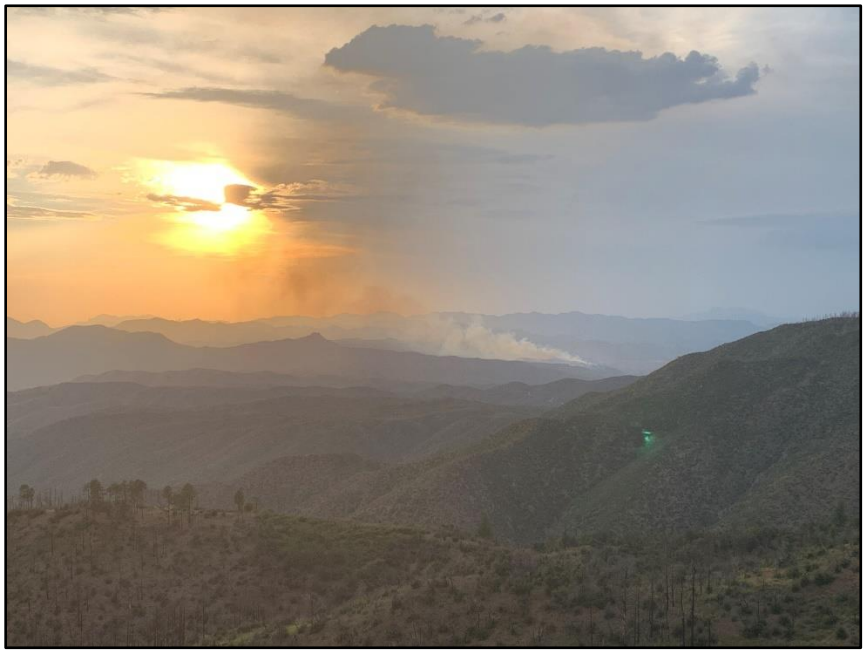
Biological Assessment

Carlota Fire Emergency Response

United States
Department of
Agriculture
Forest
Service

Southwestern Region

August 2023



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Introduction

This Biological Assessment (BA) discloses the effects that occurred or may have occurred from suppression related impacts to species and critical habitats listed or proposed for listing under the Endangered Species Act from the Carlota Fire. The Carlota Fire was located on July 26, 2023 on the Globe Ranger District of the Tonto National Forest. The fire occurred between Top-of-the-World, the Carlota Mine, and Miami in Gila County, AZ.

Forest Service biologists immediately recognized this lightning caused fire was occurring in occupied Arizona Hedgehog Cactus habitat. A Forest Service Fireline Resource Advisor familiar with Arizona Hedgehog Cactus first deployed to the Carlota Fire on July 29, 2023 when suppression work with a bulldozer began. On July 30th when backburning operations commenced, it became apparent that full avoidance of Arizona Hedgehog Cactus was not possible and emergency consultation was initiated with the U.S. Fish & Wildlife Service (USFWS, consultation number 2023-0110880). The Forest Service discussed the potential to salvage Arizona Hedgehog Cactus with both USFWS and Desert Botanical Gardens staff if impacts to the species could not be avoided. However, no plants ended up being salvaged during the incidental as full avoidance was possible during bulldozer operations and it was not safe to do so during backburn operations.

The U.S. Fish & Wildlife Service's Information for Planning and Consultation (IPaC) system was used to generate an official species list for consultation purposes (Consultation Code: 2023-0113163). Table 1 summarizes the effects determinations for all species on this list.

Table 1. Summary of effect determinations for official species list generated by IPaC on August 4, 2023.

Species	Status	Determination
Mexican Wolf *Canis lupus baileyi*	Non-essential Experimental Population	No Effect
Ocelot *Leopardus pardalis*	Endangered	No Effect
Yellow-billed Cuckoo *Coccyzus americanus*	Threatened	No Effect
Arizona Hedgehog Cactus *Echinocereus arizonicus arizonicus*	Endangered	May Affect, Likely to Adversely Affect

Species with a No Effect determination are not known to occur in the affected area, and/or there is no suitable habitat or designated Critical Habitat within the affected area. Species for which a No Effect determination was made will not be discussed further in this document. This emergency consultation BA focuses on Arizona Hedgehog Cactus (*Echinocereus arizonicus arizonicus*).

