

***Table of Contents***

|   |                  |
|---|------------------|
| <b><i>Chapter 1: Purpose and Need .....</i></b>   | <b><i>1</i></b>  |
| <b>Introduction .....</b>   | <b>1</b>         |
| <b>Proposed Action .....</b>  | <b>2</b>         |
| <b>Purpose and Need for Action .....</b>  | <b>2</b>         |
| <b>Desired Conditions .....</b>   | <b>8</b>         |
| Project Purpose, Need and Unit of Measure .....   | 8                |
| <b>Background.....</b>  | <b>10</b>        |
| <b>Decision To Be Made .....</b>  | <b>10</b>        |
| <b>Forest Plan Consistency.....</b>   | <b>11</b>        |
| <b>Public Involvement .....</b>   | <b>14</b>        |
| <b>Issues .....</b>   | <b>17</b>        |
| Significant Issues .....  | 17               |
| Non-significant Issues .....  | 17               |
| <b>Project Record Availability.....</b>   | <b>17</b>        |
| <b><i>Chapter 2: Comparison of Alternatives, including the Proposed Action.....</i></b> | <b><i>18</i></b> |
| <b>Alternative Development .....</b>  | <b>18</b>        |
| <b>Alternatives Considered but Eliminated from Detailed Analysis.....</b>               | <b>19</b>        |
| <b>Alternatives Considered in Detail.....</b>   | <b>20</b>        |
| No Action Alternative .....   | 20               |
| Proposed Action Alternative .....   | 20               |
| Treatment Descriptions .....  | 24               |
| <b>Proposed Action Alternative Design Features.....</b>                                 | <b>32</b>        |
| <b>Monitoring .....</b>   | <b>35</b>        |
| <b>Comparison of Alternatives .....</b>   | <b>36</b>        |
| <b><i>Chapter 3: Affected Environment and Environmental Consequences.....</i></b>       | <b><i>41</i></b> |
| <b>Past, Ongoing and Reasonably Foreseeable Future Actions.....</b>                     | <b>42</b>        |
| <b>Vegetation .....</b>   | <b>44</b>        |
| Vegetation Affected Environment .....   | 44               |
| Vegetation Environmental Consequences.....  | 48               |
| <b>Fire and Fuels .....</b>   | <b>58</b>        |
| Fire and Fuels Affected Environment .....   | 58               |
| Fire and Fuels Environmental Consequences .....   | 61               |
| <b>Soil and Water .....</b>   | <b>66</b>        |
| Soil and Water Affected Environment .....   | 66               |

|  |            |
|--|------------|
| Soil and Water Environmental Consequences .....  | 69         |
| <b>Wildlife.....</b>   | <b>77</b>  |
| Affected Environment for Wildlife.....   | 77         |
| Environmental Consequences for Wildlife .....  | 91         |
| <b>Fisheries .....</b>   | <b>150</b> |
| Affected Environment.....  | 150        |
| Environmental Consequences.....  | 153        |
| <b>Sensitive Plants.....</b>   | <b>159</b> |
| Affected Environment.....  | 159        |
| Environmental Consequences .....   | 160        |
| <b>Noxious or Invasive Weeds .....</b>   | <b>164</b> |
| Affected Environment.....  | 164        |
| Environmental Consequences .....   | 165        |
| <b>Recreation, Lands and Special Uses, Recreation Visual Quality, Opportunity Spectrum, and Wilderness .....</b> | <b>167</b> |
| Affected Environment.....  | 167        |
| Environmental Consequences .....   | 170        |
| <b>Rangeland Resources.....</b>  | <b>172</b> |
| Affected Environment.....  | 172        |
| Environmental Consequences .....   | 173        |
| <b>Heritage Resources .....</b>  | <b>175</b> |
| Affected Environment.....  | 175        |
| Environmental Consequences .....   | 176        |
| <b>Air Quality.....</b>  | <b>178</b> |
| Affected Environment.....  | 178        |
| Environmental Consequences .....   | 178        |
| <b>Economics .....</b>   | <b>182</b> |
| <b>Environmental Justice .....</b>   | <b>184</b> |
| <b>Chapter 4: Consultation and Coordination .....</b>  | <b>185</b> |
| <b>Appendix A: Proposed Action Treatment Tables .....</b>  | <b>187</b> |
| <b>Appendix B. Design Features For The Upper Beaver Creek Watershed Fuel Reduction Project.....</b>              | <b>217</b> |
| <b>Appendix C: Literature Cited .....</b>  | <b>235</b> |
| <b>Appendix D. Abbreviations, Acronyms and Glossary .....</b>  | <b>245</b> |

