ATTACHMENT A

U of A Cooperative Extension/ State of Arizona DFFM

Post Fire Fence Repair Specifications

NRCS/Forest Service Fence Specifications - As adapted from NRCS Conservation Practice Specification Fence (Feet) Standard Barbed Wire Fence Practice Code 382A, and USFS Apache-Sitgreaves National Forests Fence Contract Guidelines

Acronyms:

NRCS = National Resource Conservation Service

FS or USFS = USDA Forest Service

CE = University of Arizona Cooperative Extension

DFFM = State of Arizona Department of Forestry and Fire Management

1. Project Locations (from USFS):

Cow Canyon:

The project area is located within the Blue Range Primitive Area on the Alpine Ranger District of the Apache – Sitgreaves National Forest, Apache and Greenlee Counties, Arizona. The fence is an Allotment division fence that will be used to contain and manage cattle distribution. The ground that the fence will be built on is steep and rocky (both loose and solid above and below ground with some areas of bedrock). The elevation is approximately 6000 feet. Weather conditions can change quickly, particularly during the summer rain period of July, August, and September when strong thunder and lightning storms occur. Some snowfall is common in the late fall throughout the winter.

Horton:

The project area is located on the Alpine Ranger District of the Apache – Sitgreaves National Forest, Apache County, Arizona. The fence is an Allotment division fence that will be used to contain and manage cattle distribution. The ground that the fence will be built on can be steep and rocky (both loose and solid above and below ground with some areas of bedrock) or have wide drainages in it. The elevation is approximately 6000 - 8000 feet. Weather conditions can change quickly, particularly during the summer rain period of July, August, and September when strong thunder and lightning storms occur. Some snowfall is common in the late fall throughout the winter.

2. Scope of the Projects:

Contractor will construct new or repair damage livestock fence and remove the existing old fence (amounts identified below) and remove fire damaged fencing.

Fence will be 4-strand (top 3 wires barbed and the bottom wire smooth) to NRCS/Forest Service Standards.

Fence construction in the **Blue Primitive area only** will require the contractor to utilize pack animals and primitive tools (non-motorized). All other projects may use motorized tools and vehicles as allowed by Forest Service regulations.

All projects require roll up and removal of old fence materials. Wooden portions of the fence such as wood stays may be scattered away from the fence line. Wire, metal stays, and bent or broken t-post will be removed and disposed of as dictated by the Forest Service. T-post that are straight and in good condition may be re-used for FS portions. For NRCS portions all materials must be new.

Project timeline is 2 years with completion of all projects expected by spring of 2024. Extensions may be negotiable based on circumstances out of contractor/vendor and CE's control.

Awarded State DFFM grant will provide materials for fence building.

Cooperative Extension personnel will require a minimum of 5 working days to process all paperwork for submission to University of Arizona and DFFM for reimbursement. After that point, reimbursement will be dependent upon University processing timelines.

The contractor shall furnish all tools, equipment, supervision, transportation, and safety equipment necessary to complete the project. Contractor shall follow the USFS Standard Specification, and the Standard Fire Plan as required to work on Federal Lands.

3. General Information:

Any alterations or additions to this agreement must be approved by NRCS/FS/CE prior to modifying any part of it.

Fences installed on federal grazing allotments require permits and/or approval.

The NRCS/FS/CE/DFFM assumes no responsibility for interference with private or public utilities.

State and federally protected plants, animals, cultural resources, and historically significant properties shall not be harmed or destroyed during the installation of the fence.

All work shall be done in a manner that minimizes soil and vegetation disturbance and the movement of sediment and other pollutants into streams and water bodies. Vegetation clearance shall not exceed 20 feet in width as approved by CE. Any engine oil, lubricants, or other

chemical pollutants spilled during construction shall be safely collected and properly disposed of.

Old posts, wire, and other fence materials shall be completely removed from the site and properly disposed of.

Any existing structures, including the tie-in to other existing fences used in constructing the new fence, must be approved by NRCS/FS/CE prior to construction. The tie into existing fences, natural barriers, or other structure shall equal or exceed the quality of the fence constructed under this specification.

See below for project specific information.

4. Fence Building Specifics:

A. ANCHOR AND BRACE ASSEMBLIES

Brace assemblies shall be installed at all angles, corners, gates, and ends of the fence, and at the base and summit of steep slopes as needed to properly stretch the fence wire.

