3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The first section of this chapter establishes baseline condition and identifies reasonably foreseeable future actions that collectively inform the analysis of cumulative effects. Following this discussion, this chapter describes the affected environment and the environmental consequences of the no action, proposed action and other alternatives developed as part of our analysis for each of the key issues. This presentation is organized by key issue and after describing the affected environment for a key issue, an analysis of the direct and indirect effects and the effects of mitigation is provided for each alternative. Following this discussion we provide our analysis of the cumulative effects for each alternative.

3.1. Air Quality (Issue 1)

3.1.1. Affected Environment

The regional climate is semi-arid (Green and Sellers 1964). Precipitation falls in a bimodal pattern: most of the annual rainfall within the region occurs during the winter and summer months, with dry periods characterizing spring and fall. The Western Regional Climate Center (WRCC 2008) maintains data records for weather stations within the United States. These stations include the Miami and Superior stations east and west of the PAA, respectively. Climatic data summarized on Table 3-1 are from the WRCC.

Table 3-1. Annual Mean Daily Weather Conditions

Weather Station	Project Area Distance from Weather Station (miles)	Mean Daily Average Temperature (F)	Mean Daily Maximum Temperature (F)	Mean Daily Minimum Temperature (F)	Mean Total Snow (inches)	Mean Total Precipitation Rates (inches)	Annual ET[1] (inches)
Miami	6.8	63	77	51	3	19	55
Superior	1.2	70	79	59	1	19	63

[1] Evapotranspiration rate from Tecle and Yitayew (1990)

The far eastern portions of the PAA occur within the Miami Planning Area which was designated by Environmental Protection Agency (EPA) as a Nonattainment Area for PM_{10}.[4] On March 28, 2007 EPA determined that the Miami Nonattainment Area met PM_{10} (particulate matter with an aerodynamic diameter less than or equal to 10 microns) standards and qualified for redesignation as an Attainment Area. This action is pending (ADEQ 2009). The Hayden Nonattainment area for PM_{10} extends north from Hayden, Arizona. The State Implementation Plan for this area was reviewed by EPA and given limited "approval/disapproval" in 1994 (59 FR Part 36116 as cited in ADEQ 2009). While still officially designated a Nonattainment Area, the last exceedance of the 24-hour PM_{10} standard occurred in 1997 and the last annual standard exceedance occurred in 1988 (ADEQ 2009).

The Miami area has been designated an Attainment Area for sulphur dioxide (SO_2) with a Maintenance Plan (ADEQ 2009) and portions of the PAA located within Gila County are in this Attainment Area. ADEQ developed a State Implementation and Maintenance Plan in 2002 and EPA approved the plan in January of 2007 (72 FR 3061 cited in ADEQ 2009).

The PAA is within 50 miles of three Class I airsheds: the Superstition Wilderness is approximately 3 miles northwest, the Sierra Ancha Wilderness is approximately 27 miles north, and Mazatzal Wilderness is approximately 50 miles north-northwest. Prevailing winds in this area are generally from the west or southwest but may shift to the south or southeast during the summer monsoon season (Oliver and Fairbridge 1987). The CAA gives Federal land managers an affirmative responsibility to protect air quality values, including visibility in Class I areas.

Ozone is a natural component of the earth's atmosphere and can be found as a pollutant produced through chemical reactions that involve volatile organic compounds, nitrogen oxides, and sunlight at the earth's surface. Sources of volatile organic compounds include vehicles and other gasoline powered motors, industrial processes, and biogenic emissions from plants. Sources of nitrogen oxides include vehicles, construction equipment, trains, electric power plants, industrial sources, and biogenic emissions from soil (Pinal County 2008).

The latest revision to the ozone National Ambient Air Quality Standards (NAAQS) is dated March 12, 2008, when the 8-hour standard was lowered to 0.075 ppm. An area meets the revised standard if the 3-year average of the annual fourth-highest daily maximum 8-hour average at every ozone monitor is less than or equal to 0.075 ppm.

