



United States Department of Agriculture

1

2 **Draft Environmental Impact Statement**
3 **for the Rim Country Project**

4 **Four Forest Restoration Initiative**

5 Apache-Sitgreaves, Coconino, and Tonto National Forests
6 Coconino, Yavapai, Gila, and Navajo Counties, Arizona

DRAFT DEIS



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Forest Service

Southwestern Region

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31 Draft Environmental Impact Statement for the 4FRI
32 Rim Country Project

33 Apache-Sitgreaves, Coconino, and Tonto National Forests
34 Coconino, Yavapai, Gila, and Navajo Counties, Arizona

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54
55 **Abstract:** This draft environmental impact statement (DEIS) documents the analysis of three
56 alternatives, including a “no action” alternative, which were developed for the Rim Country
57 Project on the Apache-Sitgreaves, Coconino, and Tonto National Forests (NFs). Alternative 2 is
58 the preferred alternative. The project proposes to conduct restoration activities over a 20-year
59 period or until proposed activities are completed. Alternative 1 is the no-action alternative.
60 Alternative 2, the modified proposed action, would mechanically treat vegetation on up to
61 889,340 acres and would treat up to 953,130 acres with prescribed fire; alternative 3 would
62 mechanically treat up to 483,160 acres and burn up to 529,060 acres. Both of the action
63 alternatives propose significant Forest Plan amendments that would amend the 1985 Tonto
64 National Forest Plan. They are considered significant amendments because they are being
65 considered in an Environmental Impact Statement (EIS).

66 Reviewers should provide the Forest Service with their comments during the review period of
67 the DEIS. This will enable the Forest Service to analyze and respond to the comments at one
68 time and to use information acquired in the preparation of the final environmental impact
69 statement, thus avoiding undue delay in the decision-making process. Reviewers have an

|

70 obligation to structure their participation in the National Environmental Policy Act process so
71 that it is meaningful and alerts the agency to the reviewers' position and contentions.
72 Environmental objections that could have been raised at the draft stage may be waived if not
73 raised until after completion of the final environmental impact statement. Comments on the
74 draft environmental impact statement should be specific and should address the adequacy of
75 the statement and the merits of the alternatives discussed (40 CFR 1503.3).

76 For more information on how to submit comments see the project website at:
77 www.fs.usda.gov/goto/4FRIRimCountry.

Preliminary DRAFT DEIS

1. 78 List of Acronyms

79

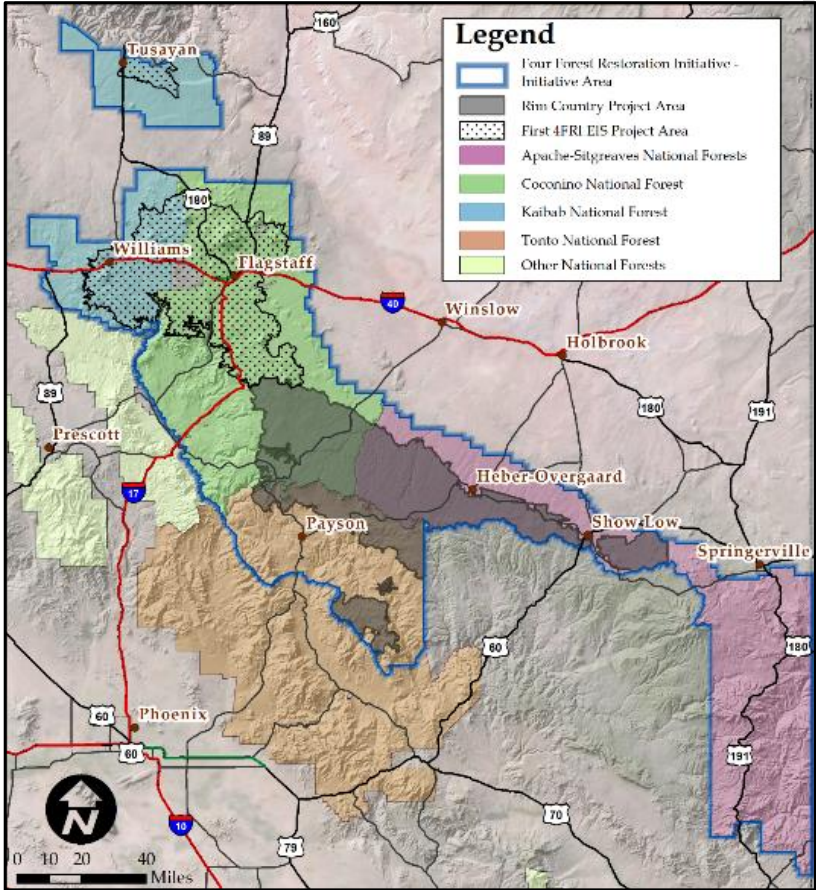
80FRI	Four Forest Restoration Initiative	100r.c.	diameter at root collar
81A 82	Advisory Council on Historic Preservation	110IS	Environmental impact statement
83A 84	Arizona Department of Environmental Quality	11E 11MA	Ecosystem management area
85A 86	Arizona Game and Fish Department	11E 11PA	Environmental Protection Agency
87A 88	Animal Unit Month	11E 11RU	Ecological response unit
89A	Basal area	11E 11EIS	Final environmental impact statement
90A 91	Burned Area Emergency Response	115 116RCC	Fire regime condition class
92A 93	Birds of Conservation Concern	117 117S	Forest Service
94A 95	Bird Conservation Region	118 118SH	Forest Service Handbook
96A 97	Biological evaluation	119 119SM	Forest Service Manual
98A 99	Best management practice	120 120TA	Flexible toolbox approach
100A 101	Hundred cubic feet	121 121EVS	Forest Vegetation Simulator
102A 103	Council on Environmental Quality	122 122EWS	United States Fish and Wildlife Service
104A 105	Collaborative Forest Landscape Restoration	123 123GIS	Geographic information system
106A 107	Collaborative Forest Landscape Restoration Program	124 124UC	Hydrologic unit code
108A 109	Code of Federal Regulations	125 125BA	Important bird area
110A 111	Critical habitat unit	126 126DT	Interdisciplinary team
112A 113	Carbon monoxide	127 127T	Intermediate thin
114A 115	Coarse woody debris	128 128ANL	Los Alamos National Laboratory
116A 117	Diameter at breast height	129 129OPFA	Landscapes outside post-fledging family area
118A 119	Draft environmental impact statement	130 130TIP	Large tree implementation plan
120A 121	Design feature	131 131TRS	Large tree retention strategy
122A 123	Dispersal post-fledging area	132 132MA	Management area
		133 133AUM	Thousand animal unit month
		134 134MIS	Management indicator species

13 M ML	Maintenance level (of a road)	163 H HO	State Historic Preservation Office
13 M MRNG	Management Recommendations	16 S SI	Stand improvement
139	for the Northern Goshawk in the	165 I IO	Scenery integrity objectives
140	Southwestern United States	166 W WCP	Soil and water conservation
14 M MSO	Mexican spotted owl	167	practice
14 N NAQS	National Ambient Air Quality	168 A AP	Travel analysis process
143	Standards	169 C CP	Traditional cultural properties
14 N NEPA	National Environmental Policy Act	170 E ES	Threatened, endangered and
14 N NF	National Forest	171	sensitive
14 N NFMA	National Forest Management Act	172 T MR	Travel Management Rule
14 N NHPA	National Historic Preservation Act	173 P PA	Trees per acre
14 N NMED	New Mexico Environment	174 U EA	Uneven-aged
149	Department	175 U SDA	United States Department of
15 N NRV	Natural Range of Variation	176	Agriculture
15 P PAC	Mexican spotted owl protected	177 U SDI	United States Department of the
152	activity center	178	Interior
15 P FA	Northern goshawk post-fledging	179 V MS	Visual Management System
154	family area	180 V SS	Vegetation structural stages
15 P J	Pinyon-juniper	181 W CATT	Watershed Classification and
15 P M	Particulate matter	182	Assessment Tracking Tool
15 P NVT	Potential natural vegetation type	183 V VEPP	Water Erosion Prediction Project
15 P OS	Recreation opportunity spectrum	184 W FLC	Western Forest Leadership
15 P OW	Right-of-way	185	Coalition
16 R U	Recovery Unit	186 W UI	Wildland-urban interface
16 S DI	Stand density index	187	
16 S HG	(4FRI) Stakeholder Group		

189 **Summary**

190 The Rim Country Project is a project of the Four Forest Restoration Initiative (4FRI). 4FRI is a
191 planning effort designed to restore ponderosa pine forest resilience and function across four
192 national forests in Arizona: the Apache-Sitgreaves, Coconino, Kaibab, and Tonto National
193 Forests (Figure S-1). In 2015, the Record of Decision for the first 4FRI EIS for the northern
194 portion of the Coconino National Forest (NF) and the southern portion of Kaibab NF was signed.

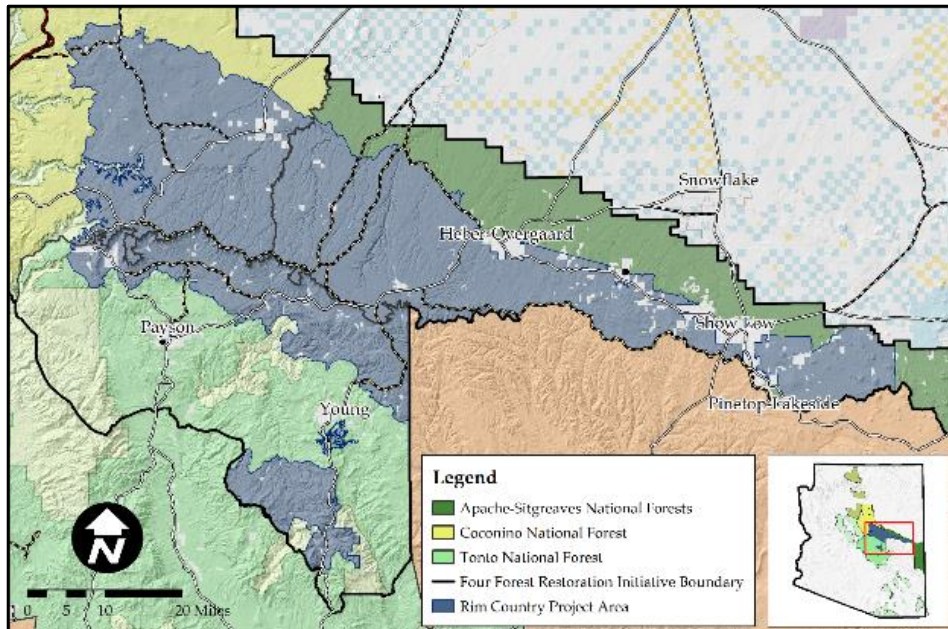
195 Figure S-1. Four Forest Restoration Initiative



196

197 The Rim Country Project continues the ecosystem restoration effort on about 1,240,000 acres on
198 the Black Mesa and Lakeside Districts of the Apache-Sitgreaves NFs, the Mogollon Rim and
199 Red Rock Ranger Districts of the Coconino NF, and the Payson and Pleasant Valley Districts of
200 the Tonto NF (Figure S-2). This analysis is independent of any preceding or subsequent
201 environmental analysis that may occur across northern Arizona.

202 Figure S-2. Rim Country Project Area



203
204 4FRI is a result of many years of planning and collaboration among interested parties, groups
205 and organizations, and federal, state and local government agencies. The focus has been to
206 restore forest landscapes and reduce the potential for severe fire effects in a manner that also
207 benefits the local economy. 4FRI was selected to receive Collaborative Forest Landscape
208 Restoration Act (CFLRA) funding. CFLRA supports landscape restoration on National Forest
209 System lands.

210 The purpose of the 4FRI Rim Country Project is to restore and maintain the structure, pattern,
211 health, function, and vegetation composition and diversity in ponderosa pine ecosystems, thus
212 moving the project area toward the desired conditions in the respective land and resource
213 management plans. One outcome of restored ecosystems is increased resilience. Resilience is the
214 ability of an ecosystem to survive natural disturbances such as fire, insects and disease, without
215 changing its inherent function (FSH 1909.12,05; SER 2004). This project is needed to:

- 216 • Increase forest resilience and sustainability
- 217 • Reduce hazard of undesirable fire effects
- 218 • Improve terrestrial and aquatic species habitat

- 219 • Improve the condition and function of streams, springs and other aquatic and
- 220 hydrological resources
- 221 • Restore riparian vegetation
- 222 • Preserve cultural resources
- 223 • Support sustainable forest products industries

224 To meet the purpose and need for action, the Apache-Sitgreaves, Coconino, and Tonto National
225 Forests are proposing a suite of restoration activities on approximately 953,100 acres over a
226 period of 20 years or when activities can be funded or completed. The area affected by the
227 proposal includes approximately 540,020 acres on the Black Mesa and Lakeside Ranger Districts
228 of the Apache-Sitgreaves NFs, 398,880 acres on the Mogollon Rim and Red Rock Ranger
229 Districts of the Coconino NF, and 299,710 acres on the Payson and Pleasant Valley Ranger
230 Districts of the Tonto NF.

231 The 4FRI Rim Country Project has been published in the Apache-Sitgreaves, Coconino, and
232 Tonto NFs' Schedule of Proposed Actions since January of 2016. The notice of intent to prepare
233 an environmental impact statement was published in the Federal Register on June 27, 2016 (81
234 FR 41517). A scoping document with the proposed action was sent to parties on the project
235 mailing list (paper copies and electronic mail) and posted on the 4FRI website. Letters were
236 mailed to 676 individuals, local governments, state governments, federal and state agencies, and
237 organizations engaged with the three national forests. Public open houses were held on July 14,
238 2016 in Showlow, AZ and on July 21, 2016 in Payson, AZ to discuss the proposed action and
239 accept comments. Fifty (50) scoping responses (e-mails letters and public meeting comment
240 forms) were received from this effort.

241 Issues

242 Seven issues, including treatments in MSO PACs, treatments in goshawk habitat, large tree
243 retention, dwarf mistletoe mitigation, smoke/air quality, economics, and roads, contributed to
244 alternative and design feature/mitigation measure development and focused the analysis. See
245 table S-2 and chapter 1 for information on how these and other public concerns and
246 recommendations were addressed.

247 Alternatives

248 Three alternatives were analyzed in detail and four alternatives were considered but eliminated
249 from detailed study. The alternatives analyzed in detail include the no-action alternative
250 (alternative 1), the modified proposed action (alternative 2), and one additional action alternative
251 (alternative 3). Alternatives 2 and 3 respond to the seven significant issues for the Rim Country
252 Project. See chapter 2 for detailed information on the alternatives considered and analyzed.

253

Comparison of Alternatives by Activity

Table S-1. Comparison of Alternatives by Activity

Proposed Activity	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Alternative
Total mechanical treatment (acres)	Treatments would be through other NEPA decisions	889,340	483,160
Intermediate thinning	Treatments would be through other NEPA decisions	150,780	112,090
Stand improvement	Treatments would be through other NEPA decisions	71,270	37,300
Single tree selection	Treatments would be through other NEPA decisions	12,510	5,630
Uneven-aged group selection	Treatments would be through other NEPA decisions	283,370	156,780
Aspen restoration	Treatments would be through other NEPA decisions	1,230	1,010
Facilitative operations	Treatments would be through other NEPA decisions	123,700	47,880
MSO recovery - replacement nest/roost	Treatments would be through other NEPA decisions	25,290	19,590
MSO PAC - mechanical	Treatments would be through other NEPA decisions	17,460	15,750
Savanna restoration	Treatments would be through other NEPA decisions	18,570	2,470

Proposed Activity	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Alternative
Severe disturbance area treatment	Treatments would be through other NEPA decisions	132,240	31,760
Grassland restoration*	Treatments would be through other NEPA decisions	36,280	36,280
Wet meadow restoration*	Treatments would be through other NEPA decisions	6,400	6,400
Riparian restoration*	Treatments would be through other NEPA decisions	13,060	13,060
Total prescribed fire (acres)	Treatments would be through other NEPA decisions	953,130	529,060
Prescribed fire along with mechanical treatment	Treatments would be through other NEPA decisions	889,340	483,160
Prescribed fire only	Treatments would be through other NEPA decisions	63,790	45,900
Total grassland restoration* (acres)	Treatments would be through other NEPA decisions	36,320	36,320
Mechanical and Prescribed Fire	Treatments would be through other NEPA decisions	36,280	36,280
Prescribed fire only	Treatments would be through other NEPA decisions	40	40
Total wet meadow restoration* (acres)	Treatments would be through other NEPA decisions	6,720	6,720

Proposed Activity	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Alternative
Mechanical and Prescribed Fire	Treatments would be through other NEPA decisions	6,410	6,410
Prescribed fire only	Treatments would be through other NEPA decisions	310	310
Total riparian restoration* (acres)	Treatments would be through other NEPA decisions	14,560	14,560
Mechanical and Prescribed Fire	Treatments would be through other NEPA decisions	13,060	13,060
Prescribed fire only	Treatments would be through other NEPA decisions	1,500	1,500
Springs restored (number)	Treatments would be through other NEPA decisions	184	184
Protective barriers around springs, aspen, native willows and bigtooth maples (miles)	Treatments would be through other NEPA decisions	200	200
Stream restoration (miles)	Treatments would be through other NEPA decisions	777	777
Existing road decommission (miles)	Treatments would be through other NEPA decisions	490	490
Unauthorized route decommission (miles)	Treatments would be through other NEPA decisions	800	800
Temporary road construction and decommission (miles)	Treatments would be through other NEPA decisions	330	170

Proposed Activity	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Alternative
Road relocation and reconstruction (miles)	Treatments would be through other NEPA decisions	As needed	As needed

256 *Overlap exists between the riparian, grassland and wet meadow restoration categories (approximately
 257 3,120 acres).

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258 Design Features, Best Management Practices, and 259 Conservation/Mitigation Measures

260 Project design features, best management practices and conservation/mitigation measures
261 (hereafter referred to collectively as design features) that minimize or avoid effects from the
262 proposed activities are included in the analysis in this DEIS (see appendix C).

263 Implementation Plan

264 A draft implementation plan (appendix D) was developed in conjunction with the design features
265 found in appendix C. The implementation plan gives guidance that will be used by Forest
266 Service personnel to ensure that treatments and activities are implemented to meet the purpose
267 and need and Forest Plan standards and guidelines.

268 Monitoring and Adaptive Management

269 Appendix E includes the monitoring and adaptive management plan. This plan details the
270 framework and process for monitoring restoration activities. The 4FRI Stakeholder Group and
271 the Forest Service collaborated on the design of the monitoring and adaptive management plan.

272 Forest Plan Consistency

273 The Rim Country Project was reviewed for consistency with the direction in the Apache-
274 Sitgreaves Revised Forest Plan (USDA Forest Service 2016), the Coconino Revised Forest Plan
275 (USDA Forest Service 2018), and the current Tonto National Forest Plan, as amended (USDA
276 Forest Service 2017). Consistency evaluations can be found in each specialist report. The design
277 features in appendix C and the implementation plan in appendix D also documents how
278 treatment design meets Apache-Sitgreaves, Coconino, and Tonto NFs Forest Plan direction and
279 desired conditions.

280 **Apache-Sitgreaves NFs:** The revised Forest Plan for the Apache-Sitgreaves NFs became
281 effective in July of 2015, with minor changes in 2016. With design features, alternatives 2 and 3
282 are consistent with Forest Plan desired conditions, objectives, standards, and guidelines, although
283 movement toward desired conditions varies by alternative. Forest Plan consistency evaluations
284 are located in each specialist report, and design features to ensure that activities are consistent
285 with Forest Plans are noted in appendix C.

286 Treatments to address high severity swarf mistletoe infections in some stands include high
287 intensity thinning and creation of considerable interspace in order to slow spread of mistletoe and
288 with a purpose of improving forest health. A guideline in the Apache-Sitgreaves NF Plan states

289 *“On single species dominated sites, thinning should not be attempted where more than 80*
290 *percent of the host species...is infected with dwarf mistletoe. Regeneration and/or deferred may*
291 *be used in these cases.”*

292 According to the 2012 Planning rule (219.7[€](iv) and 219.15(d)(3)

293 *“compliance with both standards and guidelines is mandatory, with standards requiring strict*
294 *adherence to their terms, while guidelines allow for flexibility so long as the purpose for the*
295 *guideline is achieved.”*

296 The approach to severe mistletoe infections in this document attempts modify stand
297 characteristics (i.e. old and large tree retention, basal area, trees per acre, interspace and uneven-
298 aged structure) to within the NRV and is considered a restoration-based treatment with the

299 purpose of improving forest health and resilience. As a result, these treatments are consistent
300 with the Apache-Sitgreaves Forest Plan.

301 **Coconino NF:** The revised Forest Plan for the Coconino NF became effective in June of 2018.
302 With design features, alternatives 2 and 3 are consistent with Forest Plan desired conditions,
303 objectives, standards, and guidelines, although movement toward desired conditions varies by
304 alternative. Forest Plan consistency evaluations are located in each specialist report, and design
305 features to ensure that activities are consistent with Forest Plans are noted in appendix C.

306 **Tonto NF:** The Tonto NF is presently going through the process of revising the Forest Plan. The
307 current plan was developed under the 1982 Planning Rule and went into effect in 1985.
308 Activities proposed in alternatives 2 and 3 are based on the best available scientific information,
309 which includes more than 25 years of advances in forest management science and learning since
310 the current Forest Plan was developed.

311 To align current Forest Plan standards and guidelines with best available scientific information,
312 thereby making alternatives 2 and 3 consistent with the Forest Plan, three project-specific Forest
313 Plan amendments are proposed (see appendix B). Each amendment is a one-time variance in the
314 current Tonto National Forest Plan direction specifically for the Rim Country Project. The
315 amended, direction would not apply to any other projects or areas outside of the Rim Country
316 Project, and it would cease to be in effect upon completion of the project. Analysis of the effects
317 of the proposed amendments is integrated into the analysis of the alternatives presented in
318 Chapter 3.

319 The purpose of amendment 1 is to bring the Forest Plan into alignment with the best available
320 science (Reynolds et al. 2013) that provides desired conditions for restoring fire-adapted
321 ponderosa pine in the Southwest. The purpose of amendment 2 is to bring the Forest Plan into
322 alignment with the revised Mexican Spotted Owl Recovery Plan (USDI Fish and Wildlife
323 Service 2012) and defer monitoring to the Fish and Wildlife Service biological opinion that is
324 specific to this project. The purpose of amendment 3 is to update Forest Plan language to account
325 for advances in mechanized thinning technology and capabilities. Amendment 3 would remove
326 language restricting the use of mechanical equipment to slopes less than 40 percent and
327 identifying slopes above 40 percent as inoperable. Proposed language would allow the use of
328 mechanized ground-based equipment to thin on slopes greater than 40 percent where it is not
329 otherwise restricted and where it would not result in adverse effects on soil and water resources.
330 This would allow for restoration treatments to be implemented on steeper slopes to meet the
331 purpose and need of the Rim Project, and to move toward desired conditions in these areas.

332 With the proposed significant Forest Plan amendments (see appendix B) and the design features
333 in appendix C, alternatives 2 and 3 are consistent with the direction in the 1985 Forest National

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Chapter 1. Purpose of and Need for Action

Document Structure

The Forest Service has prepared this draft environmental impact statement (DEIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This DEIS discloses the direct, indirect, and cumulative environmental effects that would result from implementation of the modified proposed action and other alternatives presented. The document is organized into three volumes.

Volume 1

- *Chapter 1. Purpose of and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for fulfilling that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as an alternative method for achieving the stated purpose. These alternatives were developed and modified based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

Volume 2

- *Chapter 3. Affected Environment and Environmental Consequences:* This chapter describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area.
- *Chapter 4. Preparers and Contributors:* This chapter provides a list of those who prepared and contributed to this environmental impact statement.
- *Chapter 5. Distribution List:* This chapter lists all tribes, agencies, organizations, and persons to whom the draft environmental impact statement (DEIS) was provided.
- *References:* This section provides a list of scientific literature used to inform the analysis.
- *Index:* The index provides page numbers for pertinent topics.

Volume 3

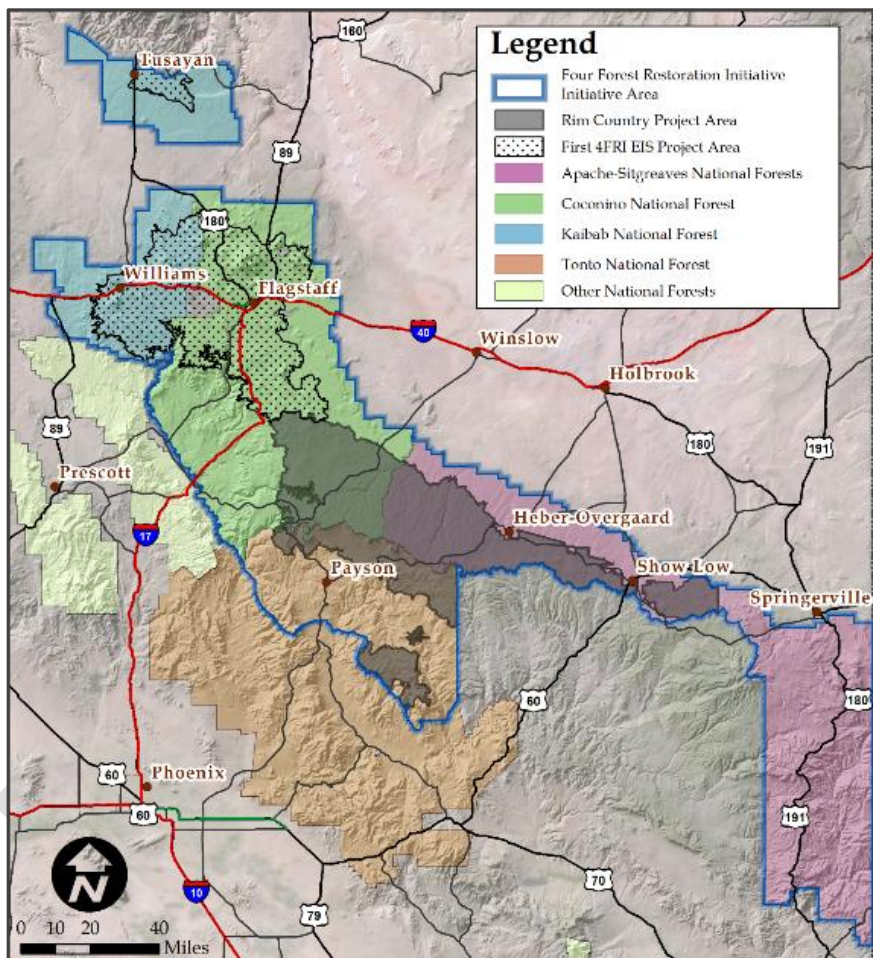
Appendices A through F: the appendices provide more detailed information to support the analysis. Appendices include a placeholder for a map packet in appendix A; proposed Forest Plan amendments in appendix B; project design features, best management practices (BMPs), and conservation/mitigation measures in appendix C; an Implementation Plan in appendix D; a Monitoring and Adaptive Management Plan in appendix E; and a glossary of terms in appendix F.

