



Black Hills Land Analysis LLC

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Cedar Berry Canyon Estates

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This fire mitigation plan and associated recommendation pertains to Lots 1 through 21, of Cedar Berry Canyon Estates, located in the East ½ of section 1, T6N, R1E, B.H.M., Lawrence County, South Dakota. *See attached Cedar Berry Canyon Estates map.*

The goal of a wildfire mitigation plan is to reduce the effects wildfire has on the land and associated values or improvements. The key to reducing the impact from wildfire is to reduce intensity by performing fuel reduction activities. Modifying fuel loads will reduce fire spread and intensity. If fuel loads are reduced, a low intensity surface fire could result which is more conducive to protecting life, property and resources. If surface fuels and ladder fuels are managed properly, this can keep a surface fire from spreading vertically into the conifer canopy. Cured grass can cause a fast-moving intense fire that can grow very large in a short period of time. Reducing fuel loads will lessen fire effects during a wildland fire event. Managing fuel breaks will help control the spread of wildfire by interrupting fuel continuity. Proactive forest/fuel management may help a property survive on its own during a fire event without the intervention of fire suppression personnel. Preserving the environmental sustainability of a property will also protect the aesthetics and value of the property.

This property is situated in a Wildland fire environment due to the fuels presented by Ponderosa pine, dead and down material and fine flashy fuels consisting of grasses and regeneration evergreens. The fire history map indicates several large fires have occurred in the general area including 3 fires near Crow Peak between 2003 and 2016 and the Iron Creek Fire in 1890. These larger fires all occurred within approximately 3.5 miles or less of this property and ranged in size from 15 acres to approximately 19,160 acres. Many additional

point fire ignitions are also recorded in this area but these were all small fires that were extinguished before they spread into larger conflagrations. This fire history is documented by South Dakota Wildland Fire Division and the US Forest Service. *See attached Fire History map.*

The Cedar Berry Canyon Estates property is located approximately 3 miles west of exit 8 on the outskirts of the Spearfish. Access to the property is off the Homestake Road to the north and the Moller Road to the south. The primary fire department for this property is the Spearfish Volunteer Fire Department. The station is approximately 3 miles travel distance by road. The Spearfish Volunteer Fire Department has current mutual aid agreements with all of the other fire departments within Lawrence County.

To reduce the fire effects and fire severity impacting a property the following generalities should be observed. Overstory conifer should maintain an average 20-30 feet between the canopy to reduce the risk of sustained crown fire activity. Conifer regeneration should be thinned to reduce ladder fuels that could cause fire spread due to the vertical fuel arrangement. A rule of thumb for understory regeneration is the spacing between the canopy should be maintained at a minimum of one half the height of the tree. These trees should also have ladder fuels trimmed up to keep the lower branches above the surrounding surface fuel which may reduce vertical fire spread. A multi-stage open stand condition between the mature conifer overstory and the conifer regeneration would provide a good strategy for reducing wildland fire effects. Regeneration conifers should be spaced away from overstory conifers to disrupt vertical fuel loads. Stand conditions can also be improved by promoting existing deciduous vegetation already established in the area. Ladder fuels and surface fuels need to be significantly reduced or eliminated to reduce the intensity and spread of wildfire across the surface or from the surface vertically into the conifer canopy. Fine flashy fuels such as prairie grasses should be managed to reduce surface fire intensity. A well-maintained right-of-way will provide an effective fuel break which can provide protection from an advancing wildland fire. A properly managed right-of-way will also provide safe ingress/egress

during a wildfire. Fuel breaks may also provide a good place to initiate tactical operations for fire suppression activities.

Properly managed forest stands not only reduce the risk from wildfire, but they are also less susceptible to infestation from insects such as the Mountain Pine Beetle and the Pine Engraver Beetle. Topography will affect fire behavior and must be considered when treating hazardous fuels. Typically, south and west aspects are drier and burn more aggressively. Fine flashy fuels such as cured grass can also contribute to high intense fast-moving wildfire. Steeper slopes also cause increased fire behavior due to the preheating of upslope fuels.

Deciduous vegetation should be encouraged where possible. Conifers will take over the deciduous stand if left unmanaged. Hardwoods not only create diversity but they also interrupt continuous conifer fuel loads. Deciduous vegetation generally does not contribute to high fire intensity. There are established deciduous stands on the property that should be encouraged by thinning the conifer regeneration that are encroaching into them.