Fences shall be constructed in straight sections. The distance between brace assemblies shall not exceed 1320 feet (1/4 mile).

Double span brace assemblies are required for sandy or wet soil conditions and/or areas with heavy animal pressure.

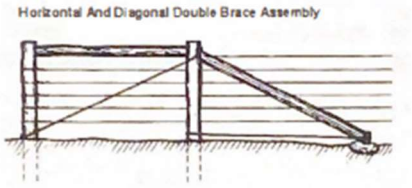
B. END BRACE ASSEMBLIES

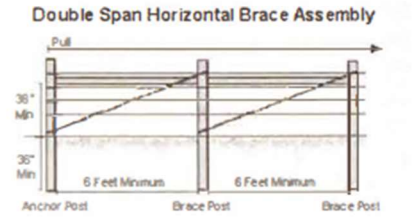
End brace assemblies shall be installed where there is only one direction of pull on the brace assembly, such as at gates or where the fence meets a natural barrier. Horizontal brace assemblies shall be used for all end bracing.

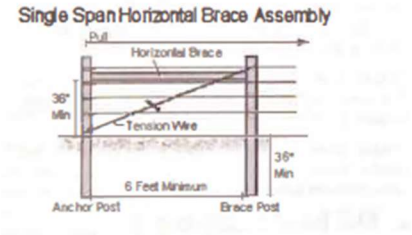
End bracing shall be installed on each side of drainages and stream channels where the fence may be damaged by trapped debris during runoff or flood events.

A diagonal brace may be used instead of an additional horizontal brace where double bracing Is needed. The diagonal brace shall be doweled or welded to the brace post at least 36 inches above the ground.

For welded steel diagonal braces, the ground end of the diagonal brace shall be set in concrete that’s at least 24" in diameter, and 12" deep.

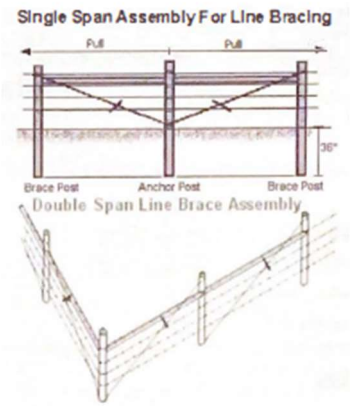


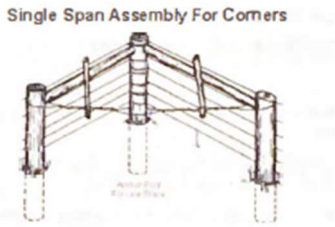




C. LINE BRACE ASSEMBLIES

Line brace assemblies shall be installed where there are two directions of pull on the anchor post, such as at corners and in-line stretch posts Line braces are constructed the same as end bracing, but with brace posts set in both direction of pull.





D. SINGLE H BRACE ASSEMBLIES

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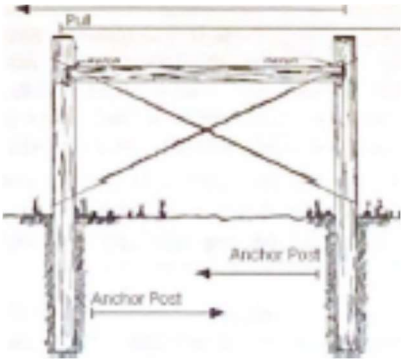
For straight, level sections of fence of 1/4 mile or less, where the distance and direction of pull are approximately equal on both sides of the line brace, a single H brace assembly can be used for line bracing. In a single H brace assembly, each post serves as both an anchor post, and a brace post They are constructed the same as a single span horizontal brace. Tension wires shall be installed in both directions, unless the assembly is welded.