Additional documentation, including the more detailed analysis for each resource in the resource specialist reports, can be found in the project record located at the Coconino National Forest Supervisor's Office, 1824 South Thompson Street, Flagstaff, Arizona. All of the specialist reports are also available on the 4FRI Rim Country webpage at: www.fs.usda.gov/goto/4FRIRimCountry

996 **Background**

997 The Four Forest Restoration Initiative (4FRI) is a planning effort designed to restore forest
998 resilience and ecosystem function in ponderosa pine forests and associated ecosystems across
999 four national forests in Arizona including the Coconino, Kaibab, Apache-Sitgreaves, and Tonto
1000 National Forests (Figure 3).

1001 Figure 3. Four Forest Restoration Initiative



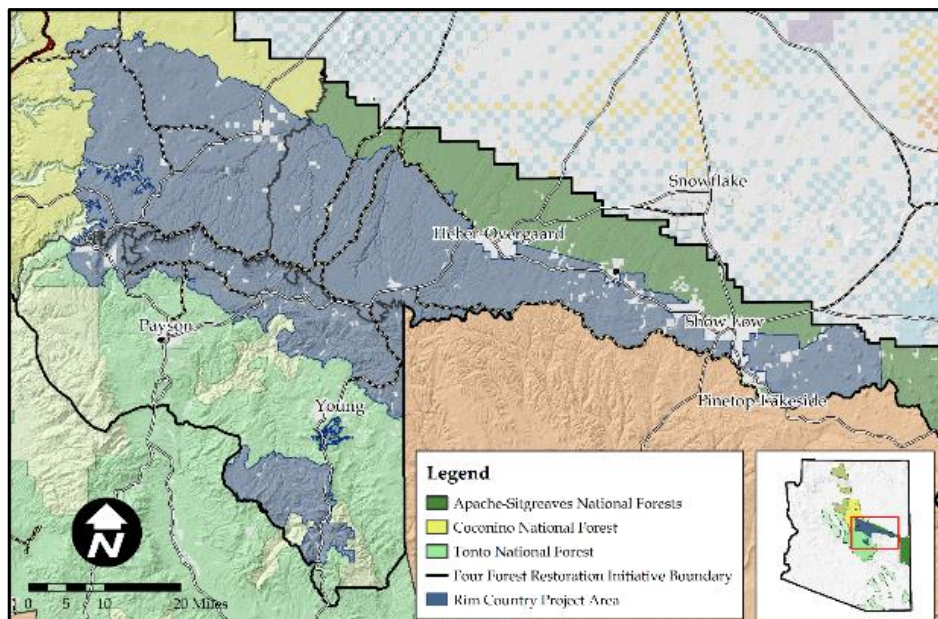
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1004

1005 In February 2008, based on recommendations within the statewide strategy, the Analysis of
1006 Small Diameter Wood Supply in Northern Arizona report (Hampton et al. 2008) was completed.
1007 This process demonstrated a level of “social agreement” on how much, where, and under what
1008 basic parameters mechanical treatment, as one restoration tool, could be used to accelerate
1009 restoration of the 2.4 million-acre initiative area.

1010 To further advance collaborative efforts and secure the necessary assistance, the Forest Service
1011 created a task force to work with the Forest Health Council. The purpose of the task force was to
1012 identify alternative approaches to accelerating forest restoration in northern Arizona. To move
1013 into on-the-ground implementation as quickly as possible, stakeholders consisting of individuals,
1014 state and federal agencies, local governments, the four national forests in northern Arizona, and
1015 the Forest Service’s Southwestern Regional Office moved forward with the Four Forest
1016 Restoration Initiative.

1017 In 2009, Title IV of the Omnibus Public Land Management Act (P.L. 111-11) authorized the
1018 Collaborative Forest Landscape Restoration (CFLR) Program and Fund to support landscape-
1019 scale restoration on National Forest System lands. In 2010, the initiative received funding via the
1020 CFLR Program. The CFLR Program objectives include reducing uncharacteristic wildfire and
1021 the associated management costs, supporting local and collaborative partnerships, supporting
1022 monitoring of restoration efforts, and supporting efforts that utilize forest products that benefit
1023 communities and offset treatment costs. In 2015, the Record of Decision was signed for the first
1024 4FRI EIS for the northern portion of the Coconino NF and the Kaibab NF. The Rim Country
1025 Project continues the ecosystem restoration effort on about 1,240,000 acres (Figure 4) on the
1026 Mogollon Rim and Red Rock Ranger Districts of the Coconino NF, the Black Mesa and
1027 Lakeside Ranger Districts of the Apache-Sitgreaves NFs, and the Payson and Pleasant Valley
1028 Ranger Districts of the Tonto NF. This analysis is independent of any preceding or subsequent
1029 environmental analysis that may occur in the national forests across northern Arizona.

1030 Figure 4. 4FRI Rim Country Project Area



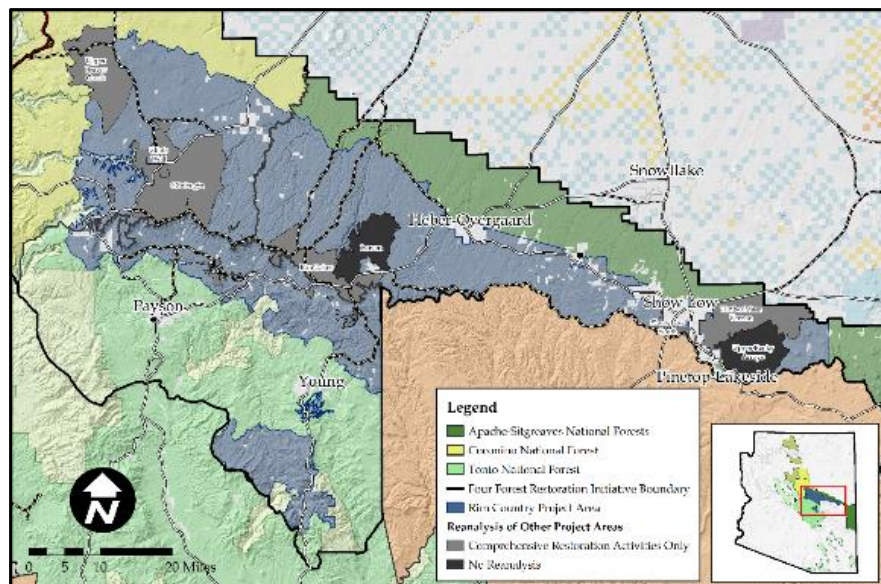
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1032

1033 Approximately 192,000 acres already covered by NEPA decisions will be included in the Rim
 1034 Country analysis in order to incorporate additional restoration activities such as road
 1035 decommissioning, spring and stream channel restoration, and wildlife habitat restoration. And, of
 1036 the total project area, about 98,000 acres (Figure 5) have been excluded from analysis because
 1037 they are not National Forest System lands, or are included in other restoration NEPA projects
 1038 that already have decisions.

- 1039 • Approximately 37,000 acres have been excluded from being incorporated into treatment
 1040 proposals because they are non-Forest Service lands. Past, present, and reasonably
 1041 foreseeable actions on these lands are addressed under cumulative effects in chapter 3.
- 1042 • Approximately 61,000 acres have been excluded because they are already covered by
 1043 NEPA decisions, with treatments designed to meet restoration objectives. These past and
 1044 ongoing projects will be addressed in cumulative effects.

1045 Figure 5. Other Projects within the 4FRI Rim Country Project Area



1046

1047 **Current Management Direction**

1048 The Rim Country Project was reviewed for consistency with the direction in the Apache-
 1049 Sitgreaves Revised Forest Plan (USDA Forest Service 2016), the Coconino Revised Forest Plan
 1050 (USDA Forest Service 2018), and the current Tonto National Forest Plan, as amended (USDA
 1051 Forest Service 2017). Consistency evaluations can be found in each specialist report. Appendix
 1052 B provides details on the Forest Plan amendments for the Tonto National Forest Plan proposed in
 1053 alternatives 2 and 3. The design features in appendix C and the implementation plan in appendix
 1054 D document how treatment design meets Apache-Sitgreaves, Coconino, and Tonto NFs Forest
 1055 Plan direction.

1056 *Wild and Scenic Rivers*

1057 There are no designated wild and scenic rivers in the Rim Country project area. Unless otherwise
 1058 specified, references to wild and scenic rivers in this document refer to either river segments that
 1059 have been evaluated, have been found to be free-flowing, and, in combination with their adjacent
 1060 land area, possess one or more outstandingly remarkable values (“eligible rivers”), or river
 1061 segments that a Federal agency has studied and determined to be suitable for inclusion in the
 1062 National Wild and Scenic Rivers System but have not been statutorily designated by Congress
 1063 (“suitable rivers”). A wild and scenic river corridor is the geographic area generally
 1064 encompassed within one-quarter mile on either side of a river studied for eligibility or suitability
 1065 that contains the river and its outstandingly remarkable values (FSH 1909.12, 80.5).

1066 Previous eligibility studies identified 12 eligible wild and scenic rivers in the project area. Seven
 1067 of these occur on the Coconino or Apache-Sitgreaves NFs or on their shared border (USDA
 1068 Forest Service 2009, 2013). Five eligible wild and scenic rivers occur on the Tonto NF and were
 1069 identified in a 1993 eligibility report covering all the national forests in Arizona (USDA Forest
 1070 Service 1993). As part of its ongoing Forest Plan revision process, the Tonto NF is completing

1071 an updated eligibility report for wild and scenic rivers to replace the existing eligibility report
1072 from 1993 (USDA Forest Service 2018). To ensure compliance with current Tonto National
1073 Forest Plan direction, the Rim Country DEIS includes both the eligible rivers listed in the 1993
1074 report, as well as those listed in the current draft eligibility report for the Tonto (March 22,
1075 2017). Design features have been included in appendix C specifically for the purpose of
1076 adjusting proposed treatments in the future as eligibility and suitability are determined. Any
1077 management activities proposed in eligible wild and scenic river corridors in the Rim Country
1078 project area would have the purposes of restoring natural geomorphic and ecological processes
1079 and protecting or enhancing the specific outstandingly remarkable values (ORVs) of the river
1080 (such as fish and wildlife habitat). In addition, classification of an eligible river must be
1081 maintained as inventoried in an eligibility study unless a suitability study is completed that
1082 recommends management at a less restrictive classification level, such as from wild to scenic, or
1083 scenic to recreational (FSH 1909.12, 84.2).

1084 *Apache-Sitgreaves National Forests*

1085 The revised Forest Plan for the Apache-Sitgreaves NFs became effective in August 2015, with
1086 minor revision in 2016. With design features in appendix C, alternatives 2 and 3 are consistent
1087 with Forest Plan objectives, standards, and guidelines. Although movement toward desired
1088 conditions varies by alternative.

1089 On the Apache-Sitgreaves NF, the Rim Country project area contains the following management
1090 or designated areas:

- 1091 • General Forest (approximately 431,600 acres)
- 1092 • Community-Forest Intermix (28,480 acres)
- 1093 • Wildlife Quiet Area (22,400 acres)
- 1094 • Wild Horse Territory (18,760 acres)
- 1095 • Natural Landscape (13,230 acres)
- 1096 • High Use Developed Recreation Area (7,490 acres)
- 1097 • Energy Corridor (1,510 acres)
- 1098 • 64 miles of the General Crook National Recreation Trail

1099 Table 1 describes the Apache-Sitgreaves NFs management areas located in the Rim Country
1100 project area and Figure 6 displays the general location of those management areas.

1101

1102 *Coconino National Forest*

1103 The revised Forest Plan for the Coconino NF was signed in March 2018. With design features in
1104 appendix C, alternatives 2 and 3 are consistent with Forest Plan objectives, standards, and
1105 guidelines. Although movement toward desired conditions varies by alternative.

1106 On the Coconino NF, the Rim Country project area contains the following management or
1107 designated areas:

- 1108 • Long Valley (approximately 156,020 acres)
- 1109 • Pine Belt (102,230 acres)
- 1110 • East Clear Creek (54,960 acres)
- 1111 • C.C. Cragin Watersheds (46,000 acres)
- 1112 • Anderson Mesa (38,016)

- 1113 • Verde Valley (1,640 acres)
- 1114 • Long Valley Experimental Forest (1,260 acres)
- 1115 • Rocky Gulch Research Natural Area (proposed) (930 acres)
- 1116 • Mogollon Rim Botanical Area (339 acres)
- 1117 • Scenic Resources, 40 miles of the Arizona National Scenic Trail
- 1118 • 37 miles of the General Crook National Recreation Trail

1119 Table 1 describes the Coconino NF management areas located in the Rim Country project area
1120 and Figure 6 displays the general location of those management areas.

1121 *Tonto National Forest*

1122 The Tonto NF is presently going through the process of revising the Forest Plan. The current
1123 plan was developed under the 1982 Planning Rule and went into effect in 1985. Activities
1124 proposed in alternatives 2 and 3 are based on the best available scientific information, which
1125 includes more than 25 years of advances in forest management science and learning since the
1126 current Forest Plan was developed.

1127 To align current Forest Plan standards and guidelines with best available scientific information,
1128 thereby making alternatives 2 and 3 consistent with the Forest Plan, three project-specific Forest
1129 Plan amendments are proposed. Each amendment is a one-time variance in the current Tonto
1130 National Forest Plan direction specifically for the Rim Country Project. The amended direction
1131 would not apply to any other projects or areas outside of the Rim Country Project and it would
1132 cease to be in effect upon completion of the project. Analysis of the effects of the proposed
1133 amendments is integrated into the analysis of the alternatives presented in Chapter 3.

1134 These amendments would be required under the current Tonto National Forest Plan if the Rim
1135 Country Record of Decision is signed prior to the revised Tonto National Forest Plan going into
1136 effect (anticipated in 2020). If this is the case, the Record of Decision will include two separate
1137 decisions: a decision on which alternative to implement and a decision on which, if any, Forest
1138 Plan amendments to approve. However, if the revised Tonto National Forest Plan goes into effect
1139 before the Rim Country Record of Decision is signed, one or more of the three proposed project-
1140 specific amendments may not be necessary depending on the content of the revised plan.

1141 The purpose of amendment 1 is to bring the Forest Plan into alignment with the best available
1142 science (Reynolds et al. 2013) that provides desired conditions for restoring fire-adapted
1143 ponderosa pine in the Southwest. The purpose of amendment 2 is to bring the Forest Plan into
1144 alignment with the revised Mexican Spotted Owl Recovery Plan (USDI Fish and Wildlife
1145 Service 2012) and defer monitoring to the Fish and Wildlife Service biological opinion that is
1146 specific to this project. The purpose of amendment 3 is to update Forest Plan language to account
1147 for advances in mechanized thinning technology and capabilities. Amendment 3 would remove
1148 language restricting the use of mechanical equipment to slopes less than 40 percent and
1149 identifying slopes above 40 percent as inoperable. Proposed language would allow the use of
1150 mechanized ground-based equipment to thin on slopes greater than 40 percent where it is not
1151 otherwise restricted and where it would not result in adverse effects on soil and water resources.
1152 This would allow for restoration treatments to be implemented on steeper slopes to meet the
1153 purpose and need of the Rim Project, and to move toward desired conditions in these areas.

1154 Although the current Tonto National Forest Plan was developed under a planning rule enacted in
1155 1982, the 2012 Planning Rule (36 CFR 219) requires the Forest Service to use an updated Forest
1156 Plan amendment process for amending plans created under a prior rule (36 CFR 219.17). Section
1157 219.15 (c) (4) of the 2012 Planning Rule provides the language authorizing the proposed project-

1158 specific amendments to the Tonto National Forest Plan. These amendments, along with the Rim
1159 Country Project, are subject to the predecisional administrative review (objection) process
1160 pursuant to 36 CFR 218.

1161 The project-specific amendments included in this project may affect substantive requirements of
1162 the 2012 planning rule at 36 CFR 219.9, which requires Forest Plans to provide for maintaining
1163 the diversity of plant and animal communities and the persistence of native species in the plan
1164 area. Since this project includes two project-specific amendments to modify current Forest Plan
1165 direction related to the management of Mexican spotted owl and northern goshawk habitats, it is
1166 possible that the plan's inherent capability to meet these attributes would be affected.

1167 The significance of each proposed amendment was evaluated in accordance with Forest Service
1168 Manual (FSM) 1926.51 and FSM 1926.52. Proposed amendments would neither significantly
1169 alter the long-term relationship between levels of multiple-use goods and services originally
1170 projected, nor have an important effect on the entire land management plan or affect land and
1171 resources throughout a large portion of the planning area during the planning period. The
1172 proposed project-specific amendments would result in minor changes in standards and guidelines
1173 that would apply only to activities carried out as part of the Rim Country Project.

1174 With the proposed Forest Plan amendments (see appendix B) and design features in appendix C,
1175 alternatives 2 and 3 are consistent with the direction in the 1985 Tonto National Forest Plan as
1176 amended.

1177 On the Tonto NF, the Rim Country project area contains the following management or
1178 designated areas:

- 1179 • 4D: Mogollon Rim Area (approximately 133,010)
- 1180 • 5D: Mogollon Rim-Sierra Ancha Area (121,580 acres)
- 1181 • 5G:General Management Area (29,480 acres)
- 1182 • 4F:General Management Area (15,570 acres)
- 1183 • MSO PACs (29,110 acres)

1184 Table 1 describes the Tonto NF management areas located in the Rim Country project area and
1185 Figure 6 displays the general location of those management areas.

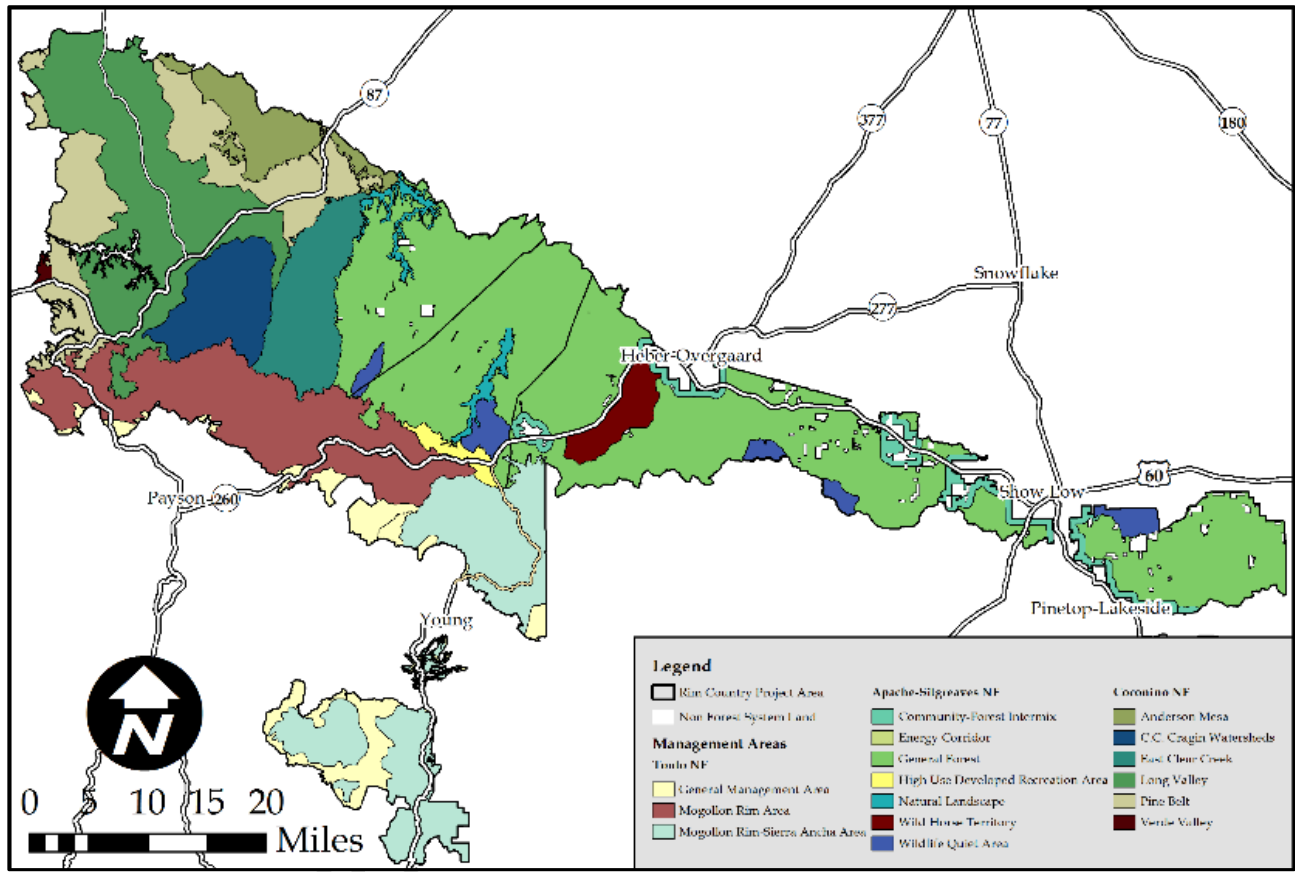
Table 1. Forest Plan Management Areas in the Rim Country Project Area

Forest Management/ Designated Area	Description	Forest Plan Emphasis	Acres in Rim Country
Apache-Sitgreaves National Forests			
Community-Forest Intermix	Lands within ½ mile of communities at risk	Complete initial treatments to reduce fire hazard, maintain with prescribed fire and mechanical treatments	28,480
Energy Corridor	Three existing high-voltage energy corridors	Managed to provide a reliable supply of energy	1,510
General Forest	Majority of the Apache-Sitgreaves NFs, capable of providing a variety of forest products	Restore priority 6 th level HUC watersheds, restore fire-adapted ecosystems, reduce the threat of uncharacteristic wildfire, and provide forest products	431,600
High Use Developed Recreation Area	Places with relatively high levels of visitor use	Recreation site plans to provide a wide variety of opportunities to a broad spectrum of visitors	7,490
Natural Landscape	Undeveloped areas that are natural appearing and provide primitive and semiprimitive recreation opportunities	Retain natural appearing character	13,230
Wild Horse Territory	The Heber Wild Horse Territory established in 1973	Manage the territory in accordance with the Wild Horse and Burro Act	18,760
Wildlife Quiet Area	Relatively undisturbed habitat where big game and other wildlife aren't disturbed by motorized vehicle use	Manage for nonmotorized access, improve wildlife habitat, and maintain existing wildlife developments	22,400
General Crook National Recreation Trail	Non-motorized scenic trail	Preserve historic route, features, and associated values	64 miles
Coconino National Forest			
Anderson Mesa	Grasslands, pinyon juniper, and wetlands on Anderson Mesa	Wildlife-viewing and hunting, supports sustainable population of pronghorn, functioning wetlands	38,020
C.C. Cragin Watersheds	Watersheds for C.C. Cragin Reservoir along the Mogollon Rim	Coordinate with partners to proactively improve the health and resilience of the watersheds, reduce the threat of uncharacteristic wildfires, flooding, and sedimentation, and maintain water quality and quantity	46,000
Long Valley	Ponderosa pine, grassland, riparian, pinyon juniper, mixed conifer, and wetlands in the Long Valley area	Functioning wetlands, low-disturbance wildlife habitat, a mix of dispersed and developed recreation opportunities	156,020
Pine Belt	Dominant ponderosa pine vegetation belt	Functioning wetlands, backcountry recreation, wildlife viewing and hunting	102,230

Forest Management/ Designated Area	Description	Forest Plan Emphasis	Acres in Rim Country
East Clear Creek	Remote area of East Clear Creek and its tributaries along the Mogollon Rim	Low disturbance wildlife habitat, primitive and semiprimitive recreational opportunities	54,960
Verde Valley	The Verde Valley north and west of the Verde River	Reduced risk of uncharacteristic flooding and sedimentation, recreational opportunities, interconnected trail system	1,640
Mogollon Rim Botanical Area	Preserves unique white fir/bigtooth maple community	Interpretation and monitoring	340
Long Valley Experimental Forest		Managed by the Rocky Mountain Research Station	1,260
Rocky Gulch Research Natural Area (proposed)	Area of old-growth ponderosa pine used as a control for research in the Beaver Creek watershed	Prepare establishment report	930
Arizona National Scenic Trail	Non-motorized scenic trail	Minimize visual impacts, keep well maintained, signed, and passable	40 miles
General Crook National Recreation Trail	Non-motorized scenic trail	Preserve historic route, features, and associated values	37 miles
Tonto National Forest			
MSO PACs	Mexican spotted owl protected activity centers	Survey all potential habitat, establish PACs,	29,110
4D: Mogollon Rim Area	Ponderosa pine forest below the Mogollon Rim, Payson Ranger District	Intensive sustained yield timber management, timber resource protection, wildlife habitat diversity, recreation opportunity	133,010
4F: General Management Area	General management area on the Payson Ranger District	Wildlife habitat improvement, livestock forage production, dispersed recreation	15,570
5D: Mogollon Rim-Sierra Anchas Area	Ponderosa pine forest below the Mogollon Rim and in the Sierra Anchas Mountains, Pleasant Valley Ranger District	Intensive sustained yield timber management, timber resource protection, wildlife habitat diversity, recreation opportunity	121,580
5G: General Management Area	General management area on the Pleasant Valley Ranger District	Wildlife habitat improvement, livestock forage production, dispersed recreation	29,480

187

Figure 6. Forest Plan Management or Designated Areas in the Rim Country Project Area



1190 **Existing and Desired Conditions**

1191 The following description of existing and desired conditions is a summary of those
 1192 conditions. Full descriptions of existing conditions in the Rim Country project area can
 1193 be found in chapter 3 of this DEIS by resource area as well as the Rim Country specialist
 1194 reports. Desired conditions for the Rim Country project area are incorporated by
 1195 reference from the current Apache-Sitgreaves, Coconino, and Tonto National Forest
 1196 Plans. Desired conditions pertinent to each resource area are described in each resource
 1197 specialist report. Movement toward the desired conditions is analyzed in both individual
 1198 specialist reports and this DEIS.