## ***Tables***

|   |           |
|---|-----------|
| <b>Table 1: Current Vegetation/Fuel Condition and Fire Frequency/Fire Severity data (FRCC) for the Project Area .....</b>   | <b>6</b>  |
| <b>Table 2. Existing Condition, Desired Condition, Need for Change &amp; Opportunity for Management by Biophysical Setting.....</b>   | <b>9</b>  |
| <b>Table 3: Applicable Forestwide Standards and Guidelines Under Program Component Protection .....</b>   | <b>11</b> |
| <b>Table 4: Summary of the Management Areas from Coconino National Forest Plan for the Upper Beaver Creek Watershed Fuel Reduction Project area.....</b>  | <b>12</b> |
| <b>Table 5. Upper Beaver Creek Watershed Fuel Reduction Project Vegetation and Prescribed Burning Treatments... </b>  | <b>21</b> |
| <b>Table 6. Vegetation and Fuels Treatment Objectives and Desired Conditions Post Treatment .....</b>   | <b>29</b> |
| <b>Table 7. Roadside Fuel Reduction and Hazard Tree Removal Maintenance.....</b>  | <b>31</b> |
| <b>Table 8. Summary of Acres of Management Practices by Alternative.....</b>  | <b>36</b> |
| <b>Table 9. Comparison of Project Units of Measure.....</b>   | <b>36</b> |
| <b>Table 10. Fire Type by Alternative, including the Existing Condition.....</b>  | <b>37</b> |
| <b>Table 11. Past Actions Considered for the Upper Beaver Creek Watershed Fuel ReductionProject .....</b>   | <b>43</b> |
| <b>Table 12. Ongoing and Reasonably Foreseeable Actions Considered for the Upper Beaver Creek Watershed Fuel ReductionProject .....</b>   | <b>43</b> |
| <b>Table 13: Biophysical Settings within the Upper Beaver Creek Watershed Fuels Reduction Project. ....</b>   | <b>45</b> |
| <b>Table 14: Average Trees per Acre, Canopy Cover and Quadratic Mean Diameter (QMD) within the Upper Beaver Creek Watershed Fuel Reduction Project, Current Condition (2008).....</b>           | <b>47</b> |
| <b>Table 15: Summary of Vegetation Effects by Biophysical Type for the No Action Alternative within the Upper Beaver Creek Watershed Fuels Reduction Project in 2018. ....</b>                  | <b>49</b> |
| <b>Table 16: Stand Attributes for the PAC 9" minus treatment by location/site for current year, 2008, 2018 No Action, and 2018 Proposed Action. ....</b>  | <b>52</b> |
| <b>Table 17: Average stand attributes for the savannah maintenance treatment on 2,294 acres for current year, 2008, 2018 No Action and 2018 Proposed Actionand Prescribed Burned. ....</b>      | <b>53</b> |
| <b>Table 18: Average stand attributes for the Thin from Below treatments on 4,900 acres for current year, 2008, and 2018 No Action and 2018 Proposed Action.....</b>                            | <b>53</b> |
| <b>Table 19: Average stand attributes for the Transition Maintenance treatment on 2,680 acres for current year, 2008, 2018 No Action and 2018 Proposed Action.....</b>                          | <b>54</b> |
| <b>Table 20: Average stand attributes for the Uneven-aged Management treatment on 1,215 acres for current year, 2008, 2018 No Action and 2018 Proposed Action.....</b>                          | <b>54</b> |
| <b>Table 21: Average stand attributes for the Uneven-aged Management Goshawk on 3,609 acres for current year, 2008), 2018 No Action and 2018 Proposed Action. ....</b>                          | <b>55</b> |
| <b>Table 22: Summary of Vegetation Effects by Biophysical Type for the Proposed Action Alternative Alternative within the Upper Beaver Creek Watershed Fuels Reduction Project in 2018.....</b> | <b>56</b> |
| <b>Table 23: Current Fire Condition and Fire Frequency Data (FRCC).....</b>   | <b>59</b> |
| <b>Table 24: Fire Condition Class and Fire Frequency Class by Biophysical Setting, Current Conditions, 2008 and under the No Action Alternative, 2018 .....</b>                                 | <b>61</b> |
| <b>Table 25. Summary of Fire Regime Condition Class for the No Action Alternative in 2008 and 2018.....</b>   | <b>62</b> |
| <b>Table 26. Summary of Acres of Fire Type for No Action 2008 and 2018.....</b>   | <b>62</b> |
| <b>Table 27: Fire Condition Class and Fire Frequency Class, Current condition 2008, and after the Proposed Action is implemented Year 2018.....</b>   | <b>65</b> |
| <b>Table 28. Summary of Fire Regime Condition Class for the Proposed Action Alternative in 2008 and 2018.....</b>   | <b>65</b> |
| <b>Table 29. Summary of Acres of Fire Type for Proposed Action Action 2008 and 2018 .....</b>   | <b>65</b> |
| <b>Table 30. Soil Data within the Upper Beaver Creek Watershed Fuels Reduction Project analysis area. ....</b>  | <b>66</b> |
| <b>Table 31. 5<sup>th</sup> Code watershed acres within the analysis area .....</b>   | <b>67</b> |
| <b>Table 32. Riparian Condition Reaches in the Upper Beaver Creek Watershed Fuel Reduction Project Analysis Area .....</b>  | <b>68</b> |
| <b>Table 33. Springs within the Analysis Area.....</b>  | <b>68</b> |
| <b>Table 34: Summary of Direct Effects to Soil for the Proposed Action Alternative.....</b>   | <b>72</b> |
| <b>Table 35. Summary of Cumulative Soil Effects Considering Ground Disturbance (logging, machine piling and high intensity burn acres) for the Proposed Action Alternative. ....</b>            | <b>73</b> |
| <b>Table 36. Comparison of Alternatives for the Soils Resource.....</b>   | <b>74</b> |
| <b>Table 37. Comparison of Alternatives for the Water Resource.....</b>   | <b>77</b> |
| <b>Table 38. Threatened and Endangered Species considered in this analysis .....</b>  | <b>79</b> |
| <b>Table 39: Tanks that have been historically occupied by Chiricahua leopard frogs. ....</b>   | <b>80</b> |
| <b>Table 40: MSO PACs in the Upper Beaver Creek Project area .....</b>  | <b>81</b> |
| <b>Table 41: MSO Habitat within the Project Area .....</b>  | <b>82</b> |
| <b>Table 42. Regional Forester's R3 Sensitive Species Analyzed and Habitats in the Project Area .....</b>   | <b>82</b> |
| <b>Table 43. Management Indicator Species Analyzed, Habitats and their Forest-wide Habitat and Population Trends</b>  | <b>87</b> |

