streams, seeps, fens, springs, and other wetland resources and that sustains the

condition. Groundwater discharge maintains site productivity and soil moisture characteristics for riparian vegetation.

09 Surface waters provide habitat for aquatic species and riparian species, contribute to connectivity for wildlife across the landscape, provide for local and urban potable[31] water supplies, agricultural uses (e.g., livestock watering and irrigation), and recreation.

10 Water rights to support water dependent resources and uses on the Forest have been acquired.

Objectives (WAT-O)

01 Ensure that at least two priority watersheds are identified at all times.

02 Implement at least one project identified in the Watershed Restoration Action Plan[32] for each priority watershed every year.

03 Improve or maintain watershed condition class (as defined in the Watershed Condition Framework or other acceptable method) of at least one 6th code (HUC12) watershed every 5 years.

04 Improve soil and water condition of 10,000 – 20,000 acres annually.

05 Complete at least four aquatic habitat restoration projects (e.g., increase pool quantity, provide stream cover, and bank stabilization) every 10 years.

~~06 Acquire state based water rights for instream flow use for at least two streams threatened with dewatering, supporting highly valued resources (e.g., threatened or endangered species, species of conservation concern) or containing unique qualities (e.g., a perennial stream in the Sonoran Desert) within each ten year period.~~

Standards (WAT-S)

01 Project-specific best management practices (BMPs) shall be incorporated in land use and project plans as a principal mechanism for controlling non-point pollution sources, to meet soil and watershed desired conditions, and to protect beneficial uses.

~~02 New wells on National Forest System lands and pipelines across National Forest System lands shall only be authorized where the water removed and/or transported by these facilities would not adversely impact springs, wetlands, riparian areas, surface flows, and other groundwater dependent ecosystems on National Forest System lands.~~

03 Water rights, to support uses other than those supported by federal reserved rights, will be secured through State of Arizona water rights procedures.

Guidelines (WAT-G)

~~01 When existing groundwater wells are proposed for improvement, adverse impacts to groundwater dependent ecosystems (e.g., wetlands, riparian areas, springs, streams, and fens) should be evaluated, and measures to eliminate, mitigate, or reduce impacts should be implemented.~~

[31] Potable (drinkable) water is one of the key ecosystem services provided by water resources from the Tonto National Forest.
[32] Watershed Restoration Action Plans for priority watersheds are used to maintain or improve watershed condition and implement essential projects.

02 When additional water supplies are necessary for Forest Service uses, existing infrastructure that could provide the supply should be evaluated for repairs or improvement prior to developing new sources of supply.

03 ~~New wells on National Forest System lands and pipelines across National Forest System lands should avoid adversely impacting nearby wells on adjoining private lands.~~

04 New water supply needs for Forest Service uses (e.g., livestock watering and recreation uses) should be met with groundwater supplies, provided that this development does not adversely impact groundwater dependent ecosystems or surface water resources.

05 Activities that could impact groundwater or surface water quality should be located outside Source Water Protection Areas[33] to prevent potential impacts.

06 New or reconstructed roads and motorized routes, infrastructure, recreation sites, or similar constructed facilities should not be located within floodplains or within 300 feet of water resource features (e.g., perennial and intermittent streams, springs, wetlands, and riparian areas), except where necessary for stream crossings or to provide for resource protection to avoid the long-term adverse impacts associated with the occupancy and modification of floodplains and water resource features.

07 Consistent with existing water rights, permitted water uses, water diversions, or obstructions should allow sufficient water to pass downstream to preserve minimum levels of water flow that maintain aquatic life, riparian and aquatic desired conditions, and other water dependent resources.

08 Watershed condition classification (using the watershed condition framework or similar protocol) should be updated after large-scale disturbance events (e.g., wildfire).

09 To enhance the protection of human health and safety, watershed treatments should be implemented where protection of people, structures, and community infrastructure (e.g., roads, bridges, power corridors, and water supply) are at risk.

10 Watershed condition improvement projects should be integrated with other project activities. Prioritize projects that require minimal maintenance (e.g., cost of maintenance and time required for maintenance) and improve resiliency to climate change.

11 Where stressors degrading watershed condition can be identified, they should be eliminated or reduced. Natural recovery of watershed conditions should be prioritized where it can be expected to occur.

12 Applications to the state by entities other than the Forest Service for water rights on National Forest System and adjacent lands should be evaluated where they could adversely affect National Forest System water rights. State procedures should be followed if adverse effects to those rights could occur.

13 Where Forest Service management contributes to designation of a water body as an impaired water body, recommendations in Total Maximum Daily Load (TMDL) assessments should be implemented to enable the Tonto to assist with meeting or exceeding water quality standards for the water body. Best management practices, watershed condition improvement treatments, or

[33] Source Water Protection Areas are areas that contribute water to wells or surface water intakes that are used for public water supply.

other identified water quality improvement practices should be utilized to improve water quality in impaired or non-attaining streams and water bodies without completed TMDL assessments.

Management Approaches for Watersheds and Water Resources

01 Work with partners to leverage resources and implement and monitor projects that improve vegetative composition, reduce erosion, and/or otherwise improve watershed function.

02 Complete an inventory of water sources where water rights exist or are needed and file water right applications for water sources needed for National Forest management purposes.

03 Select streams to ensure sufficient flow is provided for protection of riparian and aquatic species and their habitat, and for recreation. Streams prioritized for protection through instream flow water rights would be based on resource values supported by the streams and potential threats to dewatering.

04 Coordinate with Federal, State, and County agencies and with interested stakeholders with respect to water rights and ground and surface water issues (e.g., preservation, water quantity, and timing of flows).

05 Work with partners on developing appropriate environmental flows[34] for sensitive and/or high risk areas using available tools and best available scientific information (e.g., Desert Flows Assessment: Environmental Water Needs of Riparian and Aquatic Ecosystems (US and Mexico)).

06 Identify aquifers, including important recharge areas, within the forest boundary and consider these areas during project planning and implementation.

07 Manage groundwater quantity and quality on National Forest System lands in cooperation with appropriate State agencies.

~~08 Manage groundwater and surface water on National Forest System lands as a hydraulically connected system.~~

09 Identify and inventory groundwater-dependent resources. Collaborate with external groups (e.g., U.S. Geological Survey, State, Tribal and local governments, State geological surveys, and universities) when locating, investigating, or assessing the hydrogeology and groundwater resources of National Forest System lands.

10 Identify and map Source Water Protection Areas on the Forest.

11 Use the watershed condition framework, or other acceptable method, to assess and prioritize watersheds for restoration or maintenance activities.

12 Prepare Watershed Restoration Action Plans to improve or maintain watershed condition, which can include management activities or projects to maintain or improve riparian areas, seeps, springs, wetlands, and riparian management zones where these resources have been identified as impaired or functioning at risk.

[34] Necessary water flows to sustain water resources and the goods and services they provide to people.

Riparian Areas, Seeps, Springs, Wetlands, and Riparian Management Zones (RMZ)

Riparian areas

Southwestern riparian ecosystems are dynamic habitats that border perennial or intermittent streams, springs, ponds, lakes or occupy other wet areas, such as wetlands, cienegas, fens, and bogs. They occur within all terrestrial vegetation communities and are the interface between the terrestrial uplands and open water. Riparian Ecosystems include water dependent plants near the water's edge and often transition to a combination of upland and riparian species as distance from water increases, which adds significantly to their ecosystem diversity. Riparian vegetation may vary widely depending on amount, timing, and source of water, as well as biophysical characteristics (e.g., salinity and gradients in saturated soils). Riparian areas are more productive than other vegetation communities in terms of plant and animal biomass per acre.
Additionally, these systems are some of the most important habitats for plants and wildlife on the Tonto National Forest – providing water, forage, shelter, and habitat for nesting roosting, and bedding for species.

Healthy riparian areas slow water movement from uplands and from flood flows which promotes infiltration into riparian area soils that can increase recharge alluvial and bedrock aquifers. Increased recharge during wet periods can also sustain groundwater discharge from these aquifers during dry seasons of the year to help maintain base flows during these periods. Riparian zones protect streams from excessive sedimentation, erosion, and pollution, and, thus, play a role in water quality. Riparian areas provide shelter and food for aquatic animals and shade that is important for water temperature regulation. They dissipate stream energy which can reduce flood damage and maintain stream channel morphology. They provide wildlife connectivity, enabling aquatic and riparian organisms to move along stream and river systems thus preventing community isolation and fragmentation. They are a source of large woody debris recruitment. Soils in riparian ecosystems play a key role in nutrient and water storage and distribution.

Natural disturbances in stream ecosystems include animals (e.g., beavers), flooding, and changing climatic conditions (e.g., extended drought). The seasonality and quantity of water in floods are key factors in the germination and establishment of riparian vegetation. Fire is an infrequent disturbance and is related to the fire regimes of adjacent vegetation communities. Fire effects in adjacent and/or upslope communities do not negatively impact riparian communities. Key disturbances in these systems include surface water withdrawals and impoundments, groundwater pumping, domestic livestock, nonnative wildlife, and feral horse and livestock grazing, roads and motor vehicle activity, recreation pressure, and infestation by nonnative plants and animals. These disturbances can impact riparian ecosystem function.

The Tonto National Forest contains parts of two of the state's major rivers, the Salt and Verde Rivers and supports approximately 700 miles of perennial streams, and 1,100 miles of intermittent streams, and 11,000 miles of ephemeral streams (data obtained from Tonto GIS data, which includes the National Hydrography Dataset). Two of Arizona's only wild and scenic rivers (Verde River and Fossil Creek) lie partly within the forest. Stream ecosystems include perennial, and intermittent, and ephemeral streams and rivers, their adjoining riparian areas, and associated floodplains. Perennial, and intermittent, and ephemeral streams differ in the timing and duration of flow. Ephemeral streams flow for short duration in response to storm events. Intermittent streams flow seasonally, usually in response to winter precipitation but typically maintain shallow water tables throughout the year, and may contain perennial pools. Perennial streams flow year-round, though in some locations their flows may be below the surface (near-perennial streams). Stream ecosystems moderate flood events and collect, filter and transport water, sediment, and organic material from upslope and upstream. Stream ecosystems provide unique habitats for plants, animals, and micro-organisms that are specialized to live in and around water – some of which require water for all or part of their life cycles (e.g., aquatic and semiaquatic species). Lush stream corridors and cool water sources also attract campers, hikers, and fishermen.

Air Quality (AQ)

The Forest Service recognizes air quality as an important ecosystem service for national forests to protect. The public has come to value the fresh air and sweeping views forests provide. Pollution (e.g., fertilization, acid deposition, dust, and smoke) generated both on and off the forest affects air quality and resources on the forest. Air quality plays a subtle but critical role in the overall health of the forest ecosystem. Biotic communities, both botanical and zoological, are affected by pollutants in the air which can be directly deleterious to plant respiration and metabolism and indirectly injurious through degradation of water and soil quality (AirGO2, 2019). Fires are a significant source of visibility impairing pollutants. In the case of wildland fires, ~~on the other hand,~~ while they impact visibility, they are also directly beneficial to many plant communities, because the smoke particles deposited on the land surface enhance the germination and growth of plants (Omasa, 2005). Furthermore, certain air quality conditions can compromise the respiratory health of forest visitors.

Population centers with the potential to be impacted by management activities on the Tonto National Forest are the Phoenix metropolitan area, Payson, Pine, Strawberry, Globe, Miami, Tonto Basin, Punkin Center, Superior, Roosevelt, Young, and other smaller scattered communities within, or adjacent to the forest.

To protect ~~H~~human health and the environment, the Environmental Protection Agency (EPA) established ~~standards are defined in~~ the National Ambient Air Quality Standards (NAAQS) per the Clean Air Act ~~set by the Environmental Protection Agency (EPA)~~ for ~~seven~~ six criteria pollutants considered harmful to public health and the environment: carbon monoxide, lead, nitrogen dioxide, particulate matter 10 microns in size or smaller (PM10)~~,~~ and ~~particulate matter~~ 2.5 microns in size or smaller (PM2.5), ozone, and sulfur dioxide. Non-attainment areas are those areas with ambient pollution levels that exceed the NAAQS of a particular criteria pollutant.~~that have not met air standards for one or more of the National Ambient Air Quality Standards as per acceptable levels set in the Clean Air Act.~~ The State is required to develop ~~These areas must demonstrate to the public and the EPA how standards will be met in the future via~~ a State Implementation Plan which establishes enforceable emission limitations (among other measures as required by the Clean Air Act) reducing ambient pollutant emissions in a non-attainment area in order to achieve and maintain the NAAQS. Some areas on the Tonto National Forest are non-attainment areas as of October 2018. These include areas to the north, west, and south of Globe/Miami (PM10 and Sulfur dioxide), part of the Superstition Mountains up to and including the west side of the Mazatzal Wilderness and New River Mesa and Bartlett Lake, including the Tonto National Monument and Roosevelt (Ozone). Bartlett Lake and areas southwest of it are also non- attainment for PM10. Additionally, pollutants from Phoenix non-attainment area sources and near-by copper mining facilities have been adversely impacting air quality and visibility on Tonto National Forest.

Class 1 federal lands in Arizona include areas such as national parks, national wilderness areas, and national monuments. These areas are granted special air quality protections under Section 162(a) of the federal Clean Air Act. Altogether, Arizona has twelve Class I areas – four of them – all wilderness areas are near or within the TNF: Pine Mountain, Mazatzal, Sierra Ancha, and Superstition. In addition to the Class I areas already discussed, the TNF includes four other wilderness areas designated after 1977: Hellsgate, Salome, Four Peaks, and Salt River Canyon. Even though these lack Class I status, they are managed as if they had this status; moreover, their visibility characteristics are adequately monitored by the three IMPROVE sites.

Desired Conditions (AQ-DC)

01 Air quality on the Tonto National Forest meets or surpasses the ~~State of Arizona and Federal~~ National ~~a~~Ambient ~~a~~Air ~~q~~Quality ~~s~~Standards.

02 Good air quality contributes to visibility, human health, quality of life, economic opportunities, quality recreation, and wilderness values.

03 Water chemistry and biotic components are not negatively impacted by atmospheric deposition of pollutants.

04 Smoke impacts on air quality related values are minimal.

05 ~~Visibility in designated wilderness areas (Class I and sensitive Class II areas) is free of anthropogenic (human-caused) impacts.~~

06 Visibility in Class I areas meets the most recent regional haze regulations as mandated by Arizona Department of Environmental Quality and the Environmental Protection Agency~~ct~~.

Standards (AQ-S)

01 Prescribed fire (e.g., pile, broadcast, and jackpot burning) will occur in accordance with Arizona Department of Environmental Quality (ADEQ) requirements.

02 Prescribed burns and strategies for Emissions Reduction Techniques (ERTs) per Arizona Administrative Code R18-2 Article 15 shall be followed to reduce negative impacts to air quality.

03 Best management practices shall be used to protect visibility and opacity standards on the Tonto National Forest including Class I air sheds and wilderness areas that have more stringent requirements than other areas on the forest.

Guidelines (AQ-G)

01 Dust abatement should occur during projects where dust is a potential effect (e.g., construction and road and motorized trail improvements).

02 During wildfire incidents, techniques to minimize smoke impacts (e.g., public notification, timing of ignitions, mass ignitions, and limiting fire spread) should be considered, including the identification of smoke management objectives in the wildfire decision document.

03 Coordination with ADEQ should occur before and during prescribed burns to comply with State and Federal regulatory requirements for emissions and impacts to Class I areas.

04 Wildfire decision documents should identify smoke-sensitive receptors, and include objectives and courses of action to minimize and mitigate impacts to those receptors.

05 During extended periods of burning, smoke should be monitored, in cooperation with the Arizona Department of Environmental Quality, for levels that may have impacts to human health from fine particulates.