The closest Pinal County air quality monitoring site to the PAA is located at the Queen Valley water tank, approximately 20 miles west of the PAA, north of U.S. Highway 60 and 16 miles southeast of Apache Junction. The equipment at the site provides data regarding ozone transport from the Phoenix

[4] The CAA requires EPA to set NAAQS for certain pollutants. To date, EPA has set NAAQS for six principal pollutants, which are called "criteria" pollutants. These pollutants are carbon monoxide, nitrogen dioxide, particulate matter (PM_{10} and $PM_{2.5}$ standards), ozone (1-hour and 8-hour standards), sulfur dioxide, and lead. Airsheds with ambient concentrations of these pollutants below the standards set by EPA are considered to be in "attainment" of the NAAQS. Areas with ambient concentrations above the standards are designated by EPA as Nonattainment Areas.

metropolitan area (Pinal County 2008). ADEQ operates instruments at this site to measure ozone, reactive nitrogen oxides (NO_x), and Photochemical Assessment Monitoring Station volatile organic compounds. Pinal County Air Quality Department is the operator for the Interagency Monitoring of Protected Visual Environments (IMPROVE) sampler located at this site. This sampler provides particulate matter data and speciation data for assessing the impact of particulates on visibility at the nearby Superstition Wilderness.

Figure 3-1 depicts the fourth highest 8-hour ozone average recorded at Apache Junction, Casa Grande, Queen Valley, Combs, Maricopa, and Pinal Air Park. It is generally assumed that a large portion of the ozone recorded at these six monitoring sites results from transportation to and from the Phoenix metropolitan area or elsewhere. Generally, the 8-hour average ozone concentrations have decreased over time at the Apache Junction and Casa Grande sites. Many of the sites show an increase between 2005 and 2006, followed by a smaller decrease. The daily maximum 8-hour averages remain elevated at Apache Junction and Queen Valley. The year 2006 was a high-ozone year across all networks in Arizona.

Although the 1-hour ozone standard has been revoked and is no longer used in the NAAQS, the 1-hour ozone measurement remains useful in showing trends. Figure 3-2 summarizes 1-hour ozone maximum concentration readings recorded at Apache Junction, Casa Grande, Queen Valley, Combs, Maricopa, and Pinal Air Park. The 1-hour ozone concentrations at these six sites have generally decreased from 1993 to 2007.

Natural and current background visibility data for the Superstition Wilderness Class I area is collected at the Tonto National Monument monitoring site, located 2.3 miles northeast of the Superstition Wilderness. Clearest, haziest and average annual, natural, and current background visibility data for the Superstition Wilderness Class I area is presented in Table 3-2. The average annual natural and annual average 2000-2004 baseline Standard Visual Range is 163 miles and 89 miles, respectively. This visibility data reflects conditions observed during aerosol monitoring at Tonto National Monument from 2000 to 2004 as part of the IMPROVE program.

Table 3-2. Natural and Current Background Visibility Data for Tonto National Monument Northeast of the Superstition Wilderness. [Data Source: http://www.fs.fed.us/air/technical/class_1/wilds.php?recordID=76]

Site Specific Rayleigh scattering coefficient: 10	Clearest 20% Natural	Clearest 20% 2000-2004 Baseline	Haziest 20% Natural	Haziest 20% 2000-2004 Baseline	Average Annual Natural	Annual Average 2000-2004 Baseline
Standard Visual Range (miles)	198	127	126	59	163	89
Haze Index (dv)	2.03	6.46	6.54	14.16	3.99	10.09

dv = deciview, a unit of measure for a visual range.

