

CHAPTER 2. ALTERNATIVES CONSIDERED

Introduction

This chapter describes and compares alternatives to the proposed action considered in the Crescent Project analysis. Information in this Chapter will provide the decision maker with a range of alternatives to consider for the Crescent Project. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., use of commercial harvest vs. non-commercial harvest) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of habitat available to threatened/endangered species). The process used to develop alternatives; the description of alternatives to be analyzed in further detail, a comparison of those alternatives and the reasoning for eliminating other alternatives that were considered from further analysis will be explored in this section of the analysis.

Formulation of Alternatives

The Interdisciplinary Team (IDT) and District Ranger (Line Officer) analyzed both internal and external comments received during the scoping period. Alternatives were developed to respond to the unresolved issues as they related to the purpose and need for this project, laws, regulations, and policies that govern land use on the National Forest System lands. These alternatives represent different levels and types of management activities. The alternatives considered in detail; Alternative #1 (No Action), Alternative #2 (Proposed Action), Alternative #3 (herbicide/clearcut reduction), Alternative #4 (timber emphasis), and Alternative #5 (extended burning) display a range of options which could be implemented to manage the Crescent Project Area. One additional Alternative was considered but eliminated from further study and will be discussed later in this chapter. Management Needs and opportunities as determined by on-the-ground investigations were also considered in this process.

Alternatives to the “proposed action” must meet the purpose and need as stated in Chapter 1 and address the key issues described earlier. A “no action” alternative must be included as one of the alternatives analyzed. The IDT and the District Ranger believe these additional alternatives to the proposed action provide a range of alternatives for the District Ranger (Line Officer) to select from, and adequately represents the range of concerns of the Forest Service, local residents, other agencies, and most members of the public that responded to the Forest Service during the scoping (initial public involvement) phase.

As the project is implemented, actual amounts of activities on the ground (measured in acres, miles, numbers) may vary due to environmental, social and financial conditions. Advances in mapping technology and data management may account for some differences between planned activity amounts and those amounts actually implemented. All changes would be evaluated to ensure that any effects are within the parameters of the effects analyzed in this document and would be documented in the Crescent Area Project Record. Pertinent Forest Plan standards and guidelines designed to mitigate the affects of alternative treatments are also listed. All treatment activity values listed (Table 2-1) are given with approximate values (rounded to the nearest tens).

Alternatives to be Evaluated in Detail

The Forest Service through Interdisciplinary Team input and analysis of the issues, developed five alternatives, including the No Action and Proposed Action Alternatives. For a compartment/stand treatment activity listing, see Table E-1 in Appendix E.

Alternative #1 (No Action)

This alternative provides a baseline (reference point) against which to describe the environmental effects of the action alternatives. This is a viable alternative and responds to the concerns to keep the present openland management in place,

with no new activities taking place. Maintenance activities such as road repair, fire suppression, recreation maintenance and other ownership responsibilities are maintained at present levels. No vegetation is manipulated. No old growth is designated, but this alternative maximizes the old growth condition. The option for future management in this area would not be foreclosed. There is an increased cost of restarting management; such as recovery of open lands from brushy conditions, loss of products to mortality, loss of potential growth to overcrowding, insect and disease susceptibility, etc. Forest Plan objectives are not met, nor is the desired future condition being worked toward under this alternative.

Alternative #2 (Proposed Action)

This alternative is the proposed action based on the purpose and need outlined in Chapter 1. This represents the interdisciplinary team's proposal to move the existing resource condition toward the desired future condition as specified in the Forest Plan.

A non-significant Forest Plan Amendment would be written to cover 3 proposals in this alternative. To assure compliance with the Forest Plan in Management Area 6.2, a non-significant Forest Plan Amendment would be required for additional harvest above that currently allowed. A Forest Plan Amendment would also be required for expansion of the protection given to Mayfield Spring Wet Meadow Special Area (Management Area 8.1). Lastly, a non-significant Forest Plan Amendment would be required for upgrading 7.6 miles of non-system roads to system roads.

This alternative includes the projects proposed during the scoping phase of this project. This alternative responds to the need to enhance declining wildlife habitats, improve forest health and provide further dispersed recreational opportunities with minimal impacts in the Crescent Area Project and provides forest products. Below is a summary of actions (identified in Chapter 1) that would occur in Alternative #2:

Recreation Management

- Maintain 4 river access sites.
- Upgrade 2 river access parking areas
- Upgrade 4 miles of Cole Creek Trail
- Increase Public Access

Wildlife Habitat Maintenance and Improvement

- Provide 950 acres of Woodland Habitat in the 0-9 year age class. (clearcut = 330 ac., shelterwood = 320 ac., uneven-aged = 300 ac.)
- Designate 1370 acres of woodland habitat in old growth condition.
- Provide over 4000 acres of a habitat condition where 40-50 percent of the sawtimber component of the Woodland habitat in oak, oak-pine, and pine exhibits a condition of 20-30 percent forbs, grass, and shrub cover.
- Provide 320 acres of Woodland habitat in oak type over 50 years with a dense understory.
- Provide 1020 acres of open and semi-open habitat.
- Provide 13 new water sources and maintain or improve 16 existing water sources.

Wildland Urban Interface fuel reduction

- Introduce prescribed fire to 270 acres in order to reduce fuels and the risk of wildfires near urban communities.

Protect and improve Mayfield Spring Wet Meadow Special Area.

- Increase the boundary of Mayfield Wet Meadow Special Area from 10 to 90 acres through a Forest Plan Amendment.

Ecosystem Integrity and/or Watershed health

- Introduce prescribed fire to 2800 acres that would mimic natural disturbance pattern under which the oak woodlands of the Ozarks evolved. Prescribed intervals of 2-7 years would be used.
- Control fescue on 400 acres to help in the establishment of native tree species and warm season grasses.
- Improve bottomland riparian habitat by planting native hardwoods on 100 acres.
- Enhance the warm season grass component on 500 acres of existing open and semi-open habitats
- Install 8 drinker systems at waterholes for livestock.

- Control the spread of noxious weed species like multi-flora rose throughout the Crescent Project Area using herbicides (Glyphosate, Triclopyr).
- Clean-up scattered illegal dump sites.
- Close and rehabilitate 20 miles of existing old road corridors.
- Stabilize eroding stream banks.