Action Area

The action area is based on the containment perimeter used by firefighters during the incident which included actions away from the fire perimeter. The action area is bounded by the fire perimeter to the west which primarily follows Forest Road (FR) 2574, Highway 60 to the south, FR 287 to the east, and Carlota Mine to the north (Map 1). The Carlota Fire action area is approximately 1,665 acres in total. This BA does assess potential downstream affects in the portion of the Pinto Creek watershed

were the fire occurred downstream to the Carlota Mine boundary at which point Pinto Creek is diverted by the mine.

General Description of Habitat

The Carlota Fire burned 203 acres of Pinyon-Juniper evergreen shrub/woodland and 141 acres of Interior Chaparral shrubland ranging from 3,800 to 4,600 ft elevation. Terrain within the action area ranges from rolling hills to steep canyons dominated by granite boulders and outcrops overlooking Pinto Creek. The fire burned the slopes directly above Pinto Creek which flows intermittently at the bottom of a large draw at approximately 3,600 ft elevation. Riparian habitat in Pinto Creek is sparse with sycamore, cottonwood, and willow present at low densities. No flowing water was noted in the area during the fire, this section of Pinto Creek normally only flows after rain events.

Fire Description & Suppression Actions

The Carlota Fire was a lightning caused fire discovered the afternoon of July 26, 2023. With minimal winds and high relative humidity, the fire remained relatively small through July 27th. Fire activity increased on July 28th and 29th with high afternoon temperatures, low humidity, and higher wind speeds. To the north and northeast, fire spread was minimal down a steep hill towards a Carlota Mine pit. The fire was able to spread rapidly to the west, south, and southeast making a run uphill towards Highway 60.

Fire personnel worked to prepare FR 2574 as defensible fireline to control fire spread to the west and protect the nearby community of Top-of-the-World (Map 2). Hand crews removed brush along the east side of FR 2574 and a bulldozer improved the existing roadbed to facilitate firefighter access. This work initially was successful containing fire spread to the west along FR 2574 with the exception of two small slop-overs which were able to be contained by initial attack handcrews.

On July 30th, fire personnel became concerned by increased fire activity that they may not be able to hold FR 2574. A backburn operation was initiated on the southern end of FR 2574 and along FR 2575 with the goal of circling the front of the fire between the two roads. However, the fire spread around FR 2575 before this operation could be completed. Fire personnel began backburning off Highway 60 and carried fire east towards the Pinto Creek bridge which was believed to be a strong anchor point. By July 31st it was apparent this operation had successfully contained fire spread to the west and south. Fire spread to the east remained minimal with only slow creeping occurring down a steep, rocky hill.

A Forest Service Fireline Resource Advisor familiar with Arizona Hedgehog Cactus first deployed to the Carlota Fire on July 29th when work with the bulldozer began. On July 30th when backburning operations commenced, it became apparent that full avoidance of Arizona Hedgehog Cactus was not possible and emergency consultation was initiated with USFWS.

Pinto Creek was a potential natural barrier to fire spread eastward though without safe access for fire personnel to the creek bed, contingency line was prepared in case the fire was to jump the creek. This included bulldozer line created on August 1st to prevent any potential fire spread north towards mine infrastructure and preparation of FR 287 on August 1st and 2nd with hand crews brushing the east side of this road.

By August 4th, it was apparent that the fire had hung itself up while backing downhill to the east. With plenty of fuel left to burn in front of it, the fire likely just didn't have sufficient weather conditions (low humidity and strong winds out of the west) to continue pushing east. Fire personnel continued to monitor the fire long-term for signs of new activity with none observed as of writing this BA.