The general prescriptions for fuels reduction and survivable space for the property are as follows:

1. Provide an average of 20 feet between mature conifer canopy. Property on a slope greater than 8% should have the conifer overstory spacing increased to 30 feet or more where feasible. When selecting trees for removal, large dominant trees that are straight, with good form and vigor should be left providing they meet the minimum spacing requirements. Remove all storm bent, or damaged trees including trees affected by Mountain Pine beetle. Split top or trees with stem cankers should be removed. Remove unhealthy or defective trees first and then remove remaining trees until desired spacing is achieved. Conifers can be grouped as long as adequate spacing is left around these groups to separate them from the surrounding conifer stands. Encourage existing deciduous vegetation by thinning conifers in the general vicinity of hardwoods.

2. Ladder fuels need to be trimmed up a minimum of 6 feet from the ground to reduce the risk of a surface fire spreading vertically into the canopy.
3. Surface fuels need to be significantly reduced or eliminated to reduce the intensity and spread rate of a surface fire.
4. Promote and enhance the presence of deciduous vegetation on the property by thinning conifers near the hardwoods. Hardwoods don't generally contribute to high fire intensity.
5. Slope, aspect and the shape of the landscape will influence wildland fire behavior. This property is located on mid-slope and above which is more hazardous because the availability of upslope fuels. Fire spreading out of the canyon to the east could come upslope aggressively. Proper fuels management will keep fire effects minimized as it approaches the survivable space or values on the landscape.
6. Building sites should have adequate survivable space to help protect the values. Typically, 100 feet is a good rule of thumb for developing adequate survivable space on a slope of less than 8%. If the required survivable space of a property crosses a lot line, that area would need to be treated also during the development process. The home ignition zone can be comprised of different fuel conditions that help reduce the fire intensity as it approaches the values. There may be an opportunity to reduce the risk of initial ignition of structures by implementing Firewise building materials and practices. This will help the fire service personal protect the property in the event of an uncontrolled wildland fire. There are many sources for materials that provide information about reducing risk. The Lawrence County Community Wildfire Protection Plan is a good resource for information. This and other publications are available at Lawrence County, or from myself. Also, the NFPA website has an abundant amount of information available pertaining to Firewise construction and hazardous fuels.

<https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA>

After completing a site visit and reviewing the existing conditions of the property, I would recommend the following treatments to **reduce** the risk from wildfire to the Cedar Berry Canyon Estates property and associated values.

Three units or treatment areas labeled **A - C**, have been established and identified prescriptions have been developed for each. These treatments need to be maintained through time which will promote continued protection from uncontrolled wildland fire. *See attached Cedar Berry Canyon Treatment map.*

Unit A lies along the western portion of the property and is comprised of approximately 46 acres. It is fairly level with a north, northeast aspect. The vegetation is primarily prairie grass and Forbes. Tall grass that cures in late summer is available to burn. The risk is these fine flashy fuel loads is that they will support intense fast moving surface fire. Keeping grass mowed short and irrigated will mitigate this risk. Roads and driveways will act as fuel breaks to help reduce wildland fire spread within the subdivision. Structures situated in a grass fuel type should have a well-maintained survivable space within 30 feet or more of all structures and values. Conifer vegetation should be discouraged within the 30-foot survivable space of structures.

Unit B is comprised of approximately 15 acres and is in the upper end of the canyon on the east side of the subdivision. The vegetation in the canyon is primarily oak trees with some mature conifers and Forbes. No overstory conifer treatment is needed in this unit. The existing conifers are well spaced and don't pose a risk from sustained crown fire. Conifer regeneration should be treated to help promote the hardwoods and keep regeneration conifers from becoming overstocked. There are some surface fuels present from woody debris and grasses which could be treated from time to time. Dead and down from the Pine and oak trees could be piled and burned as needed to keep surface fuels to a minimum. There are existing old hand piles present in the unit that could be burned during suitable conditions. Additional dead and down materials could be added to the existing piles prior to burning.

Unit C covers approximately 13 acres. It also is comprised of mature Ponderosa pine and oak trees. There are also midstory and understory

Ponderosa pine present both in the canyon and on the bench above the cap rock.

The overstory Ponderosa pine in the canyon below the cap rock is overstocked with closed canopy conditions. Most of the ground in the canyon is steep enough that it would be very difficult to treat the large mature pine trees. There are also midstory and regeneration conifers present in these areas. Structures placed on lots 15-19 will need to treat the regeneration and midstory conifers within the 50-100 feet of these values to create and maintain open canopy conditions. If the overstory conifers cannot be treated in the canyon and smaller draws coming up to the bench, additional survivable space will be required. 100 to 300 feet of survivable space may be required to protect the structures based on the topography and fuel load where structures are located. Hardwoods should be encouraged by treating conifers around them. All dead and down surface fuels should be treated. Cured grass within 30 feet and farther, if down slope, should be treated as needed. Adequate survivable space will need to be maintained through time to protect the values in Cedar Berry Canyon Estates.