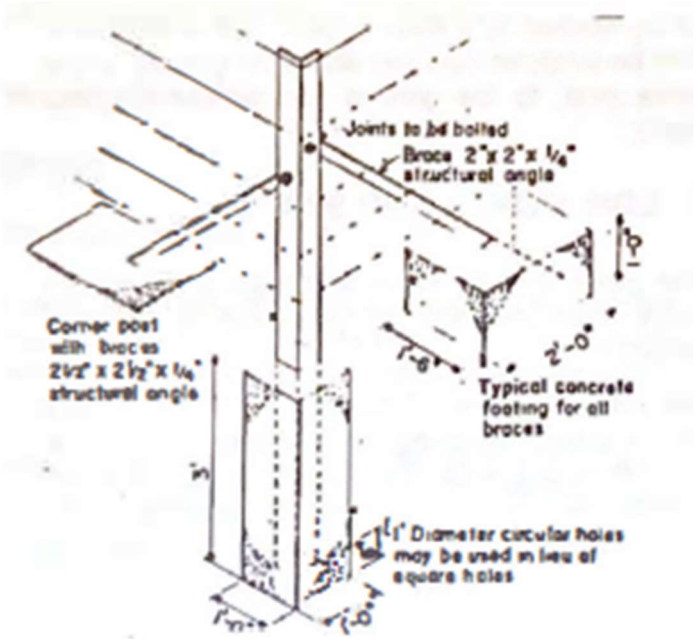


Diagonal Brace Assemblies

Diagonal and single diagonal brace assemblies may be used for bracing angles in the fence line between standard line braces or end braces. The fence wires shall not be tied off to a diagonal brace assembly.

Steel and Concrete Brace Assemblies

Steel angle iron or steel pipe set in concrete may be used for end and line bracing. Steel and concrete brace assemblies shall be constructed as single or double span horizontal brace assemblies, or as a diagonal brace assembly.



TYPICAL CORNER POST INSTALLATION

Steel angle iron or steel pipe shall be galvanized coated or painted. If painted all rust or loose material shall be removed by wire brushing or other suitable method, treated with a rust inhibitor, primed with a metal primer paint, and then painted with two coats of high-grade weather resistant epoxy or enamel paint.

E. ANCHOR AND BRACE POSTS

All anchor and brace posts shall be set in the ground at least 36 inches. Anchor and brace posts shall be long enough to extend at least 4 inches above the top wire of the fence.

Wooden Anchor and Brace Posts

The minimum top diameter for wooden anchor and brace posts shall be 6 inches. Wooden posts shall have a minimum life expectancy of 10 years. Untreated juniper, oak, mesquite, black locust, and redwood posts may be used. Pine or other softwood posts must be pressure treated. Railroad ties in good condition are suitable for use as anchor and brace posts.

Wooden anchor and brace posts shall be set into the ground a minimum of 36 inches. Posts greater than 6" in diameter shall be set in holes at least six (6) inches larger than the diameter of side dimensions of the posts. The hole shall be filled with dirt in 4-inch layers and tamped firm. The post shall be plumb. The top of the dirt fill shall be mounded above ground level such that water does not pond around the base of the post.

Steel Anchor and Brace Posts

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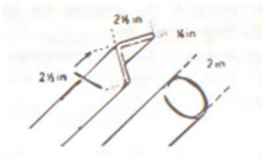


Anchor and brace posts may be made from steel angle iron that is at least 2 5" x 2.5" x 0.25" x 6 5', weighing at least 4 pounds per foot of length. Angle iron anchor and brace posts shall be set in concrete as described below:

Anchor and brace posts may be made from new steel pipe that meets or exceeds the requirements for 2-inch nominal size standard steel pipe (ASTM A 120 Schedule 40).

Used steel pipe may be used provided that it is approved prior to construction by FS as being of good quality, relatively free of pits and scaling with an expected lifespan of at least 10 years. Used steel pipe must 2 5" or larger diameter for anchor and brace posts.

Steel pipe less than 6 inches in diameter must be set in concrete as described below Steel pipe 6 inches In diameter or larger shall be set the same as wooden anchor and brace posts.

In areas with over 12" average annual precipitation, steel pipe posts shall be capped to prevent precipitation from entering the pipe.

Setting Steel Posts in Concrete

Steel pipe posts less than 6 inches in diameter, and angle iron posts shall be set in a hole at least 36 inches deep and 12 inches In diameter. The bottom of the steel post shall be placed on a rock. The hole shall be filled with concrete in such a way as to allow the concrete to flow around the base of the post. The top of the concrete shall be mounded above ground level and sloped away from the post to prevent water from ponding around the base of the post.