3.1.2. Environmental Consequences: Direct and Indirect Effects

Concern was expressed during public scoping that the Pre-feasibility Activities might cause an undue increase in particulate matter, regional haze, and ozone. The following sections provide our evaluation of the proposed action and alternative effects to air quality.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Air Quality

The no action alternative would result in no development of new drill sites on National Forest System Lands, all drill activities would be restricted to State and private lands. In the short term, drilling activities might approach the peak activity levels outlined in the proposed action. However, air emissions would likely be somewhat less than the emissions estimated for the peak activity level. Table 3-3 depicts the number of drilling rigs operated by RCM since 2001. The number of drilling rigs present in 2006 and 2007 is three less than the eight assumed for the maximum emissions scenario. The number of drilling rigs in 2008 is two less than maximum emissions scenario. As the need for new drilling targets on State and private lands that would provide new data to support RCM's pre-feasibility studies diminishes, drilling activity is expected to be reduced with associated reductions in air emissions.

Table 3-3. Drilling Rigs Operated by RCM for Exploration and Pre-feasibility Studies from 2001 through 2008 on State, private, and National Forest System Lands (RCM 2009)

Year	Number of Drill Rigs	
	Peak During Year	Average for Year
2001	3	2
2002	4	3
2003	1	na
2004	1	na
2005	3	3
2006	5	4
2007	5	4
2008	6	5

Air Quality Effects of Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Air Quality

Air contaminant emissions anticipated as a result of Pre-Feasibility Activities were analyzed, inventoried and totaled per activity and for the anticipated peak emissions scenario in the *Air Emissions Inventory Development for Resolution Copper Mining Pre-Feasibility Activities Plan of Operation*, by Malcolm Pirnie, Inc., February 2009 (Malcolm Pirnie Inventory). Emissions from roadway and drill site improvement, drilling activities, and on-going monitoring were considered. Air contaminants analyzed include carbon monoxide (CO), NO_x, SO_2, particulate matter in the form of PM_{10}, $PM_{2.5}$ (particulate matter with an aerodynamic diameter less than or equal to 2.5 microns), and volatile organic compounds.

To calculate air emissions for the Pre-feasibility Activities a peak emissions scenario was assumed based on the RCM drilling fleet and following operational assumptions:

- All road improvements, including construction of 0.33 mile of new road, occur in the first year.
- Five exploration drill sites would be operated throughout the first year.
- One deep groundwater testing and monitoring drill rig would be used to construct the three deep groundwater testing and monitoring wells during the first year.
- One shallow groundwater testing and monitoring drill rig would be used to construct the six shallow groundwater testing and monitoring wells during the first year.
- One geotechnical borehole drill rig would be used to construct the nine tunnel characterization bore holes during the first year.

A summary of emissions, expressed in tons per year, for the maximum emissions scenario is provided in Table 3-4.

Combustion and fugitive emissions under the maximum emissions scenario would be greater than the previous peak drilling periods. NO_x is an ozone precursor and contributes to the formation of haze causing deterioration of visibility measurements. The eight operating drill sites assumed to determine the estimated peak emissions for all activities is three more than were present in 2006 and 2007 and two more than were present in 2008, the three most active years since implementation of the Previously Authorized Activities (Table 3-3). The amount of construction activity that would be associated with the road improvements outlined in the Pre-feasibility Plan of Operations during a maximum year scenario when all of the proposed road improvements would be implemented is greater than the level of road work conducted in either 2006, 2007 or 2008. During 2006 and 2007 the general trend in ozone concentration was downward at the nearest monitoring station approximately 20 miles to the west (Figure 3-1 and 3-2). Under the peak emissions scenario, detectable increases in haze within the nearest Class I airsheds are unlikely. The prevailing winds in the region generally flow from the west or southwest, away from the nearest Class I airshed. The winds flow from the west particularly during the winter season when inversions are most likely. Together, the direction of the prevailing winds away from the Class I airsheds,

the distance to nearest Class I airshed from the PAA, and RCM's proposed dust control measures would mitigate potential increases in haze in these areas.