Dead/Dying tree salvage and desirable conditions for tree growth.

- Harvest dead and dying trees on 80 acres in the Crescent project area.

Alternative #3 (Reduced clearcut/herbicide use)

The objective of this alternative is to meet and implement the purpose and need of the Crescent project. This alternative was developed in response to comments, in part, by organizations such as Heartwood and Mark Twain Forest Watchers for less intensive harvest methods (fewer clearcut acres), less general harvest acres, and less herbicide use (see Alternative Comparison Table 2-1). This alternative was also developed in response to individuals requesting an increase in prescribed burning.

Clearcut harvest acres are reduced in the project area by 43% from 330 acres to 190 acres. Many of these acres were switched to tree mortality salvage, while the remaining went to an old growth designation. Prescribed burns for Ecosystem Restoration and Wildland/Urban Interface increased 1,230 acres from 3,060 acres to 4,290 acres. Fescue conversion is accomplished with repeated tilling (warm season “crop” conversion) rather than herbicide. Herbicide is restricted to spot applications of noxious weed infestations and hardwood planting spots.

A non-significant Forest Plan Amendment would be written to cover 2 proposals in this alternative. To assure compliance with the Forest Plan in Management Area 8.1, a Forest Plan Amendment would be required for expansion of the Mayfield Spring Wet Meadow Special Area. As a result of a decrease in the oak and oak-pine thinning proposal in this alternative, no Forest Plan amendment is needed for Management Area 6.2. Harvest in Management Area 6.2 meets Forest Plan direction. Lastly, a non-significant Forest Plan Amendment would be required for upgrading 7.6 miles of non-system roads to system roads.

Changes from Alternative #2 (Proposed Action) include:

- Reduce clearcutting from 330 acres (ac.) to 190 ac. Changed clearcut prescription on nine (9) stands to salvage mortality prescription. Changed clearcut prescription on one (1) stand to old growth prescription.
- Increase Group Selection Harvest (Uneven-aged harvest) from 2,010 ac. to 2,040 ac. Changed old growth prescription on 2 stands to Group Selection Harvest prescription.
- Reduce proposed old growth prescriptions from 1,370 ac. to 1,360 ac. Changed old growth prescription on two (2) stands to Group Selection Harvest prescription. Dropped one (1) stand from old growth designation and changed the clearcut prescription on one (1) stand to old growth prescription.
- Reduce pine and oak-pine thinning from 1,290 ac. to 1,140 ac. Dropped 17 stands in Management Area 6.2. As a result, a Forest Plan Amendment is not needed for additional harvest.
- Increase salvage harvest from 80 to 200 ac. Changed clearcut prescription on 9 stands to salvage harvest prescription.
- Increase Wildland Urban Interface prescribed burns from 270 ac. to 880 acres. New prescribed burns planned to protect Communities at risk.
- Increase Ecosystem Restoration prescribed burns from 2,790 ac. to 3,410 acres. New prescribed burns planned to restore ecosystem integrity.
- Reduce use of herbicides in stands proposed for fescue control. Use warm season “crop” conversion on all stands over multiple years if needed. Disk/mowing or other mechanical methods used.
- Reduce use of herbicides in stands to be planted to bottomland hardwoods. Use 4 x 6 foot strip herbicide (Glyphosate) for tree bed planting.
- Drop warm season grass planting in one stand.

- Mechanically treat identified noxious weeds in the project area. Spot herbicide use (Glyphosate, Triclopyr) is limited to: 2% of total openland acres (~20 ac.), and along roadsides (~5 acres).

Alternative #4 (Timber emphasis)

The objective of this alternative is to meet and implement the purpose and need of the Crescent project. This alternative was developed in response to comments, in part, by organizations such as Missouri Forest Products Association requesting more timber management emphasis. This alternative was also developed in response to individuals requesting a decrease in prescribed burning and an alternative method to herbicide use in stands proposed for fescue control.

Harvest acres with a clearcut prescription are increased from 330 to 530 acres (totals 4% of the project area). Grazing is eliminated as a tool for opening maintenance in this alternative. Fescue conversion is accomplished thru haying and/or other mechanical means with repeated prescribed burning rather than herbicide.

As with the proposed action, a non-significant Forest Plan Amendment would be written to cover 3 proposals in this alternative. To assure compliance with the Forest Plan in Management Area 6.2, a non-significant Forest Plan Amendment would be required for additional harvest above that currently allowed. A Forest Plan Amendment would also be required for expansion of the protection given to Mayfield Spring Wet Meadow Special Area (Management Area 8.1). Lastly, a non-significant Forest Plan Amendment would be required for upgrading 7.6 miles of non-system roads to system roads.

Changes from Alternative #2 (Proposed Action) include:

- Reduce shelterwood harvests from 630 ac. to 450 acres. Changed shelterwood prescription on 15 stands to clearcut prescription. Changed old growth prescription on one (1) stand to shelterwood prescription.
- Increase clearcut harvests from 330 ac. to 530 acres. Changed shelterwood prescription on 15 stands to clearcut prescription.
- Reduce Group Selection Harvest (Uneven-aged harvest) from 2,010 ac. to 1,980 acres. Dropped Group Selection Harvest prescription on 2 stands.
- Reduce proposed old growth from 1,370 ac. to 1,360 acres. Changed old growth prescription on one (1) stand to shelterwood prescription.
- Increase pine and oak-pine thinning from 1,290 ac. to 1,320 acres. One stand inadvertently left out at the time of scoping (Compartment 98 stand 4 - spreadsheet error).
- Reduce Wildland Urban Interface prescribed burns from 270 ac. to 53 acres. Dropped three proposed Wildland Urban Interface prescribed burns.
- Reduce Ecosystem Restoration prescribed burns from 2,790 ac. to 2,685 acres. Dropped one prescribed burn from ecosystem restoration prescription. Added one stand to already proposed prescribed burn to restore ecosystem integrity.
- Reduce use of herbicides in stands proposed for fescue control. Use hay and burn regime on all stands over multiple years if needed. Disk/mowing or other mechanical methods used.
- Drop warm season grass planting in one stand.
- Mechanically treat identified noxious weeds in the project area. Spot herbicide use (Glyphosate, Triclopyr) is limited to: 2% of total openland acres (~20 ac.), and along roadsides (~5 acres).