Management Approaches for Air Quality

01 Work with agencies, organizations, Tribes, and other entities to actively pursue actions designed to reduce the impacts of pollutants from sources within ~~and outside~~ the Forest.

02 Consider deploying smoke monitors when there is potential for significant impacts to the public.

03 To promote public awareness and protection of human health and safety, consider notifying stakeholders and the public about potential smoke from fire activities through methods of advanced notification through the media and smoke warning signs along roads when visibility may be reduced due to wildland fire.

04 Work with partners to develop strategies for managing wildfires to incorporate as many emission reduction techniques as feasible, subject to economic, technical, and safety criteria, and land management objectives.

05 Utilize Emission Reduction Techniques to minimize impacts to sensitive receptors of burn unit(s).

02 Management activities shall not permanently degrade the wilderness characteristics of the recommended wilderness area.

03 New energy developments or authorizations shall not be permitted within recommended wilderness areas.

~~04 Sales or extraction of common variety minerals[41] shall not be permitted in recommended wilderness areas.~~

Guidelines (RWMA-G)

01 Motorized vehicle access should not occur in a RWA unless specifically authorized for emergency use, resource protection, or maintenance of authorized improvements.

02 Mechanized uses for management activities (e.g., chainsaws, wheelbarrows) should be authorized in an RWA if they do not permanently degrade wilderness characteristics.

03 Intervention in natural processes through management actions (e.g., fire management, active weed management) should only be authorized where they move an area towards resource desired conditions and the project design does not permanently degrade the wilderness characteristics.

04 Management activities, including transplants (e.g., removal, reintroduction, or supplemental introduction) of wildlife species, should be permitted to use motorized and mechanical means (e.g., helicopter landings) if necessary to perpetuate or recover a threatened or endangered species, to restore the population of an indigenous species, or to manage wildlife populations.

05 When conditions permit, wildland fire in RWAs should be managed in a manner that would reduce the risk of undesirable fire behavior and effects, increase apparent naturalness, or enhance ecosystem function.

06 Existing structures necessary for administration, valid existing rights, and authorized uses within the area should be maintained but not expanded, unless necessary for public health and safety, resource protection, or viability of valid existing rights and authorized uses.

07 Maintenance of existing structures should be carried out in a manner that does not permanently expand the evidence of motor vehicle and mechanized equipment use beyond current conditions within the recommended wilderness area.

08 New permanent improvements should not be authorized unless necessary for public health and safety, resource protection, or viability of valid existing rights and authorized uses.

09 Developed recreation facilities with provisions for user comfort (e.g., picnic tables and fire grills) should not be installed in RWAs.

10 Management activities in RWAs should meet visual quality objectives of High or Very High in the long term, as defined in the Visual Management System or similar protocol.

[41] Salable/Mineral Materials/Common Variety Minerals, are synonymous terms for the same class of minerals that can be sold under a mineral material contract, and are common. These minerals are relatively low value per volume, for example: sand, gravel, cinders, common building stone, and flagstone.

Designated Wild & Scenic Rivers (DWSRMA)

In 1968, Congress passed the Wild and Scenic Rivers Act to preserve the beauty and free-flowing nature of some of the most precious waterways in America. To be designated, rivers or sections of rivers must be free-flowing and possess at least one outstandingly remarkable value, such as scenic, recreational, geologic, fish, wildlife, historic, cultural, or other features identified under the Act. Wild and scenic rivers are congressionally designated.

The Forest has two designated wild and scenic rivers; Fossil Creek 16.8 miles (9.3 miles are designated as Wild; 7.5 miles are designated as Recreational), and Verde River 40.5 miles (22.2 miles designated as Wild, 18.3 miles designated as Scenic). Both designated Wild & Scenic Rivers are jointly managed with neighboring forests. The Coconino National Forest is the lead manager for Fossil Creek and the Prescott National Forest is the lead manager for the Verde River.

Wild and scenic rivers are meant to preserve outstanding free-flowing rivers to be protected for the benefit and enjoyment of present and future generations. Wild and scenic rivers are congressionally designated.

See Figure A-3 in appendix A for a map of the designated wild and scenic rivers on the Tonto National Forest.

Desired Conditions (DWSRMA-DC)

01 The outstandingly remarkable values, free-flowing condition, and classification of designated wild and scenic river corridors are preserved.

02 The user experience, including the level of development and improvements along the river corridor, is consistent with the river's classification.

03 Designated wild and scenic river segments and their corridors are protected for the benefit and enjoyment of present and future generations.

04 Authorized projects along the river corridor of designated Wild and Scenic river segments protect or enhance the river segment's outstandingly remarkable values and classification.

05 Domestic livestock grazing and constructed range improvements within the river corridor do not impact the river segment's outstandingly remarkable values, and are consistent with the river segment's classification.

Standards (DWSRMA-S)

01 The free flowing condition, classification, and outstandingly remarkable values for wild and scenic river corridors shall be maintained when implementing projects.

~~02 Sales or extraction of common variety minerals shall not be authorized in wild and scenic rivers.~~

Guidelines (DWSRMA-G)

01 Recreation and other activities in designated rivers and associated corridors should be managed to occur at appropriate locations and intensities to protect and enhance the free-flowing condition and the outstandingly remarkable values, while remaining consistent with the classification.

02 New roads or motorized trails should not be constructed within ¼ mile of a wild river segment.

03 Management activities should be consistent with the recreation opportunity spectrum class of:

a. "primitive" to "semi-primitive non-motorized" in eligible wild rivers

b. "semi-primitive non-motorized" to "semi-primitive motorized" in eligible scenic rivers

06 Recreation uses and livestock grazing do not impair or degrade (high departure from reference conditions; measured by site potential, Terrestrial Ecological Unit Inventory data or other suitable dataset) the ecology and unique plant communities within designated and recommended research natural areas and botanical areas.

07 Designated and recommended botanical areas support narrowly restricted species, at-risk species, and important plant communities in the area and provide opportunities for education and research.

Standards (RNBAMA-S)

01 ~~Sales or extraction of common variety minerals shall not be authorized in designated or recommended research natural areas and botanical areas.~~

02 Logging or fuelwood gathering activities are not permitted in designated or recommended research natural areas and botanical areas, unless required for restoration of an area to natural conditions.

03 Overnight camping, recreation campfires, and recreational shooting are prohibited in designated or recommended botanical areas.

04 Livestock grazing will not be authorized in recommended or designated research natural areas or recommended or designated botanical areas.

05 Allotment management plans shall have the necessary provisions to protect the uniqueness, ecological condition, and biological diversity of designated or recommended research natural areas and botanical areas that occur within an active grazing allotment.

Guidelines (RNBAMA-G)

01 In designated or recommended research natural areas and botanical areas, fire management activities should be designed and implemented to mimic the natural fire regime, and/or move the burned area towards desired conditions, and should be compatible with ongoing research. Multiple entry burns and strategic planning may be required to establish a more natural fire regime.

02 New trails (motorized or non-motorized) should not be in designated or recommended research natural areas and botanical areas, except as needed for resource protection.

03 Wildland fire should be managed using Minimal Impact Suppression Tactics (MIST) or other appropriate tactics to protect the resources for which research natural areas and botanical areas are designated or recommended.

04 Special use authorizations should be designed and implemented to retain the values for which the research natural areas and botanical areas are designated or recommended.

05 Overnight camping and campfires should be prohibited in designated or recommended research natural areas when it interferes with current and/or ongoing research.

06 When granting access to designated or recommended botanical areas, prioritize non-motorized forms of transportation to protect the ecology, sensitive soils, and plant communities of these areas.

05 Visitors are aware of the nature and purpose of the national trail designation.

06 National trails are well maintained, signed, and passable. Alternate routes are available in the case of temporary closures (e.g., natural events including fire or flooding) or land management activities.

Applicable to the Arizona National Scenic Trail

07 The Arizona National Scenic Trail is a well-defined trail that provides for high-quality, primitive hiking and equestrian opportunities, and other compatible non-motorized trail activities, in a highly scenic setting traversing the State of Arizona. The significant scenic, natural, historic, and cultural resources along the trail's corridor are conserved. The trail provides visitors with expansive views of the natural landscapes.

08 Viewsheds from the Arizona National Scenic Trail have high visual qualities. The foreground of the trail (up to 0.5 miles on either side) is natural-appearing. The potential to view wildlife is high and evidence of ecological processes such as fire, insects, and diseases exist.

09 The Arizona National Scenic Trail has appropriate trailheads and access points that provide various opportunities to select the type of terrain, scenery, and trail length (ranging from long distance to day use) that best provide for compatible outdoor recreation experiences.

a. Wild and remote backcountry segments of the Arizona National Scenic Trail provide opportunities for solitude, immersion in natural landscapes, and primitive outdoor recreation.

b. Front-country and easily accessible trail segments complement local community interests and needs and help contribute to their sense of place.

Standards (NTMA-S)

Applicable to all National Trails

01 Designated national trails shall be maintained to National Forest Service standards.

02 National trails shall not be used as high speed downhill mountain bike or mechanized bike runs. Constructing ramps and jumps are prohibited. User built ramps and jumps shall be removed and the trail restored to Forest Service standards.

Applicable to the Arizona National Scenic Trail

03 Motorized use shall not be allowed on newly constructed segments of the Arizona National Scenic Trail.

04 Motorized events and activities shall not be authorized under special use permit on any section of the Arizona National Scenic Trail or anywhere crossing the trail.

~~05 Sales or extraction of common variety minerals (e.g., limestone and gravel) shall not be authorized within the Arizona National Scenic Trail corridor.~~

Guidelines (NTMA-G)

Applicable to all National Trails

01 National trails should be consistent with management direction in the trail establishment reports as well as the maintenance standards for trail class and use.

15 Best available science should be used in lieu of the comprehensive plan if the plan is out of date with science.

16 To protect or enhance the scenic qualities of the Arizona National Scenic Trail, management activities should be consistent with Visual Quality Objectives of Preservation or Retention within the foreground of the trail (up to 0.5 miles either side).

17 ~~In order to promote a naturally appearing setting and avoid visual, aural, and resource~~

18 ~~**Applicable to all National Recreation Trails**~~

17~~19~~ National recreation trails should be managed for their designated uses (e.g., non-motorized versus mechanized travel) to enhance visitor experience, except where portions of a trail are currently co-located (e.g., a segment of a non-motorized national trail coincides with a designated road) at which time multiple uses should be managed until relocation of either the trail or road is achieved.

Management Approaches for National Trails

Applicable to all National Trails

01 Consider expansion of connector trails to accommodate user access when near towns and developed recreation facilities.

02 Work with volunteer groups, partners, local governments, and adjacent landowners to maintain national trail corridors, the condition and character of the surrounding landscape, and to facilitate support by trail users that promote Leave No Trace principles and reduces user conflict.

03 Ensure that Incident Management teams are aware of all national trails as a resource to be protected during wildland fire management activities. Clearly identify fire-related rehabilitation and long-term recovery of the national trail corridor(s) as high priorities for fire managers, Incident Management Teams, burned area emergency response (BAER) teams, and post-fire rehabilitation interdisciplinary teams.

Applicable to the Arizona National Scenic Trail

04 Utilize the most recent version of the Arizona National Scenic Trail Comprehensive Plan when considering projects in the Arizona National Scenic Trail corridor.

05 Work with volunteer groups, partners, local governments, and adjacent landowners to maintain the Arizona National Scenic Trail corridor, the condition and character of the surrounding landscape, and to facilitate user support and reduce user conflicts on the trail.

06 Establish appropriate visitor use levels for specific segments of the Arizona National Scenic Trail and take appropriate actions if there is a trend away from the desired condition.

07 Identify and pursue opportunities to acquire lands or rights-of way within or adjacent to the Arizona National Scenic Trail as they become available.

08 Work with other land managers to provide consistent signage along the Arizona National Scenic Trail corridor at road crossings to adequately identify the Arizona National Scenic Trail and include interpretation at trailheads.

09 Encouraging trail partners and volunteers to assist in the planning, development, maintenance, and management of the trail, where appropriate and as consistent with the Arizona National Scenic Trail Comprehensive Plan.

Attachment B

USDA
United States Department of Agriculture

Draft Environmental Impact Statement for the Draft Land Management Plan

Tonto National Forest

Volume 1: Chapters 1 – 3

Coconino, Gila, Maricopa, Pinal, and Yavapai Counties, Arizona

Forest Service Tonto National Forest MB-R3-12-06 November 2019

10. There is a need to develop standards and guidelines that promote the maintenance, restoration and monitoring of soil condition and function (e.g., hydrology, stability, and nutrient cycling) by improving and maintaining sufficient ground cover (biotic and abiotic components).
11. There is a need for desired conditions that identify appropriate riparian characteristics (e.g., biodiversity, connectivity, and water availability) that promote functionality and resiliency while taking into account multiple stressors.
12. There is a need for standards and guidelines that minimize ecological impacts of multiple uses in riparian areas.
13. There is a need for standards and guidelines that reduce pollutant runoff into streams.
14. There is a need for providing plan components for ecosystems (e.g., springs, wetlands, riparian areas, and perennial waters) and their relationship to ~~on~~ the sustainable management of ~~ground~~water supplies, consistent with Federal and State laws. ~~and groundwater dependent influenced ecosystems (e.g., springs, wetlands, riparian areas, and perennial waters) and their interconnections with surface water flows~~.
15. There is a need to develop plan components for the long term health and sustainability of watersheds utilizing best available scientific information and consistent with state water regulations.
16. There is a need to develop plan components to ensure stream channels and floodplains are dynamic and resilient to disturbances.
17. There is a need to develop standards or guidelines to provide for the conservation, ~~and~~ recovery, and delisting of federally listed species, as well as maintain viable populations of species of conservation concern.
18. There is a need to include plan components that consider potential climate change impacts (e.g., increases in storm events, uncharacteristic wildfire, drought, flooding, and other extreme weather) to ecosystems and natural resources.

Social, Cultural, and Economic Sustainability

Topics that emerged from the Social, Cultural and Economic Sustainability discussions included recreation, cultural resources, education, law enforcement, economics, events, multiple use, access, population and resource concerns, grazing, outreach, managed use, public involvement, communities, stewardship, and road maintenance. These have been grouped into social, cultural, and economic sustainability.

The topic of recreation - its impacts and sustainability, was actively discussed at every community workshop, many of these discussions also focused on safety for all recreation types and that there may need to be distinct areas for specific types of recreation (e.g. shooting). Discussions within the topic of recreation also addressed access and concerns surrounding limiting forest access to communities. Access was also addressed as a concern regarding cultural resources and the perception that with enhanced access vandalism or cultural resource degradation would increase. The topic of law enforcement was raised as its own topic of concern and in many other contexts including recreation, cultural resources, multiple-use, increased population, and resource concerns.

The needs to change statements related to social, cultural, and economic sustainability are listed below:

1. There is a need to add plan components that recognize the Tonto National Forest's role in

contributing to local economies, including service-based sectors such as recreation and tourism, mining, timber, grazing, and other multiple-use related activities and products.