Table 3-4. Estimated Maximum Emissions for all Activities in Tons per Year

Activity Type	Days of Operation	Combustion Emissions						Fugitive Emissions	
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOC	PM_{10}	$PM_{2.5}$
		ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
Exploration Boreholes	1,825	17.4	77.8	5.4	5.1	5.1	6.4	19.4	2.0
Deep Hydrogeological Wells	168	10.4	47.6	3.3	3.1	3.1	3.9	5.0	0.5
Shallow Hydrologic Wells	168	10.5	47.6	3.3	3.1	3.1	3.9	6.5	0.7
Geotechnical Boreholes	315	3.2	13.6	0.9	0.9	0.9	1.1	6.5	0.7
Road Improvement	109	0.9	4.1	0.3	0.3	0.3	0.3	1.4	0.1
Deep Hydrogeological Well Monitoring	365	0.1	0.0	0.0	0.0	0.0	0.0	2.5	0.2
Shallow Hydrologic Well Monitoring	365	0.1	0.0	0.0	0.0	0.0	0.0	1.9	0.2
Totals		**42.5**	**190.6**	**13.4**	**12.5**	**12.5**	**15.7**	**43.1**	**4.4**

Combustion and fugitive emissions under the maximum emissions scenario would be greater than the previous peak drilling periods. NO_x is an ozone precursor and contributes to the formation of haze causing deterioration of visibility measurements. The eight operating drill sites assumed to determine the estimated peak emissions for all activities is three more than were present in 2006 and 2007 and two more than were present in 2008, the three most active years since implementation of the Previously Authorized Activities (Table 3-3). The amount of construction activity that would be associated with the road improvements outlined in the Pre-feasibility Plan of Operations during a maximum year scenario when all of the proposed road improvements would be implemented is greater than the level of road work conducted in either 2006, 2007 or 2008. During 2006 and 2007 the general trend in ozone concentration was downward at the nearest monitoring station approximately 20 miles to the west (Figure 3-1 and 3-2). Under the peak emissions scenario, detectable increases in haze within the nearest Class I airsheds are unlikely. The prevailing winds in the region generally flow from the west or southwest, away from the nearest Class I airshed during much of the year, including the winter season when inversions are most likely (Oliver and Fairbridge 1987). Together, the direction of the prevailing winds away from the Class I airsheds, the distance to nearest Class I airshed from the PAA, and RCM's proposed dust control measures would mitigate potential increases in haze in these areas.

Air Quality Effects of Mitigation Implemented Under the Proposed Action Alternative

Mitigation measures identified in Section 2.3 would limit the maximum emissions from combustion sources to the levels estimated here for the maximum emissions scenario. Fugitive dust emissions would

be limited to the levels assumed in modeling by the requirement for implementation of dust suppression and control during road construction and maintenance activities.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Alternative to Air Quality

Air emissions from the implementation of the North OF-2 drill site are not expected to be different from the emissions estimated using the OF-2 drill site in the proposed action. Operations of the two drill sites would be the same and construction of both would require grading.

Air Quality Effects of Mitigation Implemented under the North OF-2 Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Air Quality

This access alternative would result in the construction of 0.66 mile (2.31 acre) of new drill road on National Forest System Lands. Construction of the road would result in additional generation of combustion and fugitive emissions. Assuming that the duration of construction and the emissions generated would be proportional to the area of disturbance, the expected increase in combustion and fugitive emissions over the worst case year emission estimate for the Pre-feasibility Activities is small (Table 3-5).

Table 3-5. Air Pollution Emissions Associated with West Access Routes 4a and 4b. Increased air pollution: calculated values assume that emissions from proposed road improvements/activities are proportionate by area to new road construction from west access routes.

Activity Type	Increased Combustion Emissions tons/year (Percentage Increase over Proposed Action)						Increased Fugitive Emissions tons/year (Percentage Increase over Proposed Action.)	
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOC	PM_{10}	$PM_{2.5}$
West Access Route 4a	0.0656 (0.154%)	0.2991 (0.157%)	0.0219 (0.163%)	0.0219 (0.175%)	0.0219 (0.175%)	0.0219 (0.139%)	0.1021 (0.237%)	0.0073 (0.166%)
West Access Route 4b	0.0754 (0.177%)	0.3436 (0.180%)	0.0251 (0.188%)	0.0251 (0.201%)	0.0251 (0.201%)	0.0251 (0.160%)	0.1173 (0.272%)	0.0084 (0.190%)