Horizontal and Diagonal Braces

Horizontal braces shall be at least 6 feet long and attached to the upper 1/4 of the anchor and brace posts. Wooden horizontal braces shall have a minimum diameter of 4 inches. Wooden horizontal and diagonal braces shall have a minimum life expectancy of 10 years. Untreated Juniper, oak, mesquite, black locust, and redwood may be used for horizontal and diagonal braces. Pine or other softwood posts must be pressure treated. Railroad ties in good condition are suitable for use as horizontal and diagonal braces.

Wooden diagonal braces shall be a minimum of 10 feet In length. Wooden diagonal braces will have the following minimum diameters:

Length	Min. Diameter
10' – 12'	4"
12' – 15'	5"
15' – 17'	6"
17' – 18'	7"
18 – 20'	8"

Dowels shall be used to attach wooden horizontal and diagonal braces to wooden anchor and brace posts. The dowels shall be at least 6 inches long and extend at least 3 inches into each piece. The dowels shall be made from 3/8" or larger steel, or 1" or larger diameter hardwood. Steel rebar can be used.

Steel pipe used for horizontal or diagonal braces shall be new, 2-inch nominal size standard steel pipe (Schedule 40) or larger.

Used steel pipe 2 5" or greater in diameter may be used provided that it Is approved prior to construction by FS as being of good quality, relatively free of pits and scaling with an expected lifespan of at least 10 years.

Steel pipe shall be notched at least 2 inches but not more than 3 inches into wood anchor and brace posts or welded to steel anchor and brace posts.

Steel angle iron horizontal or diagonal braces shall be a minimum of 2 5" x 2 5" x 0.25" weighing at least 4 pounds per foot of length. Angle iron braces shall be notched into wooden anchor and brace post at least 2 inches but not more than 3 inches or welded to steel anchor and brace posts.

Tension Wires for Wooden Brace Assemblies

Tension wires for all wooden brace assemblies shall be made from two complete loops of 9 gauge or heavier smooth galvanized wire.

The tension wire on horizontal brace assemblies shall be attached diagonally from approximately 4 inches above the horizontal brace on the brace posts, to just above ground level on the anchor post. The tension wires shall be twisted together until the brace assembly is rigid.

For wooden diagonal braces, the ground end of the diagonal brace shall be set on a flat rock or brick. The end of the diagonal brace must be free to move forward when the fence wire is stretched and must not be blocked by a stake or post. The tension wire shall be wrapped from just above the ground on the brace post, to the ground end of the diagonal brace.

F. LINE POSTS AND STAYS

Line posts shall be set In a straight line between brace assemblies with not more than 12 inches of deviation.

Manufactured steel "T-posts" or "U-posts', with anchor plates, weighing not less than 1.33 pounds per foot of length can be used. The posts shall be studded, embossed, or notched, for the attachment of wires. They shall be galvanized, painted, or enameled. "T-posts' or "U-posts" shall be driven into the ground until the top of the anchor plate is below ground level. Steel "T" or "U" posts shall be long enough to be driven into the ground above the anchor plate and extend 4 inches above the top wire.

Wooden line posts may be used. The minimum top diameter or width for wooden line posts shall be 3 inches. Wooden line post shall be set a minimum of 18 inches into the ground, or 24 inches in sandy or wet soils. Wooden line posts shall have a minimum life expectancy of 10 years.

Untreated juniper, oak mesquite, black locust, and redwood posts may be used. Pine or other softwood posts must be treated with a preservative.

Line posts may be made from steel pipe that meets or exceeds the requirements for 2-inch nominal size standard steel pipe (Schedule 40). Used steel pipe may be used provided that it is approved by FS prior to construction as being of good quality and relatively free of pits and scaling. Steel pipe line post shall be set a minimum of 18 inches into the ground or 24 inches in sandy or wet soils.

Stays shall be made of galvanized twisted wire, or wood with a minimum 1.5-inch top diameter.

G. FENCE WIRE

Barbed and smooth fence wire shall be new, double strand 12.5 gauge or heavier galvanized malleable steel. Both barbed and smooth wire must be certified as meeting the specification ASTM A121. All wire shall have a minimum strand breaking strength of 950-foot pounds or 70,000 psi.

Wire Spacing:

Use USFS Specifications for 4-Wire at 16"- 23"'- 30"- 42"

Bottom Wire (Smooth):

Wire Attachment

Fence wires shall be firmly attached to the anchor post on each end of a fence section by double wrapping the wire around the anchor post and tying it off.