Environmental Baseline

The environmental baseline includes past and present impacts of all federal, state, or private actions in the action area, the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation process. Below (Table 2) are the projects that have undergone formal Section 7 consultation within the Carlota Fire action area.

Table 2. **Previous Arizona Hedgehog Cactus Section 7 Consultations Near the Carlota Fire**

Project Name	Determination	Year
Telegraph Fire Emergency Response	LAA	In Progress
Tonto National Forest Revised Land & Resource Management Plan	LAA	2022
Resolution Copper Mine	LAA	2020
US 60 Pinto Creek Bridge Replacement	LAA	2018
Oak Flat-Miami US 60 Roadway Enhancement	LAA	2014
Tonto National Forest Treatment of Noxious or Invasive Plants	LAA	2012
US 60 Hwy Improvements Near Pinto Valley Road	LAA	2008
Tonto National Forest Ongoing Grazing on 20 Allotments	LAA	2002
Carlota Copper Mine	LAA	1996

Ongoing activities affecting natural resources in the project area include grazing, highway operations, and both active and historic mining. The fire occurred within the Sleeping Beauty Allotment Complex which is actively grazed by domestic cattle. Consultation was last completed in 2002 for these grazing allotments.

Three consultations have occurred related to highway operations over the last 15 year with the US 60 Pinto Creek Bridge Replacement project being the most recent in 2018. Three large copper mines have completed consultation for operation in the area with the Resolution Copper Mine project being the most recent in 2020. There are at least a dozen historical mine features either within or directly adjacent to the fire with mining operations on site dating back at least a century.

Minimal recreational activities occur on Forest Service managed lands in the area. There are no designated recreation areas or developed recreation sites here. Dispersed hunting activities may occur along Pinto Creek.

Fire History in the Area

There are no records of fires in this area since at least 1970. A lack of fires on the landscape here likely led to increased vegetation density contributing to fire effects, fire behavior, and burn severity.

Species Status and Effects Analysis

Arizona Hedgehog Cactus

Status: Endangered

Species Description

Arizona Hedgehog Cactus (AHC) is a large succulent perennial plant, with dark green stems occurring in clusters of 4 to 20, and occasionally many more. Each stem has about 10 tuberculate ribs. Flowers are red to crimson on the upper third of the stem and burst through the stem rib, leaving a scar on the stem above the spine. The AHC is found at elevations ranging from 3,300 to 6,300 feet within the ecotone between the Madrean Evergreen Woodland and Interior Chaparral biotic communities. Preferred habitat for AHC is exposed, stable bedrock and boulders exhibiting sufficient fracturing or rock interstices for establishment. Most AHC are found scattered on open, rocky slopes of 20 to 90 degrees and on steep, fissured cliffs (Baker 2013). The AHC is pollinated by bees and hummingbirds and produces buds from April to May. Weather can hasten, prolong, or inhibit flowering by several weeks. Fruits become mature in June and each fruit produces approximately 100 seeds (Baker 2013).

This species occupies a narrow geographic range between Superior and Globe in Pinal and Gila counties in central Arizona. The known range for the AHC extends from the Superstition Wilderness area south to Devils Canyon, east along US 60 to Top of the World, and south to the Mescal and Pinal Mountains. Most known plants are on the TNF and on private inholdings within the exterior boundary. Additional plants likely exist as most potential habitat remain un-surveyed due to the rugged terrain where suitable habitat is located (AGFD 2020).

Critical habitat has neither been designated or proposed for the species. Additionally, a Recovery Plan has not been finalized for the species.