1199 *Existing Conditions*

1200 The forested landscapes in the Rim Country project area are highly departed from desired
 1201 conditions, lacking desired species composition, spatial arrangement, and structure.
 1202 Stands across the majority of the area where thinning treatments are proposed exhibit
 1203 extremely high densities as measured by basal area (BA), trees per acre (TPA), stand
 1204 density index (SDI). Some of these areas are at high risk for disturbance from
 1205 uncharacteristic fire behavior, insects and disease, density-related mortality, and climate
 1206 change.

1207 Table 2 shows the cover types that occur on National Forest System land within the Rim
 1208 Country project area and Table 1-3 compares the existing conditions to the desired
 1209 conditions for areas proposed for mechanical thinning.

1210 Table 2. Acres of Cover Type on FS-managed Land within the Project Area

Cover Type	Total Acres
Aspen	1,465
Grassland/Meadow*	20,378
Madrean Encinal Woodland	1,689
Madrean Pinyon-Oak	23,307
Mixed Conifer with Aspen*	19,855
Mixed Conifer/Frequent Fire*	59,860
Pinyon-Juniper Woodland	143,486
Ponderosa Pine*	764,689
Ponderosa Pine/Evergreen Oak*	149,446
Riparian	14,558
Other - Dam/Pit/Road/Water	2,994

1211 *Target cover type: frequent-fire type targeted for restoration treatments.

1212 Table 3. Desired Conditions (DC) Compared to Existing Conditions (EC) in Areas Proposed for Mechanical
 1213 Thinning*

	Desired Condition	Existing Condition
Structure - Pattern	The majority of stands are in an open condition. Forest arrangement is in individual trees, small clumps, and groups of trees or randomly spaced trees interspersed within variably sized openings of grasses, forbs, and shrubs that are similar to historic patterns. Most forest stands in uneven-aged condition to meet forest resilience and sustainability goals while maintaining wildlife habitat. The majority of stands are in an open condition.	The majority of stands are in a closed condition and lacking groups and clumps of trees or randomly spaced trees. Grasses, forbs and shrubs are underrepresented compared to historic patterns. This is departed from historic conditions consisting of a matrix of groups, clumps and individual randomly spaced trees with interspaces,
Structure - Trees per acre	Trees are distributed across size classes with total number of trees per acre between 10 and 250. Below is an idealized tree distribution across size classes totalling 73 trees per acre and carrying 90 ft ² of basal area 	Total trees per acre is higher than the desired condition and are overrepresented in the smaller diameter classes and underrepresented in the larger classes 
Basal Area	Generally less than 90 square feet per acre to meet forest resilience goals, while maintaining wildlife habitat desired conditions. For MSO protected and nest/roost replacement habitat 110 to 120 square feet per acre is the minimum.	The current average basal area within the project area is 129 square feet per acre. High densities in terms of basal area make trees more susceptible to mortality from insects, disease, and competition and increase crown fire risk.
Stand Density Index	Maintain forest density between 25% and 45% of SDI _{max} to maintain forest health and tree growth. For ponderosa pine this is between 112.5 and 202.5. For MSO protected and Nest/Roost replacement habitat, desired forest density is between 45% and 60% of SDI _{max} or between 202.5 and 270.	Currently the average stand density index across the project area is 66% of MaxSDI. 21 percent of stands meet the desired condition for SDI. High densities in terms of stand density index make trees more susceptible to mortality from insects, disease, and competition and increase crown fire risk.
Forest Insects	Stands in the project area are in the Low or Moderate hazard for bark beetles	Currently 74% of acreage have a high bark beetle hazard rating. The remaining 26% of stands meet the desired condition for insect hazard.
Forest Disease	Stands in the project area have Low to Moderate dwarf mistletoe infection severity (less than 20% of trees infected)	Currently 75% of acreage has a low dwarf mistletoe infection rating, 22 percent of acres have a moderate rating and 4 percent have a severe infection rating. 5% of the project area meets the desired condition for mistletoe infection severity

1214

1215 *These existing and desired conditions apply to the 953,130 acres analyzed for mechanical
 1216 thinning and prescribed fire treatments

1217 Across the project area, fire regimes constitute a spatial and temporal mosaic of
 1218 landscape patterns. There is a need to reintroduce or maintain fire in ponderosa pine,
 1219 aspen, mixed conifer, and grasslands in the project area. Currently, across much of the
 1220 project area, fuel loading in the immediate vicinity of many large and/or old trees is such
 1221 that mortality would be high in the event of a wildfire burning under undesirable
 1222 conditions. With a delay of 10 to 20 years between fires or mechanical treatments, areas
 1223 currently showing potential for passive crown fire are likely to transition to active crown
 1224 fire, depending on geographic location and site conditions. Table 4 shows the existing
 1225 crownfire potential in ponderosa pine cover types. When all ponderosa pine systems are
 1226 combined, modeled fire behavior shows potential for crown fire in 65 percent of the
 1227 ponderosa pine; 13 percent of which would be active crown fire.

1228 Table 4. Existing Crownfire Potential in Ponderosa Pine Cover Types

Cover Type	Acres	No Fire	Crown Fire	
			Passive	Active
Ponderosa Pine	316,660	0%	52%	11%
Pine/Evergreen Oak	146,340	1%	51%	22%
Pine/Gambel Oak	170,710	1%	54%	9%
All Ponderosa Pine	633,710	2%	52%	13%

1229 Currently, modeling results show that, under conditions similar to those of the
 1230 Rodeo/Chediski Fire, there is potential for about 79 percent of the dry mixed conifer in
 1231 the Rim Country project area to burn with crown fire, of which 33 percent would be
 1232 active crown fire, as shown in Table 5.

1233 Table 5. Existing Crownfire Potential in Dry Mixed Conifer Cover Type

Cover Type	Acres	No fire	Crown Fire	
			Passive	Active
Dry Mixed Conifer	62,940	1%	46%	33%

1234 The exclusion of fire has resulted in high canopy cover and high tree density which limits
 1235 the amount of sunlight and precipitation reaching the ground. Consequently, understory
 1236 vegetation is less diverse, sparse, and it provides poorer quality food and cover for
 1237 wildlife than under more open canopies.

1238 The ponderosa pine and mixed conifer cover types support a wide range of wildlife
 1239 species, including nesting MSO. The Rim Country project area includes about 68,630
 1240 acres of MSO PACs and over 128,800 acres of recovery habitat. Protected activity
 1241 centers currently contain high fuel loadings due to management actions for the last few
 1242 decades. There are also about 500,940 acres of goshawk post-fledging areas and foraging
 1243 habitat. The increased tree densities, closed canopies, and loss of habitat heterogeneity
 1244 have led to the loss of habitat for a wide range of species, including ground and shrub-
 1245 nesting passerines and small mammals and birds that depend upon the herbaceous

1246 understory for food and/or cover. Current stand conditions exhibit declining to stagnant
1247 tree growth in areas where late-successional habitat is desired.

1248 Aspen are dying or rapidly declining in the Rim Country project area due to the
1249 combined effects of conifer encroachment, browsing, grazing, insects, disease, severe
1250 weather events, and lack of fire disturbance.

1251 There are approximately 132,240 acres (severe disturbance areas) where high severity
1252 effects from fires, such as the Dude and Rodeo-Chediski fires, insect and disease
1253 outbreaks, or harvesting operations have resulted in reduced forest cover and a departure
1254 from desired conditions.

1255 Dwarf mistletoe is a natural component of the forest but also an historical disease-causing
1256 agent in the Rim Country cover types. Mistletoe can create or increase forest openings at
1257 endemic levels, improving wildlife habitat by creating unique canopy structure and snags
1258 with longevity and conditions that stimulate understory growth. At epidemic levels,
1259 mistletoe can prevent stands from attaining mature and old-growth conditions, preventing
1260 trees from attaining nest and roost structure for species like the MSO and northern
1261 goshawk. Infections of high severity can increase tree stress, the likelihood of bark beetle
1262 infestations during periods of drought, and tree death.

1263 While the overall incidence (distribution and percent of landscape affected) of dwarf
1264 mistletoe is thought to have increased only modestly compared to historic conditions, the
1265 overall abundance of mistletoe is thought to have increased considerably (Conklin and
1266 Fairweather 2010). Stands covering approximately 22 percent of the Rim Country project
1267 area exhibit infections at moderate severity levels (20 percent to 80 percent of susceptible
1268 trees infected) while stands making up four percent of the area have high severity
1269 infection ratings (more than 80 percent of susceptible trees infected).

1270 Grasslands, savannas, and meadows provide valuable habitat for many wildlife species
1271 including pronghorn antelope (a focal species), raptors such as western burrowing owls,
1272 Swainson's hawks, and ferruginous hawks (sensitive species/migratory birds), an
1273 abundance of small mammals including Navajo Mogollon voles (sensitive species), and a
1274 range of important prey species for both MSOs and northern goshawks. Savannas and
1275 meadows are also used by game species such as elk and black bears. In the meadows and
1276 grasslands of the Rim Country project area, junipers and other conifers have encroached
1277 into these once open grassland habitats, decreasing the size and function of landscapes
1278 that were historically grasslands. As tree canopy increases, understory productivity
1279 decreases. The grasslands have impaired soil conditions due to inadequate protective
1280 ground cover, compacted soil surfaces, and encroaching pines and junipers. In many
1281 meadows, vegetative ground cover is low, hydrologic soil function is reduced from
1282 compaction, groundwater levels have dropped below root zones due to gully formation,
1283 and encroaching upland tree species are competing with desired species.

1284 The Coconino National Forest established its Travel Management Rule (TMR) motor
1285 vehicle use designations in 2011; the Tonto National Forest will be publishing its draft
1286 Record of Decision for TMR designations this year; and the Apache-Sitgreaves National
1287 Forests are currently working on their proposed action for TMR designations.

1288 Most watersheds in the Rim Country project area have been assigned a fair or poor rating
1289 for road and trail density, location, distribution, and maintenance. Roads in close
1290 proximity to streams have the greatest effects on water quality. High road density
1291 increases effective drainage density, which can increase the size of damaging peak flows.

1292 There are approximately 411 known springs in the Rim Country project area. A limited
 1293 number have been assessed, but these assessments indicate that springs in the project area
 1294 have been adversely affected by human activities such as flow regulation through
 1295 installation of spring boxes and piping of discharge to off-site locations, recreation, and
 1296 urbanization and other construction activities, as well as grazing by wild and domestic
 1297 herbivores. Approximately 184 springs in the Rim Country project area exhibit declining
 1298 or degraded conditions where restoration treatments may be applied.

1299 Many riparian streams in the Rim Country project area, particularly within the Rodeo-
 1300 Chediski Fire area, are currently non-functioning¹ or functioning-at-risk², with
 1301 accelerated erosion and increased peak flows. Table 6 shows the condition classes of
 1302 riparian areas by national forest within the project area.

1303 Table 6. Condition Classes of Riparian Areas in the Project Area by National Forest

Forest	Total (miles*)	Properly Functioning (miles*)	Functioning- at- Risk (miles*)	Non- Functioning (miles*)
Apache-Sitgreaves	240	60	113	67
Coconino	196	120	53	23
Tonto	440	77	309	54
Totals	876	257	475	144

1304 *Miles are approximate

1305 Within the Rim Country project area there are approximately 360 miles of streams that
 1306 are occupied by, or are suitable for, aquatic species such as fish, garter snakes, mollusks,
 1307 and invertebrates. These streams and associated 6th Hydrologic Unit Code (HUC)
 1308 watersheds provide habitat for nine federally listed fish and garter snake species and 16
 1309 Forest Service Southwestern Region sensitive species, two of which are also federally
 1310 listed (see Table 7). Fourteen Forest Service Southwestern Region sensitive species,
 1311 including 12 invertebrates and 2 mollusks, are not shown in the table but were included in
 1312 the analysis presented in chapter 3 and the aquatics specialist report.

³ <http://www.nepa.gov/nepa/regs/ceq/1502.htm#1502.14>

³ <http://www.nepa.gov/nepa/regs/ceq/1502.htm#1502.14>

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1313 Table 7. Status and Habitat for Federally Listed and FS Sensitive Fish and Garter snake Species

Species	Status	Occupied/Suitable Habitat (approximate miles/acres)
Gila trout (<i>Oncorhynchus gilae gilae</i>)	Threatened	32.1 miles
Little Colorado spinedace (<i>Lepidomeda vittata</i>)	Threatened with Critical Habitat	186.9 miles
Gila chub (<i>Gila intermedia</i>)**	Endangered with Critical Habitat	21,600 acres
Gila topminnow (<i>Poeciliopsis occidentalis occidentalis</i>)**	Endangered	21,600 acres
Razorback sucker (<i>Xyrauchen texanus</i>)**	Endangered with Critical Habitat	12,300 acres
Loach minnow (<i>Tiaroga cobitis</i>)**	Endangered with Critical Habitat	12,300 acres
Spikedace (<i>Meda fulgida</i>)**	Endangered with Critical Habitat	12,300 acres
Narrow-headed gartersnake (<i>Thamnophis rufipunctatus</i>)*	Threatened with proposed Critical Habitat	3,880 acres
Northern Mexican gartersnake (<i>Thamnophis eques megalops</i>)*	Threatened with proposed Critical Habitat	1,470 acres
Desert sucker (<i>Catostomus clarki</i>)	FS Sensitive	106.1 miles
Sonoran sucker (<i>Catostomus insignis</i>)	FS Sensitive	13.1 miles
Little Colorado sucker (<i>Catostomus sp. 3</i>)	FS Sensitive	147.1 miles
Headwater chub (<i>Gila nigra</i>)	FS Sensitive	47.8 miles
Roundtail chub (<i>Gila robusta</i>)	FS Sensitive	34.4 miles

1314 * USFWS considered all proposed critical habitat as occupied for these species in the Federal
 1315 Register proposed ruling. These are also Forest Service Southwestern Region sensitive species.

1316 ** Species not known to occur within the project area, but known to occur in adjacent/nearby
 1317 parts of 6th HUC watersheds that intersect the project area. Acres displayed represent the areas
 1318 of those subwatersheds within the project area.

1319 There are 23 known species of rare plants in the Rim Country project area, including
 1320 Forest Service Southwestern Region sensitive species and Forest Planning or analysis
 1321 species. Bebb's willows and bigtooth maples, tree species that provide habitat for

1322 songbirds and small mammals, as well as soil and stream bank stability, are declining in
1323 health, vigor, and number in the project area.

1324 *Desired Conditions*

1325 The proposed treatments in the Rim Country Project would restore or move the project
1326 area toward desired conditions as described in the Apache-Sitgreaves, Coconino, and
1327 Tonto National Forest Plans, and help to establish resilient and functioning ecosystems.
1328 The proposed mechanical treatments (thinning) are specifically designed to establish
1329 interspaces reflecting pre-fire suppression-spatial patterns and uneven-aged stand
1330 structure, mitigate adverse effects of dwarf mistletoe, and improve stand structure and
1331 health. Table 1-3 displays the desired conditions related to stand structure, pattern,
1332 density, and health. Desired conditions are for no more than 15 percent of the ponderosa
1333 pine (under conditions modeled) in the treatment area to be prone to crown fire or high-
1334 severity fire, with areas of potential high severity spatially distributed. For the dry mixed
1335 conifer cover type, Forest Plan direction is to allow fire to play its natural role, with high
1336 frequency (averaging about 12 years) and mostly low severity (less than 20 percent high
1337 severity under modeled conditions). Implementing fire and mechanical treatments would
1338 decrease surface and canopy fuel loading, as well as ladder fuels in the immediate
1339 vicinity of old trees. This would decrease potential fire-caused mortality in large and/or
1340 old trees. Use of prescribed burning, particularly when combined with mechanical
1341 thinning, would reduce the potential for damage from wildfires, the costs associated with
1342 fire suppression and safety concerns for fire managers.

1343 Desired conditions for MSO and northern goshawk habitat include large tree size-classes
1344 and higher tree densities for nest areas, activity centers, surrounding nest core areas, and
1345 habitat for general foraging and movements. There is a need to restore resilient late-
1346 successional forest and increase habitat diversity, particularly within MSO PACs.
1347 Improving stands of larger/older trees would improve nesting habitat. Moving towards a
1348 forest structure with all age and size classes represented would improve MSO recovery
1349 habitat and overall habitat for northern goshawks. Creating rooting zones and returning
1350 low-severity fire would maintain a mosaic of grass, forbs, and shrubs, benefiting key prey
1351 species for both owls and goshawks.

1352 While many of the understocked forest areas may not be suitable for planting, actions are
1353 needed to move them toward their desired forested conditions. Planting, burning, and
1354 other management actions will be considered to encourage reforestation.

1355 Dwarf mistletoe is a natural component of the forest but also an historical disease-causing
1356 agent in the Rim Country cover types. Mitigations for dwarf mistletoe should be
1357 considered where more than 20 percent of the ponderosa pine trees or an aggregate of
1358 mixed conifer host species are infected (Conklin and Fairweather 2010).

1359 Grasslands were designated a priority habitat in the Arizona Partners In Flight Bird
1360 Conservation Plan, with the objective to permanently protect, enhance, and/or restore
1361 over 500,000 acres of grassland in northern Arizona. Grasslands and meadows should
1362 have satisfactory soil conditions, with vegetative cover adequate to prevent erosion above
1363 tolerance conditions, uncompacted soil surfaces that allow for satisfactory hydrologic
1364 function and desirable vegetation, and little to no tree encroachment.

1365 As Travel Management Rule (TMR) plans are completed and implemented for each
1366 forest, unneeded and poorly located roads may be improved, removed, or relocated to
1367 reduce effects on water quality and natural resources. The Forest Service will reclaim any

1368 previously disturbed areas used as temporary access roads on National Forest System
1369 lands once activities specified in the decision for the 4FRI Rim Country Project are
1370 completed.

1371 Springs exhibiting degraded or declining condition and function need to be improved to
1372 sustain these important ecological features. Spring restoration would include reducing
1373 tree encroachment and noxious weeds, returning fire to the system (through prescribed
1374 fire), placing protective barriers, restoring flow to historic areas of influence, restoring or
1375 repairing damaged infrastructure, and removing dilapidated or non-functioning
1376 infrastructure where appropriate.

1377 Desired conditions for riparian zones along streams are that they are capable of filtering
1378 sediment, capturing and/or transporting bedload (aiding floodplain development,
1379 improving flood-water retention, improving or maintaining water quality), and providing
1380 ground water recharge within their natural potential. Their necessary physical and
1381 biological components provide habitat for a diverse community of plant and wildlife
1382 species including cover, forage, available water, microclimate, and
1383 nesting/breeding/transport habitat. Stream habitats and aquatic species depend upon
1384 perennial streams or reaches and their habitat is maintained by the watershed, soil, and
1385 riparian conditions within the ecosystem.

1386 All proposed riparian treatments will also improve or maintain stream habitat by restoring
1387 watershed function or resilience. Upland treatments in watersheds may also improve
1388 water infiltration rates and increase subsurface flows higher in the stream system that
1389 provide cool perennial water to streams which helps to maintain stream temperatures.

1390 Desired conditions for streams and aquatic habitats are to support native fish and other
1391 aquatic species, providing the quantity and quality of aquatic habitat within the natural
1392 range of variation. This includes increasing habitat complexity such as pools and large
1393 woody debris, reducing downcutting and sedimentation, improving riparian areas that
1394 provide channel stability and leaf litter, and stream shading to maintain water
1395 temperatures.

1396 The habitat for rare plant species will remain suitable and capable to support them. Some
1397 habitat may improve as a result of management actions, especially in spring and channel
1398 restoration areas and in areas where litter and tree canopy are high. Any negative effects
1399 on these species from management actions will be mitigated and plant numbers will
1400 remain the same or increase. To stimulate growth, recruit younger age classes, and
1401 increase individual recruitment of aspen, protective barriers would be placed around sites
1402 to prevent browsing and other disturbance during regeneration. Protective barriers would
1403 also be placed around pockets of Bebb's willow and bigtooth maple to reduce browsing
1404 and other disturbances, recruit younger age classes, increase populations, and retain this
1405 diverse habitat until they are sustainable.

1406 Purpose of and Need for Action

1407 The purpose and need for the Rim Country Project was determined by comparing the
1408 existing conditions in the project area to the desired conditions in the Forest Plans related
1409 to forest and ecosystem function and resilience. In addition, relevant research, the best
1410 available science and information, and the landscape restoration criteria found in the
1411 Omnibus Public Land Management Act of 2009 (P.L. 111-11, Title IV Forest Landscape
1412 Restoration) were used to develop the purpose and need. Among other things, these
1413 criteria require that landscape-scale restoration strategies maintain or contribute to the

1414 restoration of the structure and composition of old growth stands, maximize the retention
1415 of large trees to the extent that they promote fire-resilient stands, focus on small-diameter
1416 tree thinning, do not require the establishment of permanent roads, and commit to
1417 decommission all temporary roads built for treatment purposes.

1418 The purpose of the 4FRI Rim Country Project is to restore and maintain the structure,
1419 pattern, health, function, and vegetation composition and diversity in ponderosa pine
1420 ecosystems to conditions within the natural range of variation, thus moving the project
1421 area toward the desired conditions in the Forest Plans. One outcome of restored
1422 ecosystems is increased resilience. Resilience is the ability of an ecosystem to survive
1423 natural disturbances such as fire, insects and disease, and climate change without
1424 changing its inherent function (FSH 1909.12, 05; SER 2004). This project is needed to:

- 1425 • Increase forest and grassland resilience and sustainability
- 1426 • Reduce hazards associated with undesirable fire effects
- 1427 • Improve terrestrial and aquatic species habitat
- 1428 • Improve the condition and function of streams and springs
- 1429 • Restore woody riparian vegetation
- 1430 • Preserve cultural resources
- 1431 • Support sustainable forest products industries
- 1432 • Improve the motorized transportation system and provide for a more sustainable
1433 road system where poorly located roads are relocated or obliterated.

1434 **Forest Resilience and Sustainability.** There is a need to restore the frequent low-
1435 severity fire regimes in which the forest in the Rim Country project area evolved.
1436 Resilience increases the ability of the ponderosa pine and mixed conifer-frequent fire
1437 forest types (target cover types) to survive natural disturbances and stressors such as fire,
1438 insect and disease outbreaks, and climate change (FSM 2020.5).

1439 There is a need to move tree group pattern, interspaces, and stand density toward the
1440 natural range of variation. There is a need to manage forest density, structure, and
1441 composition to increase forest health and reduce adverse effects from bark beetles and
1442 dwarf mistletoe, while also providing a diversity of habitat types and features. In the oak
1443 woodland and shrubland cover types, there is a need to stimulate new growth, maintain
1444 vigor in large-diameter trees, encourage faster growth in young smaller oaks, and provide
1445 for a variety of shapes and sizes of trees across the forest cover types.

1446 Where aspen is found in the frequent fire forest cover types, there is a need to stimulate
1447 growth, reduce conifer encroachment, and increase individual tree recruitment.

1448 In grassland cover types, there is a need to reduce or remove trees and other woody
1449 species that have encroached, which has decreased the size and function of these systems
1450 that were historically grasslands and functionally connected montane meadows.

1451 There is a need to improve the condition of native plant communities and the resilience of
1452 rare species. There is also a need to improve the abundance, diversity, distribution, and
1453 vigor of native understory vegetation to provide food and cover for wildlife where it is
1454 absent under dense forest stands where fire has been excluded.

1455

1456 **Undesirable Fire Effects.** There is a need to reduce the risk of undesirable fire behavior
1457 and effects, which currently pose a threat to ecosystem function and services, and human
1458 safety, lives, and values. Restoring fire regimes in forests and grasslands would decrease
1459 the risks of post-fire flooding and debris flows that cause loss of soil productivity, water
1460 quality, and watershed function. Reducing the potential for undesirable fire effects and
1461 reducing excessive fuel loadings would help protect terrestrial and aquatic species habitat
1462 as they increase resilience to fires, including areas within and adjacent to Mexican
1463 spotted owl habitat.

1464 **Terrestrial and Aquatic Species Habitat.** There is a need to move the project area
1465 toward desired conditions for snags, coarse woody debris, forest structural stages, and
1466 stream habitat complexity. There is a need to retain as many old and large trees as
1467 possible, while moving toward restoration-based desired conditions and recognizing the
1468 ecological and socio-political importance of these trees. Where restoration activities
1469 occur in the ponderosa pine and dry mixed conifer cover types, there is a need to
1470 maintain and promote the development of old growth characteristics and components.
1471 There is a need to maintain or improve aquatic habitats to meet needs for fish, frogs, and
1472 garter snakes, recognizing the ecological and socio-political importance of these streams
1473 and associated riparian areas.