Alternative #5 (Extended Burning Alternative)

The objective of this alternative is to meet and implement the purpose and need of the Crescent project. This alternative was developed in response to comments, in part, by individuals and organizations requesting an increase in prescribed burning and an alternative method to herbicide use in stands proposed for fescue control and site prep for tree planting.

Prescribed burns for Ecosystem Restoration and Wildland/Urban Interface increased 1,230 acres from 3,060 acres to 4,290 acres. Fescue conversion is accomplished with broadcast herbicide in compartment 103/50 and 56 (with follow-up

spot treatment of herbicides if needed in these stands) and repeated tilling (warm season “crop” conversion) on the remaining stands proposed for fescue control rather than herbicide. Herbicide is restricted to spot applications of noxious weed infestations and hardwood planting spots.

As with Alternative #3, a non-significant Forest Plan Amendment would be written to cover 2 proposals in this alternative. To assure compliance with the Forest Plan in Management Area 8.1, a Forest Plan Amendment will be required for expansion of the Mayfield Spring Wet Meadow Special Area. As a result of a decrease in the oak and oak-pine thinning proposal in this alternative, no Forest Plan amendment is needed for Management Area 6.2. Harvest in Management Area 6.2 meets Forest Plan direction. Lastly, a non-significant Forest Plan Amendment would be required for upgrading 7.6 miles of non-system roads to system roads.

Changes from Alternative #2 (Proposed Action) include:

- Reduce clearcutting from 330 ac. to 300 acres. Changed clearcut prescription on one (1) stand to Salvage harvest prescription and changed clearcut prescription on one (1) stand to Old Growth prescription.
- Increase Group Selection harvest (Uneven-aged harvest) from 2,010 ac. to 2,040 acres. Changed old growth prescription on two (2) stands to Group Selection harvest.
- Reduce proposed old growth from 1,370 ac. to 1,360 acres. Changed old growth prescription on two (2) stands to Group Selection Harvest prescription. Dropped one (1) stand from old growth designation and changed the clearcut prescription on one (1) stand to old growth prescription.
- Reduce pine and oak-pine thinning from 1,290 ac. to 1,140 ac. Dropped 17 stands in Management Area 6.2. As a result, a Forest Plan Amendment is not needed for additional harvest.
- Increase salvage harvest from 80 to 100 ac. Changed clearcut prescription on one (1) stand to salvage harvest prescription.
- Increase Wildland Urban Interface prescribed burns from 270 ac. to 880 acres. New prescribed burns planned to protect Communities at risk.
- Increase Ecosystem Restoration prescribed burns from 2,790 ac. to 3,410 acres. New prescribed burns planned to restore ecosystem integrity.
- In stands proposed for fescue control, broadcast herbicide (Glyphosate) in two stands (103/50 and 103/56) with follow-up spot treatment of herbicides if needed. Warm season “crop” conversion on all other stands over multiple years if needed. Disk/mowing or other mechanical.
- Reduce use of herbicides in stand to be planted to bottomland hardwoods. Use 4 x 6 foot strip herbicide (Glyphosate) for tree bed planting.
- Drop warm season grass planting in one stand.
- Mechanically treat identified noxious weeds in the project area. Spot herbicide use (Glyphosate, Triclopyr) is limited to: 2% of total openland acres (~20 ac.), and along roadsides (~5 acres).

Comparison of Alternatives

This section provides a summary of the proposed projects for each alternative. Alternatives 3, 4 and 5 are variations of the proposed action in response to comments received and additional information. Since alternatives 3-5 are derivations of alternative 2, they will be described by comparison to Alternative 2.

Chart 1 below show a comparison in acres between harvest treatment types and alternatives. In general,

- Alternative 1 (no action) shows the least number of acres harvested (0 acres).
- Alternative 3 has the least number of clearcut acres (190 acres).
- Alternative 4 has the greatest number of clearcut acres (530 acres).
- Alternative 4 has the greatest number of harvest acres treated (6,080 acres).