These recommendations do not guarantee against any injury or loss of property, real or personal, nor injury to persons, but are only intended to reduce the risk from wildfire, and if the plan is implemented and completed and properly maintained.

Sincerely,

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Cedar Berry Canyon Estates

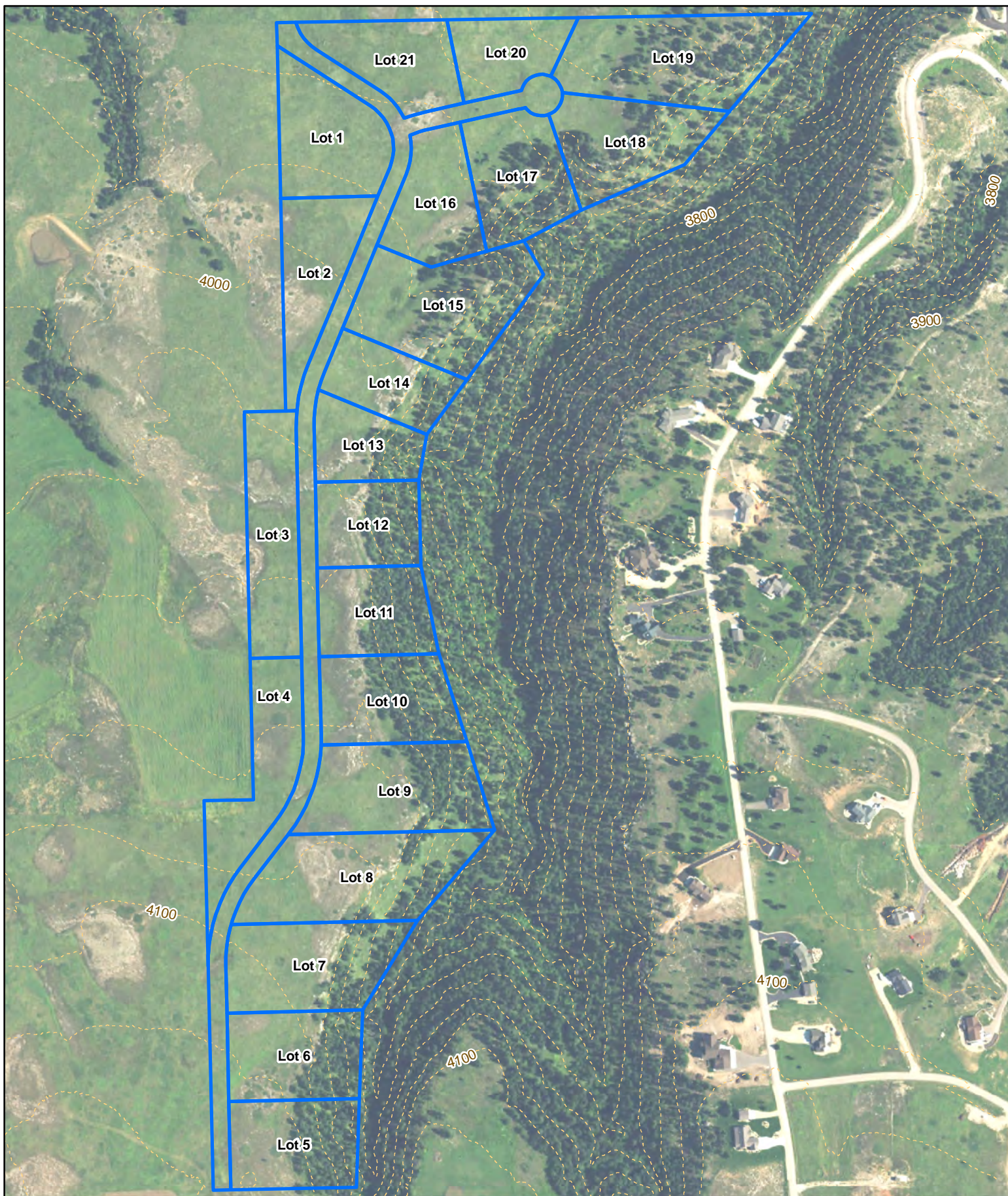
Legend

-  Roads
-  20' contours
-  Cedar Berry Canyon Estates (Lots)