1474 **Streams and Springs.** There is a need to improve the condition and function of riparian
1475 areas, wet meadows, streams, and springs in the Rim Country project area in order to
1476 sustain these features for terrestrial and aquatic habitat, as well as for human use.

1477 **Riparian Vegetation.** There is a need to restore native riparian vegetation, including
1478 large conifers and willows in some cover types, to reduce sedimentation to stream
1479 habitat, provide stream shading, maintain cool-water conditions, and provide large wood
1480 recruitment to streams to improve habitat complexity.

1481 **Cultural Resources.** There is a need to reduce threats to cultural resources caused by
1482 overly dense vegetation and soil erosion. Though most archaeological sites can tolerate
1483 low-severity fire, all are very vulnerable to the effects of high severity fire in unnaturally
1484 high fuel loads and to the soil loss that occurs in post-fire flooding. In particular, there is
1485 a need to reduce fuels accumulation around cultural resources to reduce threats to these
1486 non-renewable resources.

1487 **Forest Products Industries.** There is a need to support appropriately-scaled, sustainable,
1488 forest products industries that strengthen local economies, while conserving natural
1489 resources and aesthetic values. Appropriately-scaled businesses would play a key role in
1490 accelerated forest restoration, by harvesting, processing, and selling wood products,
1491 thereby reducing treatment costs and providing economic opportunities. Engaging
1492 industry would offer the opportunity to cover all, or nearly all, of the cost of removal of
1493 forest restoration byproducts by the value of the products removed.

1494 **. Improved Motorized Transportation System.** There is a need to have adequate access
1495 for project implementation, and decommission temporary roads after use to restore these
1496 areas once project activities are completed. In addition, there is a need to decommission
1497 unneeded routes identified during the forest Travel Management Rule planning processes
1498 as part of the restoration of the landscape in the project area.

1499 **Public Involvement**

1500 **Collaboration**

1501 Collaboration has been integral to the 4FRI, and in 2010, stakeholders began refining
1502 their vision for ponderosa pine forest restoration across 2.4 million acres on four national
1503 forests in Arizona including the Apache-Sitgreaves, Coconino, Kaibab, and Tonto.

1504 The 4FRI stakeholders developed a comprehensive restoration strategy for the first
1505 analysis area on the Coconino and Kaibab NFs (4FRI Stakeholders 2010). The landscape
1506 strategy documented existing conditions, identified potential treatment areas, and desired
1507 post-treatment conditions. The Forest Service used the stakeholder's landscape strategy
1508 to inform the purpose and need and proposed action for both the 1st 4FRI EIS and this
1509 Rim Country Project DEIS.

1510 **Cooperating Agencies**

1511 On July 15, 2015, the Arizona Game and Fish Department (AZGD) became a
1512 cooperating agency. AZGD specialists attended interdisciplinary team meetings, held
1513 workshops to gather aquatic and terrestrial wildlife data, and provided existing condition
1514 and location information (tabular and spatial) for priority species. AZGD specialists
1515 served on the interdisciplinary team for the Rim Country Project, helped develop the
1516 proposed action and other action alternatives, provided existing conditions for species
1517 and their habitat, and reviewed, edited, and augmented species analysis.

1518 **Tribal Consultation**

1519 Each forest consulted with specific tribes to reduce redundancy of information sharing.
1520 Comments gathered by each forest liaison is continuously shared with the other forests.
1521 Tribes who received invitations to consult on the project include: the Hopi Tribe,
1522 Havasupai Tribe, Hualapai Tribe, Kaibab Band of Paiute Indians, San Juan Southern
1523 Paiute Tribe, Fort McDowell Yavapai Nation, Yavapai-Apache Nation, Yavapai-Prescott
1524 Indian Tribe, Mescalero Apache Tribe, San Carlos Apache Tribe, Tonto Apache Tribe,
1525 White Mountain Apache Tribe, Pueblo of Acoma, Pueblo of Zuni, Gila River Indian
1526 Community, Salt River Pima-Maricopa Indian Community, Navajo Nation, and Navajo
1527 chapters in proximity to the project area: the Alamo, Bodaway/Gap, Cameron, Coalmine
1528 Canyon, Dilkon, Lechee, Leupp, Ramah, Tolani Lake, and To'Nanees'Dizi Chapters.

1529 On July 1, 2016 the Rim Country Project proposal was sent to each Tribe along with an
1530 invitation to formally consult with the Forest Service. This resulted in various phone
1531 calls, emails, and consultation meetings. One written scoping response was received from
1532 the Hopi Tribe in which the Tribe requested continued consultation on implementation
1533 and review of cultural resource surveys, Traditional Cultural Properties, and ethnographic
1534 studies. On April 6, 2017 the Archaeological Site Treatment strategy was distributed to
1535 tribes for comment.

1536 The tribal relations section in chapter 3 of this DEIS and tribal relations specialist report
1537 provide more information and complete documentation of consultation.

1538 **Stakeholder and Public Involvement**

1539 The Rim Country Project has been published in the Coconino, Apache-Sitgreaves, and
1540 Tonto NFs' Schedule of Proposed Actions (SOPA) since January of 2016. As the Rim
1541 Country project area was developed, the FS worked with stakeholders to define the

1542 project boundary as well as the extent of the analysis in different portions of the project
1543 including multiple meetings, presentation, and field visits. The notice of intent to prepare
1544 an environmental impact statement was published in the Federal Register on June 27,
1545 2016 (81 FR 41517). A scoping document was posted on the project website
1546 (www.fs.usda.gov/goto/4FRIRimCountry) and mailed to all known potentially interested
1547 parties, inviting public comment on the proposed action for the Rim Country Project.
1548 Letters and scoping documents were mailed to 676 individuals, local governments, state
1549 governments, federal and state agencies, and organizations that engage with all three
1550 national forests. Public workshops were held on July 14 in Show Low and on July 21 in
1551 Payson, to discuss the proposed action and accept comments.

1552 Fifty (50) scoping responses (e-mails, letters, and public meeting comment forms) were
1553 received from this scoping effort.

1554 *Development of Action Alternatives*

1555 The preliminary alternatives being considered for Rim Country were first posted to the
1556 4FRI website and shared with the SHG in March of 2017. The preliminary alternatives
1557 were then defined and shared at public workshops cohosted by the SHG in April 2017.
1558 The IDT reviewed feedback received at these workshops on the preliminary alternatives.

1559

1560 Additional presentations on the Rim Country alternatives were given to the SHG in July
1561 and November 2017, discussing the progression of the action alternatives that would be
1562 analyzed in the draft environmental impact statement (DEIS). The decision was made by
1563 the 4FRI Board of Supervisors to drop one of the preliminary alternatives from
1564 consideration in the Rim Country DEIS.

1565 Collaboration on the Mechanical Treatments and Aquatics Flexible Toolbox Approaches
1566 with the SHG, Arizona Game and Fish Department and Trout Unlimited took place
1567 throughout 2017 with meetings, presentations and field visits.

1568

1569 **Issues**

1570 Issues are statements of cause and effect, linking environmental effects to proposed
1571 activities. Comments from the public, the 4FRI Stakeholder Group, other agencies, tribes,
1572 and FS personnel were used to formulate issues concerning the proposed action. All
1573 comments received were reviewed and analyzed by the interdisciplinary team to
1574 "...identify and eliminate from detailed study the issues which are not significant or
1575 which have been covered by prior environmental review..." (Council on Environmental
1576 Quality, Sec. 1506.3; 40 CFR 1501.7(a) (3)). Non-significant issues were identified as
1577 those: 1) outside the scope of the proposed action; 2) already decided by law, regulation,
1578 Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4)
1579 conjectural and not supported by scientific or factual evidence. Significant issues were
1580 identified as those directly or indirectly caused by implementing the proposed action.
1581 Significant issues were grouped by issues that can be responded to through mitigation
1582 measures and those that were responded to in alternatives to the modified proposed
1583 action.

1584 The public comments received during the scoping period from June 27 to August 11,
1585 2016 presented seven issues that are within the scope of the proposed action, and relevant

1586 to the decision to be made for the project These key issues were used to modify the
1587 proposed action and formulate a new action alternative for the analysis.

1588 ***Significant Issues Responded to through Mitigation Measures, Analysis, and***
1589 ***Modifications to the Proposed Action***

1590 *Issue 1 – Treatments in MSO PACs*

1591 The proposed action may have negative effects on Mexican spotted owl (MSO) by
1592 cutting trees up to 17.9 inches in diameter in MSO protected activity centers (PACs). The
1593 Forest Service should act conservatively to protect MSO habitat and consider all cautions
1594 identified in the revised Recovery Plan for MSO (USDI Fish and Wildlife Service 2012).
1595 There is a concern about how MSO will respond to the removal of trees up to 17.9 inches
1596 in diameter, given a lack of monitoring data.

1597 **How Issue 1 is addressed**

1598 This issue is addressed in the effects analysis for all alternatives using the best available
1599 science and with design features and conservation measures as outlined in the 2012
1600 revised MSO Recovery Plan to apply to treatments in MSO PACs.. The wildlife analysis
1601 will reference all available monitoring information from the 1st 4FRI EIS and from other
1602 sources across the region.

1603 **Indicators/Measures**

1604 Indicators will include changes in the amount and quality of MSO nest/roost habitat
1605 within PACs. Specific measures include:

- 1606 • Stand density as measured by stand density index (SDI), trees per acre (TPA),
1607 quadratic mean diameter (QMD), Canopy Cover, Basal Area Average, reduction
1608 of average basal area (BA) of large young trees;
- 1609 • Fuel loading, fire hazard index, and risk of crown fire;
- 1610 • Prey habitat as measured by number of snags/acre \geq 12 inches in diameter, coarse
1611 woody debris (CWD), and shrub and herbaceous cover.

1612 *Issue 2 – Treatments in Northern Goshawk Habitat*

1613 The proposed action may have negative effects on northern goshawk and canopy-
1614 dependent prey species by reducing late seral, dense understory, and old growth habitat.
1615 Specifically, there is a concern that treatments will reduce the mix of densities and cover
1616 types, including later seral stages.

1617 **How Issue 2 is addressed**

1618 This issue will be addressed in the effects analysis for all alternatives, and with design
1619 features and conservation measures as outlined in the most current management
1620 recommendations to apply to treatments in northern goshawk habitat.

1621 **Indicators/Measures**

1622 Indicators will include changes in the amount and quality of goshawk nesting and
1623 foraging habitat. Specific measures include:

- |
- 1624 • Stand density as measured by stand density index (SDI), trees per acre (TPA),
 - 1625 quadratic mean diameter (QMD), Canopy Cover, Basal Area Average, reduction
 - 1626 of average basal area (BA) of large young trees;
 - 1627 • Fuel loading, fire hazard index, and risk of crown fire;
 - 1628 • Prey habitat as measured by number of snags/acre \geq 12 inches in diameter,
 - 1629 downed logs, coarse woody debris (CWD), and shrub and herbaceous cover.

1630 *Issue 3 – Large Tree Retention*

1631 The proposed action may cause the loss of large trees which may significantly affect old
1632 growth recruitment. Proposed management actions in old growth, future old trees (large
1633 young trees), and high-canopy patches should be very explicit, and no old trees be cut.

1634 **How Issue 3 is addressed**

1635 This issue will be addressed in the effects analysis for all alternatives. Large tree
1636 retention will be addressed with treatment design and location, design features, mitigation
1637 measures, and BMPs to retain old growth and groups of large trees in all action
1638 alternatives. The Old Growth Protection and Large Tree Retention Strategy (OGP/LTRS)
1639 as developed by the 4FRI Stakeholder Group will be evaluated and considered as fully as
1640 possible in all action alternatives.

1641 **Indicators/Measures:**

- 1642 • Number of acres of stands meeting collaboratively established Stands with a
1643 Preponderance of Large Young Trees (SPLYT) criteria.

1644 *Issue 4 – Dwarf Mistletoe Mitigation*

1645 The proposed action includes dwarf mistletoe treatments that may remove the largest
1646 trees in some stands. There is also a concern that more dwarf mistletoe mitigation is
1647 needed to improve forest vigor, overall health, and resilience to climate change. The scale
1648 and intensity of mistletoe mitigation should be more clearly defined as far as scale, that
1649 where it occurs at natural levels it be allowed to remain to provide essential food and
1650 occupancy needs to wildlife, and that the mitigation treatments not focus on removing the
1651 largest trees.

1652 **How Issue 4 is addressed**

1653 This issue is addressed in the effects analysis for all alternatives. Dwarf mistletoe
1654 mitigation will be addressed with treatment design and location, design features, BMPs,
1655 and mitigation and conservation measures. Some dwarf mistletoe will be retained as a
1656 natural component for wildlife, and limits will be placed on removal of large infected
1657 trees. The alternatives will propose a range of mitigation treatments depending on the
1658 severity and extent of infection.

1659 **Indicators/Measures**

- 1660 • Anticipated percent change in dwarf mistletoe infection severity on acres
1661 proposed for mechanical thinning treatments.
- 1662 • Basal Area of large trees (>18") after treatment

1663 **Issue 5 – Economics**

1664 The proposed action does not include measures to make it economically viable. A wide
1665 range of options should be considered in the action alternatives that would allow for
1666 biomass removal where economically feasible but would also allow other options to
1667 dispose of uneconomically feasible biomass.

1668 *How Issue 5 is addressed*

1669 To improve the economic viability, analysis of the development and use of 12 in-woods
1670 processing sites to increase the utilization of forest products and transportation
1671 efficiencies is included in both action alternatives. Alternative 2 provides for treating the
1672 most acres in the project area as identified by the Mechanical Treatments Flexible
1673 Toolbox Approach and determined during implementation. Alternative 3 focuses on
1674 those areas most highly departed from the natural range of variation (NRV) of ecological
1675 conditions and/or that put communities at risk from undesirable fire behavior and effects.
1676 This issue will be included in the analysis in this DEIS, the Implementation Plan
1677 (appendix D), and will also be addressed during implementation as opportunities for
1678 biomass removal are developed.

1679 *Indicators/Measures for the Analysis:*

- 1680 • Volume of wood products (ccfs and biomass dry tons) available for removal by
1681 restoration activities.
- 1682 • Unit and overall project net treatment costs.
- 1683 • Mill delivered value of wood products from restoration activities.
- 1684 • Economic efficiency (project benefits/value less project costs).
- 1685 • Changes in employment (annual jobs created) and labor income.

1686 **Significant Issues Responded to in Alternatives to the Proposed Action**

1687 *Issue 6 – Smoke/Air Quality*

1688 *The proposed prescribed burning may have negative effects on air quality and human*
1689 *health. Some commenters are concerned that the smoke from prescribed burns will*
1690 *degrade air quality and the health of northern Arizona residents.*

1691 **How Issue 6 is addressed:**

1692 Alternative 3 was partially developed to respond to this issue. It includes fewer acres of
1693 prescribed burning than the other action alternatives. This issue will be also be addressed
1694 in a considered-but-eliminated-from-detailed-study alternative that proposes even less
1695 prescribed fire (see chapter 2). This issue will be addressed in the effects analysis for all
1696 alternatives. Design features and/or mitigation measures will be included to minimize
1697 effects on air quality from prescribed fires.

1698 **Indicators/Measures:**

1699 The potential for emissions from proposed prescribed fire to affected communities will be
1700 evaluated qualitatively. The pollutants to be modeled include the six listed in the Clean
1701 Air Act for which there are National Ambient Air Quality Standards: carbon monoxide
1702 (CO), nitrogen dioxide (NO₂), particulate matter less than 10 microns in size (PM 10),
1703 particulate matter less than 2.5 microns in size (PM 2.5), ozone (O₂), and sulfur dioxide
1704 (SO₂). There will be a discussion on the ecological effects of smoke, and the

1705 socioeconomic analysis will evaluate the effects of smoke on the quality of life and
1706 tourism.

1707 *Issue 7 – Roads*

1708 The miles of temporary roads in the proposed action may negatively affect watershed and
1709 stream conditions, and wildlife habitat and connectivity. Commenters asked that the
1710 Forest Service limit road networks to those roads needed for access and management.
1711 Commenters requested an alternative that dramatically reduces temporary road mileage.

1712 **How Issue 7 is addressed:**

1713 Alternative 3 was partially developed to respond to this issue. It includes the least number
1714 of miles of temporary roads. Design features and/or mitigation measures will be
1715 developed to reduce effects on watersheds, streams, and wildlife habitat. This issue will
1716 be addressed in the effects analysis for all alternatives.

1717 **Indicators/Measures:**

1718 Indicators will include the range of temporary roads that may be needed in each of the
1719 alternatives, measured by the approximate number of miles of temporary roads proposed
1720 in each alternative.

1721 **Decision to be Made**

1722 The Apache-Sitgreaves, Coconino, and Tonto NF Supervisors are the Forest Service
1723 officials responsible for the decision about the Rim Country Project. Based on the
1724 purpose and need for action, the findings in the Environmental Impact Statement and
1725 supporting project record, and consideration of the best available science, the responsible
1726 officials' will decision will include:

- 1727 • Selecting one of the alternatives analyzed, or selecting an alternative that
1728 combines activities proposed in the different alternatives analyzed. This
1729 “blending” of alternatives must be a mix of proposed activities for which the Rim
1730 Country analysis discloses the effects.
- 1731 • Determining which, if any of the proposed Forest Plan amendments to approve
1732 and whether one or more amendments would affect the plan's inherent capability
1733 of meeting the substantive requirements in the 2012 Planning Rule.
- 1734 • Determining the design features, best management practices, and conservation
1735 and mitigation measures to be used in implementation.
- 1736 • Establishing the Implementation Plan, and the Monitoring and Adaptive
1737 Management Plan prepared with the Multi-party Monitoring Board.

1738

Chapter 2. Alternatives, Including the Proposed Action

This chapter describes and compares the alternatives considered for the Rim Country Project. It includes a description of each alternative considered. Maps for the alternatives can be found in appendix A. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social, and economic effects of implementing each alternative.

Alternative Development Process

As a result of scoping, and extensive collaboration and public involvement since June 2016, the proposed action was modified as allowed by 36 CFR 220.7(b)(2)(iii). Modifications to the Proposed Action include dropping the even-aged shelterwood treatments originally proposed and replacing them with regular restoration treatments, modifying to propose treatments with a broader range of openness in some stands, defining the proposed treatments and terms in more detail, and detailing the acreages and miles of proposed treatments.

Those concerns that could not be addressed through modifications and additions to the Proposed Action were considered significant issues (see the Issues section in Chapter 1). Three of these issues drove the development of an additional action alternative in this DEIS.

Alternatives Considered in Detail

This DEIS documents the analysis of three alternatives, including the no action (Alternative 1), the Modified Proposed Action (Alternative 2), and one additional alternative (Alternative 3). Alternatives 2(as modified) and 3 respond to issues by the public during the scoping period. The alternatives are described below.

Alternative 1 – No Action

Alternative 1 is the no action alternative as required by [40 CFR 1502.14\(c\)](#).³ It represents no changes to current management, and current forest plans would continue to be implemented. Ongoing vegetation treatments and fire management activities, as well as road maintenance, recreation, firewood gathering, authorized livestock grazing, and other activities already authorized in separate NEPA decisions would continue. There would be no other restoration activities approved with the Rim Country Project. The potential direct, indirect, and cumulative effects from no action will be analyzed. The no action alternative is the baseline for assessing the action alternatives (Alternatives 2 and 3).

³ <http://www.nepa.gov/nepa/regs/ceq/1502.htm#1502.14>

Alternative 2 – The Modified Proposed Action

Alternative 2 is the Proposed Action as presented for scoping, with additional detail, clarifications, corrections, and modifications in response to public comments received. Changes made to the Proposed Action in response to public comment include:

1. Modifications to acreages and mileage of treatments based on additional modeling.
2. Additional clarity, details, and definitions of key terms used.
3. Elimination of even-aged shelterwood silvicultural prescriptions to address dwarf mistletoe infections, replaced with regular restoration treatments. Design features will focus mechanical treatments on addressing dwarf mistletoe infections. This change was a result of additional collaboration with the 4FRI Stakeholder Group and the public.

In addition, the proposal to mechanically thin trees and implement prescribed fire on approximately 1,260 acres in the Long Valley Experimental Forest was dropped from this alternative, as well as from the Rim Country Project. In discussions with researchers with the Rocky Mountain Research Station, it was decided that experimental treatments for the experimental forest would be analyzed in a separate NEPA analysis.

This alternative, as modified, responds to the Dwarf Mistletoe Mitigation issue through the use of regular restoration treatments that focus on dwarf mistletoe infections. The restoration activities listed for Alternative 2 include vegetation treatments (mechanical thinning and burning) (Figure 2-1), using the Flexible Toolbox Approach for Mechanical Treatments (see appendix D of the DEIS); as well as comprehensive restoration treatments for meadows, springs, streams, riparian habitat, using the Flexible Toolbox Approach for Aquatic and Watershed Restoration Activities (see appendix D of the DEIS), wildlife habitat, and rare species restoration (Table 2-2). Proposed activities include:

Mechanically thin trees and/or implement prescribed fire on up to 953,130 acres.

4. Implement mechanical thinning and prescribed fire on approximately 517,950 acres including:
 - a) Approximately 150,780 acres of intermediate thinning including About 16,970 acres within ½ mile of non-FS lands with structures and critical infrastructure,
 - b) Approximately 71,270 acres of stand improvement including About 8,560 acres within ½ mile of non-FS lands with structures and critical infrastructure
 - c) Approximately 12,510 acres of single tree selection
 - d) Approximately 283,370 acres of uneven-aged group selection including About 38,390 acres within ½ mile of non-FS lands with structures and critical infrastructure
5. Implement prescribed fire alone on approximately 54,070 acres in target vegetation cover types

6. Mechanically thin and/or implement prescribed fire on approximately 82,280 acres (in target and non-target vegetation cover types) of Mexican spotted owl (MSO) protected activity centers (PACs) including --
- a) Approximately 23,550 acres of mechanical thinning and/or prescribed fire
 - b) Approximately 58,730 acres of prescribed fire only
7. Mechanically thin and/or implement prescribed fire on approximately 25,290 acres of MSO replacement nest/roost recovery habitat.
8. Conduct facilitative operations in non-target cover types to support treatments in target cover types, including --
- c) Approximately 123,400 acres of facilitative thinning and prescribed fire outside of PACs
 - d) Approximately 1,260 acres of facilitative prescribed fire only outside of PACs
 - e) Approximately 6,880 acres of facilitative prescribed fire only in PACs
 - f) Approximately 300 acres of facilitative thinning and prescribed fire in PACs
9. Restore aspen on approximately 1,230 acres, including about 30 acres in PACs.
10. Restore approximately 132,240 acres that have experienced severe disturbance, including about 3,610 acres in PACs.
11. Restore approximately 18,570 acres of savanna.
12. Restore approximately 36,320 acres of grassland, including --
- g) Maintaining or restoring montane meadow connectivity in pronghorn corridors.
13. Restore hydrologic function and vegetation on approximately 6,720 acres of meadows.
14. Restore approximately 14,560 acres of riparian areas for aquatic stream habitat

The additional actions below are in both Alternative 2 and 3.

Restore approximately 184 springs

Restore function and habitat in up to 777 miles of streams, including stream reaches with habitat for threatened, endangered, and sensitive aquatic species.

Decommission up to 200 miles of existing system roads on the Coconino and Apache-Sitgreaves NFs, and up to 290 miles on the Tonto NF.

Decommission up to 800 miles of unauthorized roads on the Apache-Sitgreaves, Coconino, and Tonto NFs.

Construct or improve approximately 330 miles of temporary roads (new and/or occurring on existing unauthorized roads) to facilitate mechanical treatments; decommission all temporary roads when restoration treatments are completed.

Relocate and reconstruct existing open roads adversely affecting water quality and natural resources, or of concern to human safety.

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Construct up to 200 miles of protective barriers around springs, aspen, native willows, and big-tooth maples, as needed for restoration.