Chart 1: Crescent Project Harvest Acres

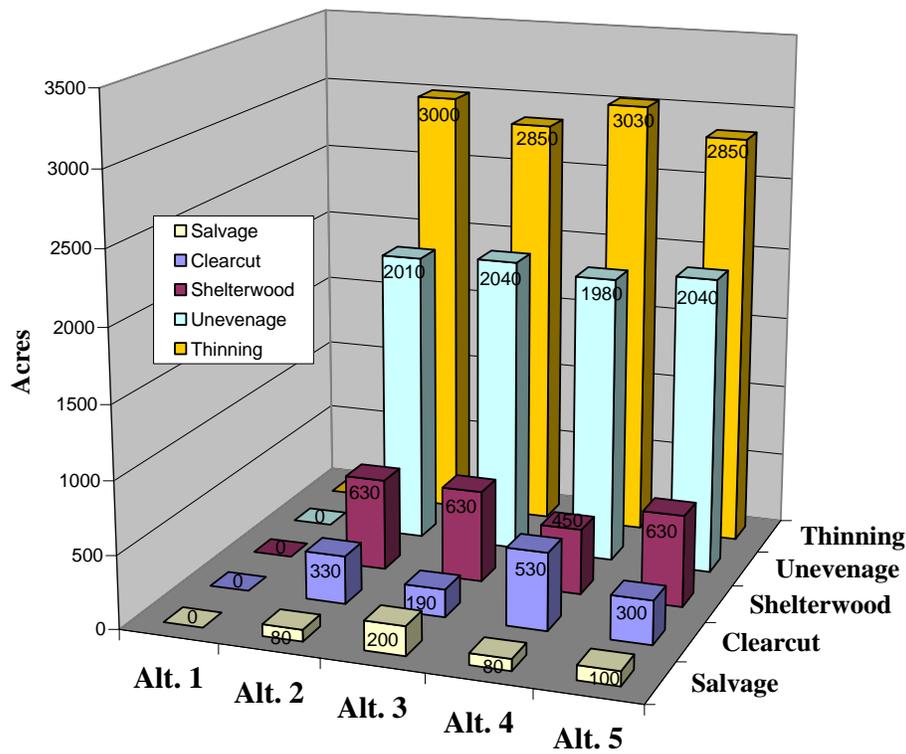
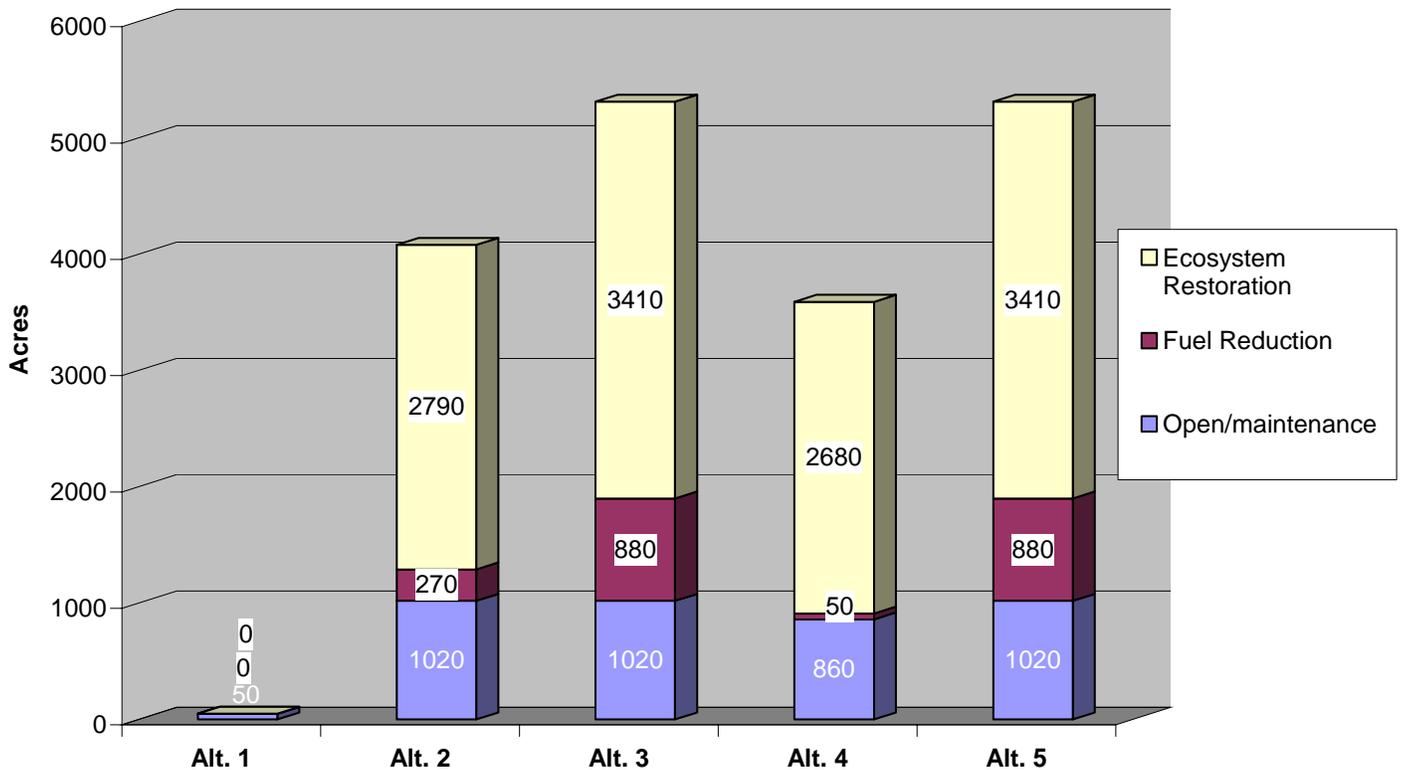


Chart 2 below shows a comparison in acres between types of prescribed burns and alternatives.

In general,

- Alternative 1 (no action) shows the least number of prescribed burn acres (50 acres). Note: This is continued maintenance of existing grazing allotments (open and semi-open habitats) not a new activity.
- Alternatives 3 and 5 show the greatest number of prescribed burn acres (5310 acres).
- Of the four action alternatives, Alternative 4 has the least prescribed burn acres (3,590 acres).
- Of the four action alternatives, Alternative 4 has the least number of acres being treated for fuel reduction (50 acres).
- Alternatives 3 and 5 have the greatest number of prescribed burn acres in all three categories.

Chart 2: Crescent Project Prescribed Burn



The information in Table 2-1 (on the following pages) is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. In this Table you will notice that the Proposed Action is Alternative 2. Note: Everything (stands being treated) in Alternative 2 is as it was during the initial public involvement phase (scoping). The numbers may differ slightly due to incorrect rounding at the time (identified with an *). No activity changes have occurred in this alternative.

Table 2-1 -Alternative Comparison of Treatment Acres in the Crescent Project

1. Recreation Management - - Provide dispersed recreation opportunities					
Proposed Action	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
<i>(1A) Maintain river access sites</i>	0 sites	4 sites	4 sites	4 sites	4 sites
<i>(1B) Upgrade river access parking</i>	0 sites	2 sites	2 sites	2 sites	2 sites
<i>(1C) Upgrade trails</i>	0 miles added	4 miles added	4 miles added	4 miles added	4 miles added
<i>(1D) Increase public access</i>	0 miles added	3.5 miles added	3.5 miles added	3.5 miles added	3.5 miles added
2. Wildlife Habitat Maintenance and Improvement for all Management Areas					
2A. Woodland Habitat in early development stage of 0-9 years old					
<i>(2A1) Shelterwood harvest</i>	0 acres	630 acres*	630 acres	450 acres	630 acres
<i>(2A2) Clearcut harvest</i>	0 acres	330 acres	190 acres	530 acres	300 acres
<i>(2A3) Group selection harvest</i>	0 acres	2010 acres*	2040 acres	1980 acres	2040 acres
2B. Woodland Habitat in Old Growth					
<i>(2B) Maintain and enhance habitat for old growth wildlife species</i>	0 acres designated	1370 acres designated*	1360 acres designated	1360 acres designated	1360 acres designated
2C. Woodland habitat in oak, oak-pine & pine sawtimber with 20-30% forb, grass, shrub ground cover					
<i>(2C1) Group Selection harvest</i>	Same as (2A3) 0 acres	Same as (2A3) 2010 acres*	Same as (2A3) 2040 acres	Same as (2A3) 1980 acres	Same as (2A3) 2040 acres
<i>(2C2) Overstory removal harvest</i>	0 acres	450 acres	450 acres	450 acres	450 acres