2. There is a need to include plan components for key ecosystem services identified in the Assessment including: water for consumption; water for recreation; habitat for hunting, fishing, and watchable wildlife; sustainable and productive rangelands; and cultural heritage.
3. There is a need for updating plan components that provide for the management of sustainable water supply for multiple uses (e.g. wildlife, grazing, economic and recreation) including public water supplies.
4. There is a need for plan components to ensure the sustainability and availability of forest products such as firewood, medicinal and ceremonial plants, and edible plants.
5. There is a need for desired conditions that incorporate a wide range of silvicultural practices to promote forest health, resiliency, and sustainability.
6. There is a need to add plan components for rangeland management that maintain or restore ecological integrity of rangelands.
7. There is a need for plan components to allow flexibility in rangeland management to prepare for changing conditions such as drought, fire, social and economic needs.
8. There is a need to include plan components for sustainable recreation management to ensure that recreation resources are integrated into all resource management decisions.
9. There is a need for desired conditions to address the long-term sustainability of recreation infrastructure (e.g., trails, facilities, and roads), maintenance, design, and improvement.
10. There is a need for management approaches to address changing trends in services, activities, and types of facilities desired by the public, while balancing those trends with other resources.
11. There is a need for plan components to address user conflicts (e.g., recreational shooting and hikers, equestrians and bicyclists, and motorized and non-motorized users).
12. There is a need for plan components to incorporate scenery management with all forest management (e.g., restoration, habitat diversity, and timber management) to further positive outcomes for all resources.
13. There is a need for desired conditions that address transmission corridors and renewable energy generation, including wind, solar, biomass, and geothermal, while protecting natural resources, heritage and sacred sites, traditional tribal activities, and scenery.
14. There is a need for plan components regarding the use of common variety mineral materials, such as commercial contracts, personal use, and free use permits.
15. There is a need for standards and guidelines for meteorite collection, rock hounding and mineral collection.
16. There is a need for plan components that ensure sustainable infrastructure (e.g., roads, trails, recreation and administrative facilities, range improvements, and maintenance backlog).
17. There is a need for plan components aimed at managing for Native American traditional cultural properties and sacred sites, and non-Native American traditional cultural properties, while conserving anonymity of such sites where appropriate.
18. There is a need for plan components that protect historic properties and tribal use areas at risk of damage or destruction during non-prescribed/unplanned fire.
19. There is a need to update plan components to protect areas that may be identified as a sacred site or part of an important cultural landscape by tribe.

20. There is a need for desired conditions in the plan that address the alignment of heritage resources management objectives (the management of historic properties and landscapes, sacred sites, and contemporary uses) with other resource management objectives (e.g., ecosystem restoration, rangeland management, and recreation).
21. There is a need to develop, modify, or remove plan components to allow flexible and efficient management of special uses while balancing resource protection with public needs.
22. There is a need to develop plan components related to Forest Service lands acquisitions, disposals, and exchanges.
23. There is a need for plan components that encourage the protection of existing public access and address the acquisition of new public access opportunities.
24. There is a need to include management approaches to develop a strategy to address issues related to known and suspected trespass and encroachment issues present on the forest.
25. There is a need for the revised plan to identify and evaluate potential additions to the National Wilderness Preservation System and eligibility of rivers for inclusion in the National Wildand Scenic Rivers Systems, and potentially other types of designated areas.
26. There is a need to reevaluate designated and proposed special areas that no longer suit the original purpose for designation (e.g., research natural areas, botanical areas, and burro territories), excluding congressionally designated areas.

Proposed Action

The Tonto National Forest proposes to revise its 1985 Land and Resource Management Plan (1985 Forest Plan) to provide strategic, program-level guidance for management of the forest's resources and uses over the next 10-15 years. Proposed changes to the Forest Plan include incorporating resource desired conditions and management areas as well as determining objectives, standards, guidelines, suitability, and monitoring requirements for forest resources. The draft Forest Plan changes the description and allocation of the management areas to move the majority of the land toward forest-wide desired conditions and adds management areas that emphasize management differences across the large landscape.

The proposed action (draft Forest Plan) focuses on the needs to change identified in the Assessment and incorporates significant issues raised during the scoping process. These are addressed in the following types of plan components found throughout the draft Forest Plan:

- Desired conditions are specific social, economic, and ecological conditions of the plan area, or a portion of the plan area, that are described in terms specific enough to allow for progress toward their achievement. Desired conditions are what drive the plan. All project-level management activities should be aimed at the achievement of the desired conditions for those resources in the area where the project is located. Desired conditions can be thought of as vision statements that need to be achievable and that can help define a collective vision for the National Forest in the future.
- Objectives are concise, measurable, and time-specific statements of a desired rate of progress toward desired conditions and should be based on reasonably foreseeable budgets. Objectives, along with the strategies (from management approaches or Forest Service handbook direction) used to accomplish them, can be thought of as the tools we will use to prioritize project activities to reach desired conditions. Objectives are mileposts along the road toward desired conditions.

and the most pessimistic outcomes, based on the constraints described in appendix B, and the last decade of mechanical treatments on the Tonto National Forest.

Riparian Areas Management

Alternative B places a greater emphasis on ~~restoring~~ improving riparian areas and setting management priorities than alternative A by setting realistic treatment objectives aimed to address riparian areas that are most impaired (non-functioning and functioning at-risk riparian areas). Plan objectives under this alternative provide clear direction on where to prioritize and accomplish restoration efforts by directing efforts at non-functioning and functioning-at-risk areas. Additionally, there is an increased focus on ~~restoring~~ improving spring ecosystems, aquatic habitat ~~restoration~~improvements, and treating invasive species in riparian areas. Standards and guidelines would provide the necessary plan direction to ensure that projects are designed in such a way to achieve desired conditions. This alternative would also include additional guidelines to maintain riparian species diversity.

Issue 3: Grazing and Rangeland Management

Alternative B utilizes adaptive management to balance livestock numbers with resource conditions. Plan components help us move toward desired conditions for rangelands. This alternative includes a plan component that requires the forest to evaluate allotments as they become vacant, and determine the best use of the land. This could include use for conversion to forage reserve, closure, or grant to a current or new permittee.

In this alternative the Lakes and River's Management Area would restrict grazing in currently vacant allotments, possibly causing them to be unusable in the future.

Issue 4: Economics

Alternative B includes plan direction that allows for adaptive management to address potential ecological changes with the potential to alter the provision of ecosystem services of the Tonto National Forest. It attempts to balance economic uses of the forest with protection of forest resources. This alternative recognizes the importance of the forest to local communities, but strives to balance multiple uses in a sustainable way.

Issue 5: Land Allocation and Allowed Uses

Proposed areas in alternative B were evaluated against the purpose of this alternative and would allow the forest to address changing conditions while managing for sustainable multiple uses and protecting important ecosystems.

There are 43,206 acres of recommended wilderness in this alternative. These acres represent 11 areas which were evaluated to have the highest level of wilderness characteristics on the forest. See Appendix D: Wilderness Recommendation Process for more detail. These areas were selected because the forest has the ability to manage in perpetuity for these characteristics. The selection of these areas would allow the Tonto to increase primitive type areas on the forest and meet the needs of the public.

There are four botanical areas proposed in this alternatives: Fossil Springs Proposed Botanical Area (9 acres), Little Green Valley Fen Proposed Botanical Area (21 acres), Horseshoe Proposed Botanical Area (3,590 acres), and Mesquite Wash Proposed Botanical Area (10 acres). These areas are proposed in alternative B in order to protect important botanical resources on the Tonto National Forest by identifying specific uses compatible with the purpose of these areas.

Alternative C – Natural Forces Predominant

Alternative C was developed in response to public comments that expressed a desire to reduce human impacts on the forest. Based on feedback to the notice of intent, preliminary plan, and public engagement, this alternative emphasizes primitive recreation opportunities, increased protections to natural resources, use of natural processes for restoration, limiting some aspects of grazing, and prioritizing natural resources over some economic development opportunities.

The comparison of alternatives (table 3 to table 10) provide specific details on the differences between alternatives.

Issue 1: Recreation Management

Alternative C calls for components of the forest plan to provide minimal human impacts to the Forest. It emphasizes primitive recreation opportunities, increased protections to natural resources, use of natural processes for restoration, limiting some aspects of grazing, and prioritizing natural resources over some economic development opportunities. This alternative would trend more to dispersed recreation use over time as the absence of developed sites for recreation would be more in line with an emphasis on natural processes. Non-motorized uses would be prioritized over motorized uses, and new recreational infrastructure would only be considered to meet desired conditions of other Forest resources or address safety concerns.

Issue 2: Natural Resource Management

The resource areas driving change in the draft plan related to this issue are vegetation and wildland fire management and riparian area management.

Vegetation and Wildland Fire Management

In alternative C, vegetation management in frequent-fire ecological response units relies on wildland fire as the primary restoration tool. Mechanical thinning would only be used in limited situations (e.g., Wildland Urban Interface areas or invasive species treatments). As a result, fewer commercial forest products would be available, and fewer suitable timber acres would be treated. Alternative C places more emphasis on restoring frequent fire woodland ecological response units through an increase in plan objectives for fire than the other alternatives. Objectives to restore grass and herbaceous cover for highly departed ecological response units (e.g. pinyon-juniper grass and juniper grass) are similar to alternative B. Objectives for desert ecosystems are the same as alternative B. Fire is actively suppressed, and restoration is primarily focused on reducing disturbance to sensitive soils and treating invasive species (specifically exotic and invasive grass species).

Acres of recommended wilderness would be significantly increased under this alternative. On those acres that were designated, there could be an increase the flexibility for wildfire management, decreases human starts in those areas, decreased the potential for mechanical

Riparian Areas Management

Plan components and effects are the same as alternative B, with additional plan components and effects described below. Alternative C would include the following standard:

- If a riparian area is non-functioning, as identified in the Proper Functioning Condition Assessment framework or similar protocol, all permitted and allowed uses (those within FS jurisdiction) and activities (excluding existing permitted water diversions and transmission facilities) will be removed until riparian recovery is achieved.

Alternative D – Human Forces Predominant

Alternative D was developed to address public comments that expressed a desire for easier access and multiple use opportunities on the Tonto National Forest. Related comments received on the notice of intent, preliminary proposed plan, and public engagement focused on providing more accessible recreation opportunities, and having fewer restrictions on land uses including no additional recommended wilderness acres. Alternative D also emphasizes active restoration techniques to achieve desired conditions and provides for more economic opportunities on the Forest including grazing and mining.

The comparison of alternatives (table 3 to table 10) provide specific details on the differences between alternatives.

Issue 1: Recreation Management

This alternative calls for components of the proposed forest plan to focus on providing more accessible recreation opportunities that favor motorized recreation, having fewer restrictions on land uses (e.g., special uses).

Developed recreation and motorized uses/trails receive much of the emphasis in this alternative, with consideration to add new motorized trails and expand or create new developed sites to meet user demands and respond to changing trends in recreation visitation to certain areas. The Lakes & Rivers Management Area would provide specific direction designed to prioritize recreation management over other select resources to accommodate high levels of recreation along the lakes and major rivers of the Forest.

Issue 2: Natural Resource Management

The resource areas driving change in the draft plan related to this issue are vegetation and wildland fire management and riparian area management.

Vegetation and Wildland Fire Management

In alternative D, vegetation management in frequent-fire ecological response units focuses on restoring conditions primarily through mechanical treatments and focuses on increasing the supply of forest products. Prescribed burning is mainly focused in areas that have been previously thinned, and there would be fewer opportunities to use wildfires to meet resource objectives. Objectives to restore grass and herbaceous cover for highly departed ecological response units (e.g. pinyon-juniper grass and juniper grass) are similar to alternative B, however there would be fewer treatment objective acres (more treatment objective acres are allocated to forested ecological response units). Alternative D also includes guidelines related to the northern goshawks which place management constraints on restoration activities (e.g., prescribed fire and mechanical treatments) during the breeding season. Objectives for desert ecosystems are the same as alternative B, however there would be fewer treatment objective acres. Due to the increased use and limited restrictions in this alternative, treatment objectives would be mainly focused at highly impacted areas or high-risk areas.

Riparian Areas Management

While this alternative places more emphasis on other program areas (e.g., increasing developed recreation opportunities and maximizing forest and mineral products), riparian areas would still be managed to achieve desired conditions. Only ~~plan~~ riparian plan objectives are different for alternative D, standards and guidelines would be the same as alternative B and alternative C. There are no specific objectives for restoring stream channel and riparian conditions, spring ecosystems, and aquatic

Resource Area	Plan Component	Alternative A	Alternative B	Alternative C	Alternative D
Riparian Areas	Objective	None	Improve or maintain 10 to 15 individual springs over a 10-year period.	Same as Alternative B	None
Riparian Areas	Objective	None	Treat and control invasive species on 2-10 stream reaches (generally ¼ mile) every five years.	Same as Alternative B	Same as Alternative B
Riparian Areas	Standard	None	None	If a riparian area is non-functioning, as identified in the Proper Functioning Condition Assessment framework or similar protocol, all permitted and allowed uses (under federal jusrusdiction) will be removed until riparian ~~recovery~~ improvement is achieved.	None
Riparian Areas	Guideline	None	In perennial and intermittent riparian stream courses, project and management activities should be designed and implemented to maintain or restore natural streambank stability, native vegetation, and riparian, floodplain, and soil function.	Same as Alternative B	In perennial and intermittent riparian stream courses, project and management activities should be designed and implemented to maintain natural streambank stability, native vegetation, and riparian, floodplain, and soil function.

Table 10 identifies which needs for change statements relate to those key issues and evaluates which alternative(s) best meet those needs. Needs to change statements that are addressed equally across each alternative are not included in this table. Alternatives are ranked as "best" for the alternative that best meets the identified need, "good" for meeting the need but not most effectively, "neutral" for not meeting the need or not having any negative affects toward meeting the need, or "undesirable" for not moving towards meeting the identified need for change.

Table 10. Comparison of how each alternative meets the needs to change

Key Issue	Need to Change	Alternative A	Alternative B	Alternative C	Alternative D
Recreation Opportunities	Management approaches to address changing trends in services, activities, and types of facilities desired by the public, while balancing those trends with other resources.	Undesirable	Best	Neutral	Good
Recreation Opportunities	Plan components to address user conflicts (e.g., recreational shooting and hikers, equestrians and bicyclists, and motorized and non-motorized users).	Undesirable	Best	Good	Good
Natural Resource Management	Management approaches that promote seeking outside assistance in addition to working with partners and volunteers to manage resources and monitor activities.	Undesirable	Best	Good	Good
Natural Resource Management	Desired conditions that identify appropriate riparian characteristics (e.g., biodiversity, connectivity, water availability) that promote functionality and resiliency while taking into account multiple stressors and State laws.	Undesirable	Best	Good	Neutral
Natural Resource Management	Standards and guidelines that minimize ecological impacts of multiple uses in riparian areas.	Neutral	Good	Good	Undesirable
Natural Resource Management	Include plan components that consider potential climate change impacts (e.g., increases in storm events, uncharacteristic wildfire, drought, flooding, and other extreme weather) to ecosystems and natural resources.	Undesirable	Best	Good	Good
Land Allocations and Allowed Uses	Reduce the complexity of plan components related to management areas that fragment the landscape by their arrangement, boundaries, and differing management direction.	Undesirable	Good	Neutral	Good
Land Allocations and Allowed Uses	Management approaches that emphasize better coordination and collaboration with other forests, local governments, and tribes to minimize conflict between local planning and zoning direction as a result of our decisions, while at the same time becoming more aware of how local regulation might enhance our own management goals, or alternatively, interfere with our own desired outcomes.	Neutral	Good	Good	Good
Land Allocations and Allowed Uses	Identify and evaluate potential additions to the National Wilderness Preservation System and eligibility of rivers for inclusion in the National Wild and Scenic Rivers Systems, and potentially other types of designated areas.	Undesirable	Good	Best	Neutral
Grazing and Rangeland Management	Plan components for rangeland management that maintain or restore ecological integrity of rangelands.	Neutral	Good	Best	Good
Grazing and Rangeland Management	Plan components that allow flexibility in rangeland management to prepare for changing conditions such as drought, fire, social and economic needs.	Undesirable	Best	Undesirable	Good

ends with a number that aligns with the individual plan component to differentiate between similar type plan components.

Throughout chapter 3 the first occurrence of a plan component will be either quoted or paraphrased followed by the plan component code in parenthesis. For example: Partners and volunteers work effectively to increase capacity for managing forest resources, assist in communicating with and educating the public, and achieve restoration and sustainable recreation goals (FW-PV-DC-01). All following references to the plan components will just include the associated code.

A full description of the plan code structure, including a list of associated acronyms, can be found in the draft forest plan.