Preliminary DRAFT DEIS

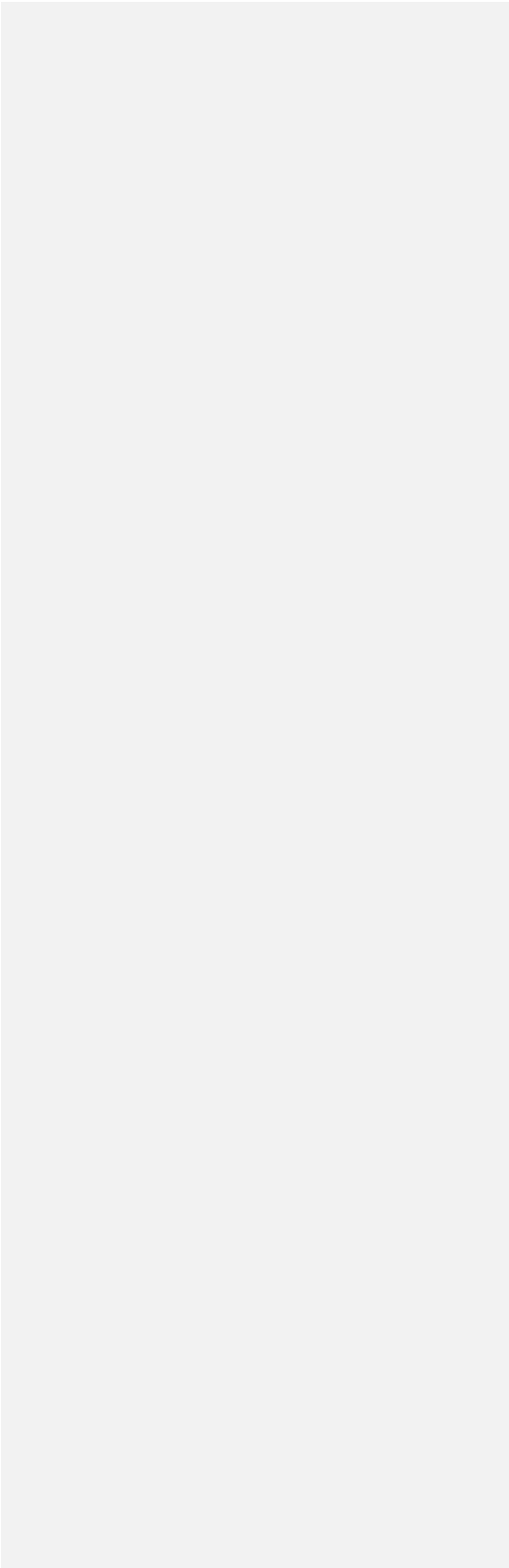


Table 9. Alternative 2 Mechanical and Fire Treatments

Treatment Type	Treatment Description/Objective	Acres
Intermediate Thin (IT) 10-25 (10 to 25% interspace)	Mechanical and fire treatments that thin stands with up to moderate infection levels of dwarf mistletoe, thins tree groups to an average of 70 to 90 square feet of basal area (BA) in pine cover types and 40-100 BA in dry mixed conifer cover type, and establishes non-forested grass/forb interspace/openings between residual tree groups or individual randomly-spaced trees. Manages for improved tree vigor and growth by retaining the best growing dominant and co-dominant trees with the least amount of dwarf mistletoe and as many old and/or large trees as possible.	30,210
IT 25-40 (25 to 40% interspace)		53,620
IT 40-55 (40 to 55% interspace)		49,980
IT 55-70 (55 to 70% interspace)		16,970
Single Tree Selection (ST)	Mechanical and fire treatments that leaves fewer tree groups and more randomly spaced trees. Designed to increase or maintain age class diversity and reduce understory brush and shrub response, creating small openings less than or equal to ¼-acre in size where seedlings and saplings are underrepresented and brush cover is greater than 40%. Maintains higher basal area where brush competition is expected to be strong to suppress woody understory response.	12,510
Stand Improvement (SI) 10-25 (10 to 25% interspace)	Mechanical and fire treatments that thin young, even-aged stands dominated by trees less than 8.5 inches in diameter. Establishes tree groups and interspace adjacent to tree groups. Manages for improved tree vigor and growth by retaining the best growing dominant and co-dominant trees within each group and as many old and/or large trees as possible, and establishes non-forested grass/forb interspace/openings between residual tree groups or individual randomly-spaced trees. Begins conversion to uneven-aged structure.	13,660
SI 25-40 (25 to 40% interspace)		34,590
SI 40-55 (40 to 55% interspace)		14,460
SI 55-70 (55 to 70% interspace)		8,560

Treatment Type	Treatment Description/Objective	Acres
Uneven-aged (UEA) 10-25 (10 to 25% interspace)	Mechanical and fire treatments designed to develop uneven-aged structure and a mosaic of interspaces and tree groups of varying sizes. Thins tree groups to an average of 20-80 BA in pine cover types and 30-100 BA in dry mixed conifer cover type, and establishes non-forested grass/forb interspace/openings between residual tree groups or individual randomly-spaced trees. Manages to enhance growing space for younger trees, while retaining as many old or large trees as possible. Establishes regeneration openings where seedlings and saplings are underrepresented. Locates interspace in currently non-forested areas and lacking pre-settlement evidence.	77,820
UEA 25-40 (25 to 40% interspace)		106,210
UEA 40-55 (40 to 55% interspace)		39,490
UEA 55-70 (55 to 70% interspace)		56,850
Prescribed Fire Only	Prescribed burning to improve structure, maintain and develop large trees, and reduce risk of high-severity. Retain old growth attributes, protect large oaks, and ensure snags and coarse woody debris post-fire. Reduce conifer litter/duff at ground level to promote increased herbaceous species cover and species richness. Restore/regulate vegetation mosaics, including woody and herbaceous species	3,240
Prescribed Fire Only in PACs		50,830
Aspen Restoration	Mechanical treatments that removes post-settlement conifers within 66 feet (one chain) of the aspen clone. Managed to stimulate suckering by removing aspen, disturbing the ground, and/or applying fire as needed.	1,200
Aspen Restoration in PACs		30
Facilitative Operations (FO) Mechanical	Mechanical and fire treatments in non-target cover types to support the use of prescribed fire in cover types targeted for restoration. Includes mastication/chipping; lop and scatter; thinning/limbing; and moving, rearranging, or removal of jackpots or excessive surface fuels. Designed to improve safety, improve treatment effectiveness, expand burn windows, decrease undesirable fire behavior and effects, and minimize disturbance from fireline construction.	123,400
FO Mechanical in PACs		300
FO Prescribed Fire Only	Fire treatment in non-target cover types to support the use of prescribed fire in cover types targeted for restoration. Includes broadcast burning, jackpotting, pile burning, and blacklining. Designed to improve safety, improve treatment effectiveness, expand burn windows, decrease undesirable fire behavior and effects, and minimize disturbance from fireline construction.	1,260
FO Prescribed Fire Only in PACs		6,880

Treatment Type	Treatment Description/Objective	Acres
MSO Recovery – Replacement Nest/Roost	Mechanical and fire treatments designed to develop uneven-aged structure, irregular tree spacing, and a mosaic of interspace and tree groups of varying size. Intent is to continue to develop replacement Nest/Roost where possible, and to develop a diverse mix of heterogeneous stand structures and densities to provide for owl dispersal and foraging.	25,290
MSO PAC Mechanical	Mechanical and fire treatments outside core areas that thins to improve structure, maintain and develop large trees, and reduce hazard of high-severity fire in PACs. Designed to increase tree vigor and health, to promote irregular tree spacing, and to create canopy gaps more conducive to fire treatment (reduce fire risk). Retain old growth attributes, protect large oaks, and ensure snags and coarse woody debris post-treatment.	17,460
Savanna Restoration (70 to 90% interspace)	Mechanical and fire treatments that restore pre-settlement tree density and pattern by removing encroaching post-settlement conifers. Manages for a range of 70 to 90 percent interspace (grass/forb) between tree groups or individual trees using pre-settlement tree evidence as guidance. Retains all pre-settlement trees and the largest post-settlement trees as replacement trees adjacent to pre-settlement tree evidence (stumps, dead and down).	18,570
Severe Disturbance Area Treatment	Combination of restoration treatments: reforestation, prescribed fire, lopping/scattering, mastication, and other mechanical methods.	128,630
Severe Disturbance Area – in PACs	Objective is to identify treatments that would be effective in restoring the fuel structure that produces the types of fire to which ponderosa pine is adapted.	3,610
Grassland Restoration	Mechanical and fire treatments to reduce or eliminate woody species encroachment (pines, junipers and various shrubs). Remove trees established since interruption of the historic fire regime. Promote and re-establish the historic meadow edge. Retain all pre-settlement trees and leave replacement trees where evidence of historical large trees exist.	36,320
Wet Meadow Restoration		6,720
Riparian Restoration	Combination of restoration treatments, including mechanical and fire treatments to maintain riparian vegetation and habitat. Remove encroaching upland tree and shrub species. Remove noxious or invasive plants. Promote, protect, or plant native aquatic or riparian species. Prescribed fire to regenerate riparian species and reduce fuels accumulation.	14,560

Spring Restoration

Specific treatments to restore springs would be identified prior to mechanical and fire treatments in the vicinity, using the Flexible Toolbox Approach for Aquatic and Watershed Restoration Activities (see appendix D). Treatments could include: removing tree canopy close to the spring, applying fire, re-plumbing the spring improvements to conserve water, protecting the spring with fencing, and removing or relocating adjacent roads or trails.

Stream Restoration

Specific treatments to restore riparian streams and stream channels and their function would likely be identified prior to mechanical and fire treatments in the vicinity, using the Flexible Toolbox Approach for Aquatic and Watershed Restoration Activities (see appendix D). Treatments could include: reestablishing former drainage patterns, stabilizing slopes, restoring vegetation, protecting sites from grazing ungulates, removal of upland species that compete with riparian species, returning fire to the system (prescribed fire), and/or removing stock tanks. The emphasis will be on non-structural rather than structural methods.

Riparian Habitat Restoration

Proposed stream habitat treatments may be needed within all or some portion of the fish-bearing streams. Specific treatments to restore riparian streams and stream channels and their function would likely be identified prior to mechanical and fire treatments in the vicinity, using the Flexible Toolbox Approach for Aquatic and Watershed Restoration Activities (see appendix D). Restoration treatments may include channel restoration (one rock dams, grade control or induced meandering) and channel structural improvements (felling or girdling trees to provide large woody debris for cover and habitat complexity).

Road and Trail Relocation/Reconstruction

Specific treatments for roads, trails, and unauthorized routes that are affecting water resources would be evaluated prior to mechanical and fire treatments in the vicinity, using the Flexible Toolbox Approach for Aquatic and Watershed Restoration Activities (see appendix D). Generally, routes crossing and those within 300 feet of streams and waterbodies are the highest priority for evaluation and treatment. Treatments could include: adding gravel to the road surface of existing authorized routes, stabilizing slopes, and restoring vegetation; closing roads, trails, or unauthorized routes by blocking the entrance or installing water bars; removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed; and obliterating the roadbed by restoring natural contours and slopes.

Specific treatments for improving stream crossings that are affecting water resources would be evaluated prior to mechanical and fire treatments in the vicinity. Treatments could include: armoring downstream outlets of culverts, upsizing existing culverts, installing culverts or additional culverts, installing culvert arrays to mimic existing channel width, installing low water crossings, installing bridges, restoring downstream channels created from crossings, using sediment reduction methods on connected disturbed areas upstream from roads that connect to the drainage, paving crossings, and relocating the segment of the road that has the crossing issue out of the stream.

Figures 2 and 3 display the locations of Grassland, Meadow, and Riparian and Stream Restoration activities for both Alternative 2 and Alternative 3.

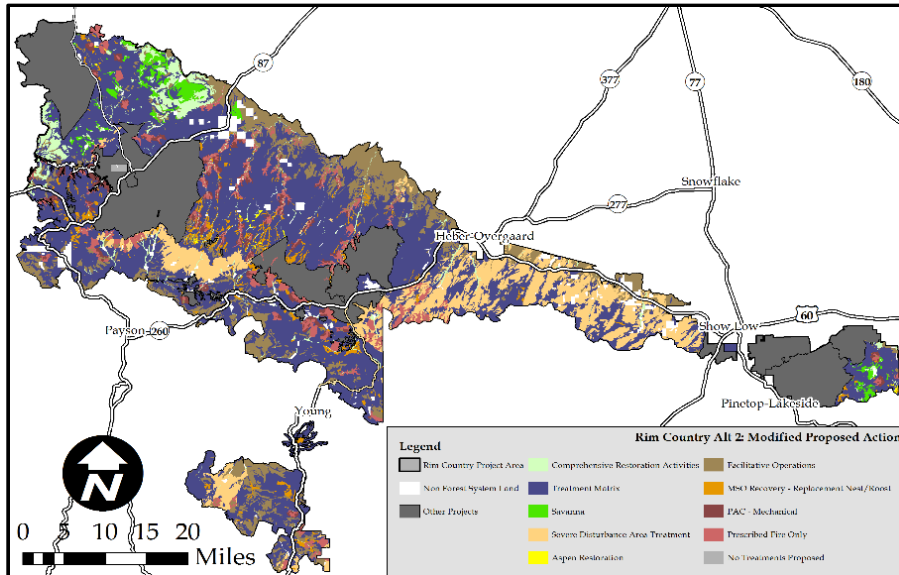


Figure 1-Alternative 2 Proposed Mechanical and Fire Treatments

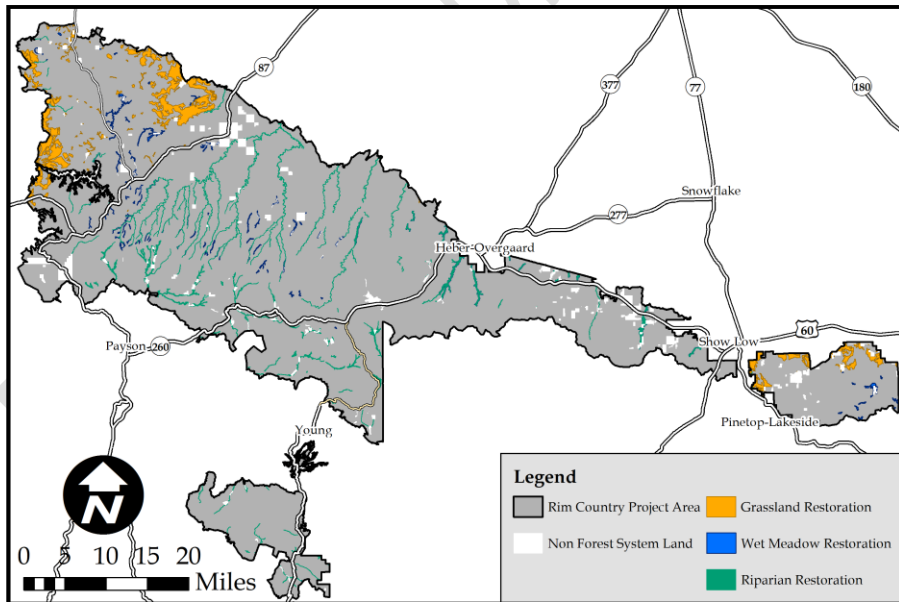


Figure 2-Alternatives 2 and 3 Grassland, Meadow, and Riparian Restoration Activities

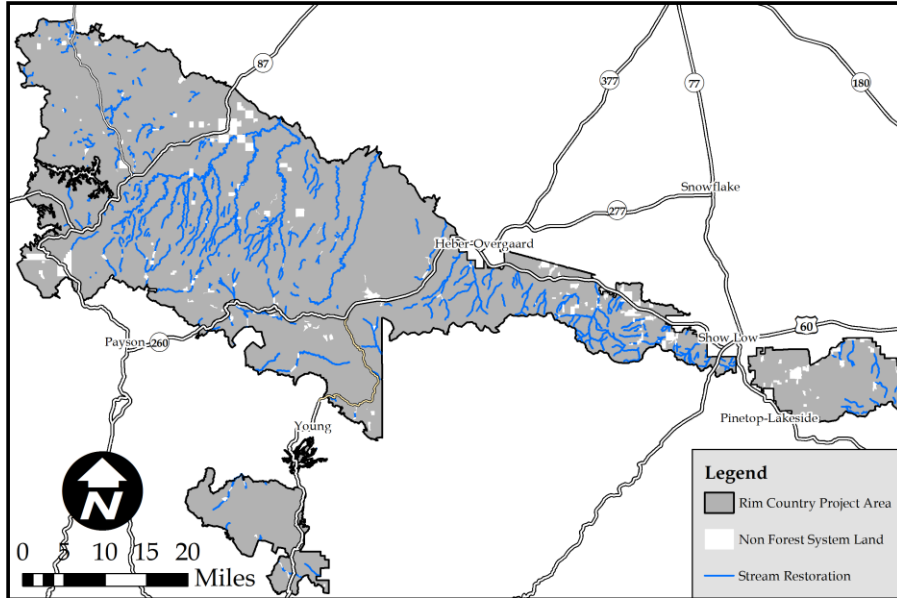


Figure 3-Alternatives 2 and 3 Stream Restoration Activities

Alternative 3 – Focused Restoration

This alternative is designed to focus restoration treatments in areas that are the most highly departed from the natural range of variation (NRV) of ecological conditions, and/or that put communities at risk from undesirable fire behavior and effects. High value assets will be better protected and burn boundaries will be designed to create conditions safe for personnel and to ensure fire can meet objectives. Treatment areas would be chosen to optimize ecological restoration, those areas that are most important to treat and can be moved the furthest toward desired conditions. Focusing on the higher priority ecological restoration will result in fewer acres being treated.

The restoration treatments proposed in Alternative 3 will be used to address moderate and high levels of mistletoe infection, but to a lesser extent on the fewer acres proposed for mechanical treatment and fire. The presence of dwarf mistletoe will not be used to prioritize areas for treatment, but it will be addressed where it exists, using the same types of treatments as Alternative 2. Design features will be developed to focus activity on addressing dwarf mistletoe infections during implementation of mechanical treatments.

Alternative 3 responds to the Smoke/Air Quality, Economics, Roads, and Dwarf Mistletoe Mitigation issues. The restoration activities listed for Alternative 3 include vegetation treatments (mechanical thinning and burning) (Figure 2-4), using the Flexible Toolbox Approach for Mechanical Treatments (see appendix D); as well as the same comprehensive restoration treatments as proposed in Alternative 2 for grassland and meadows, springs, streams, riparian habitat, using the Flexible Toolbox Approach for

Aquatic and Watershed Restoration Activities (see appendix D), wildlife habitat, and rare species restoration (Table 2-3). Proposed activities include:

Mechanically thin trees and/or implement prescribed fire on up to 529,060 acres.

1. Implement mechanical thinning and prescribed fire on up to 529,060 acres.
 - h) Approximately 112,090 acres of intermediate thinning including about 14,040 acres within ½ mile of non-FS lands with structures and critical infrastructure
 - i) Approximately 37,300 acres of stand improvement including about 5,020 acres within ½ mile of non-FS lands with structures and critical infrastructure
 - j) Approximately 5,630 acres of single tree selection
 - k) Approximately 156,780 acres of uneven-aged group selection including about 27,200 acres within ½ mile of non-FS lands with structures and critical infrastructure
2. Implement prescribed fire alone on approximately 40,630 acres in target vegetation cover types
3. Mechanically thin and/or implement prescribed fire on approximately 61,700 acres (in target and non-target vegetation cover types) of Mexican spotted owl (MSO) protected activity centers (PACs) including:
 - a) Approximately 19,650 acres of mechanical thinning and/or prescribed fire
 - b) Approximately 42,050 acres of prescribed fire only
 - c) Approximately 3,370 acres of facilitative operations
4. Mechanically thin and/or implement prescribed fire on approximately 19,590 acres of MSO replacement nest/roost recovery habitat.
5. Conduct facilitative operations in non-target cover types to support treatments in target cover types, including:
 - l) Approximately 47,580 acres of facilitative thinning and prescribed fire outside of PACs
 - m) Approximately 630 acres of facilitative prescribed fire only outside of PACs
 - n) Approximately 3,070 acres of facilitative prescribed fire only in PACs
 - o) Approximately 300 acres of facilitative thinning and prescribed fire in PACs
6. Restore aspen on approximately 1,010 acres, including about 30 acres in PACs.
7. Restore approximately 31,750 acres that have experienced severe disturbance, including about 1,420 acres in PACs.
8. Restore approximately 2,470 acres of savanna.
9. Restore approximately 36,320 acres of grassland, including:

|

- p) Maintaining or restoring montane meadow connectivity in pronghorn corridors.
- 10. Restore hydrologic function and vegetation on approximately 6,720 acres of meadows.
- 11. Restore approximately 14,560 acres of riparian areas for aquatic stream habitat.

The additional actions below are in both Alternative 2 and 3.

Restore approximately 184 springs.

Restore function and habitat in approximately 777 miles of streams, including stream reaches with habitat for threatened, endangered, and sensitive aquatic species.

Decommission approximately 200 miles of existing system roads on the Coconino and Apache-Sitgreaves NFs, and approximately 290 miles on the Tonto NF.

Decommission approximately 800 miles of unauthorized roads on the Apache-Sitgreaves, Coconino, and Tonto NFs.

Construct or improve approximately 170 miles of temporary roads (new and/or occurring on existing unauthorized roads) to facilitate mechanical treatments; decommission all temporary roads when restoration treatments are completed.

Relocate and reconstruct existing open roads adversely affecting water quality and natural resources, or of concern to human safety.

Construct approximately 200 miles of protective barriers around springs, aspen, native willows, and big-tooth maples, as needed for restoration.

Preliminary Draft

Table 10. Alternative 3 Mechanical and Fire Treatments

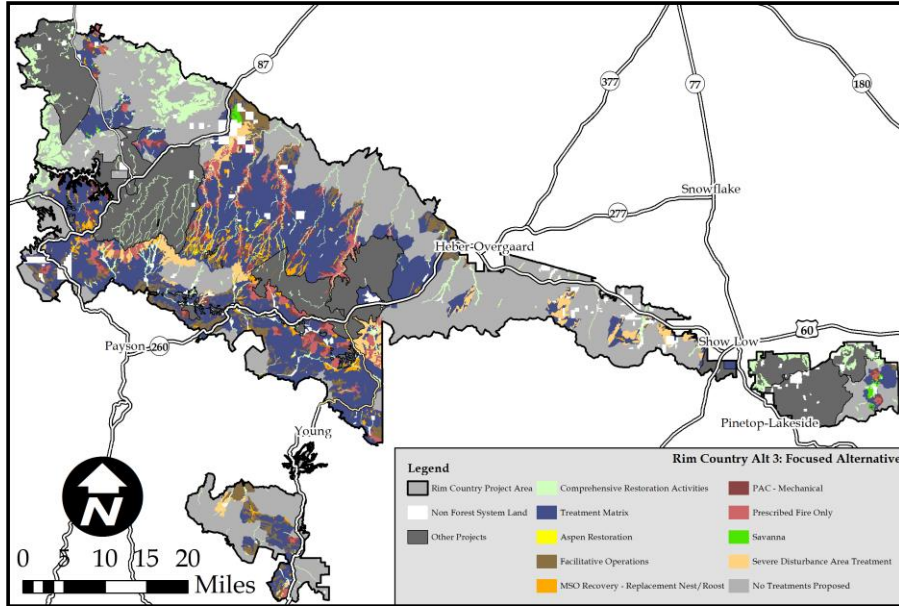
Treatment Type	Treatment Description/Objective	Acres
Intermediate Thin (IT) 10-25 (10 to 25% interspace)	Mechanical and fire treatments that thin stands with up to moderate infection levels of dwarf mistletoe, thins tree groups to an average of 70 to 90 square feet of basal area (BA) in pine cover types and 40-100 BA in dry mixed conifer cover type, and establishes non-forested grass/forb interspace/openings between residual tree groups or individual randomly-spaced trees. Manages for improved tree vigor and growth by retaining the best growing dominant and co-dominant trees with the least amount of dwarf mistletoe and as many old and/or large trees as possible.	24,260
IT 25-40 (25 to 40% interspace)		34,530
IT 40-55 (40 to 55% interspace)		39,260
IT 55-70 (55 to 70% interspace)		14,040
Single Tree Selection (ST)	Mechanical and fire treatments that leave fewer tree groups and more randomly spaced trees. Designed to increase or maintain age class diversity and reduce understory brush and shrub response, creating small openings less than or equal to ¼-acre in size where seedlings and saplings are underrepresented and brush cover is greater than 40%. Maintains higher basal area where brush competition is expected to be strong to suppress woody understory response.	5,630
Stand Improvement (SI) 10-25 (10 to 25% interspace)	Mechanical and fire treatments that thin young, even-aged stands dominated by trees less than 8.5 inches in diameter. Establishes tree groups and interspace adjacent to tree groups. Manages for improved tree vigor and growth by retaining the best growing dominant and co-dominant trees within each group and as many old and/or large trees as possible, and establishes non-forested grass/forb interspace/openings between residual tree groups or individual randomly-spaced trees. Begins conversion to uneven-aged structure.	7,480
SI 25-40 (25 to 40% interspace)		17,120
SI 40-55 (40 to 55% interspace)		7,690
SI 55-70 (55 to 70% interspace)		5,010

Treatment Type	Treatment Description/Objective	Acres
Uneven-aged (UEA) 10-25 (10 to 25% interspace)	Mechanical and fire treatments designed to develop uneven-aged structure and a mosaic of interspaces and tree groups of varying sizes. Thins tree groups to an average of 20-80 BA in pine cover types and 30-100 BA in dry mixed conifer cover type, and establishes non-forested grass/forb interspace/openings between residual tree groups or individual randomly-spaced trees. Manages to enhance growing space for younger trees, while retaining as many old or large trees as possible. Establishes regeneration openings where seedlings and saplings are underrepresented. Locates interspace in currently non-forested areas and lacking pre-settlement evidence.	48,500
UEA 25-40 (25 to 40% interspace)		53,740
UEA 40-55 (40 to 55% interspace)		11,110
UEA 55-70 (55 to 70% interspace)		43,440
Prescribed Fire Only	Prescribed burning to improve structure, maintain and develop large trees, and reduce risk of high-severity.	2,670
Prescribed Fire Only in PACs	Retain old growth attributes, protect large oaks, and ensure snags and coarse woody debris post-fire.	37,960
Aspen Restoration	Mechanical treatments that remove post-settlement conifers within 66 feet (one chain) of the aspen clone. Managed to stimulate suckering by removing aspen, disturbing the ground, and/or applying fire as needed.	980
Aspen Restoration in PACs		30
Facilitative Operations (FO) Mechanical	Mechanical and fire treatment in non-target cover types to support the use of prescribed fire in cover types targeted for restoration. Includes mastication/chipping; lop and scatter; thinning/limbing; and moving, rearranging, or removal of jackpots or excessive surface fuels.	47,580
FO Mechanical in PACs	Designed to improve safety, improve treatment effectiveness, expand burn windows, decrease undesirable fire behavior and effects, and minimize disturbance from fireline construction.	300
FO Prescribed Fire Only	Fire treatment in non-target cover types to support the use of prescribed fire in cover types targeted for restoration. Includes broadcast burning, jackpotting, pile burning, and blacklining.	630
FO Prescribed Fire Only in PACs	Designed to improve safety, improve treatment effectiveness, expand burn windows, decrease undesirable fire behavior and effects, and minimize disturbance from fireline construction.	3,070
MSO Recovery – Replacement Nest/Roost	Mechanical and fire treatments designed to develop uneven-aged structure, irregular tree spacing, and a mosaic of interspace and tree groups of varying size. Intent is to continue to develop replacement Nest/Roost where possible, and to develop a diverse mix of heterogeneous stand structures and densities to provide for owl dispersal and foraging.	19,590

Treatment Type	Treatment Description/Objective	Acres
MSO PAC Mechanical	Mechanical and fire treatments outside core areas that thins to improve structure, maintain and develop large trees, and reduce risk of high-severity fire in PACs. Designed to increase tree vigor and health, to promote irregular tree spacing, and to create canopy gaps more conducive to fire treatment (reduce fire risk). Retain old growth attributes, protect large oaks, and ensure snags and coarse woody debris post-treatment.	15,750
Savanna Restoration (70 to 90% interspace)	Mechanical and fire treatments that restore pre-settlement tree density and pattern by removing encroaching post-settlement conifers. Manages for a range of 70 to 90 percent interspace (grass/forb) between tree groups or individual trees using pre-settlement tree evidence as guidance. Retains all pre-settlement trees and the largest post-settlement trees as replacement trees adjacent to pre-settlement tree evidence (stumps, dead and down).	2,470
Severe Disturbance Area Treatment	Combination of restoration treatments: reforestation, prescribed fire, lopping/scattering, mastication, and other mechanical methods. Objective is to identify treatments that would be effective in restoring the fuel structure that produces the types of fire to which ponderosa pine is adapted.	30,340
Severe Disturbance Area – in PACs		1,420
Grassland Restoration	Mechanical and fire treatments to reduce or eliminate tree encroachment (pines and junipers). Remove trees established since interruption of the historic fire regime. Promote and re-establish the historic meadow edge. Retain all pre-settlement trees and leave replacement trees where evidence of historical large trees exist.	36,320
Wet Meadow Restoration		6,720
Riparian Restoration	Combination of restoration treatments, including mechanical and fire treatments to maintain riparian vegetation and habitat. Remove encroaching upland tree and shrub species. Remove noxious or invasive plants. Promote, protect, or plant native aquatic or riparian species. Prescribed fire to regenerate riparian species and reduce fuels.	14,560

The same amount of comprehensive restoration activities: spring restoration, stream restoration, riparian habitat restoration, and road and trail relocation/reconstruction, are proposed in Alternatives 2 and 3. These activities are described above for Alternative 2 and will be implemented using the Flexible Toolbox Approach for Aquatic and Watershed Restoration Activities (see appendix D of the DEIS).