Impacts during operation of the two drill sites that would be located along this alternative route and the use of these roads to access drill site M, OF-1, OF-3, and the RES-13 drill site on State lands is not expected to materially differ from the proposed action. Overall, travel distance from the Superior East Plant Site to the intersection of FR 3153 and the user-created road that provides access to RES-13 would be 1.39 miles shorter than the proposed action. From the Superior East Plant Site to the intersection of

FR 3153 and the user-created road accessing RES-13, the proposed action travel route through Oak Flat Withdrawal Area is 3.78 miles long; 2.0 miles of it is paved road and 1.78 miles is dirt road. From the Superior West Plant Site to this same point via West Access Route 4a requires 2.39 miles of travel; 0.75 mile of paved road and 1.64 miles of dirt road.

Vehicle trips to support drilling operations at drill sites, M, OF-1, OF-3, and RES-13 were estimated for various operating scenarios for the proposed action and the West Access Route 4a alternative (see Section 3.5.2). The maximum number of vehicle trips estimated through the Oak Flat Withdrawal Area to support drilling operations at these four drill sites is 56. Table 3-6 summarizes the total vehicle miles traveled, miles traveled on paved road surface, and miles traveled on unpaved road surface for the proposed action, the West Access Route 4a alternative, and the West Access Route 4b alternative. West Access Route 4a would result in approximately 77.9 fewer miles of vehicle travel per day than the proposed action to support drill sites M, OF-1, OF-3, and RES-13 during the peak operating scenario assumed for the impact analysis for traffic through the Oak Flat Withdrawal Area. This peak traffic scenario assumed that all four of these drill sites would be operating concurrently.

Table 3-6. Total Miles Traveled during Maximum Predicted Vehicle Trips Per Day to Support Drilling Operations at Drill Sites M, OF-1, OF-3, and RES-13

Road Surface	Proposed Action	West Access Route 4a Alternative	West Access Route 4b Alternative
Miles Paved	112.0	42.0	42.0
Miles Dirt	99.7	91.8	100.2
Total Miles	**211.7**	**133.8**	**142.2**

Air Quality Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of West Access Route 4b to Air Quality

This access alternative would result in the construction of 0.81 mile (2.76 acre) of new road on National Forest Service Lands. Construction of the road would result in additional generation of combustion and fugitive emissions. Assuming that the duration of construction and the emissions generated would be proportional to the area of disturbance, the expected increase in combustion and fugitive emissions over the worst case year emission estimate for the Pre-feasibility Activities is small (Table 3-5).

Impacts to air quality during operation of the two drill sites that would be located along this alternative route and the use of these roads to access drill site M, OF-1, OF-3, and the RES-13 drill site on State

lands is not expected to materially differ from the proposed action. From the Superior West Plant Site to the intersection of FR 3153 and the user-created road accessing RES-13 via West Access Route 4b would require 2.54 miles of travel, 1.24 miles shorter than the proposed action and 0.15 mile longer than West Access Route 4a. West Access Route 4b would utilize 0.75 miles of paved road and 1.79 miles of dirt road.

West Access Route 4b would result in approximately 69.5 fewer miles of vehicle travel per day than the proposed action to support drill sites M, OF-1, OF-3, and RES-13 during the peak operating scenario assumed for the impact analysis for traffic through the Oak Flat Withdrawal Area (Table 3-6).

Air Quality Effects of Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.2. Erosion and Sedimentation (Issue 2)

3.2.1. Affected Environment

The characteristics of underlying geologic units can greatly affect the volume of sediment production and erosion potential of a landscape. There are a variety of geologic units underlying the PAA (Peterson 1960; Ransome 1903; Shafiqullah et. al. 1980). Although the majority of the PAA is located on Tertiary Apache Leap tuff, the northeastern portion is located primarily upon Tertiary Schultze Granite. The portions south and west of Apache Leap pass through a complex assemblage of additional geologic units. The units represent a wide span of geologic time, and include Older Precambrian Madera diorite; Younger Precambrian Troy quartzite, Ruin granite, Pioneer shale, Dripping Spring quartzite, and Mescal limestone; Devonian Martin formation; Mississippian Escabrosa and Pennsylvanian Naco limestones; Cretaceous Willow Springs granodiorite; Mid-Tertiary Whitetail conglomerate; and Quaternary-Tertiary basalt. FR 2440, directly west of Apache Leap, lies atop relatively recent (Quaternary) unconsolidated alluvium, talus, and colluvium at the mouth of Cross Canyon. Layers of varying depth are present along most drainages and flats.