The species is threatened by development including highway and road construction/operation, mining, grazing, and wildfire. In recent years, fires in the area have increased in size and severity from historic conditions and are now likely the primary threat to AHC. A buildup of fuels on the landscape from over a century of fire suppression actions and a changing climate creating direr conditions are contributing factors to this changing fire regime. Over the last 5 years, the Woodbury, Salt, and Telegraph Fires have affected large swaths of suitable AHC habitat. Most recently, the Telegraph Fire in 2021 burned over 180,000 acres. Approximately 1,578 AHC were known to occur within the Telegraph Fire perimeter. Post fire survivorship data has estimated that 38.92% of AHC within the fire area are healthy (unburned), 15.75% are in fair condition (<50% damaged), 25.93% are in stressed condition (>50% damaged), and 19.40% are dead (Bruner, 2022).

Status in the Action Area

Information on species abundance is limited due to the rugged terrain where this species is found, with most data being compiled for Section 7 consultations under the Endangered Species Act. A majority

of habitat potentially suitable for the species may yet be unsurveyed. The Forest Service does have a dataset of over 7,000 AHC observation points. Observation age, GPS accuracy, and accompanying information varies greatly amongst the points in this data set which can influence an individual points reliability and usefulness.

Of the 1,665 acre Carlota Fire action area, approximately 75 acres had previously been surveyed for AHC locating exactly 500 plants. Within the Carlota Fire perimeter, approximately 60 acres had been surveyed before the fire with a total of 342 AHC document. Most of these points come from surveys conducted for the Resolution Mine project. Cacti involved in this survey effort have been tagged in the field with metal numbers and have quality accompanying information. Based on this limited survey data and a general habitat assessment conducted by Forest Service biologists, it is likely much of the action area is suitable habitat for AHC. The southern and southwestern portions of the action area have the highest concentrations of granite boulders/outcrops and likely supported the highest densities of AHC pre-fire.

Mining, both historic and modern, and road construction/maintenance likely have impacted AHC within the action area to some degree. These impacts are primarily found on the fire's perimeter with the Carlota Mine to the north and Hwy 60 to the south. Most of the action area is remote and has not been disturbed, at least not within the last century. Trend data is not available for the species within the action area though given the lack of disturbance within the action area and the number of known plants present, it is likely that a stable AHC population did occur here pre-fire.

Effects to the Species

The Carlota Fire burned a total of 344 acres, likely all of which was suitable for AHC. A total of 342 known AHC were present in the burned area. Suppression activities directly impacting the species included a backburn along FR 2574, 2575 and Highway 60. Roadways prepared as fireline and bulldozer created fireline may have indirectly impacted the species.

Backburn

A backburn was conducted off of portions of FR 2574, 2575, and Highway 60 (Map 2). Fire personnel recorded the linear route along which the backburn was ignited. Estimating an area burned from this linear ignition data to estimate the area impacted by backburn activities is imprecise at best. Forest Service Fireline Resource Advisors estimated that the backburn traveled approximately 50 meters before being met with wildfire. A GIS exercise was carried out to map this and calculate impacts to habitat and known AHC. It is likely the backburn was variable across the landscape though due to terrain, fuels, and wind. In some locations more habitat may have been impacted and in other location less habitat may have been impacted by the backburn.

The backburn is estimated to have covered 39.8 acres of ground. Two AHC were known to occur in the backburn area pre-fire and a third individual was located by Forest Service Fireline Resource Advisors post-fire. One of these plants was likely killed by backburn activities, one has been damaged and is in stressed condition (>50% damage to surface tissue) though it potentially has viable stems remaining, and a third plant could not be located post-fire. More plants are likely present within the backburn area than were known pre-fire.

Photos showing AHC potentially impacted by backburn activities. Left: a partially burned plant with some potentially viable stems remaining. Right: an AHC mortality with all stems burned. Photos by Camden Bruner, 7/30/2023.

Backburn activities directly impacted AHC with damage to plants and direct mortality of at least 1 plant observed. It is likely the backburn indirectly impacted AHC by reducing vegetation cover, changing vegetation composition, and increasing erosion within burned area. The heat from fire can also cause cracking and flaking of granite rocks which can negatively affect AHC individuals and suitable habitat long-term. Post Telegraph Fire, cracking granite observed by Forest Service biologist in Devil's Canyon negatively affected AHC that had survived the original fire. It is unclear if backburn activities became hot enough to cause such impacts though it is possible.