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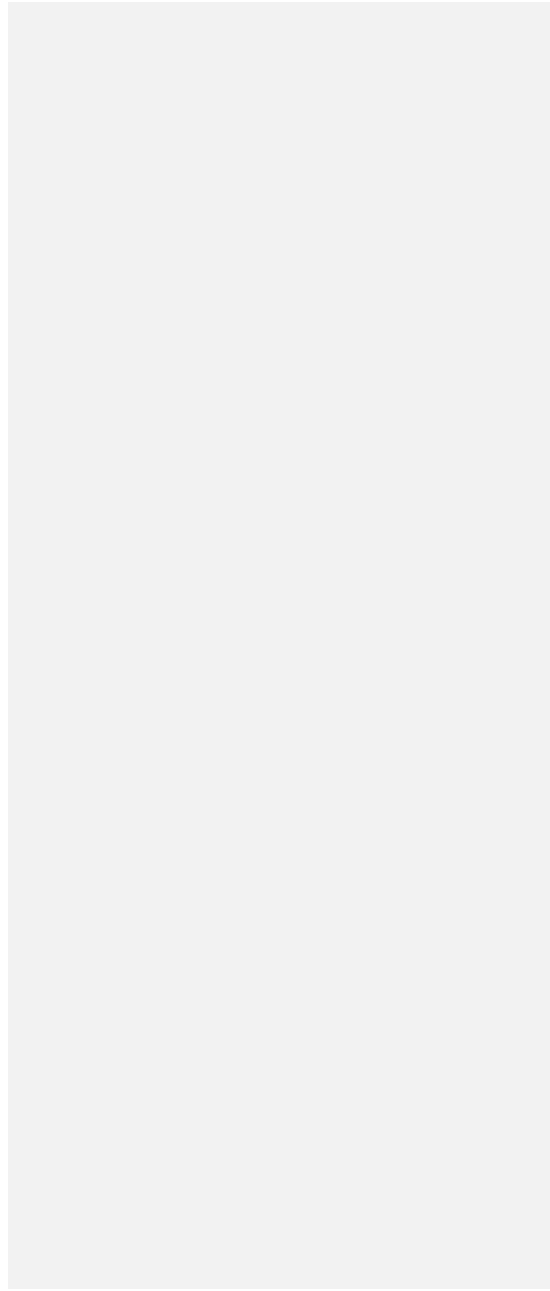


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4 Elements Common to Alternatives 2 and 3

5 *Forest Plan Amendments*

6 Three project-specific plan amendments for the Tonto NF are proposed for both action
7 alternatives. The purpose of Amendment 1 is to bring Alternatives 2 and 3 into alignment
8 with the revised Mexican Spotted Owl Recovery Plan and defer monitoring to the FWS
9 biological opinion that is specific to this project. Amendment 2 clarifies existing direction
10 related to managing canopy cover and interspace in the Forest Plan. The purpose of
11 Amendment 2 is to bring the project into alignment with the best available science
12 (Reynolds et al. 2013) that provides desired conditions for restoring fire-adapted
13 ponderosa pine in the Southwest. Amendment 3 removes the restrictive language related
14 to 40 percent slopes and the language identifying slopes above 40 percent as inoperable,
15 to allow mechanical treatments with new methods and equipment on slopes greater than
16 40 percent without adverse environmental effects (see appendix B for the full amendment
17 text).

18 A project-specific plan amendment is a one-time variance in current Forest Plan direction
19 for a project; Forest Plan direction reverts back to its original language/direction upon
20 completion of the specified project. The language proposed does not apply to any other
21 project.

22 *Comprehensive Restoration*

23 The overall goal of 4FRI is landscape-scale restoration that provides for fuels reduction,
24 forest health, and wildlife and plant diversity. All kinds of restoration work, in addition to
25 thinning and prescribed burning, are proposed in the Rim Country Project.
26 Comprehensive restoration is the term used for these other types of restoration activities.
27 The two action alternatives include the same amount of comprehensive restoration
28 activities throughout the project area: grassland restoration, meadow restoration, spring
29 restoration, stream restoration, and aquatic habitat restoration.

30 *The Flexible Toolbox Approach*

31 The flexible toolbox approach is a condition-based management strategy that allows
32 predetermined treatments to be aligned, prior to implementation, with current conditions
33 on the ground. A combination of selection criteria and vegetation conditions are used to
34 determine habitat and forest cover filters and modifiers, as well as the appropriate
35 treatments for each. Using existing stand data, these conditions and criteria are quantified
36 to estimate the acreages of specific treatments to propose in a project area. These
37 estimates are used to analyze the effects from those treatments. Site-specific field reviews
38 are conducted before implementation to verify that ground conditions match those
39 predicted. If they do not, the same selection criteria are applied again based on the actual
40 ground conditions to be sure that the right treatment occurs on the right acre.

41 The flexible toolbox approach:

- 42 • Gives the ability to obtain more detailed site-specific information.
- 43 • Adapts to changes in environmental conditions.
- 44 • Uses expected conditions to make an informed decision about what types of
45 treatments would work best in those conditions.
- 46 • Encourages application of the appropriate tool based on site conditions at time of
47 implementation.

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YES we need to review and make sure sp. are analyzing
effects of the amendments per 2012 planning rule...

- 48
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- Uses site-specific landscape features and current site conditions during implementation to guide selection of specific treatments or tools to move areas toward desired conditions and put the right treatment in the right place.
 - Gives resource specialists flexibility to increase heterogeneity across the landscape by varying the extent, type, or intensity of treatments within the extent of the treatment.

54 The flexible toolbox approach is used to:

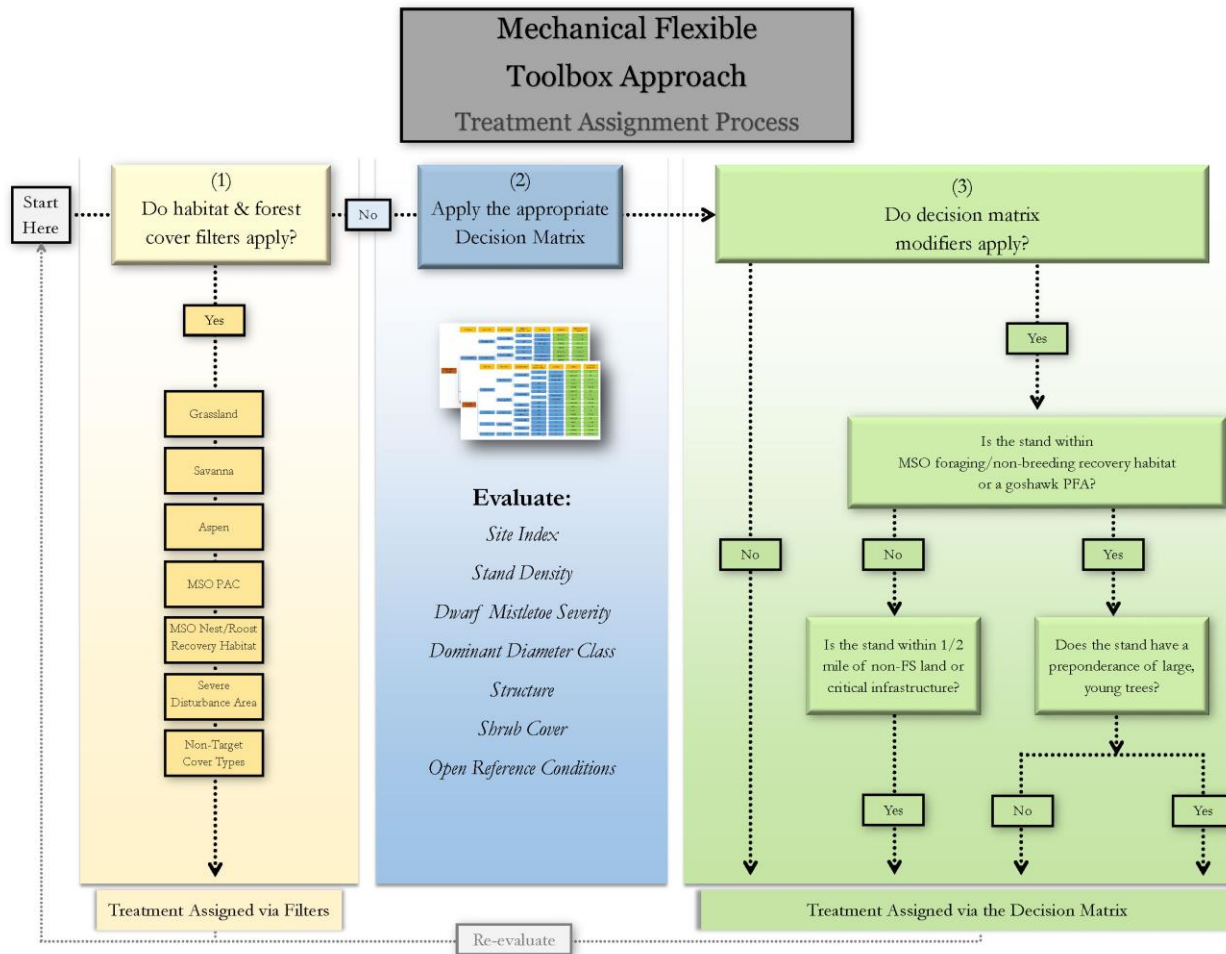
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- Identify forest cover and habitat types that warrant special consideration and require additional management constraints before prescribing treatments are “filtered” out of the decision matrix treatment considerations. These include MSO PACs, MSO Nest/Recovery Habitat, Aspen Restoration, Grassland, Savanna, Severe Disturbance Areas, and Non-target Cover Types. (The Aquatics FTA allows specialists to choose from a variety of tools designed for specific site conditions.)
 - Develop decision matrices to display the different site conditions that would lead to different treatments in areas outside of filters. While treatments in some cover and habitat types will not be determined by the decision matrices, others will make use of the decision matrices with added design features or “modifiers” to ensure resource protection. These include: MSO Recovery Habitat, NOGO Nest Stands, NOGO PFAs, SPLYT, and Sensitive Soils.
 - Estimate the number of acres of each type of treatment proposed in each of the action alternatives. Proposed treatments, each with a defined range of openness, are analyzed at the higher end of openness or intensity, in order to analyze the maximum potential effects from these treatments.
 - Prescribe appropriate treatments during implementation. Pre-implementation surveys will determine site-specific cover and habitat types and current conditions. Selection criteria for these types as spelled out in the FTA will be used to prescribe the appropriate treatments.

76 Two flexible toolbox approaches (FTAs) are being used in the Rim Country Project: one
77 for mechanical treatments (and fire), and one for aquatics and watershed restoration
78 activities. The two FTAs use different types of decision matrices. The mechanical
79 treatments FTA uses decision matrices based on vegetation or stand conditions to
80 determine the appropriate mechanical and/or fire treatments to prescribe. The aquatics
81 FTA uses a different type of decision matrix for implementation of and prioritizing
82 restoration projects. These two FTAs are included in appendix D of this EIS, the
83 Implementation Plan, in their entirety.

84 Figure 2-5 diagrams the process used in the Flexible Toolbox Approach for Mechanical
85 Treatments for assigning mechanical and fire treatments. Table 2-4 lists the
86 considerations used in the Flexible Toolbox Approach for Aquatics and Watershed
87 Restoration Activities to prioritize these activities.

88

Figure 7. Mechanical Flexible Toolbox Approach Treatment Assignment Process



91 Table 11. Considerations for Prioritizing Aquatics and Watershed Restoration Activities

Consideration	Description
Watershed Condition Framework and priority watersheds.	Areas or activities within existing Watershed Restoration Action Plans can increase opportunities to move watersheds into a higher condition class. Maintaining or improving watershed condition where feasible should be taken into consideration. Projects in priority watersheds should be considered.
Projects that improved impaired waters	Projects that improve water quality in ADEQ TMDL (water quality improvement plan) or 303b listed streams,
Vegetation restoration activities within the area.	Incorporating aquatic and watershed restoration activities in an area with other restoration treatments whenever possible is one way to create efficiencies with heavy equipment and personnel.
Partner Interest	Projects that already have partners or interested partners, particularly if funding is available, should be considered.
Presence of federally listed or candidate species	The presence of these species and improving their habitat could increase the prioritization of a project over a site that had none present.
Wet meadows, cienegas, and other similar habitats.	These habitat types store water in upper watersheds and maintain baseflow to other aquatic habitats. They also cool water and can provide for lower stream water temperatures. Maintaining and improving these areas can have great downstream beneficial impacts.
Upper watershed vs. lower	Restoration in upper portions of watersheds can have beneficial impacts downstream such as reduced sedimentation, maintaining baseflow, and cooling stream temperatures. They will have a larger range of beneficial impacts than projects lower in a watershed.
Issues that are new, easily treated, or could quickly spread.	Newer issues have not yet caused that much damage; restoration treatments of these are more cost and time effective as well as preventing more degradation. Projects such as these are 'low-hanging fruit' when compared to larger or more widespread issues. In addition, new infestations of noxious weeds or aquatic invasive plants are easier to treat early rather than after they spread.
Federal employee, contracted, and partner implementation	All three categories have merit, but may have differing financial or oversight costs. These should be considered differently amongst options and assessed. Prioritization may depend upon which category a project occurs in when weighed against work load, capacity, and financial considerations.

Consideration	Description
Process versus form-based projects	Projects that enhance site conditions, but do not restore the processes that create habitat or site conditions are considered form-based. These types of projects can require more maintenance than projects that restore the processes that create and maintain habitat. Projects that restore processes may be more of a priority than those that address a specific issue rather than the larger problem.

92

93 *Facilitative Operations*

94 Facilitative operations (FO) are vegetation treatments proposed in non-target cover types
 95 in the Rim Country project area to support the use of prescribed fire in target cover types
 96 (those targeted for restoration). FO would be used in non-target cover types that are
 97 adjacent to or between target cover types, or where existing features can be used as
 98 prescribed fire unit boundaries. FO treatments would either move these non-target cover
 99 types toward Forest Plan desired conditions or maintain their current condition.

100 FO treatments would not have to be implemented to meet Rim Country objectives, but
 101 would be available as needed to facilitate the use of prescribed fire. The use of FO would:

- 102 1. Improve safety by expanding burn units to existing natural or man-made features
 103 that could serve as effective firelines (roads, cliffs, ridges, powerlines, etc.) This
 104 would reduce firefighter exposure to risks encountered during fireline
 105 construction. These existing barriers are usually more effective than a fire line
 106 made by firefighters and heavy machinery, or can be made so with less risk, less
 107 time, less effort, and lower costs.
- 108 2. Improve treatment effectiveness and the timeframes for which prescribed fire
 109 treatments can be applied
- 110 3. Under some conditions, heavy fuel loading in chaparral or dense pinyon/juniper
 111 (particularly with a significant dead component) has the potential to produce
 112 extreme fire behavior, spotting, or other undesirable fire behavior. Where these
 113 kinds of fuels exist between target cover types and logical fuel breaks, undesirable
 114 fire behavior and effects could be decreased by manipulating fuel loading and
 115 structure. This would allow prescribed fire to be implemented under a broader
 116 range of conditions, while producing the desired fire effects.
- 117 4. Minimize the disturbance associated with fireline construction, such as soil
 118 disturbance, branch breakage, or bole damage caused by bulldozers, ATV
 119 draglines, handlines, and other means. Using existing features would result in less
 120 disturbance than other methods of creating a functional burn unit.

121 *Types of FO Treatments*

122 The expectation is that most FO treatments would be only prescribed fire with no
 123 mechanical treatments. Mechanical FO treatments would be the exception.

124 **Fire**

125 All areas proposed for FO would be available for prescribed fire, including:

- 126 • Broadcast burning
- 127 • Jackpotting (process of adding to and igniting small accumulations of woody
- 128 debris)
- 129 • Pile burning
- 130 • Blacklining

131 **Mechanical**

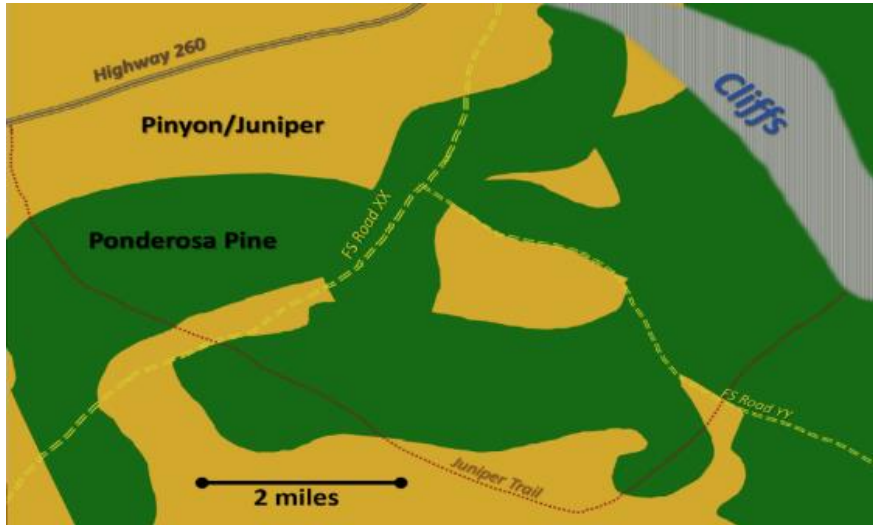
132 Where mechanical FO treatments are needed, they would be site-specific and consider
133 the requirements for all resources. Mechanical treatments could be combined with
134 prescribed fire include:

- 135 • Mastication/chipping
- 136 • Lop and scatter
- 137 • Thinning/limbing
- 138 • Moving, rearranging, or removal of jackpots or excessive surface fuels
- 139 • Any combination of the above

140 Figure 8 shows an idealized landscape in which the existing features that would make a
141 good fireline are some cliffs, two Forest Service roads, a highway, and a trail. In this
142 case, all of the burn units that could be outlined with these features would include
143 pinyon/juniper. Excluding pinyon/juniper from a burn unit would require a fireline. If the
144 pinyon/juniper was included in the burn units, the need for ground disturbing activities
145 would be minimized, and decrease the risk of injury for fire managers building firelines.

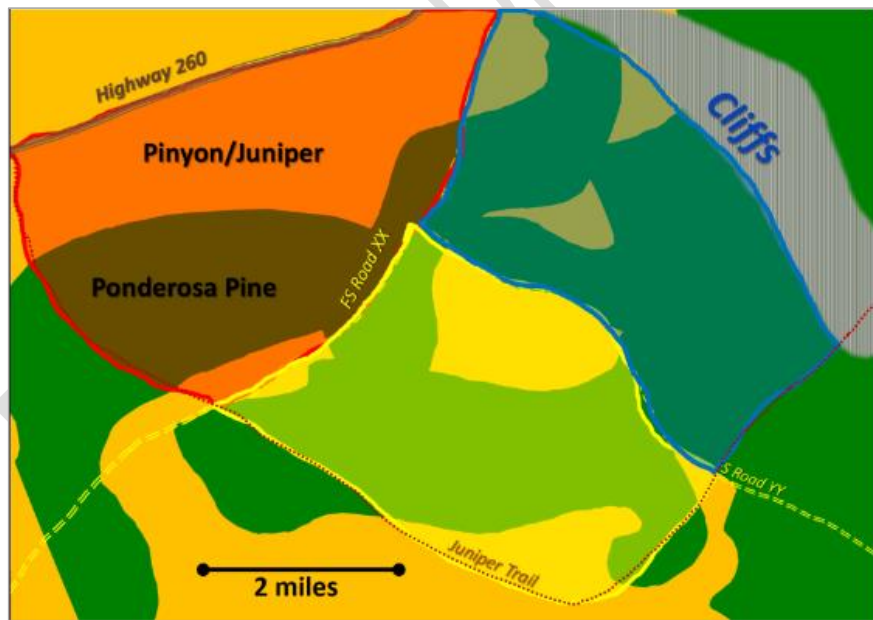
146 In this case, the use of FO would allow the inclusion of the pinyon/juniper area between
147 the ponderosa pine and the road to be included in the prescribed burn unit, as shown in
148 Figure 9. Fire managers would identify areas where there would be a potential need for
149 mechanical treatments, and work with other resource specialists to identify the
150 appropriate mechanical treatments.

151 Figure 8. Idealized Landscape of Target and Non-target Cover Types and Fireline Features



152

153 Figure 9. Same Landscape with Three Burn Units



154

155 Severe Disturbance Area Treatments

156 Severe disturbance areas (approximately 125,800 acres) are those where the spatial extent
157 or the pattern of high severity fire effects is not within NRV. In some places this has
158 resulted in aggressively sprouting species, such as alligator juniper and various species of
159 oak dominating the vegetative response, making it difficult or impossible for ponderosa
160 pine to establish or thrive. In other areas, extensive, overly dense patches of ponderosa
161 pine regeneration have put stands on a trajectory toward stagnation, density-related
162 mortality, or additional severe disturbance. Those severe disturbance areas known and
163 included in this acreage for Rim Country are:

- 164 • Bray Fire (Coconino, Tonto)
- 165 • Breed Fire (Apache-Sitgreaves)
- 166 • Coon Fire (Tonto)
- 167 • Crossing Fire (Apache-Sitgreaves)
- 168 • Dude Fire (Apache-Sitgreaves, Coconino, Tonto)
- 169 • Durfee Fire (Apache-Sitgreaves)
- 170 • February Fire (Tonto)
- 171 • Five Mile Fire (Coconino, Tonto)
- 172 • Juniper Fire (Tonto)
- 173 • Mistake Peak Fire (Tonto)
- 174 • Packrat Fire (Coconino, Tonto)
- 175 • Picture Fire (Tonto)
- 176 • Pot Fire (Coconino)
- 177 • Potato Fire (Apache-Sitgreaves)
- 178 • Promontory Fire (Tonto)
- 179 • Rodeo-Chediski Fire (Apache-Sitgreaves, Tonto)
- 180 • Rim Fire (Tonto)
- 181 • Slim Fire (Apache-Sitgreaves)
- 182 • Tanner Fire (Tonto)
- 183 • Webber Fire (Tonto)
- 184 • Tinder Fire (Coconino)
- 185 • Pivot Rock Fire (Coconino)

186 Restoration treatments in severe disturbance areas will include combinations of
187 reforestation, prescribed fire, lopping/scattering, mastication, and other mechanical
188 methods with the objective of identifying treatments that would be effective in restoring
189 the fuel structure that produces the types of fire to which ponderosa pine is adapted. In
190 areas of extensive, pure ponderosa pine regeneration, the decision matrix in the flexible
191 toolbox approach for mechanical treatments will be applied.

192 *In-woods Processing and Storage Sites (Processing Sites)*

193 The distance of the western part of the Rim Country project area from businesses that can
194 process wood products from mechanical thinning prompted the identification of potential
195 processing sites for use as needed by contractors during implementation. If primary
196 processing can be accomplished in the project area, it would facilitate more utilization of

197 forest resources, increase transportation efficiencies, reduce implementation costs, and
198 generally make it easier to complete implementation.

199 The identification of potential processing sites was initially done using spatial analysis
200 techniques and followed up with on-the-ground validation and input from subject matter
201 experts. Variables such as current road system, slopes and landforms, economics of
202 transportation, recreation sites, visual aesthetics, and wildlife and hydrological concerns
203 were factored into the analysis process.

204 The closest mill to Rim Country is the Lumberjack Mill, approximately 13 miles from
205 Heber, Arizona, just north of the eastern edge of the project area. The Lumberjack Mill is
206 operated by Good Earth Power. The mill underwent an extensive upgrade in 2017 and is
207 currently processing dry kilned and finished lumber.