The majority of the PAA is located within the Gila River watershed. The large basin west of Apache Leap drains into Queen Creek, a tributary of the Gila River. East of Apache Leap, ephemeral channels are separated by a visually indistinct drainage divide. The channels immediately east of Apache Leap follow a relatively shallow gradient toward Queen Creek, while those farther east eventually flow into Devils and Rawhide Canyons. These large canyons drain into Mineral Creek, another tributary of the Gila River, whose confluence lies approximately 12 miles south of the PAA, near the town of Kelvin. The only portions of the PAA falling within the Salt River watershed are north and east of Signal Mountain, near the Pinal/Gila County line.

Surface water flows within the PAA are restricted to a network of small to medium ephemeral drainages, most of which discharge indirectly into Queen Creek and Devils Canyon. There are no wetlands within the PAA, though wetlands likely occur along some reaches of perennial and intermittent drainages and in association with springs in the vicinity of the PAA. Both Queen Creek and Devils Canyon contain relatively small reaches of intermittent or perennial flow located downstream of most Pre-feasibility Activities. The only perennially flowing reach of Queen Creek is located west of the town of Superior, and is dependent upon effluent discharge from the town's wastewater treatment plant. A naturally occurring perennial segment of Devils Canyon is located approximately 5.6 miles upstream of the confluence with Mineral Creek and a very short intermittent section is located approximately 6.8 miles upstream of the Mineral Creek confluence. ADEQ (2008b) has designated Queen Creek as an impaired stream for recorded exceedances of dissolved copper.[5]

Relatively long distances separate the Pre-feasibility Activities from perennial or intermittent drainages. The unimproved road to drill site H-E is the nearest Pre-feasibility Activity to a perennial stream segment. It is located approximately 1.3 miles from a perennial reach of Devils Canyon, beginning at the Rancho Rio confluence. Drill site OF-1 is approximately 1.4 miles from this perennial reach of Devils Canyon at the Rancho Rio confluence.

Approximately 0.4 mile separate FR 2466 and the intermittent reach of Devils Canyon. Drill site OF-1 is approximately 0.7 mile from the nearest intermittent reach of Devils Canyon near the National Forest System Lands boundary with State land.

FR 2458 follows the portions of Queen Creek identified by ADEQ as an impaired water, crossing the Creek three times before arriving at drill site H-K. H-K is the closest drill site to the impaired reach of Queen Creek. It is approximately 280 feet from the Queen Creek. This portion of FR 2458 is closed for public use. OMYA Arizona, Inc., utilizes the road for access to its limestone quarry approximately 3 miles north of U.S. Highway 60. OMYA Arizona, Inc. has installed cement aprons at all crossings to eliminate sediment loading from FR 2458 road crossings into Queen Creek.

3.2.2. Environmental Consequences: Direct and Indirect Effects

Several commenters expressed concern that the Pre-feasibility Activities would increase erosion and sediment runoff from the PAA and adversely affect surface water quality. The following sections provide our evaluation of the effects of the proposed action and alternatives on erosion and sedimentation.