Bulldozer Created Fireline

A total of 921 meters of fireline was created with a bulldozer (dozerline) in the northeast corner of the action area (Map 2). A Forest Service Fireline Resource Advisor familiar with AHC surveyed this area ahead of bulldozer operations. No AHC were identified within or immediately adjacent to this line. The dozerline followed a ridgeline connecting FR 287 and Pinto Creek. This activity may have impacted potential suitable habitat for AHC. It is also possible that increased erosion may impact AHC downhill from this dozerline. Straw wattles and a native seed mix have been applied to the dozerline to mitigate any potential negative affects to AHC and AHC suitable habitat.

A bulldozer creating a new fireline down a ridgeline from FR 287 to Pinto Creek. A handcrew can be seen on the upper portion of the dozerline brushing the south side of the new line. Photo by Camden Bruner, 8/1/2023.

Roadway as Fireline

A total of 6,120.6 meters of existing roadways, FR 2574 and 287, were prepared as fire line to contain the Carlota Fire. This primarily involved hand crews removing brush on one side of the road reducing fuels available to the fire. Along FR 2574, a bulldozer was used within the existing roadbed to improve the road facilitating fire personnel access to the fire. A Forest Service Fireline Resource Advisor familiar with AHC surveyed FR 2574 ahead of bulldozer operation. One AHC was flagged and avoided on the edge of FR 2574. The plant flagged for avoidance was on the west side of FR 2574 and was not impacted by the fire or fire suppression activities.

Both photos showing FR 2575 prepared as fireline. Note cut stumps for removed vegetation in each photo on east side of road (righthand side of photos). Photos by Camden Bruner, 7/30/2023.

Two known AHC occurred on the east side of FR 2574 and were likely impacted indirectly when fire personnel removed brush to prepare the road as defensible fireline. It is likely more AHC are present along roads prepared as fireline than are currently known. Changed canopy cover, including the potential removal of nurse plants, and changed vegetation composition may negatively impact these plants. They may be more exposed to weather, including sun, and may experience increased wind and water erosion due to reduced surrounding vegetation.

Point Protection

A historic cabin is located in Pinto Creek near the terminus of the dozerline in the northeast corner of the action area. Fire crews brushed around this cabin by hand with chainsaws to protect it should the fire reach it. A Forest Service Fireline Resource Advisor familiar with AHC supervised this work. Three previously unknown AHC were located near the cabin though were not impacted by point protection activities which occurred greater than 100 meters away.

Historic cabin in Pinto Creek prepared for point protection. Photo by Camden Bruner, 8/1/2023.

Determination

Based on the information provided above, it is our determination that the suppression activities to control the Carlota Fire *May Affect and are Likely to Adversely Affect* Arizona Hedgehog Cactus.

- Direct mortality of Arizona Hedgehog Cactus occurred during backburn activities. At least 3 known cacti were impacted by the backburn though additional plants may also have been impacted.
- Indirect impacts to the species occurred when roadways were prepared as fireline as brush was removed over Arizona Hedgehog Cactus changing vegetation structure around individual plants.

Cumulative Effects

Overall, impacts to AHC from Carlota Fire suppression actions are relatively minor given the small scale of the fire itself. These are similar impacts to those from the much larger Telegraph Fire though. With increased fire frequency, size, and severity in the area; effects to the species from fire suppression activities will likely continue in the foreseeable future. The Forest Service does plan to

conduct fuels treatment projects within the species range to mitigate wildfire and fire suppression effects to the species though the fuels treatments themselves may also impact AHC. Cumulatively, effects from fire suppression and future fuels treatment work to reduce wildfire risk may be significant for AHC. Additionally, mining and road maintenance work are likely to continue in the action area potentially contributing to cumulative effects to the species long-term.