Wires shall be attached to all line posts using staple, tie wires or manufactured wire fasteners of good quality.

Tie Wires

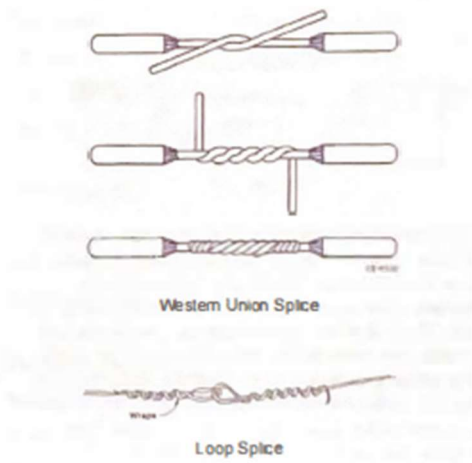
Tie wires for attaching fence wires to posts shall be 14(USFS) or 16 gauge (NRCS) or heavier galvanized steel.

Staples

Staples shall be 9 gauge galvanized or polished hard wire, 1.75 inches long for softwood, and 1 inch long for hardwood posts. Staples shall be driven diagonally to the grain at a slightly downward angle. The staples on line posts shall be driven such that they do not bind or bend the fence wire allowing the fence wire to contract and expand.

Wire Splicing

When splicing of wire is necessary, either the "Western Union" or "loop splice is acceptable.



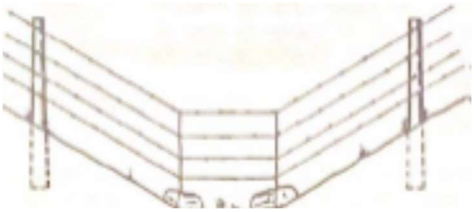
H. FENCE LINE SECTIONS

The maximum line post spacing for standard fence line sections is as follows:

- 20 feet with no stays
- 25 feet with 1 stay halfway between
- 30 feet with 2 stays spaced 10' apart
- USFS Spec is 20 feet with 3 stays evenly spaced at approximately 6.5’ intervals

I. FENCE ANCHORS

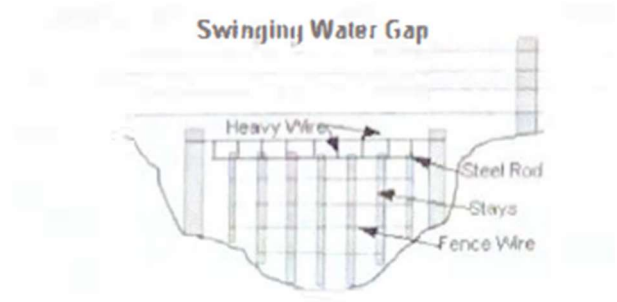
Fence anchors shall be installed when the bottom wire is more than 6 inches above the design height above the ground.



Anchor weights for holding down fence wires crossing drainages or depressions shall weigh at least 5O pounds or be equivalent to a 1 cubic foot concrete block. They shall be attached with 9 gauge or heavier smooth wire.

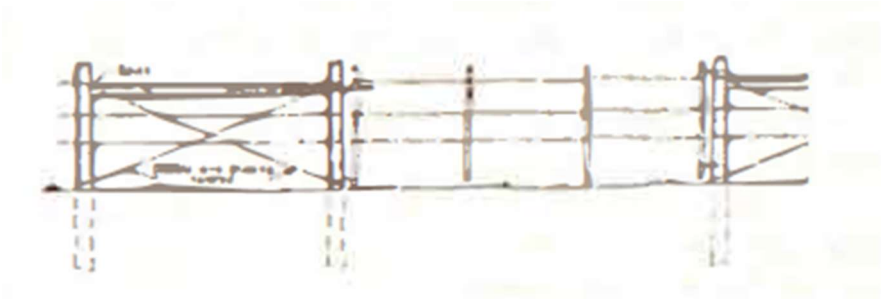
J. WATER GAPS

Where the fence crosses a drainage more than 40 feet wide, end bracing shall be installed on each side of the drainage. Water gap fence section materials shall equal the quality of the adjoining fence. They shall be assembled as a separate unit to protect the main fence from damage. The ends of the water gap fence wires shall be attached to a separate steel or wooden line post attached to the end brace using lightweight wire or staples that will allow the water gap to break away from the end braces in a flood event without damaging the end braces and adjacent fence sections



For deep narrow drainages, a separate fence section can be installed below the main fence. This separate fence section shall not be attached to the main fence.