Environmental Analyses and Overall Assumptions

During development of the environmental analyses that follow, the Tonto National Forest planning team used the best available scientific information, which is documented in the planning record. The environmental analyses focus on the needs for changing the existing plan and the significant issues identified through the scoping process.

The discussions in chapter 3 refer to the potential for consequences to occur, realizing they are only estimates in many cases. To estimate the consequences of alternatives at the programmatic plan level, we must assume the kinds of resource management activities allowed under the prescriptions will occur to the extent necessary to move toward or achieve the objectives of each alternative. In many cases, the nature of the consequences are similar across the forest but the magnitude of the consequences vary by the difference in plan objectives and specific plan components for different management areas by alternative.

Several assumptions were made in the analyses of alternatives:

- The Tonto National Forest draft forest plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carry out any project or activity (including ground-disturbing actions). As a result, it does not result in direct effects. However, there may be implications, or longer term indirect or cumulative environmental consequences from managing the forests under this programmatic framework.
- Before any ground-disturbing actions take place, they must be authorized in a subsequent site-specific environmental analysis. Therefore, none of the alternatives would cause unavoidable adverse impacts or an irreversible or irretrievable commitment of resources.
- The planning components (desired conditions, objectives, standards, guidelines, management areas, and monitoring) will be followed when planning or implementing site-specific projects and activities.
- Law, regulation, and policy regulations (including all applicable State and local laws) will be followed when planning or implementing site- specific projects and activities.
- Funding levels will be similar to the past 5 years.
- The planning timeframe for the effects analysis is 10 to15 years; although other timeframes may be specified in the analysis, depending on the resource and potential consequences.
- Monitoring identified in the plan's monitoring chapter will occur.
- The land management plan will be amended (including public participation and review), as needed, during the life of the plan.

opportunities would be relevant and responsive to changing user demands while remaining stable (REC-WR-MA-04).

Restoration by mostly passive means and lack of specific decisions in this alternative to use native plants would slowly return damaged sites to natural conditions and may result in minor negative impacts in the social well-being of area residents who value natural ecosystems (e.g., esthetics in the area). This may slow the process to getting to desired conditions without more active management.

Vegetation and Wildland Fire

Alternative B incorporates a balance of mechanical and prescribed fire treatments across the forest for the management of vegetation and wildland fire. This alternative places emphasis restoring or maintaining conditions through mechanical thinning, prescribed burning in those areas within frequent fire forested and woodland areas. The balance of mechanical and wildland fire management across the forest would reduce recreational access during the time of treatment and degrade wildlife habitat quality in the short-term, causing wildlife related recreation to be unavailable on those lands. These effects would be temporary until treatment activities are completed and the system recovers. Economically, the unavailability of wildlife related recreation on those lands would either result in a loss of trip related expenditures or a displacement of them into different areas of the state. In the long-term, however, the areas that undergo treatment would be more open, less susceptible to extreme fire events, and likely have an overall increase in wildlife habitat quality. Once access for humans and wildlife habitat is restored, these areas would once again provide a supply of recreational opportunity. The long-term improvement of habitat quality would benefit wildlife species and may lead to an increase in recreational opportunity (REC-WR-MA1a). As a result, the economic benefit of wildlife recreation would likely return to the area, and possibly increase (REC-WR-MA-04).

Riparian Areas

Management in Alternative B includes the following treatment objective. Complete ~~restoration~~ improvement projects on 200-500 acres of riparian areas rated as nonfunctioning and functioning at-risk (proper functioning condition or similar protocol) during each 10-year period, with emphasis on priority 6th code watersheds (RMZ-O-01). This objective is focused on maintaining and improving riparian conditions by restoring function to non-functioning and at risk riparian areas, improving springs, and to maintain or restore natural streambanks, native vegetation, and riparian, floodplain and soil function. Improving or maintaining springs, at risk areas, perennial and intermittent riparian areas would benefit effects to all fish and wildlife by providing quality habitat. The management of these areas includes improving vegetation; however, does not lend to improving ecological integrity necessary to maintain quality and functionality for fish and wildlife. Short-term effects from activities (e.g., stream channel recontouring, vegetation planting, bank stabilization, relocating uses away from the channel) could displace wildlife and/or cause behavior changes in things like foraging during activities; however, long-term effects would be beneficial to all wildlife and fish and wildlife based recreation as habitat quality and quantity would increase over time.

Rangeland Management

Alternative B is similar to Alternative A; all vacant allotments are assumed to be open to grazing. However, once it becomes vacant the Forest Service would work toward an evaluation to determine the need for a status change within two years. This is also similar to Alternative D except that they would stay open after evaluated. At least one vacant allotment should be evaluated for either: conversion to forage reserves to improve resource flexibility; grant to current or new permittee, or close to permitted grazing part or in whole. If additional are waived without preference they would then be evaluated for one or a

combination of those options. Closing an allotment to grazing would benefit wildlife resources both short-term and long-term and would allow for recreational access. The habitat would recover over time increasing the quality and quantity of available cover and forage (REC-WR-DC-03).

Recreation

Alternative B incorporates sustainable recreation opportunities in order to balance public demand for both motorized and non-motorized activities and natural resource desired conditions. This would include development of modification of systems of sustainability designated motorized and non-motorized trails to provide for user groups; maintain to standard motorized and non-motorized trails and to decommission unneeded motorized and/or non-motorized trails. Development of systems for motorized and non-motorized trails would be beneficial for providing access to fish and wildlife related recreation (REC-WR-DC-03, REC-WR-DC-04); however, this could impact these species being recreated for through short term disturbance and noise. The decommissioning of 10 miles every 5 years, depending on the specific location, could impact long-term fish and wildlife related recreation as it could restrict the routes available to access those resources but could have positive effects on the habitats for fish and wildlife (REC-WR-DC-03). Areas and trails that are desirable and consistently used by the public would not likely be decommissioned, so no effects to other resources (e.g. soil compaction and vegetation trampling) are expected.

Mineral Materials

New ~~M~~materials would not be removed from the riparian management zone without adequate engineering to protect the surface waters in this alternative. Existing material removal operations continue to operate under the existing federal permit conditions. This would be beneficial long-term to fish and wildlife related recreation as it would assist in the protection of riparian areas and the waters associated. Water flow regime would allow for reliable sources for fish and wildlife, increasing the habitat quality and quantity (REC-WR-G-04).

Management Areas

The Lakes & Rivers Management Area would include specific management direction to accommodate the high levels of recreation they receive. These areas include the following lakes: Roosevelt, Apache, Canyon, Saguaro, Horseshoe, and Bartlett; as well as the Lower Verde and Lower Salt Rivers. The LRMA management direction would have effects on desired conditions for nonnative species for sportfishing opportunities (REC-WR-DC-05, REC-WR-DC-03, REC-MA-01a, REC-MA-01e, and REC-MA-06).

This alternative includes 43,206 acres of recommended wilderness. This change would result in a reduction in areas suitable for public motorized vehicle use on a year-round basis. This alternative includes a plan component that says that mechanized transport and motorized travel and uses would not be suitable in recommended wilderness area (RWMA-G-01). This plan component responds to the public concern that if existing mechanized transport and motorized travel and uses were allowed to continue, the social and ecological characteristics that provide the basis for the areas ‘suitability for inclusion in the National Wilderness Preservation System would not be protected or maintained, thereby reducing the potential of their being designated as wilderness.

Riparian management zones would include limiting dispersed camping and access to within a 100 foot buffer that would impact wildlife related recreationists near riparian areas (REC-WR-DC-03. REC-WR-DC-04). It is not clear as to more specific effects that would be anticipated at this level and it would need evaluated per site. Short-term effects could displace wildlife and/or cause behavior changes such as foraging activities and animal distributions; however, long-term effects would be beneficial to all wildlife and fish and wildlife based recreation as habitat quality and quantity would increase providing more

hunting activities. These activities would have short term displacement and changes in foraging by wildlife.

Riparian Areas

Improving or maintaining springs, at risk areas, perennial and intermittent riparian areas would benefit all fish and wildlife overall by providing quality habitat. Short-term effects could displace wildlife and/or cause behavior changes in things like foraging during activities; however, long-term effects would be beneficial to all wildlife and the associated fish and wildlife based recreation (REC-WR-MA-01a, REC-WR-DC-03, REC-WR-DC-04, and REC-WR-DC-01).

If a riparian management area is determined to be non-functioning, alternative C would restrict all access in the area until recovery is reached, although existing lawful diversion and reservoir operations must be accommodated. This would impact fish and wildlife related recreation uses, displacing activities to nearby locations or off-Forest lands. This may be an especially noticeable impact if the riparian area is one of the few sources of water over many miles; recreationists would have to travel farther distances to find another riparian area open to public access where wildlife are abundant.

Rangeland Management

Allotments would be closed to grazing as they become vacant under this alternative. This can have short-term and long-term benefits to fish and wildlife related recreation. Closed allotments and a lack of fencing, gates, etc. can increase recreational access and improve the overall habitat quality and quantity for valuable wildlife watching (REC-WR-DC-01, REC-WR-DC-03). On the other hand, allotments tend to include additional water sources available to both cattle and wildlife (i.e. water tanks), and closing allotments would remove those sources for wildlife. Wildlife related activities would then be effected in terms of locations where wildlife gather for water.

Recreation

Non-motorized and primitive forms of recreation are the focus under this alternative. Modification of only non-motorized trails may benefit fish and wildlife related recreation for those users who prefer the “backcountry” experience and areas with less developments. Users who rely on accessible areas (high-clearance roads, parking areas, and restroom facilities) would be restricted to existing developed areas and motorized trails. Unneeded and unsustainable sites and motorized trails would be decommissioned, decreasing accessible fish and wildlife related recreation opportunities (REC-WR-DC-03 and REC-WR-DC-04). Those users would be forced to utilize accessible fish and wildlife related recreation opportunities on non-Forest lands, or not recreate at all.

Mineral Materials

Similar to Alternative B, this action would have both short-term and long-term benefits in terms of maintaining and improving the quality of habitat for fish and wildlife related recreation in those areas (REC-WR-MA-01a, REC-WR-G-04, and REC-WR-DC-01).

Management Areas

Alternative C has more acres of recommended wilderness than the other alternatives totaling about 375,576 acres of recommended wilderness. This change would result in a large reduction in areas suitable for public motorized vehicle use on a year-round basis. This alternative includes a plan component that says that mechanized transport and motorized travel and uses would not be suitable in recommended wilderness area (RWMA-G-01). This plan component responds to the public concern that if existing mechanized transport and motorized travel and uses were allowed to continue, the social and ecological characteristics that provide the basis for the areas’ suitability for inclusion in the National Wilderness

Riparian Areas – Availability and Abundance of Sacred Water from Natural Sources

Tribes would like to see the forests performing active restoration work. Tribes would like to participate in designing restoration activities. Tribes wish to see the forests restored to prehistoric conditions. Areas where natural water occurs on the Forest are of particular importance to tribes as they are considered traditional cultural properties. Tribes have concerns for management of springs, seeps, riparian areas and other waters. While water is considered sacred and holy, water development projects are also necessary to meet community needs. Many of these places have tribal place names and are related to tribal histories. Tribal members conduct ceremonies at many of these locations. Many traditionally important plants and animals are found at these waters. Many water sources on the Forest have been damaged by ~~grazing, recreation, mining, and other activities~~human activity. Tribes emphasize the active restoration and protection of these places.

Alternative B is the ideal alternative because water is sacred. The health and function of riparian areas are prioritized, often over other uses including recreation, grazing, and mining, except where existing lawful permits have been acquired. Alternative B would actively ~~restore~~ improve watersheds and other natural water on the landscape. ~~The health and function of riparian areas are prioritized over other uses including recreation, grazing, and mining~~human activity which is in alignment with protection of tribal resources.

Alternative C is not ideal because it does not actively restore and protect riparian areas. Restoration of riparian areas happens indirectly through additional plan components limiting or restricting uses that impact these ecosystems, ~~such as grazing, mining, and recreation~~through including human activity. In regards to the restoration of springs, seeps, and riparian areas, Alternative C falls short because it does not direct for the active restoration of these resources.

Alternative D includes direct restoration, but only in areas damaged by recreation. Tribes prefer broader restoration goals for riparian areas.

Grazing

Cattle negatively impact tribal resources such as medicinal plants, Emory oak groves, archaeological sites, springs, and traditional cultural properties.

Tribes prefer to see cattle minimized and managed to prevent adverse effects to tribal resources. Grazing can adversely impact archeological sites or change traditional landscapes. Range activities that alter springs, riparian areas, and other waters are of concern to tribal communities. Springs are sacred and should not be altered to prioritize use for cattle. These alterations are considered adverse effects. Grazing adversely impacts access to, and the availability, abundance, and sustainability of, non-economic plants, including plants used for subsistence, religious, medicinal, and other cultural purposes.

Alternative B would have the most positive impact for tribal communities. Grazing allotments are evaluated as they become vacant to ensure for healthy and productive rangelands. Alternative B would actively manage grazing for better forest health. Alternative B would have a positive impact for tribal resources.

In Alternative C grazing is not authorized in desert ecosystems and allotments are closed as they become vacant. Alternative C is supported, but not a broad enough goal to actively manage cattle on the entire forest. In Alternative C is supported, but more active management such as outlined in Alternative B would better address tribal concerns.

In Alternative D there is an increase in use levels for grazing and vacant allotments are granted to new permittees. This alternative would negatively impact archaeological sites, springs, plants, forest products, and traditional cultural properties.

Not all activities and stressors equally impact riparian areas on the forest. Riparian areas near urban areas and areas which are highly accessible to users tend to have a greater concentration of negative impacts. Other riparian areas are especially sensitive to the compounded effects of drying conditions (climate change and drought), increasing pressure of water demands (surface and subsurface flows), livestock grazing, and the effects of wildfires (e.g., excessive erosion and sediment deposition in riparian areas).

Cottonwood willow ecosystems (Cottonwood Group and Fremont Cottonwood-Conifer ecological units) are limited in the southwestern United States and on the forest and represent some of the most important riparian ecosystems. They have been dramatically reduced over the past century and are at very high risk of degradation on and off the Tonto National Forest from recreational use, livestock grazing, water control measures (irrigation diversions, dams, groundwater pumping), climate change, and drought.

Altered flows (timing, magnitude, frequency) continue to have strong and lasting regional impacts on these ecosystems. A number of riparian key species are groundwater ~~dependent~~ influenced – with some requiring permanent shallow ~~groundwater sources~~alluvial water tables, such as willows (*Salix* spp.) and cottonwoods (*Populus* spp.). Additionally, these riparian species depend on the timing between seed dispersal and the floods that create seedbeds or opportunities for species to establish. Many riparian areas have become altered because flows do not coincide with the phenology (for example, seed dispersal) of the species. Without periodic flooding, structural diversity (fewer age groups) is lowered and further reduces ecological integrity.

Recreational pressure is an increasing risk to all riparian ecological response units on the forest, especially riparian areas that experience heavy use, such as areas along the forest near the Phoenix metropolitan area. At the watershed level, the high densities of roads have also influenced impaired stream conditions forest-wide. Roads directly affect the natural sediment and hydrological regimes by altering stream flow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperatures, water quality, and riparian conditions in the watershed. Also, the high density of user-created trails, trampling, off-highway vehicle use, and herbivory at sites are resulting in impaired riparian conditions. At some areas, fences and enclosures have become damaged (fire, recreation, and fallen trees) where livestock and wildlife are impacting riparian areas (compacted soils and reduced streambank vegetation).

Livestock and wildlife grazing occurs throughout many perennial streams, riparian areas, and some wetlands. Overgrazing has been observed to reduce effective vegetative ground cover and riparian vegetation, which contributes to accelerated erosion and soil compaction (Tellman 1997), as well as increase sedimentation into connected perennial waters. Due to ample soil moisture, riparian and wetland areas have the capacity to produce very large amounts of forage. Riparian area conditions of high moisture content of forage, cool temperatures, and available water causes concentration of herbivore use in riparian areas and can lead to the overuse of vegetation necessary to protect streambanks from the effects of high flows.