Table 2-1 -Alternative Comparison of Treatment Acres in the Crescent Project

Proposed Action	Alternative 1 No action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
<i>(2C3) Cedar thinning</i>	0 acres	220 acres	220 acres	220 acres	220 acres
<i>(2C4) Pine thinning & Oak/Pine thinning (Commercial & Pre-commercial)</i>	0 acres	1290 acres*	1140 acres	1320 acres	1140 acres
<i>(2C5) Oak Thinning (Commercial & Pre-commercial)</i>	0 acres	810 acres*	810 acres	810 acres	810 acres
<i>(2C6) Savanna improvement with firewood removal (inc. prescribed burning)</i>	0 acres	230 acres	230 acres	230 acres	230 acres
<i>(2C7) Improve Forest Health Salvage tree mortality</i>	0 acres	80 acres*	200 acres	80 acres	90 acres
2D. Woodland habitat in oak type over 50 years with a dense understory					
<i>(2D) Shelterwood harvest</i>	Same as (2A1) 0 acres	Same as (2A1) 630 acres*	Same as (2A1) 630 acres	Same as (2A1) 450 acres	Same as (2A1) 630 acres
2E. Open and Semi-Open habitat					
<i>(2E1) Burn/Mechanical/Graze For opening maintenance</i>	Current management direction would continue. 50 acres	160 acres	160 acres	No Grazing Alternative 0 acres	160 acres
<i>(2E2) Mechanical treatment For opening maintenance (inc. Prescribed burning)</i>	0 acres	560 acres*	560 acres	560 acres	560 acres
<i>(2E3) Savanna improvement with firewood removal (inc. prescribed burning)</i>	Same as (2C6) 0 acres	Same as (2C6) 230 acres	Same as (2C6) 230 acres	Same as (2C6) 230 acres	Same as (2C6) 230 acres

Table 2-1 -Alternative Comparison of Treatment Acres in the Crescent Project

Proposed Action	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
<i>(2E4) Maintain existing glades (inc. prescribed burning)</i>	0 acres	70 acres	70 acres	70 acres	70 acres
2F. Water Sources (number)					
<i>(2F1) Build waterhole</i>	0	8	9	9	9
<i>(2F2) Build waterhole for Amphibians</i>	0	5	5	5	5
<i>(2F3) Improve existing waterhole</i>	0	8	7	7	7
<i>(2F4) Develop waterhole with drinking system for livestock</i>	0	8	8	0	8
3. Wildland/urban interface fuel reduction					
<i>(3A) Wildland/urban interface fuel reduction burns</i>	0 acres	270 acres	880 acres	50 acres)	880 acres
4. Protect and improve the “Mayfield Spring Wet Meadow” special area					
<i>(4A) Mayfield Springs Special Management area</i>	0 acres	90 acres* Additional acres of protection	90 acres Additional acres of protection	90 acres Additional acres of protection	90 acres Additional acres of protection
5. Ecosystem Integrity and Watershed Health					
<i>(5A) Ecosystem restoration prescribed burns</i>	0 acres	2790 acres*	3410 acres	2680 acres	3410 acres
<i>(5B) Fescue Control utilizing mechanical/herbicide/burns</i>	0 acres	390 acres* Herbicide use on 354 ac.	390 acres Herbicide use on 17 ac. (tree planting only)	390 acres Herbicide use on 34 ac. (tree planting only)	390 acres Herbicide use on 87 acres

Table 2-1 -Alternative Comparison of Treatment Acres in the Crescent Project

Proposed Action	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
<i>(5C) Plant native hardwoods in riparian areas</i>	0 acres	100 acres 4 ft. strip site prep	100 acres 4x6 foot spot site prep	100 acres 4 foot strip site prep	100 acres 4x6 foot spot site prep
<i>(5D) Plant warm season grasses</i>	0 acres	500 acres	500 acres	500 acres	500 acres
<i>(5E) Develop waterhole with drinking system for livestock</i>	Same as (2F4) 0 waterholes	Same as (2F4) 8 waterholes	Same as (2F4) 8 waterholes	Same as (2F4) 0 waterholes	Same as (2F4) 8 waterholes
<i>(5F) Eliminate noxious weeds May include the use of herbicides</i>	No treatment done	Treat any state listed noxious weeds in the project area. Spot herbicide treatment could occur on all project acres.	Treat identified noxious weeds in the project area. Spot herbicide use is limited to: 2% of total openland acres (~20 ac.), along roadsides(~5 acres)	Treat identified noxious weeds in the project area. Spot herbicide use is limited to: 2% of total openland acres (~20 ac.), along roadsides(~5 acres)	Treat identified noxious weeds in the project area. Spot herbicide use is limited to: 2% of total openland acres (~20 ac.), along roadsides(~5 acres)
<i>(5G) Dump Clean-up</i>	No dump clean-up	Clean up dumps where present in project area.	Clean up 5 major dumps plus assorted dumps within the project area.	Clean up 5 major dumps plus assorted dumps within the project area.	Clean up 5 major dumps plus assorted dumps within the project area.
<i>(5H) Improve watershed health by closing and rehabilitating unneeded non-system road corridors</i>	No non-system road corridors closed	20 miles	20 miles	20 miles	20 miles
<i>(5I) Watershed rehabilitation – Streambank stabilization</i>	No sites stabilized	2 sites	2 sites	2 sites	2 sites
6. Salvage mortality and create desirable conditions for tree growth to insure healthy, sustainable forests, and provide for production of timber products.					
<i>(6A) Improve Forest Health Salvage tree mortality</i>	Same as (2C7) 0 acres	Same as (2C7) 80 acres*	Same as (2C7) 200 acres	Same as (2C7) 80 acres	Same as (2C7) 90 acres
Associated and Connected Actions					
<i>(E1) Fire line construction</i>	0 miles	30 miles	30 miles	30 miles	30 miles