208 On the western side of Rim Country, the closest wood processing facility is Canyon
209 Wood Supply, approximately 25 miles from the western boundary of the project area in
210 Camp Verde, Arizona. Canyon Wood Supply processes ponderosa pine into bundled
211 fuelwood for retail consumption.

212 A fully loaded log truck at a gross weight of 80,000 pounds can typically transport 5,000
213 board feet of raw logs. In comparison, a tractor trailer with a 45-foot trailer can typically
214 transport 40,000 board feet of green logs and be within the 80,000-pound threshold.
215 Drying ponderosa pine wood for 60 days results in a weight reduction of 23 percent,
216 which results in considerable haul cost savings. These figures put into perspective the
217 underlying economics of transporting forest products in Arizona.

218 Processing sites serve many purposes. Some log sorting would be done on all processing
219 sites, for various reasons such as increased log value and decreased hauling cost, taking
220 advantage of available log markets, and providing a better log mix to consuming mills.
221 Concentration log yards would provide a central point for accumulating logs for drying,
222 debarking, and processing, and later shipment to mill yards. Small diameter timber or
223 residue from log processing may be chipped and hauled to mills or other businesses. The
224 advantage of having strategically-located processing sites over sorting logs at a landing is
225 that logs can be more easily moved, bucked, and sorted by quality characteristics
226 (species, size, and grade) for allocation to their highest values use (Dramm et al. 2002).

227 Tasks done by equipment at processing sites would include drying, debarking, chipping
228 stems and bark, cutting logs, manufacturing and sorting logs to size, producing wood
229 cants⁴, scaling and weighing logs, and creating poles from suitable sized logs. Equipment
230 commonly used at processing sites would include circular or band saws, various sizes and
231 types of front-end loaders, log loaders, and several types of chippers. Equipment may
232 include timber processors, planers and mechanized cut to length systems, associated
233 conveyers, and log sorting bunks for accumulation and storage of logs. Electric motors
234 and gas or diesel generators would also be used to provide power. Large processing sites,
235 10 or more acres in size, would allow for more flexibility in their design and allow for
236 more area to process, grade, scale and sort logs, and manufacture cants, poles, and chip
237 and haul products. Larger sites would handle surges in incoming logs and would protect
238 workers better by providing better separation between processing and transport functions.
239 Medium-sized processing sites, five to 10 acres in size, would allow log processing

4 A **cant** is a piece of **wood** usually over 2" thick and sawn flat on one to three sides. Most pallet shops want cants to re-saw into pallet parts because they have more options on what sizes they can cut from them.

240 equipment use with more limited storage (Dramm et al. 2002). Landings for mechanical
 241 thinning contracts would be considerably smaller than log sort yards, typically about 1/3
 242 of an acre.

243 Eight processing sites were proposed and analyzed for environmental effects in the
 244 Cragin Watershed Protection Project (CWPP) (Table 2-5). These sites are carried forward
 245 for potential use in implementing the Rim Country Project. In addition, 12 in-woods
 246 processing sites are being proposed and the environmental effects from their use analyzed
 247 in the Rim Country EIS (Table 2-6). For both projects, processing site location and siting
 248 considerations include: flat uplands less than 5 percent slope; more than 200 feet from
 249 perennial, intermittent, and ephemeral stream channels/ more than 300 feet from
 250 meadows, springs, and karst features; more than ¼ mile from MSO PACs and outside of
 251 NOGO PFAs; more than ¼ mile from system hiking trails, campgrounds, and group
 252 event recreation sites; more than ¼ mile from private lands, residences, or offices; and
 253 adjacent to roads that are open year-round for product removal. Processing sites were
 254 located to provide a buffer of 100 to 300 feet from forest roads and state highways to
 255 provide for visual screening from Concern Level 1 and 2 travel ways. Figure 10 displays
 256 the processing sites already analyzed in the CWPP Environmental Analysis (EA) and the
 257 additional sites being analyzed in this EIS.

258

259 Table 12. Processing Sites Analyzed in CWPP

Site Name	Acres
FR 141, 9398	5
FR 147, 6096/6097	5
211 Revised	15
613F	15
9033H	15
FR 95, North 9032C	10
FR 95F/396	9
9729A	5
Total (8)	79

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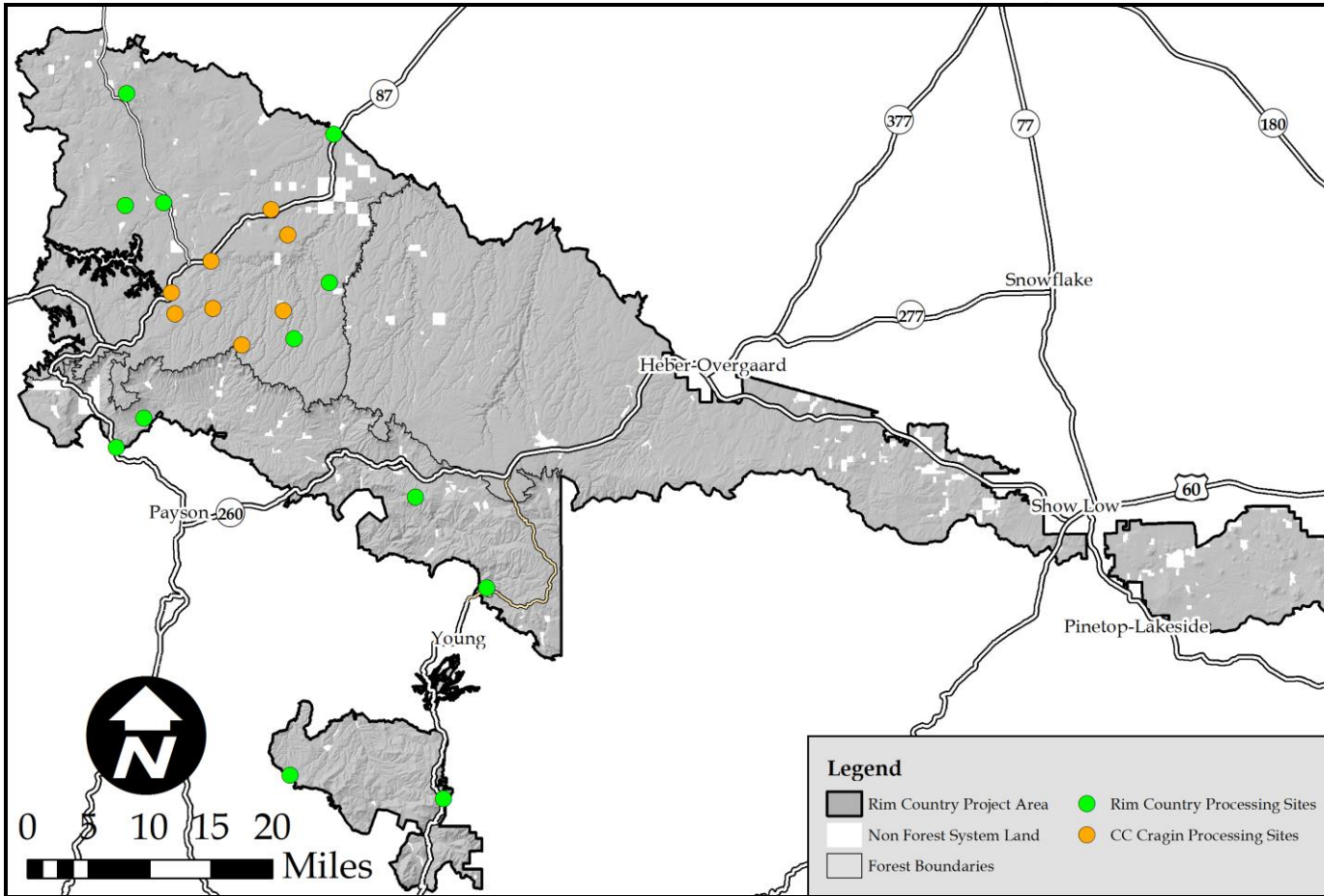
267 Table 13. Processing Sites Analyzed in 4FRI

268 Rim Country

Site Name	Acres
FR 117, 1321	4
FR 139, 9729D	14
FR 145A, 9615X	7
FR 288, 2781	4
FR 294, 294D	18
3238, 512	20
FR 582, Hwy 87	5
FR 609, 1938	7
FR 74, 64	8
FR 81, 81E	7
9364L, FH 3	21
9731G, Hwy 87	9
Total (12)	128

269

270 Figure 10. Proposed In-woods Processing Sites



271

272 These 20 in-woods processing and storage sites may be used for implementation of the
273 Rim Country Project over its implementation period for 20 years, or until implementation
274 is completed. Continuous-use processing sites are those where use is expected to be
275 continuous on a regular basis for 10-20 years. These sites are typically the larger 10 to
276 21-acre areas located close to major highways. Sites originally developed and operated
277 for continuous use will frequently change to intermittent use or occasional use following
278 initial harvest activities in the area. Intermittent use processing sites are those where use
279 is expected to be shorter term and used for one or multiple contract periods, lasting from
280 3-10 years.

281 The design features for in-woods processing sites are listed in appendix C of this DEIS.

282 *Rock Pit Use*

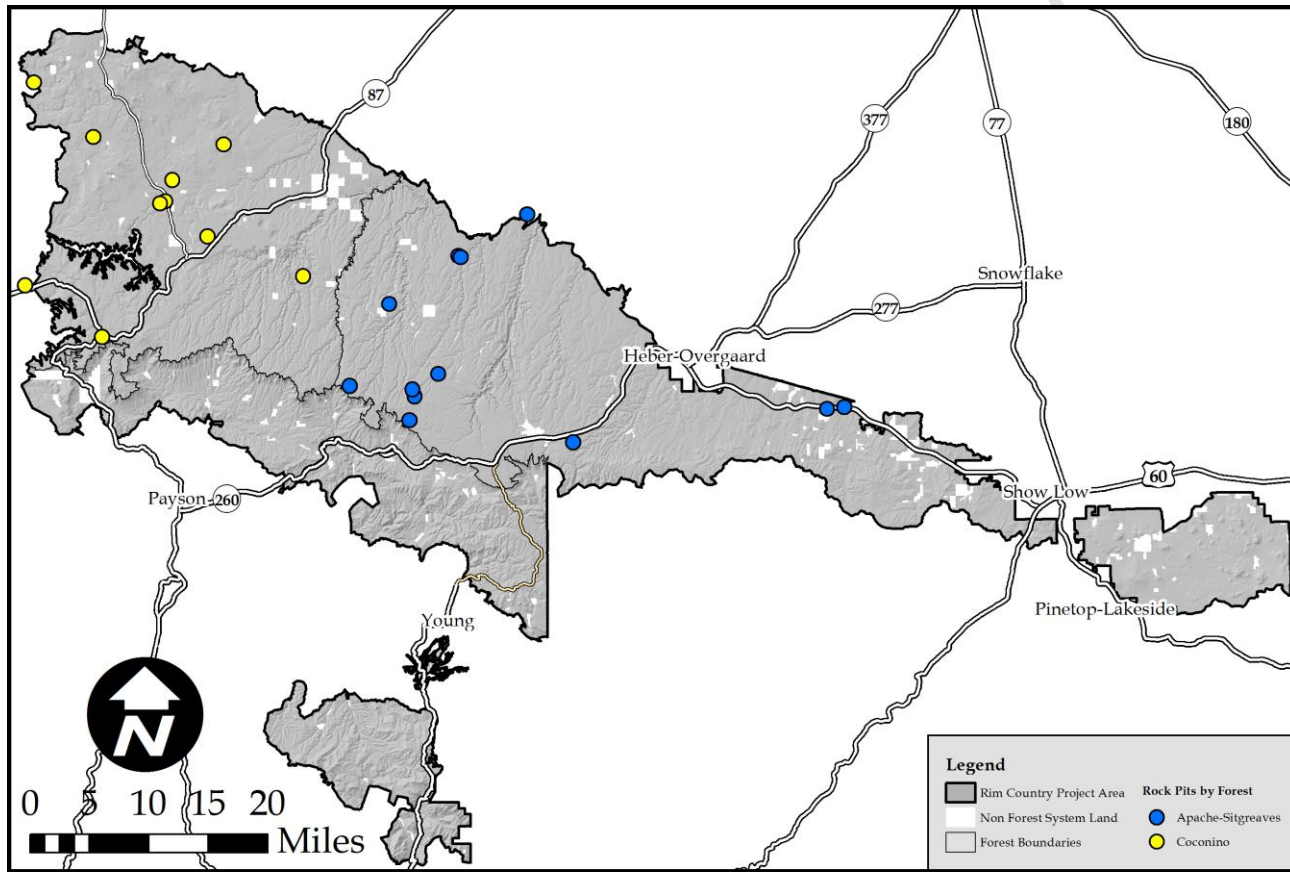
283 The Rim Country Project will analyze the effects from the use of several rock pits in the
284 project area. On the Coconino National Forest, the development, expansion, and use of
285 nine rock pits in the Rim Country project area were analyzed in the Rock Pits
286 Environmental Assessment for the Coconino and Kaibab National Forests (June 2016).
287 One additional rock pit, Park Knoll, is currently being developed by Coconino County
288 under permit. The Forest Service will have a reserve of approximately 20,000 cubic yards
289 of material in this pit, so the potential effects from the use of this rock pit will be
290 analyzed in the Rim Country EIS.

291 On the Apache-Sitgreaves National Forest, two ranger districts are in the Rim Country
292 project area, the Lakeside and Black Mesa Ranger Districts. Surfacing material needs on
293 the Lakeside Ranger District are met by a large county-operated rock pit under special
294 use permit, as well as other commercial sources. On the Black Mesa Ranger District, 11
295 existing rock pits in the Rim Country project area are proposed for expansion to provide
296 future material for implementation of Rim Country. Each of these rock pits are
297 considered for 30 percent expansion of their current footprint. The potential
298 environmental effects from the anticipated expansion of these rock pits, as well as those
299 from their use, will be analyzed in the Rim Country EIS.

300 On the Tonto National Forest, all road surface material needs would be met by local
301 commercial sources. Therefore, no effects from rock pit use on the Tonto would be
302 analyzed in the Rim Country EIS. Figure 11 displays the locations of these rock pits in
303 the Rim Country project area.

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304 Figure 11. Coconino and Apache-Sitgreaves NFs Rock Pits



305

306 Alternatives Considered and Eliminated from Detailed Study

307 This DEIS documents four (4) alternatives recommended in public comments that have
308 been considered and eliminated from detailed study. Public comments suggested four
309 alternative methods to meet the purpose and need, including alternatives that would: (1)
310 eliminate the use of prescribed fire, (2) use the original Large Tree Retention Strategy,
311 (3) return the forest to historic reference conditions, and (4) prioritize strategic treatments
312 for fire use.

313 Each alternative was evaluated to determine how well the proposal would meet the
314 purpose and needs for the Rim Country Project. The purpose of the project is to
315 reestablish and restore forest structure and pattern, forest health, and vegetation
316 composition and diversity in ponderosa pine ecosystems to conditions within the natural
317 range of variation, thus moving the project area toward the desired conditions established
318 in the Apache-Sitgreaves, Coconino, and Forest Plan Tonto National Forest Plans. The
319 needs are to increase forest resiliency and sustainability, reduce the risk of undesirable
320 fire effects, improve terrestrial and aquatic species habitat, improve the condition and
321 function of streams and springs, restore woody riparian vegetation, preserve cultural
322 resources, and support sustainable forest products industries. Resiliency increases the
323 ability of the ponderosa pine forest to survive natural disturbances such as fire, insect and
324 disease, and climate change (FSM 2020.5).

325 Eliminate the Use of Prescribed Fire

326 Some public comments suggested eliminating all prescribed fire (broadcast burns, pile
327 burns, jackpot burning) to reduce hazards from particulate matter and other substances
328 released during burning, to protect the health of the public, to provide cleaner air, and to
329 reduce carbon emissions. Recommendations for alternatives to prescribed fire include
330 logging for fire breaks, chipping, thinning, and goat or cattle grazing.

331 After an initial review, it was determined that it would not meet various elements of the
332 purpose and need for the Rim Country Project or move toward the desired conditions in
333 the Forest Plans, such as:

- 334 5. Eliminating the use of prescribed fire would negatively affect forest structure in
335 terms of moving toward age and size class diversity and desired conditions for
336 forest health. Without the thinning effects of fire on canopy fuels, seedlings, and
337 young saplings, denser conditions could slow stand development and growth
338 (Waring et al 2016). This would result in more of the landscape continuing in the
339 young forest stage. Contrary to the restoration purpose and need, development of
340 the mature and old forest stages would be impeded.
- 341 6. Mechanical treatments would address the majority of conditions associated with
342 density-related mortality, bark beetle hazard, and dwarf mistletoe infections
343 (Conklin and Geils 2008). However, the pruning effect of fire that would sanitize
344 dwarf mistletoe infections and reduce tree densities (due to the thinning effect of
345 fire) would not occur. This could lead to slight increases in bark beetle infestation
346 and density-related mortality, and would move the project area away from the
347 desired conditions for resiliency and sustainability.
- 348 7. Without the use of prescribed fire, patterns of surface vegetation would further
349 depart from the natural range of variation as fire-adapted shrubs and herbaceous
350 species decline (Huffman and Moore 2008, Moir 1988). Eliminating fire would

351 also have an effect on Gambel oak growth forms and densities. Currently, the
352 Gambel oak population throughout the project area is dominated by seedlings and
353 saplings. Without fire as a regulator of these smaller size classes, both the variety
354 of oak growth forms and densities of seedlings and saplings would continue to be
355 outside of the natural range of variation (Waring et al 2016). This would move the
356 project area away from the desired conditions for forest structure, pattern, and
357 vegetation composition and diversity.

358 8. Mechanical treatments in the project area would be effective initially at
359 restructuring most of the canopy bulk density, canopy base heights, tree density,
360 and the arrangement of trees in the short term (immediately after treatment).
361 Additionally, mechanical treatments have only a minimal effect on seedlings, and
362 provide mineral soil that can increase seedling germination. In order to avoid
363 seedling re-growth that would support undesirable fire behavior and effects, much
364 of the forested areas of the Rim country project area would need some kind of
365 treatment every 10 years, roughly 90,000 acres annually.

366 9. Mechanical treatments alone would not be sufficient to produce effects that
367 simulate regeneration and growth of native herbaceous understory vegetation
368 (move toward desired conditions for vegetation composition and diversity) or
369 reduce the natural surface fuels that have accumulated since the interruption of
370 fire on the landscape (Puhlick et al 2013). Mosaics created by patterns of
371 litter/duff and other surface vegetation could not be recreated by mechanical
372 means, and species that benefit from the heat or smoke of fire, such as
373 Beardtongue Penstemon, Fendler's Ceanothus, several species of Grama grass,
374 and various species of legumes (Abella et al. 2007, Huffman and Moore 2008,
375 Lata 2015). The negative effects of the heat and smoke of fire on species such as
376 Pineland Dwarf Mistletoe or non-native crabgrasses are beneficial for the native
377 ecosystems they inhabit.

378 10. Accumulations of litter, duff, dead and down woody debris, seedlings, and small
379 saplings would not be reduced. These accumulations, in addition to the debris
380 from mechanical treatments, could result in surface fires that burn at high
381 intensities and lethally scorch tree crowns. It could also result in mortality of large
382 and old trees in the project area.

383 11. High severity fires have the potential to cause second-order fire effects (such as
384 flooding, debris flows, and erosion). This would be contrary to the need to reduce
385 the risk of undesirable fire behavior and effects and move toward forest
386 ecosystems with increased resiliency to wildfires.

387 12. Nutrients would increasingly become locked up in litter layers, and soil
388 productivity would decline, affecting species composition and patterns (Moir
389 1988; Laughlin et al. 2011; Abella et al. 2007).

390 Depending primarily on mechanical means for project implementation, whether it was
391 grazing or machines, this alternative would not meet the purpose and need of the Rim
392 Country Project. The Guidance for Implementation of Federal Wildland Fire
393 Management Policy states:

394 Fire, as a critical natural process, is integrated into land and resource management plans
395 and activities on a landscape scale, and across agency boundaries. Response to wildland
396 fire is based on ecological, social, and legal consequences of fire. The circumstances

397 under which a fire occurs, and the likely consequences on firefighter and public safety
398 and welfare, natural and cultural resources, and values to be protected, dictate the
399 appropriate management response to fire.

400 Fire is a critical natural process, and not including prescribed fire in the Rim Country
401 Project would not meet the purpose and need of the project. The effectiveness of using
402 prescribed fire as a tool, alone or combined with mechanical treatments, to restore
403 ponderosa pine to healthier, more sustainable and resilient conditions is well documented
404 (Fulé et al. 2012).

405 Grazing was suggested as a method to reduce fuel loading. Grazers would remove the
406 herbaceous vegetation that helps carry a fire across the majority of the project area.

407 To replace the use of prescribed fire, livestock (cattle and goats) would be authorized to
408 graze on up to 899,340 acres (Alternative 2). This type of increased use would exceed
409 what is currently permitted in the existing allotment management plans in the Rim
410 Country project area. There would likely be a decline in herbaceous species production
411 and diversity, and possibly an increase in soil compaction across the project area. This is
412 contrary to the purpose and need to improve the abundance, diversity, distribution, and
413 vigor of native understory vegetation to provide food and cover for wildlife, as well as
414 move toward the desired conditions of improved condition and function of streams and
415 springs, grasslands and connected montane meadows, watersheds, and forest ecosystems.

416 This alternative would respond to Issue 5 -- Smoke/Air Quality. It would be possible to
417 use mechanical treatments to move biomass offsite and reduce surface fuels that would
418 have been burned and produced smoke. The costs to implement this would be significant
419 and there would be a large increase in truck traffic that would increase emissions, dust,
420 and degradation to roads however, mechanical treatment would not replace the role fire
421 has in improving vegetation composition and diversity.

422 It is estimated that the project area would move away from the desired conditions for
423 forest structure and pattern and resiliency within 10 years of mechanical treatments
424 without the ability use prescribed fire to: (1) stimulate understory vegetation growth; (2)
425 reduce excessive fuel loadings (accumulated since the interruption of fire on the
426 landscape); (3) maintain desired canopy base heights; (4) reduce ladder fuels (attained
427 through mechanical treatment); (5) thin seedlings and small saplings to maintain a mosaic
428 of age classes; and (6) reduce threats to cultural resources and terrestrial and aquatic species
429 habitat.

430 The use of alternative fuel reduction methods in lieu of prescribed fire could reduce some
431 surface fuels, but would not meet the ecological need for a fire-adapted landscape and
432 would add significantly to the cost of restoration. Fire that did occur on the landscape
433 would be wildfire, and the effects and behavior would be more severe than on a
434 landscape which prescribed fire had been part of the restoration treatments.

435 **Use the Original Large Tree Retention Strategy (LTRS)**

436 Scoping comments recommended incorporating the LTRS as written by the 4FRI
437 stakeholders. In the 1st 4FRI EIS, it was determined that incorporating and implementing
438 the original LTRS would not meet various elements of the purpose and need. The Forest
439 Service modified the original strategy, developing the Large Tree Implementation Plan
440 (LTIP), which was included in that EIS.

441 The Old Growth Protection and Large Tree Retention Strategy (OGP/LTRS) was
442 developed by the 4FRI stakeholders in 2011 through a collaborative process. The intent
443 of the LTRS process is to increase landscape heterogeneity and conserve biodiversity.
444 The LTRS represents a social agreement between parties, and was developed to reduce
445 conflict and enhance the chance of successfully implementing restoration at the landscape
446 scale. The original LTRS defines large post-settlement trees as those greater than 16
447 inches in diameter. The LTRS provides direction for retaining large trees across the 4FRI
448 landscape, except:

- 449 1. As necessary to meet community protection and public safety goals, and
- 450 2. Where best available science and stakeholder agreement identify sites where
451 ecological restoration and biodiversity objectives cannot otherwise be met. This
452 specifically applies to several exception categories including wet meadows, seeps,
453 springs, riparian areas, encroached grasslands, aspen groves or oak stands, within-
454 stand openings, and heavily stocked stands with high basal area generated by a
455 preponderance of large, young trees.

456 The rationale for considering but eliminating the original LTRS from detailed study are:

- 457 3. The original LTRS did not provide the ability to create regeneration openings
458 using a group selection treatment in the within-stand openings (OGP/LTRS, pp.
459 21–22) and preponderance of large, young trees (OGP/LTRS, pp. 23–24)
460 exception categories. In the short term (0 to 10 years), this would result in a
461 continued imbalance of size classes and would not move toward Forest Plan
462 desired conditions in non-PFA goshawk habitat outside of nest stands. There
463 would be no movement toward sustaining the older, larger trees into the future.
464 The ability to recruit trees into the largest size classes would be hindered.
- 465 4. The original LTRS would have required the Forest Service to consult with
466 stakeholders should a new exception category be found during implementation
467 (OGP/LTRS, p. 25). To remove the potential for Federal Advisory Committee Act
468 (FACA) violations, this consultation requirement was removed. The LTIP
469 includes language to address the concern without potentially violating FACA.
- 470 5. During implementation using the flexible toolbox approach, if conditions exist
471 that do not meet the ecological objectives included in the Large Tree
472 Implementation Plan (LTIP), no large trees would be cut until the National
473 Environmental Policy Act (NEPA) decision is reviewed by an interdisciplinary
474 team of specialists. This implementation team would decide whether the action is
475 consistent with the analysis and the record of decision. This information would be
476 part of the annual implementation plan checklist and compliance review that is
477 recommended by the team and approved by the forest supervisor(s).
- 478 6. In the original LTRS, movement toward desired conditions in the pine-oak forest
479 cover type was constrained to Mexican spotted owl habitat (OGP/LTRS, pp. 19-
480 20). This would preclude moving toward desired conditions in non-Mexican
481 spotted owl habitat (LTRS, pp. 19-20). For this reason, the ability to move all
482 pine-oak forest cover type in the project area toward desired conditions was
483 included in the Large Tree Implementation Plan.