0 230 460 920 Feet

Scale 1:5,100
3/29/2021
NAD83
RLM



Fire History Map

Scale 1:48,000
3/29/2021
NAD83
RLM



Spearfish Fire Station



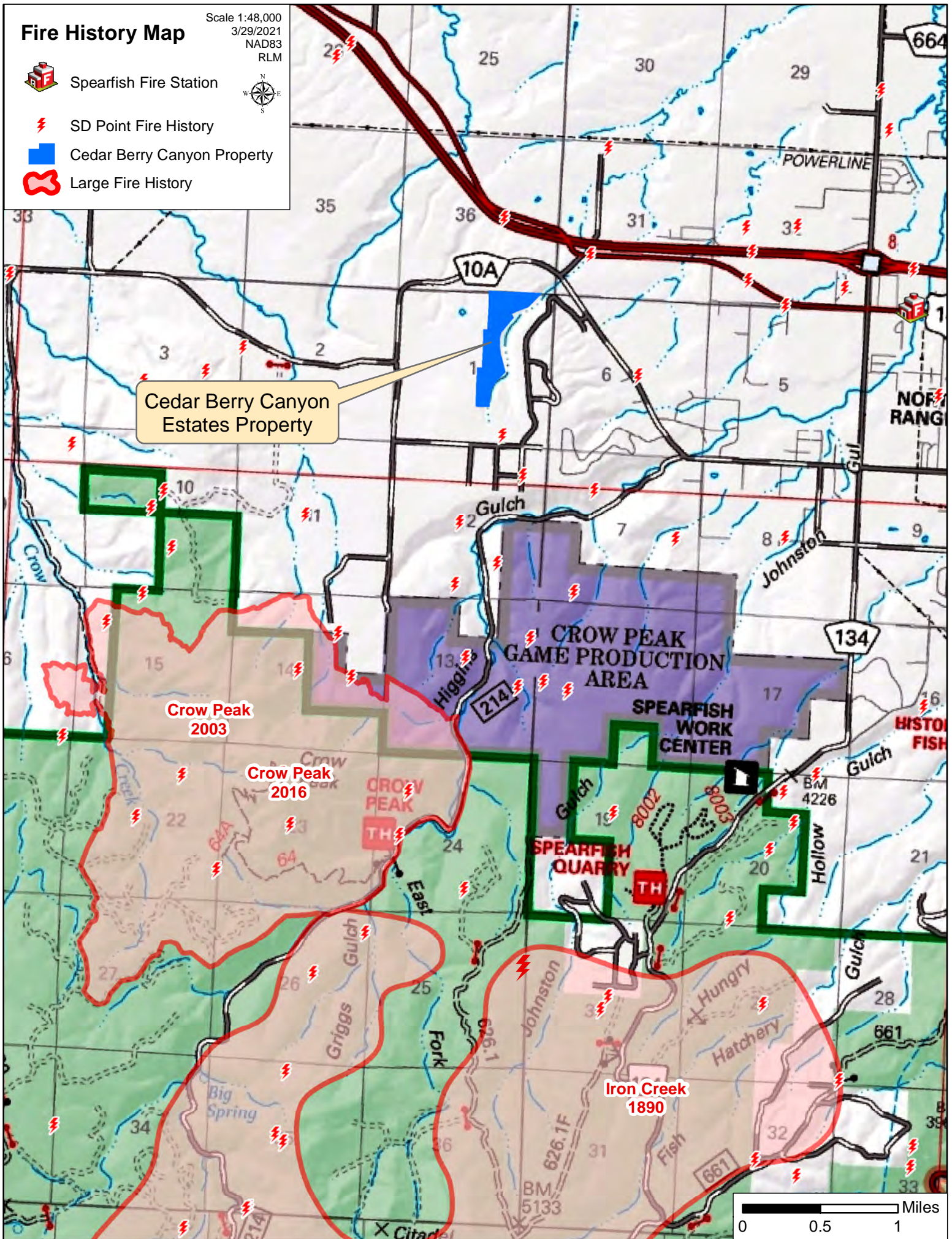
SD Point Fire History






Cedar Berry Canyon Property



Large Fire History

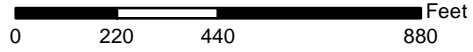


Cedar Berry Canyon Treatment Map

-  Cedar Berry Canyon Treatment areas
-  Cedar Berry Canyon Estates Lots
-  20 ft Contour Lines



Scale 1:5,000
3/29/2021
NAD 83
RLM



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GIS - MAPPING