Table 2-1 -Alternative Comparison of Treatment Acres in the Crescent Project

Proposed Action	Alternative 1 No Action	Alternative 2 Proposed Action	Alternative 3	Alternative 4	Alternative 5
(E2) <i>Temporary road construction and obliteration</i>	0 miles	40 miles	40 miles	40 miles	40 miles
(E3) <i>Right-of-Ways</i>					
<i>Compartment 114, Sec. 19 Existing road</i>	Not needed	0.2 mile	0.2 mile	0.2 mile	0.2 mile
<i>Compartment 96, Sec. 8 Existing road</i>	Not needed	0.1 mile	0.1 mile	0.1 mile	0.1 mile
<i>Compartment 104 stand 5 Sec. 6</i>	Not needed	0.1 mile	0.1 mile	0.1 mile	0.1 mile
<i>Compartment 104 stand 25 Sec. 5</i>	Not needed	0.5 mile	0.5 mile	0.5 mile	0.5 mile
<i>Compartment 107 Sec. 6</i>	Not needed	0.5 mile	0.5 mile	0.5 mile	0.5 mile
<i>Compartment 108 stands 2,3,5,8 Sec. 7</i>	Not needed	0.7 mile	0.7 mile	0.7 mile	0.7 mile
<i>Compartment 110 stand 58 Sec. 7</i>					
(E4) <i>Road Relocation Compartment 96 Forest Road 1676</i>	Not needed	0.8 miles	0.8 miles	0.8 miles	0.8 miles
(E5) <i>System Road redesignation</i>	Not needed	8.1 miles*	8.1 miles	8.1 miles	8.1 miles
(E6) <i>Road Reconstruction</i>	0 miles	5.8 miles	5.8 miles	5.8 miles	5.8 miles

Note #1: Numbers in this table are approximate values. Continued analysis after scoping has shown the need to clarify rounding of the numbers in this table. For ease of comparison between treatments and alternatives, most acres values are rounded to the nearest tens.

Note #2: Everything (stands being treated) in Alternative 2 is as it was during the initial public involvement phase (scoping). The numbers may differ slightly from the January 2004 mailing due to incorrect rounding at the time (identified with an *). No activity changes have occurred in this alternative.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action provided suggestions for alternative methods for achieving the purpose and need, as discussed earlier in this chapter.

An alternative that is similar to the proposed action but does not commercially harvest the trees was considered. In this alternative all actions would be the same as our proposed actions except no removal of the cut trees would occur. This alternative was developed to respond to scoping issues related to commercial logging of National Forest System Lands. This alternative would respond to the purpose and need but was dropped because it is contrary to Forest Plan Direction as well as concerns for Forest Health and Wildland Interface (i.e. fuel load). This alternative would not be carried further into analysis.

Mitigation Common to All Action Alternatives

The following are mitigation measures in addition to the Forest Plan standards and guidelines. Mitigation measures identified with a “T” pertain to timber harvesting and an “M” refers to mechanical treatments. Those identified with an “F” pertain to fire.

Mitigation Measures - Heritage Resources (CR):

CR1 (T, M, F): Site Avoidance

Site avoidance is the preferred mitigation action pursuant to the Forest Plan, Section IV-30, 31 [also FSM 2361.21(2)]. Avoidance of cultural resources will be understood to require the retention of such properties in place and their protection from effects resulting from the undertaking [MOU 2002, Section II, H (2a, 2b)]. Effects will be avoided by implementing the following specific actions:

- (1) Establishing buffer zones around those sites in areas where harvest activities will take place [to include timber harvest as well as construction of skid trails and landings]; buffer zones will be of sufficient size to ensure that the integrity of the characteristics and values which contribute to, or may potentially contribute to, the properties' significance will not be affected.
- (2) Locating landings, skid trails, and temporary roads away from archaeological sites.

CR2 (F): Site Protection during Prescribed Burns

(1) Firelines

- a) Those archaeological sites located along existing woods roads that may be used as fire lines will be protected by hand-clearing those sections of the road/fireline that crosses the sites. Although these roads are generally clear of combustible debris using a small dozer, those sections of roads crossing archaeological sites will be cleared using leaf blowers and leaf rakes. There will be no removal of soil or disturbance below the ground surface during fireline preparation.
- b) Archaeological sites and features that may be located along proposed routes of dozer-constructed firelines, where firelines do not now exist, will be avoided by fireline construction by routing firelines around archaeological sites. Sites that lie along previously constructed dozer lines from past burns will be protected during future burns by hand clearing those sections of line that cross the sites, rather than re-clearing the lines using heavy equipment.

(2) Burn Unit Interior

- a) Combustible elements at potentially eligible sites in the burn unit interiors will be protected from damage during the burns by removing fuels from the feature vicinity, and, where necessary, by burning out an area around the feature prior to igniting the main burns. Burning out is accomplished by constructing a set of two hand lines, approximately 30 to 50 ft. apart, around the feature and by then burning the area between the two lines while the

burn is carefully monitored. A fuel-free zone is thereby created around the combustible elements. Any combustible features that might be located in a burn unit will also be fully documented with photographs and field drawings prior to the burn. For burns in which this mitigation measure is in effect, a Heritage Resources Specialist will attend the pre-burn briefings, and Forest Service personnel will accompany any non-Forest Service crews that may participate in the burn.

- b) Those sites containing above ground, non-combustible cultural features and exposed artifacts would be protected by removing by hand, any concentrations of fuels that might have built up on the sites and features. Where such fuel concentrations are not present, no mitigation is required.
- c) No mitigation measures are proposed for any sites in the burn interior that do not contain combustible elements or other above ground features [as described in (a) and (b) above], because it is not expected that the burns proposed for the Crescent Project Area will harm these sites.

(3) Post-Burn Monitoring

Post-burn monitoring will be conducted at selected sites in order to assess the actual effects of the burns on the sites against the expected effects and to check for indirect effects at the sites following the burn. State Historic Preservation Office (SHPO) consultation will be carried out with respect to mitigation for any sites that suffer unexpected damage during the burn, or that are suffering damage from indirect effects following the burn.