|   |            |
|---|------------|
| <b>Table 44. Arizona Partners In Flight Designated Priority Species by Habitat in the Project Area.....</b>   | <b>90</b>  |
| <b>Table 45. Cover by type for current conditions (2008), 2018 PA (Proposed Action) and 2018 NA (No Action) for the project area .....</b>  | <b>97</b>  |
| <b>Table 46. Total cover % by 10K for current condition (2008), 2018 PA (Proposed Action) and 2018 NA (No Action).<br/>Table 47: Mexican spotted owl habitat within the project area by treatment type.....</b> | <b>98</b>  |
| <b>Table 48: MSO PACs, Treatments and Timing of Treatments within and adjacent to PACs. ....</b>  | <b>102</b> |
| <b>Table 49. Summary Potential Effects to Breeding MSO or Protected MSO Habitat within PACs for the Project analysis Area .....</b>   | <b>103</b> |
| <b>Table 50. Treatments in Protected, Restricted and Target/Threshold Habitat .....</b>   | <b>106</b> |
| <b>Table 51: Existing and Desired VSS Distribution for Other Forest and Woodland types within the Upper Beaver Creek Project Area .....</b>   | <b>109</b> |
| <b>Table 52: Existing and Desired VSS Distribution within three Post Fledging Areas combined .....</b>  | <b>114</b> |
| <b>Table 53: Northern Goshawk PFAs and Treatment Acres, Proposed Action Alternative .....</b>   | <b>115</b> |
| <b>Table 54: % Vegetative Structural Stages for Northern goshawk habitat within the Upper Beaver Creek Watershed Fuels Reduction Project and by 10K –Proposed Action Alterantive.....</b>                       | <b>117</b> |
| <b>Table 55: % Canopy Cover for Northern goshawk habitat within the Upper Beaver Creek Watershed Fuels Reduction Project and by 10K –Proposed Action Alterantive.....</b>                                       | <b>121</b> |
| <b>Table 56. Acres and percentage of habitat in 10K blocks of VSS 3 and 4 B and C canopy types .....</b>  | <b>134</b> |
| <b>Table 57. Changes in Forestwide Habitat for Elk, Mule Deer and Turkey with the Proposed Action, by Management Area .....</b>   | <b>138</b> |
| <b>Table 58. Comparison of Alternatives for Wildlife .....</b>  | <b>147</b> |
| <b>Table 59. Threatened, endangered, or Regional Forester’s Sensitive fishes, occurrence and habitat in the project area or vicinity.....</b>   | <b>152</b> |
| <b>Table 60. Comparison of alternatives for fisheries resource .....</b>  | <b>159</b> |
| <b>Table 61. Comparison of Alternatives for Sensitive Plants .....</b>  | <b>164</b> |
| <b>Table 62. Comparison of Alternatives for Noxious and Invasive Weeds .....</b>  | <b>166</b> |
| <b>Table 63. Comparison of Alternatives for Recreation Resources .....</b>  | <b>172</b> |
| <b>Table 64. Comparison of Alternatives for Range Resources.....</b>  | <b>175</b> |
| <b>Table 65. Comparison of Alternatives for Heritage Resources.....</b>   | <b>178</b> |
| <b>Table 66. Comparison of Alternatives for Air Resources .....</b>   | <b>182</b> |
| <b>Table 67. Cost/Benefit Ratio for the Proposed Action Alternative. ....</b>   | <b>183</b> |
| <b>Table 68. Comparison of Alternatives for Economics .....</b>   | <b>184</b> |
| <b>Table A-1. Vegetation, Prescribed Burn and Fuel Treatment Summary, (sorted by location # and site #). ....</b>   | <b>187</b> |
| <b>Table A-2. Vegetation Treatments, Upper Diameter Objective of Thinning and Estimated Number of Trees in the Larger Size Class to be Cut.....</b>   | <b>201</b> |
| <b>Table A-3 Stands with Mechanized Harvest Slope Limitations.....</b>  | <b>204</b> |
| <b>Table A-4. Estimated Number of Trees Cut 16-18” dbh in Restricted and Target Threshold Stands. ....</b>  | <b>205</b> |
| <b>Table A-5. Location/sites where ¼ protection buffer for Chiricauha and northern leopard frogs .....</b>  | <b>207</b> |
| <b>Table A-6. Location/sites where timing restrictions occur for Chiricauha and northern leopard frogs .....</b>  | <b>208</b> |
| <b>Table A-7. Location/sites of stream buffers along protected streamcourses for Chiricauha and northern leopard frogs .....</b>  | <b>209</b> |
| <b>Table A-8. Location/sites of known leafy spurge infestations that require chemical treatment prior to implementation .....</b>   | <b>214</b> |
| <b>Table A-9. Location/sites of proposed treatments in existing and developing old growth stands .....</b>  | <b>215</b> |

