

<b>Appendix H Cost and Operations Assumptions</b>					
<b>(through 2017)</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>	<b>Alternative 4</b>	<b>Alternative 5</b>
<b>TREATED ACRES</b>					
Acres of Prescribed Fire	64,200	64,200	25,400	109,300	29,900
Acres of Wildland Fire Use	55,000	55,000	8,800	5,500	88,000
Acres of Suppression	20,050	20,050	26,070	24,070	18,050
Acres of Manual Thinning	400	375	592	120	401
Acres of Mechanical Thinning	0	2,117	3,358	682	2,275
<b>Total Acres Treated</b>	<b>139,650</b>	<b>141,742</b>	<b>64,220</b>	<b>139,672</b>	<b>138,626</b>
<b>Average Acres Treated/Year</b>	<b>12,695</b>	<b>12,886</b>	<b>5,838</b>	<b>12,697</b>	<b>12,602</b>
<b>COSTS<sup>1</sup></b>					
Prescribed Fire	\$5,080,146	\$5,080,146	\$2,009,902	\$8,648,909	\$2,365,987
Wildland Fire Use	\$10,831,150	\$10,831,150	\$1,732,984	\$1,083,115	\$17,329,840
Suppression	\$5,847,182	\$5,847,182	\$7,602,794	\$7,019,534	\$5,263,922
Manual Thinning	\$474,800	\$445,125	\$702,704	\$142,440	\$475,987
Mechanical Thinning	\$0	\$1,481,900	\$2,350,600	\$477,400	\$1,592,500
<b>Total Project Costs</b>	<b>\$22,233,278</b>	<b>\$23,685,503</b>	<b>\$14,398,984</b>	<b>\$17,371,398</b>	<b>\$27,028,236</b>
<b>Average Cost / Treated Acre</b>	<b>\$159</b>	<b>\$167</b>	<b>\$224</b>	<b>\$124</b>	<b>\$195</b>
<b>GRCA PERSONNEL DAYS<sup>2</sup></b>					
Prescribed Fire	17655	17655	6985	30058	8223
Wildland Fire Use	12265	12265	1962	1227	19624
Suppression	5915	5915	7691	7101	5325
Manual Thinning	200	188	296	60	201
Mechanical Thinning	0	265	420	85	284
<b>Total GRCA Personnel Days</b>	<b>36035</b>	<b>36287</b>	<b>17354</b>	<b>38530</b>	<b>33656</b>
<b>Average GRCA Pers. Day/Year</b>	<b>3276</b>	<b>3299</b>	<b>1578</b>	<b>3503</b>	<b>3060</b>
<b>NON-GRCA PERSONNEL DAYS<sup>3</sup></b>					
Prescribed Fire	7,319	7,319	2,896	12,460	3,409
Wildland Fire Use	17,875	17,875	2,860	1,788	28,600
Suppression	8,622	8,622	11,210	10,350	7,762
Manual Thinning	8,000	7,500	11,840	2,400	8,020
Mechanical Thinning	0	3,176	5,037	1,023	3,413
<b>Total Non-GRCA Personnel Days</b>	<b>41,815</b>	<b>44,491</b>	<b>33,843</b>	<b>28,021</b>	<b>51,203</b>
<b>Average Non-GRCA Pers Day/Year</b>	<b>3,801</b>	<b>4,045</b>	<b>3,077</b>	<b>2,547</b>	<b>4,655</b>
<b>OPERATION DAYS<sup>4</sup></b>					
Prescribed Fire	180	180	71	306	84
Wildland Fire Use	550	550	88	55	880
Suppression	201	201	261	241	181
Manual Thinning Operations	400	375	592	120	401
Mechanical Thinning Operations	0	529	840	171	569
<b>Total Fire Operations Days</b>	<b>1330</b>	<b>1835</b>	<b>1851</b>	<b>892</b>	<b>2114</b>
<b>Average Fire Ops. Days/Year</b>	<b>121</b>	<b>167</b>	<b>168</b>	<b>81</b>	<b>192</b>
<b>HOURS OF FLIGHT TIME<sup>5</sup></b>					
Prescribed Fire	161	161	64	273	75
Wildland Fire Use	355	355	57	35	568
Suppression	1215	1215	1580	1459	1094
<b>Total Hours of Flight Time</b>	<b>1730</b>	<b>1730</b>	<b>1700</b>	<b>1768</b>	<b>1736</b>
<b>Average Hours Flight Time/Year</b>	<b>157</b>	<b>157</b>	<b>155</b>	<b>161</b>	<b>158</b>

<b>TRAIL CLOSURES (Days)<sup>6</sup></b>					
Prescribed Fire	26	26	10	44	12
Wildland Fire Use	60	60	10	6	96
Suppression	48	48	63	58	43
<b>Total Trail Closures</b>	<b>134</b>	<b>134</b>	<b>82</b>	<b>107</b>	<b>151</b>
<b>Average Trail Closure Days/Year</b>	<b>12</b>	<b>12</b>	<b>7</b>	<b>10</b>	<b>14</b>
<b>ROAD CLOSURES (Days)<sup>6</sup></b>					
Prescribed Fire	26	26	10	44	12
Wildland Fire Use	40	40	6	4	64
Suppression	48	48	63	58	43
<b>Total Road Closures</b>	<b>114</b>	<b>114</b>	<b>79</b>	<b>105</b>	<b>119</b>
<b>Average Road Closure Days/Year</b>	<b>10</b>	<b>10</b>	<b>7</b>	<b>10</b>	<b>11</b>
<b>MILES OF HANDLINE CONSTRUCTED<sup>7</sup></b>					
Prescribed Fire	14	14	6	29	8
Wildland Fire Use	6	6	1	1	9
Suppression	79	79	102	94	71
<b>Total Line Construction (Miles)</b>	<b>98</b>	<b>98</b>	<b>109</b>	<b>124</b>	<b>87</b>
<b>Average Line Const. Miles/Year</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>8</b>