CR3 (M): Road Maintenance

Where Forest Service Roads scheduled for maintenance cross archaeological sites, road work will be confined to the existing roadway and ditches.

CR4 (T,M,F): Survey of Landings, Temporary Roads, Skid Trails, Roads to be Reconstructed, Dozer-Constructed Firelines

If activities take place outside those areas not already included in cultural resource surveys, prior to project implementation, the cultural resource surveys will be completed. Appropriate measures as noted in CR1, CR2, and CR5 will be applied prior to project implementation to protect any archaeological sites that may be located in these areas. Consultation with the Missouri SHPO will be completed prior to project implementation.

CR5 (T, M, F): Other Mitigation Measures

If it is not feasible to completely avoid an archaeological site (CR1) and if mitigation measures outlined in CR2 and CR3 are not applicable, then the following steps will be taken:

- (1) In consultation with the Missouri State Historic Preservation Officer (SHPO), the site(s) will be evaluated against National Register of Historic Places significance criteria (36 CFR 60.6) to determine if the site is eligible for, or appears to be eligible for, inclusion in the National Register of Historic Places.
- (2) In consultation with the Missouri SHPO, mitigation measures will be developed which will lessen, or minimize, the adverse effects on the site(s), so that a finding of No Adverse Effect results.
- (3) The agreed-upon mitigation measures will be implemented prior to initiation of project activities that have the potential to affect the site(s).

CR6 (T,M,F): Discovery of Cultural Resources during Project Implementation

Although the cultural resource surveys completed for this project are designed to locate all archaeological sites that might be eligible for the National Register, such sites may go undetected for a variety of reasons. Pursuant to the provisions found in 36 CFR 800.13, should any previously unidentified cultural resources be discovered during project implementation, activities that may be affecting that resource will be halted immediately. The resource will be evaluated by a professional archaeologist, and consultation will be initiated with the Missouri SHPO, as well as the Advisory Council on Historic Preservation, if required, to determine appropriate actions for protecting the resource and for mitigating any adverse effects on the resource. Project activities will not be resumed until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval.

Mitigation Measures - Air Quality (A):**A1 (F)**

Prescribed burning would be completed during weather conditions that facilitate smoke dispersal. The public would be informed of the planned burning days and Forest Service employees would monitor for public safety hazards, if needed, along public travel ways.

Mitigation Measures – Soil and Water (SW):**SW1 (T & M)**

Temporary road and main skid trails would be located on the ground by Forest Service personnel prior to harvest operations, avoiding layouts that concentrate runoff into draws, ephemeral drainages, sinkholes or watercourses.

SW2 (T & M)

Proper grade and water control structures would be constructed and maintained on skid trails. Specifications that are indicated in the Missouri Department of Conservation's "Missouri Watershed Protection Practice" would be followed. Roads would not drain directly onto skid trails or into stream channels.

SW3 (T)

When logging is complete additional slash would be pulled onto skid trails.

SW4 (T)

Forest Service would suspend skidding during wet periods, when excessive rutting (>24 inches) and churning of the soil begins or when runoff from skid trails is turbid and no longer infiltrates the forest leaf litter within a short distance from the skid trail.

SW5 (F)

Prescribed burn units should have as little mechanical disturbance to the soil before and just after burning as possible. Equipment would not use stream channels as "roads." Where stream crossing is unavoidable it would be done in locations that would create the least impact on stream banks and beds.

SW6 (F)

Fire lines created with dozers would not be placed in riparian areas, fens, wetlands, or other sensitive habitats.

SW7 (F)

Fire lines would be seeded when necessary with a cover crop (native species) suited to area objectives and would be fertilized, if necessary, with standard fertilizer immediately after construction or as soon afterwards as to allow the best chance of germination. Water bars would be constructed in accordance with the Missouri Department of Conservation's "Missouri Watershed Protection Practice" to minimize water movement along fire lines.

SW8 (T)

Trees anchoring stream banks of any distinct channel would not be cut unless they are species that are known to "sprout" from a cut tree's roots, even if the stream does not require a buffer zone. This may include channels that are the result of road drainage ditches.

SW9 (T & M)

Reconstructed and temporary road constructions, which have potential to cause severe erosion, would have additional water protection mitigations as follows: Temporary roads that cross drainages would be closed as soon after the harvest or treatment as possible. All crossings would be constructed at right angles to the channel at locations chosen to have the least impact as possible on the stream channel and banks. Slash filter would be placed uphill from any drainage and used as filter at the outside of the water-bar nearest the drainage. If the crossing location is soft, it would be reinforced with aggregate.

SW10 (T & M)

No operation of mechanical equipment would occur on slopes greater than 35%.

SW11 (T, F & M)

Stands with soils that have perched water tables would have little to no mechanical disturbance to wet soil.

SW 12 (T & M)

A 100 foot radius buffer zone will be in place around significant springs, seeps, and fens. Skidding and decking of forest products is prohibited within the buffer zone of seeps, fens, and springs.

SW 13 (T, F & M)

There will be a no cut zone of at least 50 feet from the break or crest of the sinkhole basin. A buffer of 100 feet will be provided around natural sinkhole ponds. Within this buffer, there will be no commercial harvest of trees, no firewood permits, and no ground-disturbing activity. Prescribed fire would be allowed within the buffer zone.

SW 14 (T & M)

Log landings, major skid trails, and other areas where mineral soil is exposed would be naturally re-vegetated. If not successful after one growing season, artificial seeding and fertilizing would be done for cover crop only. No invasive, non-native species would be seeded to provide permanent vegetation.

Mitigation Measures - Vegetation (V):**V1 (T)**

Log landings, major skid trails, and other areas where mineral soil is exposed would be seeded and fertilized if necessary for cover crop only. No non-native species would be seeded to provide permanent vegetation.

V2 (F)

Prescribed burn plans would incorporate burning conditions that best meet specific management area objectives to reduce fuel loads, stimulate forest regeneration, meet visual standards, and protect sensitive species. Prescribed burns may be conducted primarily during the dormant (leaf-off) season and as frequently as necessary to meet management objectives as determined through annual evaluations of initial and subsequent burn treatments.