---

## ***Figures and Maps***

|  |            |
|--|------------|
| <b>Figure 1. Vicinity Map.....</b>   | <b>3</b>   |
| <b>Figure 2. WUI Sites.....</b>  | <b>4</b>   |
| <b>Figure 3. Potential Natural Vegetation by Biophysical Setting .....</b>   | <b>7</b>   |
| <b>Figure 4. Management Area Map for the Upper Beaver Creek Watershed Fuel Reduction Project Area.....</b>         | <b>13</b>  |
| <b>Map 1. Proposed Action Alternative Vegetation Treatments .....</b>  | <b>22</b>  |
| <b>Map 2. Proposed Action Alternative, Prescribed Burning and Fuel Treatments.....</b>                             | <b>23</b>  |
| <b>Map 3. Turkey winter range cover corridors .....</b>  | <b>34</b>  |
| <b>Map 4. Fire Type, Existing Condition, 2008.....</b>   | <b>38</b>  |
| <b>Map 5, Fire Type, No Action Alternative, 2018.....</b>  | <b>39</b>  |
| <b>Map 6. Fire Type, Proposed Action Alternative, 2018.....</b>  | <b>40</b>  |
| <b>Figure 5: Smoke Emissions for particulate matter (PM10 and PM 2.5) for prescribed fire versus wildfire.....</b> | <b>179</b> |
| <b>Figure 6: CO2 emmisions for prescribed fire versus wildfire .....</b>   | <b>179</b> |

---