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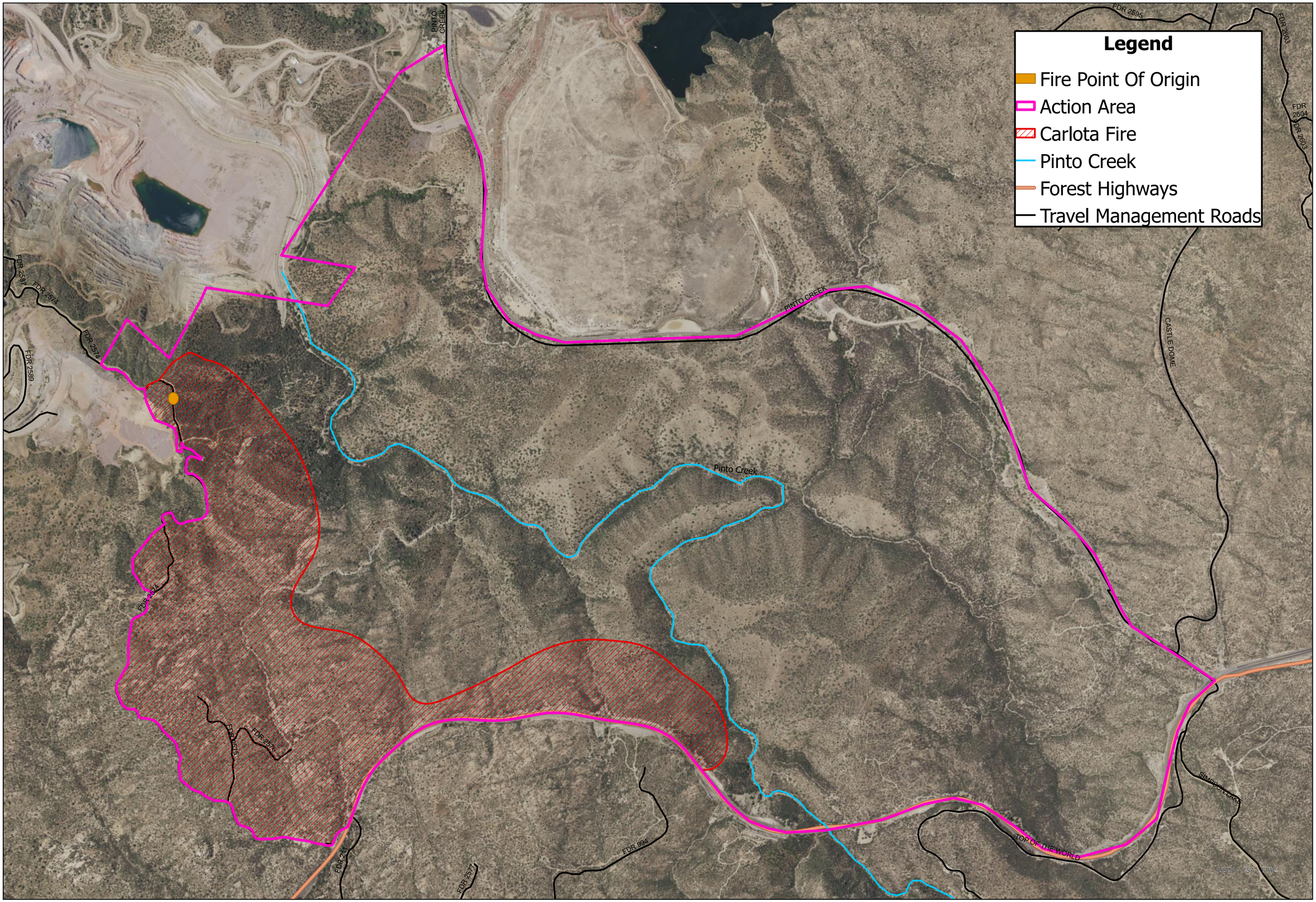