Most riparian ecological response units have low similarity to the potential reference plant community. The height and density of herbaceous vegetation in riparian areas is important for maintaining streambank stability needed for proper riparian condition and function. Areas of high concern are those areas with actively eroding stream banks or high erosion potential. Restoring native species in riparian areas is key to long-term riparian condition. A number of species have become naturalized in these systems (such as mullein and sweetclovers) where they have effectively filled in the spaces and are now part of the potential plant community.

Road decommissioning is a common restoration practice which involves using heavy equipment to treat the road prism to reduce erosion and hydrologic impact. Levels of treatment range widely, but generally requires de-compacting the road and may involve removing the road prism and reshaping the area to match natural hillslope contours. Road decommissioning should benefit surface water resources and Riparian Management Zones through restored hillslope drainage patterns, increased infiltration, water storage and retention, restored hydrographs, decreased channel aggradation, and improved water quality. In addition, the smaller road system may limit motorized use impacts in the riparian management zone including the spread of invasive plants and increases in erosion. Ultimately, these should result in a water supply that is less expensive to clean to standard, increased baseflows during the dry periods of the year, and improved fisheries. Non-motorized trail decommissioning objectives are also include in alternatives. Non-motorized trail decommissioning objectives have minimal negative effects to riparian areas largely because these trails do not impact the land (size, scale, and extent) the same way motorized trails do. Additionally, trails are decommissioned based on user demand and need and is not always near the riparian management zone.

Recreation

Common recreation activities within riparian areas include hiking, camping, fishing, swimming, biking, and motorized vehicle use. Not all recreational uses have the same effects to riparian conditions – the intensity of recreation and the sensitivity of the riparian area are large factors on riparian conditions. Dispersed recreation, such as camping, can cause ground disturbance, impair soil and vegetation conditions. Off-highway vehicle use within or in close proximity to riparian areas can impair soil conditions, increase erosion into streams, and impair vegetation conditions. Developed recreation sites are maintained to standards that minimize negative impacts to riparian areas (e.g., hardened surfaces that reduce soil erosion), however they can increase visitor use and dispersion within the vicinity of the developed site – which can increase negative impacts similar to dispersed recreation. Effects form dispersed and developed recreation are greater among sensitive stream types and riparian areas where stream bank vegetation is essential to maintain stability and ecological integrity (e.g., Rosgen C-type streams).

All of these activities can impact riparian condition by affecting vegetation and soils through soil compaction and displacement and destruction or damage to riparian vegetation. Off-highway vehicle use is limited in riparian areas to occasional crossing on approved roads and trails in all alternatives. BMPs and forest plan standards and guidelines require developed recreation sites to mitigate or avoid adverse impacts to stream conditions and riparian areas. There BMPs and forest plan direction would be followed under all alternatives to minimize adverse impacts to riparian areas.

Special Uses

Water developments and road access are common special uses that affect riparian areas. Special uses for water developments, such as wells and stock tanks, can reduce base flows in stream channels and springs depending on the location and amount/intensity of water withdraws. Spring ecosystems are especially sensitive to changes in ~~subsurface or groundwater withdraws~~ water withdrawals from alluvial or fractured bedrock geologic formations – some springs can become completely dewatered once ~~ground~~water levels are reduced. Road access within riparian management zones can increase sedimentation to riparian areas, impair soil and vegetation conditions – however special uses include provisions to minimize or mitigate impacts to riparian areas. These effects are greater among sensitive riparian areas where vegetation is essential for stream function and riparian ecological integrity (e.g., Rosgen C-type streams). Under all

negative effects include impaired stream conditions, loss of native vegetation, and lowered biodiversity.

Overall, this alternative would provide better management direction with the effect of improving riparian and wetland conditions (including springs) and improving species diversity compared to alternative A and D, and similar effect to alternative C. For these reasons, these proposed plan components for alternative B would lead to the most beneficial effects of restoring geomorphic and biological processes compared to alternatives A and D and more or less similar to alternative C. These effects include improving stream and riparian conditions which would improve floodwater retention and ~~ground water~~aquifer recharge, support vegetation capable of developing root masses that stabilize streambanks against erosion, and maintain channel characteristics.

Resource Indicator 2: Upland Conditions

Fire regimes would move towards desired conditions for fire return intervals, fire severity, and patch size more so than other alternatives (see Vegetation and Fire section). The combination of mechanical and fire treatments would improve the resilience of frequent fire ecological response units to disturbances, such as fire and drought. Restoring a fuel loading and structure (trees, shrubs, herbaceous surface fuel, litter/duff, and coarse woody debris) which supports the kind/s of fire that these ecological response units evolved with is key to their restoration and maintenance. Under this alternative, when wildfires do occur, there is an increased chance that the effects would bebeneficial. The balance of mechanical treatments with wildland fire in this alternative is the most realistic, in regards to the burn windows and resources needed. The increase rate of treatment under alternative B would lead to less adverse second order fire effects to riparian areas compared to other alternatives. These adverse second order fire effects include accelerated erosion and excessive sedimentation to connected stream courses and into closed wetland areas; excessive or increased water flow, and uncharacteristic flooding, which can result in scouring of stream channels and the removal of vegetation and coarse woody debris important for maintaining hydrological dynamics in riparian areas. Alternative B includes the plan objective of decommissioning 10 miles of unneeded motorized and/or non-motorized trails every 5 years. This alternative would have increased beneficial effects to riparian areas compared to alternative A and D. Decommissioning of motorized and non-motorized routes can meet this objective under alternative B, therefore depending on the proportion of motorized routes decommissioned, alternative C (objective is specific to only decommissioning motorized routes) may have a greater beneficial effect to riparian areas from road decommissioning compared to alternative B. Beneficial effects include improved surface water resources and Riparian Management Zones through restored hillslope drainage patterns, increased infiltration, water storage and retention, restored hydrographs, decreased channel aggradation, and improved water quality. In addition, the smaller road system may limit motorized use impacts in riparian management zones including the spread of invasive plants and increases in erosion.

Resource Indicator 3: Management Areas, Recommended Research Natural Areas, and Recommended Botanical Areas Managed for Unique Riparian Ecosystems

Alternative B would not carry forward any of the natural areas in the existing plan: the Sycamore Creek Natural Area, Blue Point Cottonwood Natural Area, and Fossil Springs Natural Area.

Alternative B would include all recommended research natural areas in the existing plan, including those described in alternative A. Plan direction in alternative B would more or less provide the same resource protections as alternative A (see plan direction listed below). Effects of including these recommended research natural areas in alternative B are the same as described in alternative A.

simply through passive means. These systems would require active management (revegetation and bank stabilization) to improve riparian conditions and make meaningful progress within the planning cycle.

Most of the beneficial effects to riparian areas would come from the other proposed plan components that are already included in this alternative and in alternative B, and it is uncertain that this additional standard would provide any measureable beneficial effects for the reasons listed above. Additionally, where the potential exists for passive recovery (i.e. those systems that have a natural flow regime) – we may not see a measureable improvement in riparian conditions and make meaningful progress towards desired conditions within the planning cycle. Therefore, alternative C would lead to more or less the same beneficial effects as alternative B. These beneficial effects include improving stream and riparian conditions which would improve floodwater retention and ~~ground water~~aquifer recharge, support vegetation capable of developing root masses that stabilize streambanks against erosion, and maintain channel characteristics. By removing any and all uses in non-functioning riparian areas, this additional standard in alternative C could increase management conflicts and negative effects to other resource areas and uses[100].

Resource Indicator 2: Upland Conditions

Alternative C focuses on treatments primarily using wildfire (22 percent is anticipated to be treated with prescribed fire). This alternative has the potential to treat more acres than any other alternative, though it would not necessarily move the most acres as far towards desired fire regime as alternative B primarily due to environmental and logistical constraints (e.g., sufficient burn windows). To get acres to a point where their ecological functions are close to desired conditions (or as close as they could get with a deficit of large and/or old trees), requires more entries in those areas that would be thinned with fire. For these reasons upland conditions are anticipated to still remain moderately departed and could increase the incidence of adverse second order fire effects to riparian areas. Therefore, there is a potential for more adverse second order fire effects to riparian areas under alternative C compared to alternative B. However, alternative C would likely have less negative effects compared to alternative A simply due to more acres treated compared to alternative A. These adverse second order fire effects include accelerated erosion and excessive sedimentation to connected stream courses and into closed wetland areas; excessive or increased water flow, and uncharacteristic flooding, which can result in scouring of stream channels and the removal of vegetation and coarse woody debris important for maintaining hydrological dynamics in riparian areas. Alternative C includes the plan objective of decommissioning 10 miles of unneeded motorized trails every 5 years. This alternative would have the greatest potential of increasing beneficial effects that come from motorized road and trail decommissioning compared to other alternatives. Beneficial effects include improved surface water resources and Riparian Management Zones through restored hillslope drainage patterns, increased infiltration, water storage and retention, restored hydrographs, decreased channel aggradation, and improved water quality. In addition, the smaller road system may limit motorized use impacts in riparian management zones including the spread of invasive plants and increases in erosion.

Resource Indicator 3: Management Areas, Recommended Research Natural Areas, and Recommended Botanical Areas managed for Unique Riparian Ecosystems

Effects are the same as alternative B

[100] See the recreation, range, and mining and minerals sections for effects from implementing this standard.

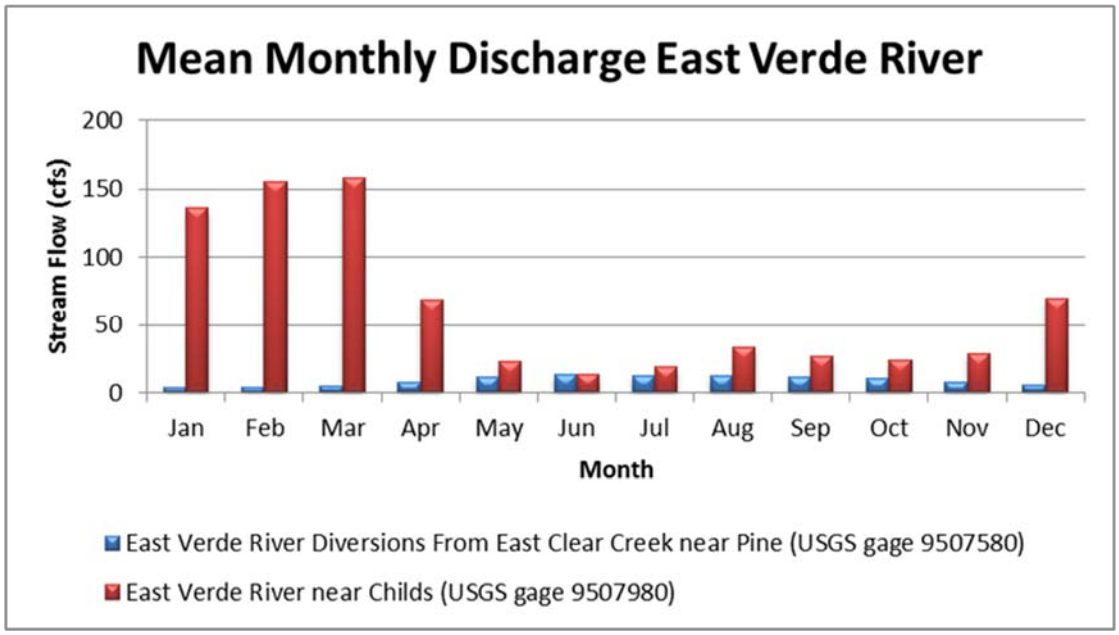

Figure 34. East Verde River mean monthly discharge

Most of the stream flow in Fossil Creek was diverted from the creek for run-of-the-river hydroelectric power generation beginning in the early 1900's until 2005 when the full flow was restored. Water for power generation was provided by a series of springs that discharged an average of about 43 cubic feet per second year round. The water discharging from these springs is supersaturated with carbon dioxide (CO2) that created travertine features from calcium carbonate precipitation as CO2 outgassed from the spring water. These travertine features were damaged by floods during the period of power generation and have been rebuilding since full flows were restored to the creek.

Small-scale diversions occur from many of the perennial streams, or springs feeding these streams, that originate below the Mogollon Rim to provide water to private lands located along these streams. Groundwater pumping on private lands also occurs in proximity to many streams and may also impact stream flows. Diversions for fish hatcheries affect short reaches of Tonto and Canyon Creek. A well field authorized on the Tonto for widening and realigning Highway 260 from Payson to Heber affects nearby springs and a stream. Mitigation measures for the well field include a diversion from Tonto Creek that allows withdrawals from the creek during the winter and spring if specific flow conditions are met in the creek. Water from the creek is used to artificially recharge the aquifer affected by pumping. (NAU, 2005)

Stream diversions from Cherry Creek on the east side of the Tonto National Forest, Tonto Creek above Gisela, Deer Creek near Rye, and Pine Creek above Pine reduce base flows or dewater reaches of these creeks below the diversions.

Large mines exist in the Globe-Miami and Superior areas. ~~Groundwater pumping~~Water withdrawals by these mines may affect stream flows in Pinal and Pinto Creeks. Impacts to streamflow from groundwater pumping by the Carlota Copper Mine were documented in a perennial tributary to Pinto Creek (USDA Forest Service 1997). In addition to the pumping impacts, mines can also affect groundwater flow paths through development of pits in open pit mines and by tunnels, shafts, adits, etc. in underground mines. Both types of mines are found as either abandoned or currently operating mines on the Tonto National Forest. An additional large mine (Resolution Copper Mine) is proposed on the

Tonto in the near future. The Resolution Copper Mine is proposed as an underground mine but would be expected to have subsidence effects at the surface.

In addition to human related impacts the recent drought in the Southwest has reduced flows in some streams. Stream flow in Tonto Creek for example has declined from an average annual flow of more than 300 cubic feet per second in the late 1970's to less than 100 cubic feet per second in the last 5 years. Figure 35 displays a running 10-year average precipitation versus long-term average precipitation for Climate Division 4 (Gila County) in Arizona[110]. Data used for the figure begins in 1895 and ends in 2013. The figure displays the extreme drought that occurred at the turn of the 19th century from about 1891 to 1904 (Webb et al. 2007). It also displays a drought period in the 1950s and the severity of the most recent drought that began in the middle 1990s. The figure also displays wet periods in the 1910s to 1920s and from the late 1970s to early 1990s.