V3 (T & M)

A buffer zone of at least 100 feet in radius would be retained in association with significant seeps, fens, springs, and any other special features or habitats. Skidding and decking would be prohibited within these buffer zones.

Mitigation Measures - Visuals (VS):

In order to reduce potential negative impacts to the view, the specified mitigating measures would be used for the following areas in the designated foreground seen area for any action alternative:

VS1 (T&M)

"Not more than 10 chains (660') of temporary opening may occur along any 40 chains (0.5 mile) of hiker or horse trail during this plan period. Log landings are prohibited within 100' of a recreation trail. Where skidding across a recreation trail is unavoidable it will be done at a right angle and at designated locations."

VS2 (T&M)

Slash adjacent to travelways with a travel speed of 11mph or above within a Sensitivity Level (SL) 1 or 2 will be lopped and scattered to lie within 24" of the ground for a VQO of Retention or 30" for Partial Retention within the near foreground seen area. Slash adjacent to travelways within SL 3 with a Variety Class of A or B will be lopped and scattered to lie within 48" of the ground.(FLMP IV-35) No trees will be left across trails.

VS3 (T&M)

Slash disposal protective measures are specified by stand within contract specifications by Forest Plan regulation. "The negative visual impacts will be mitigated concurrently with or immediately after each phase of activity. Protective measures will be completed for each cutting unit before beginning activities in the next sequential block in

the same corridor or view shed. The total lapsed time from initiation of activities to completion of obligations specified by a contract or a project prescription shall not exceed one year for any single cutting unit. Emphasis will be placed on completing all work within these areas in a systematic manner within the shortest practical time." (Page IV-31 Forest Plan)

VS4 (T&M)

Harvest edges will be feathered away from the property line where the private land is open.

VS5 (T&M)

All harvest areas will be laid out on the ground in a manner that will reflect natural lines and be visually subordinate to the characteristic landscape.

Mitigation Measures - Wildlife (WL):

WL 1 (F) In order to eliminate any smoke from entering Mayfield cave from Forest Service activities during the period when the cave could be utilized as a maternity cave, no prescribed burning may occur within ½ mile of Mayfield Spring between the dates May 1 and August 30.

WL 2 (F) In order to reduce and/or eliminate any potential disturbance from smoke to a nearby Gray bat transitory cave--No prescribed burning would occur between the dates of March 1 and October 15 in T35N, R12W sections 3 and 4 if the wind is blowing from a South, Southeast or East Direction (90-180 azimuth).

WL 3 (T) To the maximum extent possible and logistically practical, retain all dead trees ≥ 20 " dbh and all live trees ≥ 26 " dbh unless they are an immediate human safety hazard. This is to provide and retain potential Indiana bat roost sites

WL 4 (T) In all harvest units retain all the shagbark hickory, shellbark hickory, and lightning struck trees ≥ 9 " dbh. Also retain some (not all) dead and dying trees ≥ 9 " dbh with at least 10% exfoliating or defoliating bark. This is to provide and retain potential Indiana bat roost sites

WL 5 (F) Only hand ignition methods may occur in the fens. This is to prevent any residual fuel from entering the fens. Therefore the use of a terra torch, ATV mounted torch or aerial ignition methods are prohibited within any fens.

WL 6 (F) No burning would occur between the dates of April 15 and November 1 in any fen when an Adult Hines emerald dragonfly could be in the area.

WL 7 (T) No cutting of any Butternut tree(s) would occur in the Crescent area. This is to protect and retain any potential Butternut trees that have not already been killed by the Butternut Canker.

WL 8 (T) In a clearcut harvest unit, retain a minimum of 15 sq. ft of basal area of reserve trees. In a shelterwood harvest unit, retain a minimum of 25 sq. ft of basal area of reserve trees.

When selecting reserve trees, favor retaining longer lived species such as White and post oak over short lived species such as black oak if possible. Try to clump the reserve trees (at least 5 together if possible). Do not locate these clumps if possible on a ridge top where they would be more susceptible to wind throw.

WL 9 (T) For both cavity trees and snags:

(1) Retain at least 1 cavity tree and snag ≥ 19 " dbh (if available), for every 2 acres,

(2) Retain at least 4 cavity trees and snags per acres which are 11-18: dbh (if available),

(3) Retain at least 2 cavity trees and snags per acres which are ≥ 10 " dbh (if available).

Snags should not be left standing alone within the cut area. If snags cannot be clumped together, they should be surrounded by several live trees.

Mitigation Measures – Invasive Plants (IP):

IP1: Prevention measures prescribed in Forest Service Guide to Noxious Weed Prevention Practices (USFS 2001) would be followed during agency activities to minimize invasive plant introduction and spread on the Forest. This would be the single most effective and least expensive weed management option available.

IP2: If restoration of treated areas included establishing new plants, this would be accomplished by broadcast seeding of native species.

IP3: All sites treated (with herbicides) for non-native invasive species would be monitored. A monitoring plan would be prepared as part of each treatment activity. Baseline monitoring to determine existing conditions would occur prior to treatment. Implementation monitoring would occur during treatments to insure design and safety standards are followed. Monitoring would be designed to insure that surveys for occupied and potential habitats for sensitive plants and animals have been conducted prior to weed treatment activities.

IP4: Projects would be supervised by state-certified applicator that would be responsible for insuring safe handling, worker protection, application and disposal of herbicides.

IP5: Herbicides would be applied only by ground-based equipment.

IP6: All requirements in a Safety and Spill Plan would be followed.

IP7: Areas treated with pesticides will be signed, as appropriate, to ensure users are informed of possible exposure.

Issue Comparison

Table 2-2 - Comparison of Key Issues (Acres Treated)					
Key Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
1) Amount of Clearcutting	0	330	190	530	300
2) Herbicide Use (total)	0	*	42	59	109
Harwood Riparian Planting	0	34	17	34	17
Fescue conversion	0	289	0	0	67
Noxious Weed Treatment	0	Any location in project area	25	25	25
3) Prescribed Burning	0	3060	4290	2730	4290
Ecosystem Restoration	0	2790	3410	2680	3410
Wildland/Urban Interface	0	270	880	50	880

* Could potentially cover entire project area (12, 592 acres).