Map 1 - Carlota Fire Action Area

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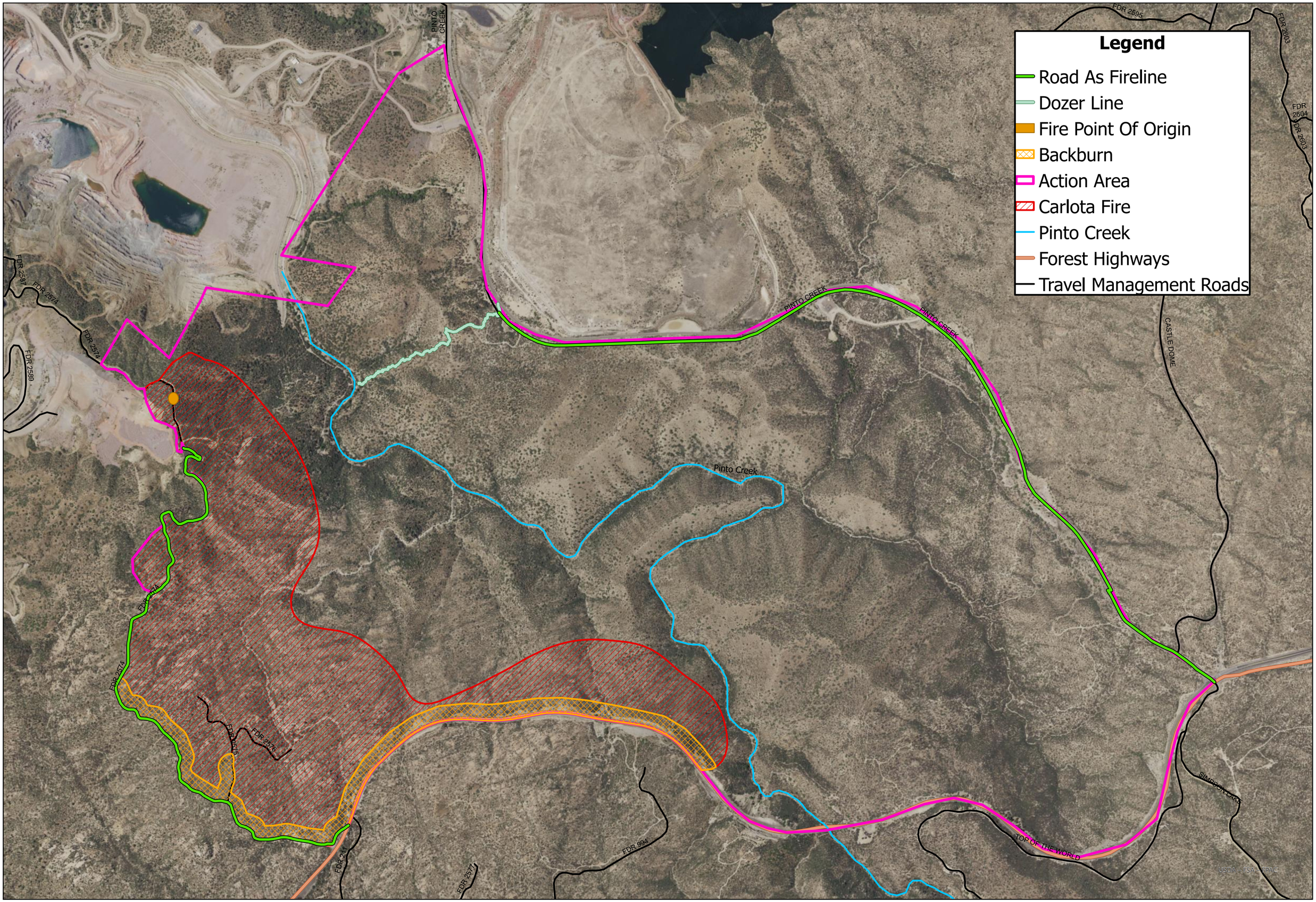