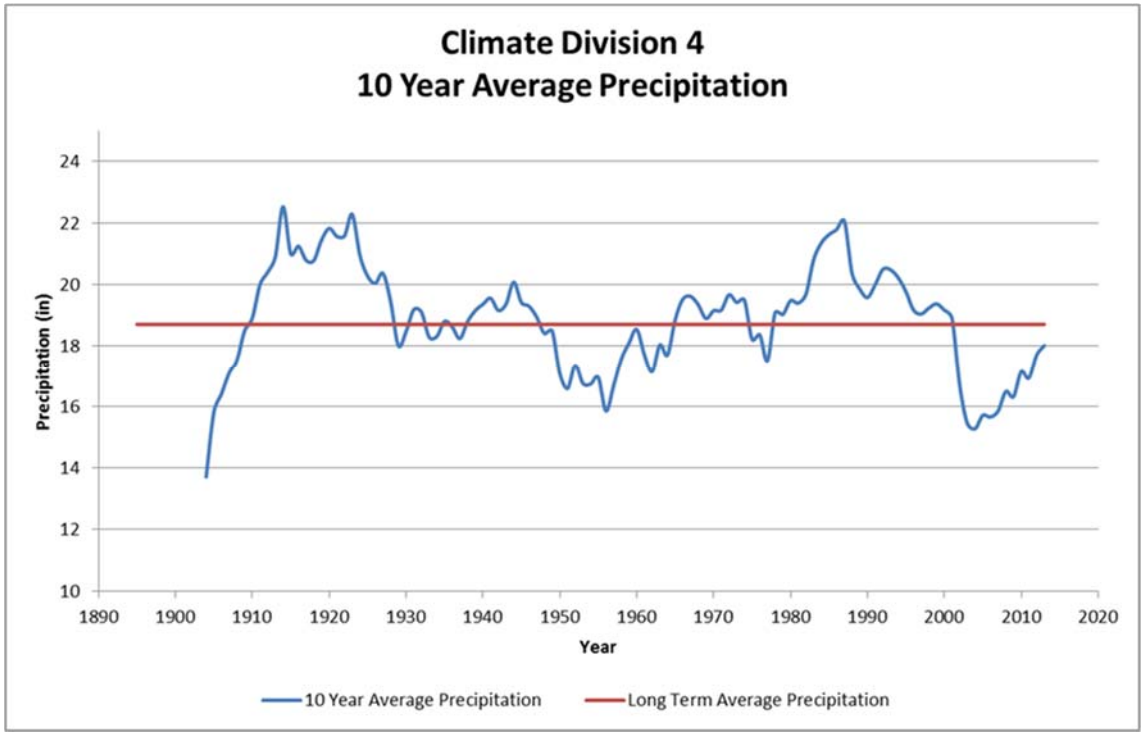

Figure 35. Ten-year average precipitation, climate division 4

Springs are a valuable but limited resource on the Tonto National Forest particularly in the more arid portions. Water discharged from springs supports riparian habitat and provides important water sources for wildlife, livestock, and human needs. Springs can also be an important source of base flows in perennial streams and can maintain stream flows during the hot summer months. The Tonto National Forest water rights database identifies approximately 1,860 springs and seeps within the forest boundary for which the ~~forest~~ Forest Service has submitted water right applications. Applications for water rights for springs are typically intended to provide water for livestock and wildlife and sometimes include domestic and recreational uses. Developments that divert water from the spring source can affect ecological values supported by the springs. Springs which discharge to form Fossil Creek are the largest springs in the state outside of the Grand Canyon. These springs lie within both the

[110] Source: WRCC 2015

Plateau. The rim is approximately 7,000 feet in elevation with sheer drops of 2,000 feet at some locations (ADWR 2010). The rim stretches for over a hundred miles and forms much of the northern boundary of the Tonto.

Groundwater within the Tonto National Forest occurs primarily within fractured bedrock and in ~~shallow~~ alluvial aquifers along the margins of streams. Deeper basin fill aquifers with greater groundwater resources although limited in areal extent on the Tonto can also be valuable groundwater resources for cultural uses. ~~They are~~Basin fill aquifers have varying degrees of ~~typically~~ hydrologic~~ally~~ ~~connected~~ connectivity with stream alluvium. Basin-fill aquifers underlie the area around Globe, Tonto Basin, portions of Pinto Creek, Cherry Creek, Sycamore Creek, Queen Creek, and the Verde River. Recharge to basin-fill aquifers occurs primarily along mountain fronts and by infiltration from streams. (ADWR 2008)

Groundwater recharge occurs in areas of higher precipitation, particularly along the Mogollon Rim just north of the Tonto National Forest boundary, the Sierra Ancha Mountains northeast of Roosevelt Lake, the Pinal Mountains south of Globe-Miami, and the Mazatzal Mountains between the Verde River and Tonto Basin. Precipitation at the highest elevations of these features averages greater than 30 inches annually. Groundwater recharge on the Mogollon Rim was estimated to be 4 to 17 percent (up to 5 inches) of the annual precipitation on the Rim (Parker et al. 2005). Groundwater discharging from the Coconino Sandstone (also known as the C Aquifer) and the Redwall Limestone at the base of the Rim maintains perennial flow in many of the streams that originate beneath the Rim. Several of these streams maintain perennial flow for only a mile or two before flow is lost due to seepage into permeable and occasionally karstic terrain. Examples include Webber, Chase, Dude, Bonita, Ellison, and Horton Creeks. The largest spring discharging from below the Rim is Fossil Springs which discharges at an estimate 42 to 45 cubic feet per second and maintains perennial flow in Fossil Creek. Other major springs discharging below the Mogollon Rim include Tonto Spring that discharges into Tonto Creek, See Spring that flows into Christopher Creek, and OW Springs that discharges to Canyon Creek. Tonto and OW Springs have been developed to provide water to fish hatcheries on Tonto and Canyon Creeks.

Groundwater recharge in the Sierra Ancha Mountains discharges to a number of springs on the east side of the mountains that help to sustain perennial flow in Cherry Creek. Perennial flow in Workman and Reynolds Creeks that flow to the west side of the mountains, Coon Creek on the south side and Spring and Rock Creeks on the north side are also sustained by groundwater discharged from precipitation recharged in the Sierra Ancha Mountains. Groundwater discharging from the west side of the Mazatzal Mountains sustains perennial flow in a number of streams draining through the Mazatzal Wilderness to the Verde River.

The Forest lies primarily within the Central Highlands (83 percent of the forest) and Active Management Area (13 percent of the forest), management areas established by the Arizona Department of Water Resources. The area of the Forest within the Active Management Area is entirely within the Phoenix Active Management Area. The Active Management Areas are areas that relied heavily on mined groundwater prior to enactment of the 1980 Arizona groundwater code. This code was enacted to reduce over pumping of the states finite groundwater resources. In the Phoenix, Prescott, and Tucson active management areas, the primary management goal is to achieve safe yield by the year 2025. Safe yield is achieved when the amount of groundwater being withdrawn equals the amount that is annually replaced. Within ~~a~~Active M~~m~~anagement A~~a~~reas, groundwater rights were established; wells are regulated; and the municipal, industrial, and agricultural sectors are subject to mandatory conservation programs (ADWR 2010a). Outside active management areas, which

includes the majority of the Tonto National Forest, there is essentially no restriction on withdrawing groundwater as long as it is put to reasonable and beneficial use (ADWR 2010a).

Groundwater-dependent Ecosystems

Groundwater ~~-dependent~~ influenced ecosystems on the Tonto National Forest include slightly more than 1,000 springs that support valuable aquatic and riparian habitat. There are also approximately 700 miles of perennial streams on the Tonto that are ~~supported~~ assisted by groundwater discharge and approximately 1,100 miles of intermittent streams where shallow ~~ground~~water table elevations support obligate riparian vegetation. Riparian vegetation ~~supported~~assisted by groundwater discharge supports fish and wildlife habitat, filters sediment from upland runoff and flood flows, moderates stream temperatures, provides bank stability for stream channels, and helps to recharge shallow alluvial aquifers. Figure 38 displays the location of perennial and intermittent streams on the Tonto National Forest.

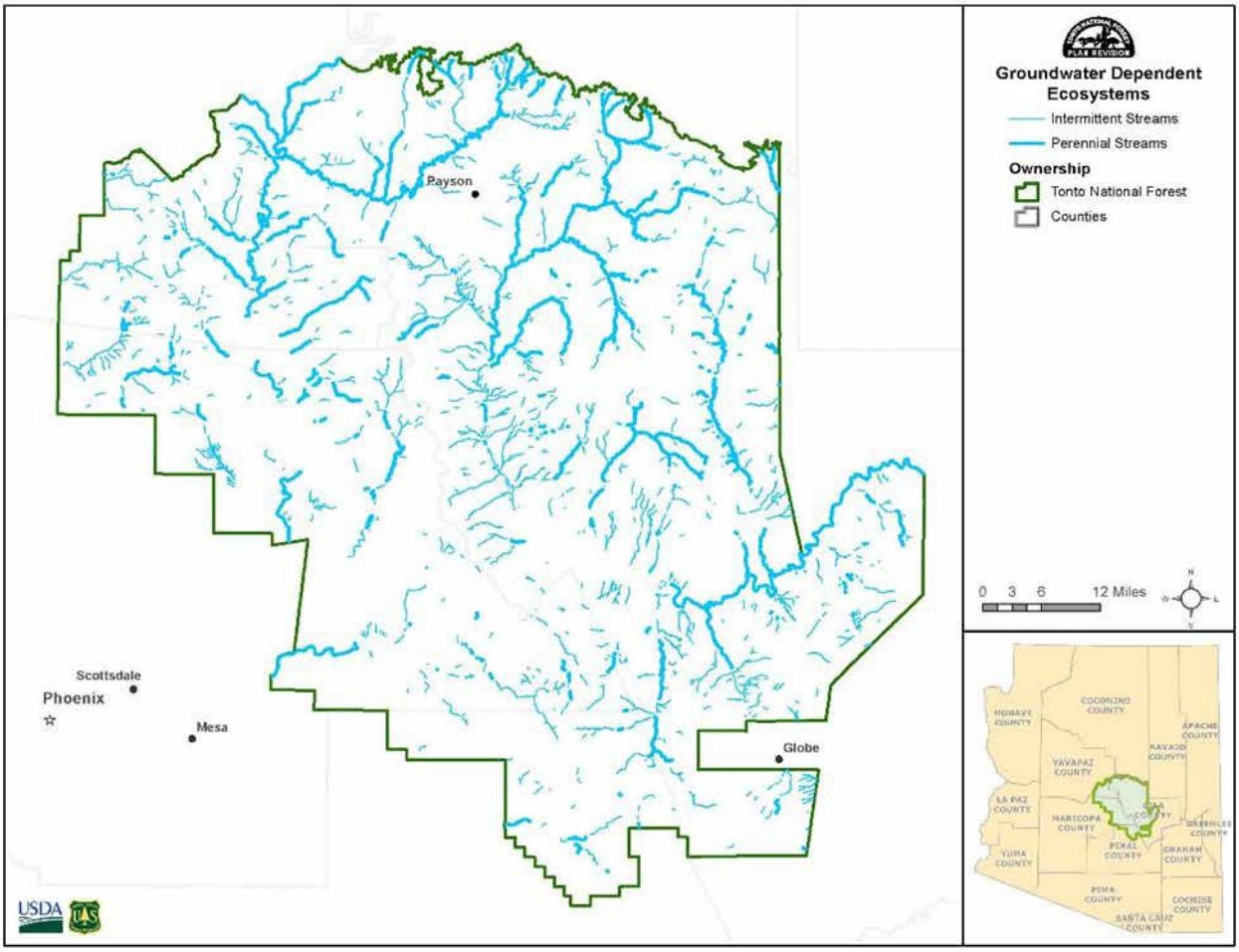

Figure 38. Groundwater-dependent ecosystems as they relate to perennial and intermittent streams

Most of the perennial streams on the Tonto National Forest are supplemented in part ~~dependentrely on~~ by groundwater discharge to help maintain perennial flow. Typically headwaters areas on these streams are areas of groundwater discharge ~~(effluent areas)~~where springs are concentrated. Many of these spring-fed streams ~~become losing (influent)~~ start dissipating ~~streams~~ as they exit mountainous areas and enter broader and more arid alluvial valleys. Many of the streams draining the Mogollon Rim area become influent streams where they cross karstic terrain. Alternating zones of gaining and losing reaches are common where canyon-bound and alluvial reaches alternate along a stream

The U.S. Geological Survey has developed base flow indices for gaging stations across the United States. The indices estimate the portion of streamflow that is derived from base flow (base flow is defined as the component of streamflow that is attributed to groundwater discharge and other delayed sources such as snowmelt into streams (Santhi et al. 2008). Base flow indices developed for 13 gaging stations on perennial streams on the Tonto range from 0.30 for Sycamore Creek near Sunflower to 0.76 for Pinal Creek at Inspiration Dam, and average 0.45 for the 13 gages assessed on the Tonto. The average value of 0.45 indicates almost half of the flow in many of the streams on the Tonto is derived from groundwater discharge and other sources of delayed flow. Table 86 displays base flow indices for stream gages on perennial streams within the national forest that are minimally affected by dams, diversions, and imports.

Table 86. Base flow index values for selected stream flow gages within Tonto National Forest

USGS Gage No.	USGS Gage Name	Drainage Area (square miles)	Median Flow (cubic feet per second)	Average Base Flow Index Value
9497900	Cherry Creek near Young, AZ	62.1	1.5	0.351
9497980	Cherry Creek near Globe, AZ	200	8	0.474
9498400	Pinal Creek at Inspiration Dam, near Globe, AZ.	195	7	0.762
9498500	Salt River near Roosevelt, AZ	4,306	329	0.631
9498502	Pinto Creek near Miami, AZ	102	1.9	0.500
9498800	Tonto Creek near Gisela, AZ	430	20	0.313
9498870	Rye Creek near Gisela, AZ	122	2.7	0.319
9499000	Tonto Creek above Gun Creek, Near Roosevelt, AZ	675	22	0.316
9499500	Tonto Creek near Roosevelt, AZ	841	24	0.287
9507700	Webber Creek above West Fork Webber Creek near Pine, AZ	4.79	0.6	0.535
9507900	Webber Creek below West Fork Webber Creek near Pine, AZ	9.63	0.7	0.499
9508500	Verde River below Tangle Creek, above Horseshoe Dam, AZ	5,858	237	0.563
9510150	Sycamore Creek near Sunflower, AZ	52.3	0.5	0.302

In streams with low flow volumes, base flow conditions are critical for water quality and quantity management (Santhi et al. 2008). Maintaining ~~ground~~water discharge~~s~~ to ~~sustain~~ help support perennial stream flow, shallow water table elevations, or both at these sites is important for the aquatic and riparian resources ~~dependent on~~ these features ~~for~~ that contribute to their survival. Examples from the table above include streams such as Cherry Creek, Pinto Creek, Rye Creek, Webber Creek, and Sycamore Creek.

The Arizona Department of Water Resources monitors index wells across the state to collect long-term water level data (Beversdorf et al. 2009). A number of these wells lie within the boundaries of the Tonto National Forest, primarily on private lands, but a few are located on National Forest System lands. An example of water level trends of selected wells within the boundaries of the Tonto National Forest is a well (55-601024) in the uplands of Tonto Basin near Lambing Creek (ADWR

Water Uses and Demands

The cities of Payson, Globe-Miami, and Superior lie within the exterior boundaries of the Tonto National Forest. The communities of Strawberry, Pine, Star Valley, Christopher Creek, Young, Gisela, and Tonto Basin also lie within the boundaries. Population growth in these communities and other unincorporated areas within the forest is increasing water usage. The city of Payson has been entirely dependent on groundwater for its water supply and has explored for additional water sources on the Tonto. The Arizona Water Settlement Act of 2004 allocated 3,500 acre-feet of water to communities in Northern Gila County from C.C. Cragin Reservoir (formerly Blue Ridge Reservoir). The city, which has one of the lowest per capita water use rates in the state, is constructing a pipeline to import up to 3,000 acre-feet of that water to the city. Other unincorporated communities along the pipeline route, as well as the Tonto Apache Tribe, will benefit from this water. The communities of Pine and Strawberry periodically have to ration their water supplies and actively search for new water sources. The city of Globe operates a well field on the Tonto National Forest near the border with the San Carlos Reservation. Water table elevations in an index well near the well field have declined over the years. The city provides ~~is looking to reuse~~ treated effluent from its municipal wastewater treatment facility to the Freeport Miami Mine to reduce freshwater consumption at the mine~~improve its water supply outlook~~. The city of Superior receives the majority of its water supply from wells operated by the Arizona Water Company located beyond the boundaries of the Tonto National Forest. Most water supplies for other communities are provided by wells on private lands.

Several large mines exist within the boundaries of the Tonto National Forest including Carlotta, Pinto Valley, and the Freeport Miami ~~Copper~~ Mine~~s~~ in the Globe-Miami area. An additional large copper mine (Resolution Copper) is proposed within the boundaries of the Tonto and is currently undergoing environmental analysis. The existing large mines ~~are dependent on~~use a variety of sources including groundwater, surface water and recycled effluent ~~sources for~~ to meet ~~the majority of~~ their water needs. Wells and pipelines on the Tonto National Forest provide a portion of the water needs of the Carlota and Pinto Valley mines on Pinto Creek west of Miami. Smaller mines on the Tonto that produce a variety of minerals ~~. Water needs~~ are typically ~~provided by wells~~dependent on water supplied from wells.