K. GATES AND CATTLE GUARDS



Gates shall equal or exceed the quality of the adjoining fence. They shall be of adequate width to accommodate the intended purpose. They may be made of wood, aluminum, steel, or wire.

If a heavy gate is attached to the anchor post side of the end brace assembly, an additional tension wire running in the opposite direction from 4 inches above the horizontal brace on the anchor post to the bottom of the brace post, shall be installed. This tension wire should only be tightened enough to offset the weight of the gate.

Wire gates shall be constructed with equal or better-quality wire and posts as used in the fence. Wire gates across roads shall have stays at least every 3 feet to ensure they are visible to vehicles. They shall be secured to the end brace assemblies with smooth 9-gauge galvanized wire, or fence wire.

Any commercially available cattle guard approved by the manufacturer for the intended use in the fence may be used.

5. Additional Project Specific Information:

Cow Canyon Only:

Steel Easy Brace as per Forest Service Directions

Steel Brace not set in concrete

Line post spacing will typically be 20 feet (but could vary some dependent upon terrain, etc.) with three stays (stay material determined on a project-by-project basis) evenly spaced between and secured to each barbed wire strand. The stays must be perpendicular to barbed wire. The spacing of T-posts shall not be greater than specified in each task order but may be closer to maintain the specified bottom wire distance to the ground or the specified top wire height.

Materials - NRCS request – Due to remoteness of sites and susceptibility to fire, steel materials are recommended. Forest Service recommends use of Easy Braces to meet these means as USFS and Cooperator have had good success with Easy Braces.

Bear Only:

Contractor will remove trees impacting the fences to build fences without additional Fence Right of Way Clearing guidelines.

Line post spacing will typically be 20 feet (but could vary some dependent upon terrain, etc.) with three stays (stay material determined on a project-by-project basis) evenly spaced between and secured to each barbed wire strand. The stays must be perpendicular to barbed wire. The spacing of T-posts shall not be greater than specified in each task order but may be closer to maintain the specified bottom wire distance to the ground or the specified top wire height.

All Projects (Bear, Horton, Cow Canyon):

Metal line T-posts will have 48 inches remaining above ground. Straddle jack braces and/or rock

crib/wire crib/ may be used, where it is not possible to dig or drive posts. Contractor will provide straddle jacks and rock/ wire/wood cribs if needed.

No wire shall be attached directly to a tree unless approval is given by CE/USFS

Wildlife Considerations: Maximum wire height is 42" at posts in rangeland and forest land. Mule deer - bottom wire smooth and installed at least 16" above ground at post. At least 12" spacing required between top and next wire. Pronghorn - bottom wire smooth and installed at least 18"' above ground at posts. Bottom wire covered with split PE or PVC pipe at known pronghorn crossing areas and no stays will be installed at these locations.

6. Contracted Miles of Fencing By Project:

Cow Canyon: 21 miles total – 11 miles of new fence construction, 10 miles of fence repair, 21 miles of fence removal

Bear: 8 miles of new fence construction, 5 miles of fence repair, 13 miles of fence removal

Horton: 13 miles total – 5 miles of new fence construction, 8 miles of fence repair, 13 miles of fence removal

7. Inspection Agreement:

CE will inspect up to 75% of fence lines to ensure contractor/vendor is meeting FS/USFS specifications. Results are pass/fail and are a collaboration between CE and the contractor/vendor.

If deficiencies are found, CE representative will flag area with pink or other agreed upon color tape for contactor/vendor review. If contractor/vendor disagrees with CE representatives' issue, USFS rangeland employees will be the deciding factor. If USFS agrees with the contractor/vendor, the repair/rework will not be required. If USFS agrees with CE, the repair/rework is required.

Inspection results will be provided to the contractor upon request.

CE will also provide results to USFS on a daily or weekly basis depending upon cell phone service.

CE will provide results to DFFM on a quarterly basis.

*****For work clarification, special requests, or special needs, please give CE representative 48 hours' notice to meet on site (60 hours for primitive area). If they are unavailable at that time, CE will make arrangements with USFS to provide an agency Range representative to visit the site to answer questions or concerns*****

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