Map 2 - Carlota Fire & Fire Suppression Actions

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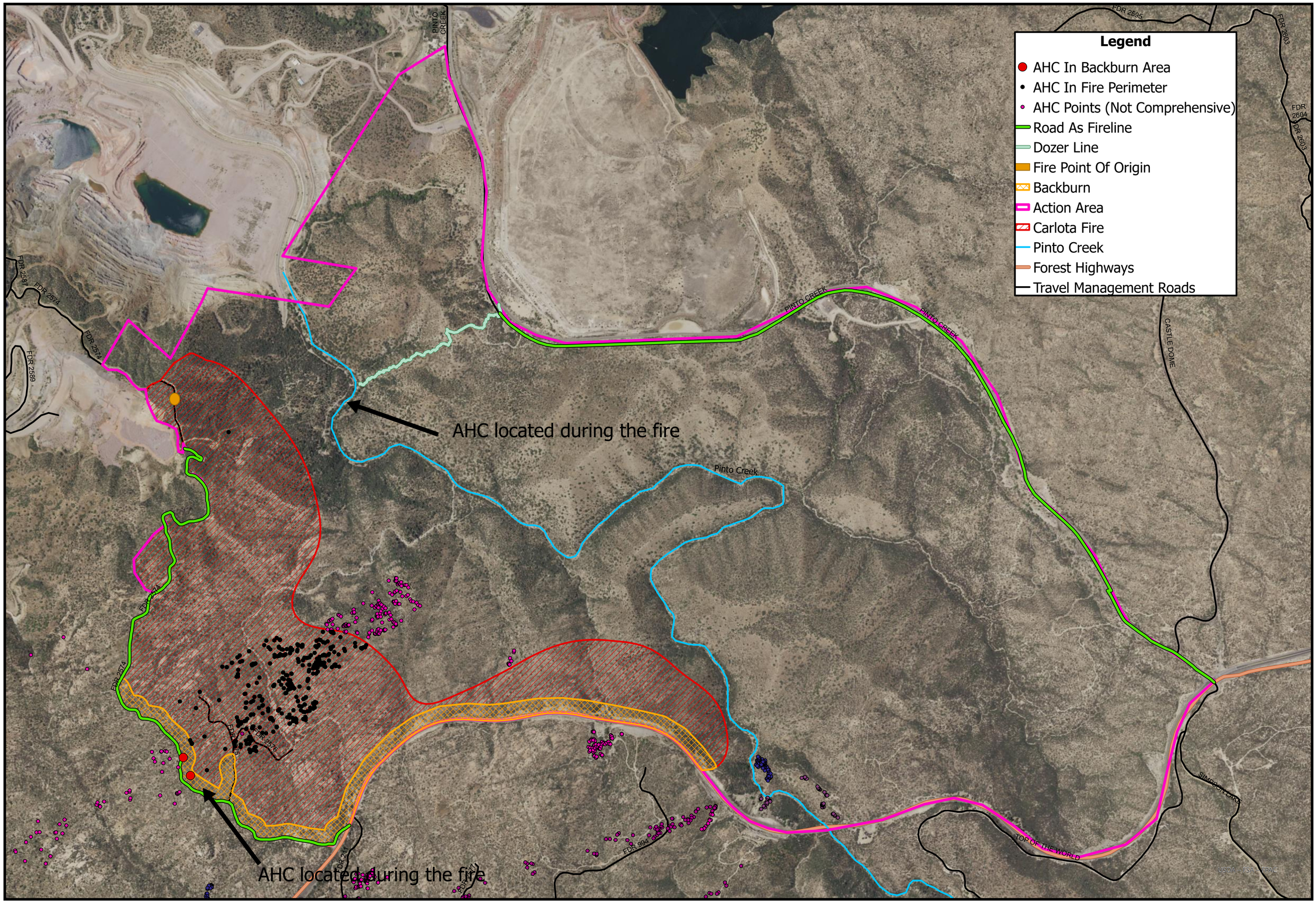
Miles



Map 3 - AHC in Carlota Fire Action Area

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