A small amount of agriculture occurs in the vicinity of Gisela. Water for agricultural use and residential watering is provided by the Gisela community ditch, which diverts surface water from Tonto Creek. Diversions for agricultural (orchards) and residential watering also occur from the East Verde River. The Tonto Basin area north of Roosevelt Lake has been growing rapidly. Most of the water to support development in the basin, as well as other developments within the boundaries of the Tonto National Forest, is derived from groundwater sources. Small surface water diversions for residential uses occur from a number of perennial streams draining the Rim country. Water for pasture irrigation and a bottled water operation is diverted from Seven Springs on the Cave Creek Ranger District.

Two fish hatcheries divert water from springs on the Tonto National Forest. The Tonto Fish Hatchery diverts water from Tonto Spring in the headwaters of Tonto Creek and discharges it back to Tonto Creek after treatment. The Canyon Creek Fish Hatchery diverts water from OW Springs and discharges it to Canyon Creek.

Recreational uses of public and private lands are also a popular activity on the Tonto National Forest, particularly water-related recreation on the reservoirs and rivers. Surface water diversions from Webber Creek and Chase Creek support activities at the Camp Geronimo Boy Scout Camp and Shadow Rim Girl Scout Camp, respectively. Spring diversions provide water to recreation residence communities on Camp Creek in the Cave Creek District and Pinal Peak on the Globe District. Wells

Numerous springs and stock tanks have been developed across the Tonto to provide water for livestock and wildlife use. A small number of range wells have also been developed for livestock use.

Trends and Projections

Total water yield is directly related to precipitation. The current period of lower than normal precipitation is likely to result in a continuation of the recent trend of reduced streamflow and somewhat reduced base flows. Climate change modeling predicts that some of the most likely changes to expect in the Southwest (USDA Forest Service 2009) include:

- Warmer winters with reduced snowpack,
- A delayed monsoon season,
- A five percent decline in precipitation in most of Arizona and New Mexico,
- An increase in extreme flood events, and
- Temperature increases of 5 to 8 degrees Fahrenheit.

These conditions may result in reduced groundwater recharge and changes in the magnitude, frequency, and duration of stream flows. Continued growth on private lands within and beyond the boundaries of the Tonto, and the groundwater pumping associated with development on these lands, may ~~result in~~contribute to reduced ~~groundwater discharge to~~ spring~~s~~ and stream~~s~~ flow within ~~on~~ the Tonto National Forest and potentially the duration of flow in perennial streams.

Environmental Effects[111]

Effects Common to All Alternatives

In all alternatives, water quality would improve based on implementation of watershed restoration action plans in priority sixth code watersheds, implementation of treatments recommended in Total Load assessments, and application of Best Management Practices to projects and activities proposed by other Forest management programs. Improvement of water quality would benefit other resources such as recreation and fisheries. For example, reducing E. coli will make lakes and streams safer for the recreating public and reducing sediment load can improve habitat for native fish.

Watershed condition would be improved in all alternatives, however, the type, rapidity, and location or improvement varies by alternative and will be discussed below. Actions common to all alternatives that will improve watershed condition include:

- Implementing essential projects identified in Watershed Restoration Action Plans developed for sixth-code watershed designated as priority watersheds,
- Compliance/enforcement of utilization standards for livestock grazing in uplands and riparian areas,
- Restoring aquatic habitat and riparian area function,
- Improving or maintaining the function of springs,
- Acquiring instream flow water rights for streams vulnerable to dewatering, and

[111] For legal and regulatory compliance for watershed and water resources, along with the assumptions and methods used in the analysis of the alternative can be found in appendix B of volume 3 of the DEIS.

continue, which will impact aquatic resources and use of the waterways for recreation. The other three alternatives address the omission of Total Load recommendations.

The Forest Plan does not provide direction for management of resources in response to climate change. Climate change has begun and will continue to cause changes in temperature and rainfall patterns (Seager et al, 2013). Without management direction, climate change would directly affect forest water resources and indirectly affect resources they support, such as vegetation, wildlife, and habitat. Adverse effects to water resources from a changing climate include impairment of water quality, degradation of watersheds, loss of potential recreational uses, and loss of aquatic habitat and biota as a result of higher velocity and greater quantities of surface runoff associated with more intense storms and flooding; and lowered water yield and availability for wildlife, grazing, and human uses because of warmer and drier conditions/drought that decrease annual precipitation and snowpack (Jardine, et al 2013; Archer and Predick, 2008).

Effects Common to Alternatives B, C, and D

Water quantity would continue to be largely controlled by weather events and climate. However, clear direction in the desired conditions and objectives with regard to securing additional instream flow water rights, improving or maintaining springs, restoring streams, implementing essential watershed improvement projects, stewardship of groundwater resources within Tonto NF land as well as reducing hazardous fuel accumulation and improved grazing management of riparian areas would help meet water needs on and off the forest and would assist with maintaining the functions of channels and flood plains. This would help maintain watershed condition and the number of miles of perennial waters. A functional channel and floodplain, and maintenance of water table elevations in these features improves water retention on the landscape and helps release water over a longer time period for uses on and off the forest. An indirect effect of functioning floodplains is the support of riparian habitat by maintaining natural disturbance cycles, which helps to recruit a diversity of plant species and age classes. This, in turn, benefits riparian wildlife species by providing diverse forage and nesting locations.

The objective of obtaining instream-flow water rights for the beneficial use of recreation and wildlife, including fish, results in protection of non-consumptive stream flow for water dependent ecosystems and recreation users (see component WAT-O-06). Existing water right certificates would be senior and take precedence over any newly procured instream-flow water right obtained under this proposed action objective. Indirect effects include support of numerous positive biological processes including riparian and wildlife habitat maintenance. Stewardship of groundwater resources within Tonto NF land that help support ~~water dependent~~ riparian ecosystems would also benefit these processes and habitats.

The management approach of creating watershed restoration action plans for improvement and maintenance of springs (Management Approach 09) and the objective for implementation of aquatic and riparian restoration projects (WAT-O-05) will support aquatic and riparian habitats for plant and animal species dependent on these types of resources. Indirect effects include maintaining a more complex ecosystem and, thereby, improving viability of aquatic and riparian species, the resilience of these systems to human and natural disturbances and to the effects of changing climate conditions which are desired conditions in alternatives B, C, and D.

The proposed action alternative contains specific desired conditions for overall watershed condition, moving watersheds conditions toward properly functioning, and prioritizing treatments for watershed restoration (WAT-DC-01, 03, 04, and 07). Alternatives B, C, and D all focus on treatments to improve the watershed functions where they are most needed through designation of priority

treatment if burn severity is greater than prescribed in the burn plan. In in woodland and forested watersheds, treatments proposed in this alternative would help achieve desired conditions of watershed improvement, maintaining or improving water quality, and maintaining watersheds within the natural range of variability (WAT-DC- 03, 04, and 07) than alternative B and substantially greater benefits than alternatives A and D due to the difference in acreage treated between the alternatives. For more details on the benefits of fire treatments in watersheds see the Vegetation, Ecological Response Units, Fire and Fuels section.

Effects of Riparian Area Management

The only difference between this alternative and alternative B is that this alternative prescribes a standard that would remove all permitted (federally only?) and allowed uses from a riparian area when it is rated as non-functioning based on the proper functioning condition framework (USDI, 2015) until riparian recovery is achieved. This alternative could experience an incremental improvement in riparian area condition in watersheds with riparian areas and natural flow regimes compared to alternative B if the riparian areas where use is removed if the areas are good candidates for passive restoration techniques. This alternative would provide a greater improvement than alternatives A and D in watersheds with riparian areas and natural flow regimes. Riparian vegetation condition is one of the indicators assessed in the Watershed Condition Classification process (Potyondy and Geier, 2011), therefore any additional improvements in riparian condition would also benefit overall watershed condition and assist the forest in meeting desired conditions associated with watershed condition (WAT-DC- 03, 04, and 07).

Effects of Rangeland Management

The difference between this alternative and alternatives B and D is that it would evaluate and close vacant allotments rather than granting them to a new permittee (alternative D) or evaluate them and determine whether to convert them to forage reserves, grant to a new permittee, or close to permitted grazing, in whole or in part (alternative B). Closing vacant allotments to grazing in those watersheds where soil, riparian, vegetation, and/or channel conditions are currently in fair or poor condition should benefit these resource values and help achieve desired conditions related to watersheds that are functioning properly, water quality meeting or exceeding state standards, ecological components of the watershed that are resilient to human actions, and based on local conditions recharging of aquifers (due to less soil compaction). (WAT-DC-02, 03, 04, 06, and 07)

Effects of Recreation Management

This alternative favors non-motorized and primitive recreation opportunities and would maintain to standard 30 percent of the forests designated non-motorized trails annually. It would also decommission ten miles of unneeded motorized trails every five years. This alternative would maintain a smaller percentage of motorized trails than alternatives B and D. Motorized trails have a larger footprint and therefore greater impact on the land than non-motorized trails. Reduced emphasis on maintaining motorized trails results in potentially greater erosion and sediment impacts from these trails than would occur from the other alternatives and could therefore impair the ability to achieve desired conditions associated with properly functioning watershed conditions (WAT-DC-03 and 04) in those watersheds where motorized trails occur. Depending on the individual watershed conditions, these impacts would potentially be offset by the decommissioning of ten miles of unneeded motorized trails every five years proposed in this alternative.

This alternative would designate approximately 375,576 acres of wilderness, the most of any of the alternatives. In watersheds that contain proposed wilderness, designation would prevent adverse

completed a land exchange that substantially increased the area owned by the tribe in exchange for privately held inholdings on the Forest. The exchange benefitted both entities. Activities on the reservation have minimal impacts on the Forest. Activities to improve Forest condition will, however, also improve the health of the watersheds that the Tonto either shares with or is upstream from the Tonto Apache Reservation.

Mining Activities

Mineral prospecting and mining is an activity within and near the forest that has occurred for many years. Mineral prospecting by itself has only small surface disturbing activities but mining economical ore deposits can affect larger areas with tailings ponds, leach pads, power, water and other mining infrastructure. Impacts to surface water quantity and quality and groundwater quality and quantity as well as water dependent resources dependent on them have occurred in the past and are likely to occur in the future. The Resolution Copper Project near Superior is currently being evaluated in an Environmental Impact Statement, along with an Environmental Impact Statement being prepared for expansion of the Pinto Valley Mine near Miami-Globe. These projects have the potential to create surface disturbance and affect water resources by potentially degrading water quality and decreasing groundwater levels, which would impact the ability to achieve desired conditions related to water quality, maintaining groundwater levels and discharge, and proper functioning watershed condition. (WAT-DC-02, 03, 04, 06, and 08) Other mineral exploration activities are occurring on the forest. If economically viable ore deposits are discovered and developed they also have the potential to affect watershed conditions and water resources on the forest. The cumulative effect of both current and proposed mining activates on the Forest has the potential to decrease the ability of the Forest to meet desired conditions related to watershed health overall and riparian health in particular because of ~~associated~~ potential ~~decreases~~ declines in ~~ground~~water table elevations and impacts to spring ecosystems. (WAT-DC-02, 03, 04, 08, and 09)

Population Growth

Population in the Verde Valley and the Prescott area up gradient from the forest are growing. Population growth is resulting in increased development of ~~ground~~water resources which can impact ~~ground~~water discharge to the Verde River and its tributaries and result in reduced base flows in the river where it flows through the forest.

Population in the Phoenix Metropolitan Area is growing rapidly. The Forest is immediately adjacent to the metropolitan area and easily accessible. Visitors come to the Forest year round for a variety of reasons. Increasing population is likely to result in increasing visitation and some types of uses (e.g. off highway vehicle use) can result in impaired watershed conditions.

Population growth is also occurring in communities and private lands within the forest boundary. The city of Payson is developing a new source of water (CC Cragin Reservoir) that should provide for their water needs for many years. The communities of Pine and Strawberry are currently water short communities that may need to develop additional sources. The primary source of new water is likely to be groundwater. Impacts to ~~groundwater dependent~~riparian ecosystems from declining water tables may occur if new ~~ground~~water resources are found and developed, which would impact desired conditions related to healthy riparian conditions, maintaining ~~ground~~water discharge, and properly functioning watersheds. (WAT-DC-02, 03, 04, 08, and 09) Similar impacts may occur from growth in Young and Tonto Basin. The Forest standard of permitting new wells on NFS lands and pipelines across NFS lands only where the water removed and/or transported by these facilities would not adversely impact springs, wetlands, riparian areas, surface flows, and other ~~groundwater dependent~~riparian ecosystems on NFS lands could impact the ability of these communities to secure additional

United States Department of Agriculture

Draft Environmental Impact Statement for the Draft Land Management Plan

Tonto National Forest

Volume 2: Chapter 3 (continued), Chapter 4, References, and Glossary

Coconino, Gila, Maricopa, Pinal, and Yavapai Counties, Arizona

Forest Service Tonto National Forest MB-R3-12-06 November 2019

Poor Watershed and Riparian Conditions

Affected Environment

Aquatic and riparian systems are at significant risk across the Forest[6]. Shallow water tables, cooler temperatures, and greater productivity typically characterize these systems. However, human alterations to the landscape such as impoundments, diversions and pumping, introduction of invasive plants, grazing, and recreational impacts are altering these systems. Roads, grazing, and recreational uses (including trails and dispersed recreation) remove vegetation and compact soils in riparian areas, causing significant departures from reference condition in terms of species composition, proportion of bare soils, and stream bank stability, ultimately causing erosion and sedimentation downstream.

Increased water demand (water withdrawal) and climatic changes (e.g., long-term drought) have also affected these systems. Water tables are lower and there have been decreases in periodic flooding which is necessary for the regeneration of some important riparian species (e.g., cottonwood). This results in shifts in species composition and a reduction in available soil moisture. Bare soil and reduced native species provide conditions suitable for establishment of invasive species. Invasive species, in combination with adjacent uncharacteristically dense upland vegetation, lead to an increased risk of fire from the uplands entering riparian areas, where fire is not a natural part of the ecosystem. Loss of riparian vegetation leads to higher water temperatures, increased erosion and sedimentation, and an overall decrease in water quality, which negatively affects aquatic biota and wildlife. The impact on wildlife is significant; an endangered species that is a riparian obligate and fifteen species of conservation concern are dependent on the riparian area for their habitat.

Both natural and human caused disturbances impact the condition of water resources across the forest. Although some wildfires are a natural disturbance, high burn severity areas within wildfires from both natural and man-caused ignitions lead to increased rates of erosion and sedimentation, negatively impacting water quality. Drought also impacts water resources through reduced flow in streams and springs. Roads in close proximity to stream channels increase delivery of water and sediment to stream networks on and off the Forest. Likewise, grazing, recreation, and other multiple uses continue to impact water resources into the future.

Human-caused and natural disturbances across the landscape result in water quality designation of 34% of the assessed stream miles on the forest as not attaining or impaired. Impairments vary but can include heavy metals, sediment, nutrients, dissolved oxygen, bacteria and mercury in fish tissues.

The majority of the sub-watersheds on the forest, 89%, are classified as functioning-at-risk or impaired. Water quantity, aquatic habitat, aquatic biota, riparian vegetation, roads and trails, and soil condition are the watershed conditions indicators that have the greatest impact on overall watershed condition scores.