**ASSUMPTIONS**

**<sup>1</sup>Cost Assumptions**

Mechanical Thinning will accomplish approximately 85% of the thinning project acres

Average cost per acre for Wildland Fire Use (2003-2006) = \$196.93/acre

Treatment cost per acre for RX Fire ranged from \$14.19/acre to \$209/acre with an average of \$34.13/acre

Costs for Cultural and Wildlife Surveys average approximately \$45/acre for RX Fire

Total Cost/Acre for RX Fire = \$79.13/acre

Average Cost/acre for Manual Thinning FY06-FY03 Thinning Projects = \$1187/acre

Average Cost/acre for Mechanical Thinning and Fuel Removal = \$700\$/acre (Discussion with IMR Fire Specialist Mike Davin)

Average Cost/acre for Suppression Fire for GRCA 2000-2006 = \$291.63

**<sup>2</sup>Number of GRCA Personnel Days**

For every 1,000 acres of prescribed burning there are

20 person days for planning

20 person days of ESA/SHPO monitoring

75 person days for preparation

80 person days for implementation

60 person days for monitoring/holding

20 person days for rehab/cleanup Total for RX Fire = 275 person days/1,000 acres

For every 1,000 acres of wildland fire use there are

3 person days planning

200 person days implementation

20 person days rehab/cleanup Total for WFU = 223 person days/1,000 acres

For every 1,000 acres of suppression fire there are

150 person days containment

100 person days mop-up

30 person days rehab

	15 person days logistics and cleanup	Total for Suppression = 295 person days/1,000 acres
For every 2 acres of manual thinning use there are	1 day for planning, COR duties, and logistics	Total for Manual Thinning = 1 person day/2 acres
For every 8 acres of mechanical thinning there are	1 day for planning, COR duties, and logistics	Total for Mechanical Thinning = 1 person day/8 acres
<b><sup>3</sup>Number of Non-GRCA Personnel Days</b>		
For every 1,000 acres of prescribed burning there are	25 person days of ESA/SHPO monitoring 10 person days for preparation 65 person days for implementation 6 person days for monitoring/holding 8 person days for rehab/cleanup	Total for RX Fire = 114 person days/1,000 acres
For every 1,000 acres of wildland fire use there are	5 person days planning 300 person days implementation 20 person days rehab/cleanup	Total for WFU = 325 person days/1,000 acres
For every 1,000 acres of suppression fire there are	250 person days for containment 150 person days for mop-up 30 person days for rehab	Total for Suppression = 430 person days/1,000 acres

*Manual* A 20-person crew can accomplish 1-treated acre/day of thinning, hauling, piling/chipping  
*Mechanical* A 6-person crew can accomplish 4-treated acres/day of thinning, hauling, piling/chipping/removal  
Foreman, 2 sawyers, 3 equipment operators

#### **<sup>4</sup>Fire Operation Days**

1. 7 days of operations for every 2,500 acres of RX fire
2. 25 days for every 2,500 acres of WFU
3. 25 days for every 2,500 acres of Suppression
4. Prescribed fire and WFU may both occur on the same days (counted twice)
5. Two WFU fires may be active on the same day (counted twice)
6. Approximately 1-acre/day manual thinning could be accomplished
7. Approximately 4-acres/day mechanical thinning could be accomplished

#### **<sup>5</sup>Hours Flight Time**

1. 1 hour flight time for every 400 acres of RX fire
2. 1 hour flight time for every 155 acres of WFU
3. 1 hour flight time for every 16.5 acres of suppression fire

#### **<sup>6</sup>Trail and Road Closures**

1. For each 2,500 acres of prescribed burning, a trail will be closed for 1 day. This trail may be an inner canyon trail that

starts or ends in the burn unit, or a trail that runs through the unit

2. For every 2,500 acres of prescribed burning, a road will be closed for 1 days.
3. For every 5,500 acres of wildland fire use, a trail will be closed for 6 days
4. For every 5,500 acres of wildland fire use, a road will be closed for 4 days
5. For every 2,500 acres of suppression fire, a trail will be closed for 6 days
6. For every 2,500 acres of suppression fire, a road will be closed for 6 days
7. No trail or road closures will occur during thinning operations

### <sup>7</sup>Handline Construction

1. South Rim - 12.5 miles of handlines are already established. These lines will need to be raked but actual line construction is complete from past projects
2. South Rim - 4 miles of new handline will need to be constructed for future projects for Alternatives 1, 2, 3, 5
3. South Rim - 11 miles of new handline will need to be constructed for future projects for Alternative 4
4. North Rim –Alternatives differ
  - Alt. 1 - 10 miles
  - Alt. 2 - 10 miles
  - Alt. 3 - 2 miles
  - Alt. 4 - 18 miles
  - Alt. 5 - 3.5 miles
5. Approximately 45% of suppression fire perimeters will have line construction  
The other 55% will be natural barriers, roads, trails, or cold fire edge  
1 square mile is 640 acres = 4 miles circumference. Added another 40% for uneven fire edge  
= 5.6 miles/640 acres (2500acres/640acres) 5.6 miles = 21.84 miles per 2500 acres  
45% of 21.84 miles= 9.8 miles of handline/2500 acres
6. Assumption For every 2,500 acres of WFU, 1/4 mile of fire line will be constructed