484 **Return the forest to historic reference conditions (an aggressive**
485 **strategy to achieve comprehensive landscape restoration)**

486 An alternative that analyses the effects of “returning the forest to a state closely approximating
487 historic reference conditions, and which incorporates an aggressive strategy to achieve the stated
488 goal of comprehensive landscape restoration while complying with requirements such as the
489 Endangered Species Act... was recommended during scoping.

490 The comments state that a science-based alternative is required to understand how the
491 compromises and simplifications built into this document either are, or are not, consistent with
492 the best available science.

493 This type of alternative was considered similar to the evidence-based full restoration alternative
494 considered and evaluated in the 1st 4FRI EIS, except that it allows for complying with
495 requirements for certain habitat types (such as in the Endangered Species Act).

496 This alternative would meet the purpose of and need to increase ecosystem resiliency and
497 sustainability. It would address species habitat requirements compelled by the Endangered
498 Species Act, but would compromise sensitive species’ habitat, such as closed and moderately
499 closed forest structure in Mexican spotted owl (MSO) and goshawk habitat. Forest Plan desired
500 conditions are intended to apply to all ponderosa pine, Gambel oak, and mixed conifer cover
501 types. A subset of the ponderosa pine-Gambel oak cover type and most of the mixed conifer
502 cover type will meet the definition of recovery habitat for MSO. Recommendations regarding
503 MSO habitat are contained in the Mexican Spotted Owl Recovery Plan (USDI Fish and Wildlife
504 Service 2012).

505 With this alternative, MSO and goshawk habitat requirements would not be met. The desired
506 condition of having moderate-to-closed canopy conditions widely distributed on the landscape
507 would not be achieved. And, there would be insufficient moderate-to-closed conditions to
508 provide habitat connectivity.

509 For these reasons, this alternative was considered and eliminated from detailed study.

510 **Strategic Treatments for Fire Use Alternative**

511 This alternative was recommended after public scoping and initial development of the
512 alternatives. This suggested alternative proposes “expanded use of prescribed and resource
513 benefit fire, coupled with strategic placement of mechanical treatments...,” and a “spatially-
514 explicit means to prioritize the Rim Country landscape and identify optimal treatment actions.”
515 The project area would be divided into three types of management areas:

- 516 1. Community Protection (1/2 mile around homes and critical infrastructure, highest priority
517 for mechanical treatment)
- 518 2. Strategic Thinning Treatment (approximately 20% of operable landscape outside of
519 community protection areas, next priority, consensus-based treatments including fire-
520 only)
- 521 3. Fire Use (rest of project area not prioritized for mechanical treatment, prescribed and
522 resource benefit fire only with increased resources and dedicated fire implementation
523 team)

524 This alternative would meet the purpose of Rim Country to increase ecosystem resiliency and
525 sustainability, and would move the project area toward desired conditions. However, this
526 alternative was not analyzed in detail as the major elements suggested have been considered and

527 included in the existing action alternatives, the Modified Proposed Action and the focused
528 restoration alternative. The Modified Proposed Action proposes fire across the project area and
529 would incorporate the use of any naturally-occurring fire for resource benefits. The focused
530 restoration alternative prioritizes and limits where mechanical treatments are proposed, based on
531 spatial analysis of the values-at-risk to protect from undesirable fire effects, and where resources
532 should be deployed to “yield the greatest restoration benefit.” Although the three management
533 areas recommended are not used, both action alternatives prioritize treatments around non-FS
534 land with structures and critical infrastructure. The focused restoration alternative also prioritizes
535 areas with the highest probability of active crown fire. Both action alternatives propose
536 “consensus-based treatments” as developed with stakeholders through the collaboration process.

537 **Design Features, Best Management Practices, Conservation and** 538 **Mitigation Measures**

539 The Forest Service employs several measures in the planning and implementation of
540 management activities to reduce or prevent negative effects on the environment. The application
541 of these measures begins in the planning and design phase of a project. Forest Plan standards and
542 guidelines and the direction contained in the Watershed Conservation Practices Handbook (FSH
543 2509.25) are protection measures applied to any project. Both of these sources are incorporated
544 by reference and are not reiterated here.

545 Project design features, best management practices (BMPs), and conservation and mitigation
546 measures that are designed to minimize or avoid effects from the proposed activities have been
547 included in the analysis of this DEIS (see appendix C). All design features apply to both action
548 alternatives.

549 **Implementation Plan**

550 The implementation plan (appendix D) is designed to be integral to the selected alternative and
551 record of decision. It must be considered in conjunction with appendix C, which provides the
552 design criteria, best management practices, and conservation and mitigation measures. The
553 implementation plan provides direction to be used by Forest Service personnel to ensure that
554 management activities are implemented to meet the purpose and need for Rim Country and to
555 follow Forest Plan standards and guidelines. The implementation Plan includes the Large Tree
556 Implementation Plan (LTIP) and Old Tree Implementation Plan (OTIP) as well as permits and
557 other law, regulations and policy requirements the project would follow.

558

559 **Monitoring**

560 Appendix E includes the biophysical and socioeconomic monitoring plan. This plan is designed
561 to be integral to the selected alternative and record of decision. The monitoring plan details the
562 framework and process for monitoring selected activities. The 4FRI stakeholders and the Forest
563 Service coordinated on the design of the monitoring plan.

564 **Comparison of Alternatives**

565 This section provides a comparison of the action alternatives by the detailed mechanical and
566 prescribed fire treatments proposed for each (Table 14), and a comparison of the alternatives
567 analyzed in detail by both the significant issues (Table 15) and the potential environmental
568 effects (**Error! Reference source not found.**). Information in the tables is focused on those

|

569 activities, issue indicators and measures, and effects which can be distinguished quantitatively or
570 qualitatively between the alternatives.

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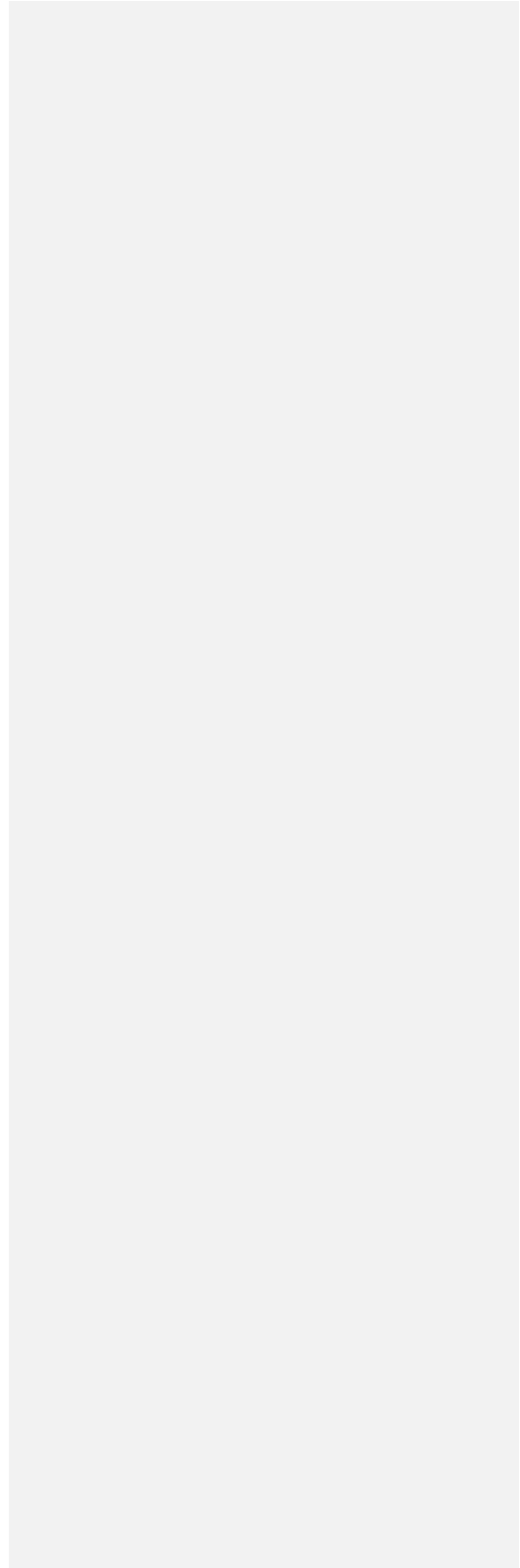


Table 14. Comparison of Alternatives by Proposed Treatment

Commented [SMK-3]: What are the * for in this table? May just be the location of the *s.- Needs updating RR

Proposed Activity	Alternative 2 Modified Proposed Action	Alternative 3 Focused Restoration
Total mechanical treatment (acres)	889,340	483,160
Intermediate thinning	150,780	112,090
10% to 25% interspace	30,210	24,260
25% to 40% interspace	53,620	34,530
40% to 55% interspace	49,980	39,260
55% to 70% interspace	16,970	14,040
Stand improvement	71,270	37,300
10% to 25% interspace	13,660	7,480
25% to 40% interspace	34,590	17,120
40% to 55% interspace	14,460	7,690
55% to 70% interspace	8,560	5,010
Single tree selection	12,510	5,630
Uneven-aged group selection	283,370	156,780
10% to 25% interspace	77,820	48,500
25% to 40% interspace	106,210	53,740
40% to 55% interspace	39,490	11,110
55% to 70% interspace	56,850	43,440
Aspen restoration	1,230	1,010
Facilitative operations	123,700	47,880
MSO recovery - replacement nest/roost	25,290	19,590
MSO PAC - mechanical	17,460	15,750
Savanna restoration	18,570	2,470
Severe disturbance area treatment	132,240	31,760
Grassland restoration*	36,280	36,280
Wet meadow restoration*	6,400	6,400
Riparian restoration*	13,060	13,060
Total prescribed fire (acres)	953,130	529,060
Prescribed fire along with mechanical treatment	889,340	483,160
Prescribed fire only	63,790	45,900
Total grassland restoration* (acres)	36,320	36,320
Mechanical and Prescribed Fire	36,280	36,280
Prescribed fire only	40	40

Total wet meadow restoration* (acres)	6,720	6,720
Mechanical and Prescribed Fire	6,410	6,410
Prescribed fire only	310	310
Total riparian restoration* (acres)	14,560	14,560
Mechanical and Prescribed Fire	13,060	13,060
Prescribed fire only	1,500	1,500
Springs restored (number)	184	184
Protective barriers around springs, aspen, native willows and bigtooth maples (miles)	200	200
Stream restoration (miles)	777	777
Existing road decommission (miles)	490	490
Unauthorized route decommission (miles)	800	800
Temporary road construction and decommission (miles)	330	170
Road relocation and reconstruction (miles)	As needed	As needed

Comparison of Alternatives by Issue

Table 15. Comparison of Alternatives by Issue

Issue	Alternative 1	Alternative 2	Alternative 3
Indicator/Measure	No Action	Modified Proposed Action	Focused Restoration
Issue 1 – Treatment in MSO PAC			
1. Stand density as measured by SDI, TPA, QMD, Canopy Cover and Basal Area (BA). Metrics are calculated for Mixed	SDI MC: from 398 (existing condition) to 414 in 2029 and 425 in 2039 SDI PO: from 339 (existing condition) to 353 in 2029 and 362 in 2039 TPA MC: from 1,291 (existing condition) to 1,170 in 2029 and 1,057 in 2039	SDI MC: from 398 (existing condition) to 253 in 2029 and 218 in 2039 SDI PO: from 339 (existing condition) to 215 in 2029 and 191 in 2039 TPA MC: from 1,291 (existing condition) to 392 in 2029 and 227 in 2039	SDI MC: from 398 (existing condition) to 262 in 2029 and 235 in 2039 SDI PO: SDI PO: from 339 (existing condition) to 237 in 2029 and 223 in 2039 TPA MC: from 1,291 (existing condition) (existing condition) to 531 in 2029 and 379 in 2039

Issue Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Restoration
Conifer (MC) and Pine-Oak (PO) Cover Types.	<p>TPA PO: from 1,276 (existing condition) to 1,130 in 2029 and 990 in 2039</p> <p>QMD MC: from 6 to 7" over 20 years QMD PO: from 6 to 7" over 20 years</p> <p>Canopy Cover MC: from 74% (existing condition) to 76% in 2029 and 78% in 2039 Canopy Cover PO: from 69% (existing condition) to 71% in 2029 and 73% in 2039</p> <p>BA MC: from 173 inches in the existing condition to 185 in 2029 and 196 in 2039 BA PO: from 144 inches in the existing condition to 155 in 2029 and 163 in 2039</p>	<p>TPA PO: from 1,276 (existing condition) to 369 in 2029 and 232 in 2039</p> <p>QMD MC: from 6" (existing condition) to 9" in 2029 and 12" in 2039 QMD PO: from 6" (existing condition) to 9" in 2029 and 11" in 2039</p> <p>Canopy Cover MC: from 74% (existing condition) to 67% in 2029 and 66% in 2039 Canopy Cover PO: from 69% (existing condition) to 62% in 2029 and 61% in 2039</p> <p>BA MC: from 173 inches in the existing condition to 131 in 2029 and 127 in 2039 BA PO: from 144 inches in the existing condition to 110 in 2029 and 106 in 2039</p>	<p>TPA PO: from 1,276 (existing condition) to 496 in 2029 and 368 in 2039</p> <p>QMD MC: from 6" (existing condition) to 9" in 2029 and 12" in 2039 QMD PO: from 6" (existing condition) to 9" in 2029 and 10" in 2039</p> <p>Canopy Cover MC: from 74% (existing condition) to 67% in 2029 and 67% in 2039 Canopy Cover PO: from 69% (existing condition) to 64% in 2029 and 64% in 2039</p> <p>BA MC: from 173 inches in the existing condition to 131 in 2029 and 130 in 2039 BA PO: from 144 inches in the existing condition to 117 in 2029 and 117 in 2039</p>
Fuel loading in Mixed Conifer (MC and Pine-Oak) Cover Types, fire hazard index, and risk	<p>Fuel loading MC: 29 tons per acre (existing condition) to 29 tons/acre in 2029 and 33 tons/acre in 2039 Fuel Loading PO: 20 tons/acre (existing condition) to 23 tons/acre in 2029 and 25 tons/acre in 2039 Fire hazard index: from 49,889 acres (41 % of all</p>	<p>Fuel loading MC: 29 tons/acre (existing condition) to 28 tons/acre in 2029 and 27 tons/acre in 2039 Fuel Loading PO: 20 tons/acre (existing condition) to 18 tons/acre in 2029 and 19 tons/acre in 2039 Fire hazard index: from 49,889 acres (41 % of all PACs</p>	<p>Fuel loading MC: 29 tons/acre (existing condition) to 27 tons/acre 2029 and 27 tons/acre in 2039 Fuel Loading PO: 20 tons/acre (existing condition) to 19 tons/acre in 2029 and 20 tons/acre in 2039 Fire hazard index: from 49,889 acres (41 % of all PACs</p>

Issue Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Restoration
of crown fire	<p>PACs in the project area) in the existing condition to 57,191 (47 %) are at risk of high severity wildfire</p> <p>Active and Passive Crown fire assessment: from 58,253 acres (48% of all PACs in the project area) in the existing condition to 61,608 acres (50%) that are at risk of active fire</p>	<p>in the project area) in the existing condition to 34,410 (28 %) are at risk of high severity wildfire</p> <p>Active and Passive Crown fire assessment: from 58,253 acres (48% of all PACs in the project area) in the existing condition to 34,068 acres (28%) that are at risk of active fire</p>	<p>in the project area) in the existing condition to 33,105 (30 %) are at risk of high severity wildfire</p> <p>Active and Passive Crown fire assessment: from 58,253 acres (48% of all PACs in the project area) in the existing condition to 33,044 acres (30%) that are at risk of active fire</p>

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Issue Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Restoration
<p>Prey habitat as measured by number of snags/acre ≥ 12 inches in diameter, CWD, and shrub and herbaceous cover. Metrics are calculated for Mixed Conifer (MC) and Pine-Oak (PO) Cover Types.</p>	<p>Snags/acre ≥ 12" MC: from 7/acre (existing condition) to 5/acre in 2029 and 2039</p> <p>Snags/acre ≥ 12" PO: from 3/acre (existing condition) to 4/acre in 2029 and 2039</p> <p>CWD MC: from 10 tons/acre (existing condition) to 12 tons/acre in 2029 and 14 tons/acre in 2039</p> <p>CWD PO: from 8 tons/acre (existing condition) to 9 tons/acre in 2029 and 10 tons/acre in 2039</p> <p>Shrub cover MC: from 0.4 tons/acre (existing condition) to 0.34 tons/acre in 2039. Shrub cover decreased</p> <p>Shrub cover PO: from 0.23 (existing) with no change through 2039</p> <p>Herbaceous cover MC and PO: from 0.21 tons/acre (existing condition) with no change through 2039.</p>	<p>Snags/acre ≥ 12" MC: from 7/acre (existing condition) to 12/acre in 2029 and 8/acre in 2039</p> <p>Snags/acre ≥ 12" PO: from 3/acre (existing condition) to 7/acre in 2029 and 2039</p> <p>CWD MC: from 10 tons/acre (existing condition) to 12/tons/acre in 2029 and 13 tons/acre in 2039</p> <p>CWD PO: from 8 tons/acre (existing condition) to 9 tons/acre in 2039</p> <p>Shrub cover MC: from 0.4 tons/acre (existing condition) to 0.63 tons/acre in 2029 and 0.73 tons/acre in 2039</p> <p>Shrub cover PO: from 0.23 (existing) to 0.24 in 2039</p> <p>Herbaceous cover MC: from 0.21 tons/acre (existing condition) to 0.24 tons/acre in 2039</p> <p>Herbaceous cover PO: from 0.21 tons per acre (existing condition) to 0.23 tons/acre in 2039</p>	<p>Snags/acre ≥ 12" MC: from 7/acre (existing condition) to 10/acre in 2029 and 8/acre in 2039</p> <p>Snags/acre ≥ 12" PO: from 3/acre (existing condition) to 7/acre in 2029 and 6/acre in 2039</p> <p>CWD MC: from 10 tons/acre (existing condition) to 12 tons/acre in 2029 and 12 tons/acre in 2039</p> <p>CWD PO: from 8 tons/acre (existing condition) to 9 tons/acre in 2039</p> <p>Shrub cover MC: from 0.4 tons/acre (existing condition) to 0.55 tons/acre in 2029 and 0.65 tons/acre in 2039.</p> <p>Shrub cover PO: from 0.23 (existing) to 0.25 in 2039</p> <p>Herbaceous cover MC: from 0.21 tons/acre (existing condition) to 0.24 tons/acre in 2039.</p> <p>Herbaceous cover PO: from 0.21 tons per acre (existing condition) to 0.22 tons/acre in 2039</p>
Issue 2 – Treatments in Goshawk Habitat			

Issue Indicator/Measure	Alternative 1 No Action	Alternative 2 Modified Proposed Action	Alternative 3 Focused Restoration
<p>Stand density as measured by SDI, TPA, QMD, reduction of average BA of large young trees Size Classes 3 (5-12") and 4 12-18"</p>	<p>SDI: from 312 (existing condition) to 326 in 2029 and 336 in 2039.</p> <p>TPA: 872 (existing condition) to 793 in 2029 and 721 in 2039.</p> <p>QMD: from 6 to 7" over 30 years.</p> <p>BA of Tree Size Classes: 3 (5-12") 47 trees/acre (existing condition) to 48 trees/acre in 2039 4 (12-18") 41 trees/acre (existing condition) to 47 trees/acre in 2039</p>	<p>SDI: from 312 (existing condition) to 129 in 2029 and 118 in 2039.</p> <p>TPA: 872 (existing condition) to 136 in 2029 and 88 in 2039.</p> <p>QMD: from 6 to 14" over 30 years</p> <p>BA of Tree Size Classes: 3 (5-12") 47 trees/acre (existing condition) to 9 trees/acre in 2039 4 (12-18") 41 trees/acre (existing condition) to 20 trees/acre in 2039</p>	<p>SDI: from 312 (existing condition) to 168 in 2029 and 165 in 2039</p> <p>TPA: 872 (existing condition) to 271 in 2029 and 224 in 2039.</p> <p>QMD: from 6 to 12" over 30 years</p> <p>BA of Tree Size Classes: 3 (5-12") 47 trees/acre (existing condition) to 18 trees/acre in 2039 4 (12-18") 41 trees/acre (existing condition) to 25 trees/acre in 2039</p>
<p>Fuel loading, fire hazard index, and risk of crown fire</p>	<p>Fuel loading: from 17 tons/acre (existing condition) to 22 tons/acre in 20439</p> <p>Fire hazard index: from 16,211 acres (28 % of all PFAs in the project area) in the existing condition to 19,472 (33 %) are at risk of high severity wildfire</p> <p>Crown fire assessment: Risk of crown fire in PFAs goes from 23,270 acres (39% of all PFAs in the project area in the existing condition to 24,653 acres (41%) in 2039</p>	<p>Fuel loading: from 17 tons/acre (existing condition) to 12 tons/acre in 2039</p> <p>Fire hazard index: from 16,211 acres (28 % of all PFAs in the project area) in the existing condition to 8,281 (14 %) are at risk of high severity wildfire</p> <p>Crown fire assessment: Risk of crown fire in PFAs goes from 23,270 acres (39% of all PFAs in the project area in the existing condition to 11,170 acres (19%) in 2039</p>	<p>Fuel loading: from 14 tons/acre (existing condition) to 13 tons/acre in 2039</p> <p>Fire hazard index: from 16,211 acres (28 % of all PFAs in the project area) in the existing condition to 9,621 (17 %) are at risk of high severity wildfire</p> <p>Crown fire assessment: Risk of crown fire in PFAs goes from 23,270 acres (39% of all PFAs in the project area in the</p>

Issue	Alternative 1	Alternative 2	Alternative 3
Indicator/Measure	No Action	Modified Proposed Action	Focused Restoration
			existing condition to 11,421 acres (20%) in 2039
Prey habitat as measured by number of snags/acre ≥ 12 inches in diameter, CWD, and shrub and herbaceous cover	Snags/acre ≥ 12 inches: from 4/acre (existing condition) to 3/acre in 2039. CWD: from 7 tons/acre (existing condition) to 9 tons/acre in 2039 Shrub cover: from 0.28 tons/acre (existing condition) to 0.26 tons/acre in 2039 (no change). Herbaceous cover: from 0.20 tons/acre (existing condition) with no change through 2039	Snags/acre ≥ 12 inches: from 4/acre (existing condition) to 6/acre in 2039. CWD: from 7 tons/acre (existing condition) to 6 tons/acre in 2039 Shrub cover: from 0.28 tons/acre (existing condition) to 0.38 tons/acre in 2039 Herbaceous cover: from 0.20 tons/acre (existing condition) to 0.24 tons/acre in 2039	Snags/acre ≥ 12 inches: from 4/acre (existing condition) to 5/acre in 2039. CWD: from 7 tons/acre (existing condition) to 7 tons/acre in 2039 Shrub cover: from 0.28 tons/acre (existing condition) to 0.38 tons/acre in 2039 Herbaceous cover: from 0.20 tons/acre (existing condition) to 0.23 tons/acre in 2039
Issue 3 – Large Tree Retention			
Acres meeting SPLYT criteria (2019 / 2039)	36,270 / 80,140	36,270 / 64,770	36,270 / 72,420
Issue 4 – Dwarf Mistletoe (DM) Mitigation			
Acres of severe DM mitigation proposed	0	29,860	21,510

Issue Indicator/Measure	Alternative 1 No Action				Alternative 2 Modified Proposed Action				Alternative 3 Focused Restoration			
		Low	Mod	Severe		Low	Mod	Severe		Low	Mod	Severe
% of acres in DM severity rating classes	2019	75%	22%	4%	2019	75%	22%	4%	2019	75%	22%	4%
	2029	67%	26%	6%	2029	69%	30%	2%	2029	68%	30%	2%
	2039	66%	25%	9%	2039	66%	31%	3%	2039	66%	30%	4%
Issue 5 – Smoke/Air Quality												
Potential for Rx fire emissions	Smoke impacts generated from the proposed treatment area would only come from wildfires or other vegetation treatment decisions. The impacts would be infrequent (a few times a year); more severe when they occur; and the duration, location, and extent of area/s affected would be largely unpredictable. The timing and type of smoke effects would change little initially, but as the likelihood of large fires increase so does the potential for air quality levels that exceed National Ambient Air Quality Standards (NAAQS) and nuisance smoke.				Updating				Updating			
Level of modelled pollutants	PM2.5- 250lbs/acre, PM10-@500 lbs/acre, carbon monoxide-@ 3400 lbs/acre, sulfur dioxide- ?? Updating				Updating				Updating			
Effects of smoke on quality of life and tourism	Updating				Updating				Updating			
Issue 6 – Economics												

Issue	Alternative 1	Alternative 2	Alternative 3
Indicator/Measure	No Action	Modified Proposed Action	Focused Restoration
Volume of wood products available	Ongoing projects will continue to provide some amount with no contribution from the Rim Country Project	5.3 MMCCF	3.6 MMCCF
Economic efficiency (project benefits/value less costs)	No direct project benefits or costs; no economics of scale in forest restoration activities	Avoided costs from forest restoration and reduced risk of high intensity wildfire	Avoided costs from forest restoration and reduced risk of high intensity wildfire; more concentrated treatments (compared to alternative 2) would lower operating costs
Changes in employment (jobs created) and labor income	Three national forests would continue to support local employment and labor income associated with harvesting, grazing and recreation at levels similar to current conditions	1,890 jobs and 78 million dollars in labor income	1283 jobs and 53 million dollars in labor income
Issue 7 – Roads			
# of miles temporary roads needed	0 miles	330 miles	170 miles

Preliminary DRAFT

Preliminary DRAFT DEIS