Habitat modification and fragmentation has occurred from dam construction, conversion to agricultural uses, dewatering, road construction, cattle grazing, and timber harvest. Additionally, catastrophic wildfires have led to declines in the distribution and abundance of native aquatic biota. Wildfires followed by monsoon rains can cause flooding that carries ash that can kill fish and severely alter habitats, often taking years to recover. As a result of all disturbances, native species

[6] A complete description of the existing condition of ecological response units on the Tonto National Forest, along with the analysis of the effects, by alternative, to these units can be found in the Riparian Areas in a proceeding section of this DEIS. The following analysis takes those conclusions as part of the basis for this analysis.

> If a riparian area is non-functioning, as identified in the Proper Functioning Condition Assessment framework or similar protocol, all (federally?) permitted and allowed uses will be removed until riparian recovery (how is this determined?) is achieved.

This standard would exclude uses at riparian areas that are non-functioning. This standard would only apply to riparian areas that have the ability to reach their potential extent and where major stressors are within forest service jurisdiction. Plan direction for watersheds and riparian areas in this alternative are generally the same as the proposed action, alternative B; however, the focus on limiting or removing human disturbances suggest a longer-term solution for threats to species connected to these systems. If significant sources of disturbance are removed until desired conditions are met, this alternative is likely to convey the greatest benefit to species.

Management Areas: Alternative C

Table 106. Effects of management areas in alternative C to watershed and riparian conditions

Type of area	Name(s)	Effects
Recommended Wilderness	About 375,576 acres	Generally, desired conditions for recommended wilderness focus on preserving natural ecologic processes and maintaining a relatively undisturbed system, which is likely to have some benefits for the watersheds and riparian areas they include. Restrictions on new roads, motorized access, and energy development, are likely to benefit the overall health and function of watershed and riparian areas.
Proposed Botanical Areas	Fossil Springs, Little Green Valley Fen, Horseshoe, Mesquite Wash	These areas receive some additional guidance and protection through plan direction. Additional restrictions grazing, visitor use levels, logging, camping, fire suppression and management, and new roads, may offer some programmatic benefits to the riparian areas included in these areas.
Proposed Research Natural Areas	Dutchwoman Butte, Picketpost Mountain, Three Bar, Upper Forks Parker Creek	These areas receive some additional guidance and protection through plan direction. Additional restrictions grazing, visitor use levels, logging, camping, fire suppression and management, and new roads, may offer some programmatic benefits to the riparian areas included in these areas.
Management Area	None	(No significant effects expected)

Alternative D Effects

This alternative has the least amount of direction specifying objectives and protections for watersheds and riparian areas. It also emphasizes access and allows for additional roads, both of which may have negative impacts on watershed and riparian areas. Generally there are fewer restrictions to recreation and multiple uses that affect riparian areas.

While it does specify treating areas most at risk, the threats to watershed and riparian areas are large in scale and widespread, thus this alternative is the least likely to address threats to the many species tied to riparian and aquatic habitats.

Alternative D would likely lead to improved riparian conditions and a positive trend towards desired conditions over the planning cycle similar to alternative A. Alternatives B and C would likely result in more acres of riparian areas restored over the planning cycle compared to alternative D – mainly because those alternatives have objectives that set management priorities to accomplish restoration

preserve the free-flowing[36] condition of the river, protect the outstandingly remarkable values that provide the basis of the river's eligibility for inclusion in the system, and do not affect the classification of the river segment. In some cases, free-flow may be positively affected when instream structures promote more natural levels of river processes (e.g., bank erosion, channel shifting, groundwater infiltration, floodplain development) and bed load or debris movement. In the case a project may negatively impact the free-flow characteristics, a suitability study must analyze the effects of designation to other resource values, identify issues, and explore alternatives for protecting river values.

Environmental Effects[37]

Effects Common to All Alternatives

The number and miles of eligible rivers defined in the revised Plan do not vary by alternative. In all alternatives the identified eligible wild and scenic rivers and their corridors (one-quarter mile on either side of the river) would be managed in accordance with Forest Service Handbook 1909.12, Chapter 82.5. The presence of an eligible river constrains the type and manner activities that may be conducted within the river corridor. Three constraints would apply to activities proposed under any alternative in all eligible river corridors: (1) the protection of the free-flowing river character; (2) the protection of the identified outstandingly remarkable values; and (3) the maintenance of the preliminary river classification (wild, scenic, or recreational) unless a completed suitability study recommends a less restrictive classification.

Application of the management guidelines found in the Forest Service Handbook (FSH 1909.12_80) would also constrain the management of other resources within the river corridor, thereby minimizing the potential negative effects of management activities on the ORVs, which may include reduced scenic value, degraded water quality, interference with water flow, reduction in recreation opportunities, or threats to cultural and historic values. Management constraints defined in the Forest Service Handbook are specific to water resources projects, hydroelectric power, minerals, transportation system, utility proposals, recreation development, motorized travel, wildlife and fish projects, vegetation management, and domestic livestock grazing[38].

Management direction dictates that activities in eligible Wild and Scenic River corridors shall comply with interim protective measures outlined in Forest Service Handbook 1909.12, 84.3 (EWSRMA-S-02). This direction places the most restrictions on wild river corridors and the least restrictions on recreational river corridors. For example, the cutting of trees is not allowed in Wild river corridors unless it is necessary for human safety or to protect a cultural value at risk, but is acceptable within Recreational areas to meet resource objectives. Additionally, fire (either natural or planned) is acceptable in all wild and scenic river areas to provide for better wildlife habitat or to restore conditions within the natural range of variability. Some activities or infrastructure may be limited (e.g., roads, vegetation management, minerals) or restricted (e.g., hydroelectric power, utility corridors) within wild and scenic river areas, unless there are existing utility ROW permits that would allow for continued access and maintenance activies, -and as a result this would assist in maintaining, protecting, or enhancing river characteristics and outstandingly remarkable values on our eligible

[36] Flowing in a natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway.
[37] All assumptions and methods used for this analysis can be found in volume 3 of the DEIS, appendix B.

river segments. ~~If these thing are protected, they then would be available for use by current and future generations.~~

The presence of these river corridors may result in increased public interest and awareness of river resources, especially in the arid Southwest, leading to increased visitation and potential impacts to the area. Conversely, increased visitation to wild and scenic river areas could have some detrimental ecological impacts, such as ground disturbance, increased trash or discarded items, non-native species introductions or spread, reduced fish populations (through increased fishing pressure), or aquatic habitat degradation. That said, it is noteworthy to indicate there are no known studies comparing river use levels before and after wild and scenic river designation. Therefore, greater localized resource damage after wild and scenic river designation caused by raised recreation use and tourism cannot be confirmed (U.S. Department of Agriculture and U.S. Department of Interior).

As populations increase and more people visit the Tonto National Forest, the value of managing these areas in their relatively natural condition may increase user satisfaction and contribute to the increased wellbeing of visitors from spending time in these special areas. The peacefulness of the more untrammeled Wild and Scenic areas could reduce stress and allow for sightseeing or wildlife viewing opportunities, while Recreation segments provide increased opportunity for sport and leisure activities. An increase in visitation to wild and scenic river areas could generate increased economic revenue within the surrounding communities through the sale of food, lodging, bait and tackle, guide services, or other river-based revenue sources.

If eligible wild and scenic rivers are designated by Congress, it ~~will~~ may provide ~~a~~ higher protection for: safeguarding clean water; preventing activities that would significantly harm the river's character and benefits; prohibiting new dams or ~~damaging~~ water projects; and protecting land along the river with a quarter-mile protective buffer along the wild and scenic river flowing through publicly owned lands (American Rivers 2017). A management plan that is consistent with state water regulations and ~~with~~ that obtains input from local landowners and other stakeholders located upstream and downstream ~~insures~~ contributes to a shared vision on how to preserve the special character of the river. The designation can also reduce the impacts of floods; preserve some important ecosystems; enable native plants and animals to thrive; preserve the cultures of communities who once lived by the river; provide exceptional recreation and wildlife viewing; and improve understanding of the evolution of the planet by preserving special rock and geologic formations. Furthermore, it may preserve the quality of life of adjacent landowners, protect and/or increase private property value, and boost local economy by generating income through the growth of recreation and tourism activities.

Effects of Alternative A

The 1985 forest plan includes little to no forestwide management direction for eligible wild and scenic rivers. Thus, management of eligible wild and scenic rivers would defer to Forest Service Handbook 1909.12, Chapter 84.3 – Interim Protection Measures for Eligible or Suitable Rivers for directives in alternative A. In the instances an eligible segment overlaps with a different management area, interim management guidelines for each preliminary river classification do not always match the directives for a particular management area, eligible wild and scenic river corridors are managed by the more restrictive management area or river corridor direction and are supplemented by the proposed wild and scenic river comprehensive management plan direction, especially with regard to identified outstandingly remarkable values. By managing for the most restrictive management directives, the criteria guiding the eligibility (or designation) of wild and scenic rivers would be upheld and the benefits and effects of the alternatives described above would remain applicable.

Goshawk post-fledging family areas (PFAs). The areas that surround northern goshawk nest areas. They represent an area of concentrated use by the northern goshawk family until the time the young are no longer dependent on adults for food. PFAs are approximately 420 acres in size (not including the nest area acres).

Groundcover. The layer of dead and living vegetation that provides protection of the topsoil from erosion and drought.

Groundwater-dependent ecosystem. Community of plants, animals, and other organisms whose extent and life processes depend to varying degrees on groundwater. Examples include many wetlands, groundwater-fed lakes and streams, cave and karst systems, some aquifer systems, springs, and seeps.

Group. A cluster of two or more trees with interlocking or nearly interlocking crowns at maturity surrounded by an opening. Size of tree groups is typically variable depending on forested PNVT and site conditions and can range from fractions of an acre (a two-tree group) (i.e., ponderosa pine, dry mixed conifer) to many acres (i.e., wet mixed conifer, spruce-fir). Trees within groups are typically non-uniformly spaced, some of which may be tightly clumped.

Group selection. An uneven-aged management method in which trees are removed and new age classes are established in groups, adjacent to other groups of different age classes. Group cut size is determined by the reproduction requirements of the species desired and by the number or total acreage of different age classes desired across the stand.

Habitat. The physical location or type of environment in which an organism or biological population lives or occurs.

Habitat fragmentation. The process by which habitat loss results in the division of large, continuous habitats in smaller more isolated remnants.

Habitat type. A land or aquatic unit, consisting of an aggregation of habitats having equivalent structure, function, and responses to disturbance.

Herbaceous. Grass, grass-like, and forb vegetation.

Herbivory. Loss of vegetation due to consumption by another organism.

Hydrologic function. The behavioral characteristics of a watershed described in terms of ability to sustain favorable conditions of waterflow. Favorable conditions of waterflow are defined in terms of water quality, quantity, and timing.

Hydrologic unit code (HUC). A unique hierarchical hydrologic unit based on the area of land that drains to a single stream mouth or outlet at each level, and nested levels are identified by successively longer codes. A HUC 8 sub-basin is 700 square miles or larger and is divided into multiple HUC 10 watersheds that range from 62 to 390 square miles. HUC 12 sub-watersheds are 15 to 62 square miles and nest inside HUC 10 watersheds.

Impaired waters. Polluted or degraded waterbodies (e.g., lakes, streams, segments of streams) which do not meet state water quality standards.

Infill. An increase in trees per acre in forests and woodlands, resulting in a decrease in the quality and size of interspaces.

maintain a wide spectrum of high quality representative areas that represent the major forms of variability found in forest, shrubland, grassland, alpine, and natural situations that have scientific interest and importance that, in combination, form a national network of ecological areas for research, education, and maintenance of biological diversity.

Resilience. The ability of an ecosystem and its component parts to absorb, or recover from the effects of disturbances through preservation, restoration, or improvement of its essential structures and functions and redundancy of ecological patterns across the landscape.

Responsible official. The official with the authority and responsibility to oversee the planning process and to approve a plan, plan amendment, and plan revision (36 CFR 219.62).

Restoration, ecological. The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions (36 CFR 219.19).

Restore. To renew by the process of restoration. See restoration (36 CFR 219.19).

Riparian areas. Three-dimensional ecotones [the transition zone between two adjoining communities] of interaction that include terrestrial and aquatic ecosystems that extend down into the ~~ground~~water table, up above the canopy, outward across the floodplain, up the near-slopes that drain to the water, laterally into the terrestrial ecosystem, and along the water course at variable widths (36 CFR 219.19).

Riparian management zone. The interface between land and a river or stream. Plant habitats and communities along the river margins and banks are called riparian vegetation, characterized by hydrophilic plants.

Risk. A combination of the likelihood that a negative outcome will occur and the severity of the subsequent negative consequences (36 CFR 219.19).

Road. A motor vehicle route over 50 inches wide, unless identified and managed as a trail (36 CFR 212.1).

Road decommissioning. Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1). It includes a range of activities from ripping and seeding to full reclamation by restoring the original topography. Road decommissioning results in the removal of a National Forest System road from the forest transportation atlas.

Road Maintenance Levels (ML):

- ML1. Roads that are closed to vehicular traffic intermittently for periods that exceed 1 year. Can be operated at any other maintenance level during periods of use.
- ML2. Roads that are open and maintained for use by high-clearance vehicles; surface smoothness is not a consideration. Most have native material surface (not paved and no aggregate surface).
- ML3. Roads that are open and maintained for use by standard passenger cars. Most have gravel surface.

United States Department of Agriculture

Draft Environmental Impact Statement for the Draft Land Management Plan

Tonto National Forest

Volume 3: Appendices

Coconino, Gila, Maricopa, Pinal, and Yavapai Counties, Arizona

Forest Service Tonto National Forest MB-R3-12-06 November 2019

- Ensure the ecological components of watersheds are resilient to human and natural disturbances, including climate change.
- Ensure watershed conditions support ~~ground~~water recharge and discharge, and that ~~ground~~water discharge maintains water table elevations, supports base flows and water temperature in groundwater ~~dependent~~ influenced ecosystems within their natural range of variability.
- Surface waters provide habitat for aquatic and riparian species,
- Should be consistent with State water permitting guidelines and be clearly characterized to recognize nno rights to water have been adjudicated (confirmed) to date under the General Stream Adjudication in this area.
- Water rights are acquired, consistent with State of Arizona regulations, to provide for the needs of livestock, wildlife, recreation, and administrative uses and to maintain instream flows for streams flowing through the forest

Watershed Objectives Common to Action Alternatives

- Ensure that at least two priority watersheds are identified at all times, if necessary and develop Watershed Restoration Action Plans (WRAPs) to improve or maintain watershed condition
- Implement at least one project identified in Watershed Restoration Action Plans developed for priority watersheds every year.
- Complete at least four aquatic habitat restoration projects every 10 years
- Restore the function of 200 to 500 acres of nonfunctioning and functioning-at-risk riparian areas within designated Wilderness Areas or designated Wild and Scenic River corridors over a 10-year period, with emphasis on priority 6th code watersheds
- Acquire state based water rights for instream flow support for at least two streams threatened with dewatering within designated Wilderness Areas or designated Wild and Scenic River corridors, supporting highly valued resources (e.g. threatened or endangered species, species of conservation concern) or containing unique qualities (e.g. a perennial stream in the Sonoran Desert) within each ten year period.

Wildlife, Fish, and Plants

In evaluating whether plan components from various alternatives provide the ecological conditions necessary to support at-risk species, we have focused on the following:

- Relevant information derived from the status of at-risk species (FSH 1909.12, ch. 10, sec. 12.55), as well as limiting factors, threats, and stressors to each at-risk species.
- The key habitat relationships of the species.
- Effects, influences, and contributions from other land ownerships and actions outside of the plan area in addition to those within the plan area.

In addition to disclosing potential future conditions, analyses may address current conditions within a context of historical ecological conditions.

In evaluating whether alternatives contribute to the recovery of federally listed species, we evaluate whether projected scenarios (1) maintain or restore habitats in the plan area to provide the ecological conditions necessary to contribute to recovery of threatened and endangered species, and (2) contribute to preventing candidate species from becoming federally listed in the future. Where possible, we have