[5] Queen Creek begins at the foot of Fortuna Peak, descends to the southwest through the town of Superior, and continues into the Roosevelt Irrigation Canal. Two reaches of Queen Creek are currently included on Arizona's 303(d) List of Impaired Waters due to recorded exceedances in dissolved copper. The upstream reach, an 8.8-mile segment from the Queen Creek headwaters to the Superior Waste Water Treatment Plant (WWTP), was first classified as Impaired in 2002. The 5.9-mile downstream reach, beginning at the Superior WWTP and ending at Potts Canyon, was added to the Impaired list in 2004. ADEQ (2008) states that dissolved copper loading has been found to exceed ADEQ surface water quality standards in both reaches in at least two of three sampling years between 2002 and 2005. A Total Maximum Daily Load (TMDL) analysis is currently being developed by ADEQ for Queen Creek to examine the source and extent of water quality impairment. The TMDL study is scheduled for completion by ADEQ in 2009, and will include an implementation plan outlining alternatives for restoring water quality (ADEQ 2008b).

Alternative 1 – No Action

Direct and Indirect Erosion and Sedimentation Impacts of the No Action Alternative

Implementation of the no action alternative would require RCM to reclaim drill sites developed as part of the Previously Authorized Activities. Over time, as reclamation activities became established, this would reduce sediment and erosion at these sites. Existing Forest Roads would remain in their present condition. In the short term, erosion and soil loss from these roads would not change from the current condition. User-created roads that provide access to previously authorized drill sites would be closed.

Erosion and Sedimentation Effects of Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Erosion and Sedimentation Impacts of the Proposed Action

Under the proposed action, RCM would complete necessary roadway improvements on approximately 16.97 miles of existing roads impacting approximately 33.39 acres. In addition, 0.33 mile of new roads would be constructed, impacting 0.55 acre. Construction of drill sites would disturb approximately 4.72 acres. The total area of disturbance would be 38.66 acres. Much of the PAA is underlain by rock and would not be erodible; however, the overall foot print of erodible surface within the vicinity of the PAA would be increased. RCM has included Best Management Practices (BMPs) in their proposal which would localize and minimize impacts. Roads and drill sites would be reclaimed when no longer needed. Ephemeral drainage systems and the few intermittent or perennial water courses in the vicinity of the PAA are not expected to be adversely impacted by the increased surface area of disturbance and runoff from these areas. Implementation of the mitigation measures, the relatively high percentage of rock substrate, vegetation cover and distance between the PAA and any potential receiving water body would eliminate the potential for sedimentation to reach those waterbodies.

Erosion and Sedimentation Effects of Mitigation Implemented Under the Proposed Action

Ensuring implementation of BMPs outlined in the SWPPP to control and limit erosion and sedimentation would mitigate soil loss from the proposed road and drill site improvements.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Erosion and Sedimentation Impacts of the North OF-2 Alternative

There would be an approximately 0.25 acre increase in overall surface disturbance in the PAA over the proposed action. The existing surface disturbance associated with the Boulder Campsite would remain the

same. This drill site would be reclaimed at the end of the authorized period of occupancy. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Erosion and Sedimentation Effects of Mitigation Implemented Under the North OF-2 Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Erosion and Sedimentation Impacts of West Access Route 4a Alternative

A 2.82-acre increase in overall surface disturbance in the PAA would occur from construction of West Access Route 4a and new drill sites 4W and 4E. This access road would cross a small ephemeral drainage. Gating this road would limit use and reduce mechanical erosion from general recreational vehicle travel. This alternative would also reduce the vehicle trips on roads within the Oak Flat Withdrawal Area, reducing the rate of mechanical erosion on those roads. The drill sites would be reclaimed at the end of the authorized period of occupancy when access to drill sites is no longer needed. With implementation of BMPs, the impacts associated with this alternative, when compared to the proposed action would be negligible.

Erosion and Sedimentation Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Erosion and Sedimentation Impacts of the West Access Route 4b Alternative

A 3.24-acre increase in overall surface disturbance in the PAA would occur from construction of West Access Route 4b and new drill sites 4W and 4E. Gating this road to limit public access would reduce mechanical erosion from general recreational vehicle travel. This alternative would also reduce the vehicle trips on roads within the Oak Flat Withdrawal Area, reducing the rate of mechanical erosion on those roads. The drill sites would be reclaimed at the end of the authorized period of occupancy when access to drill sites is no longer needed. This alternative route is longer than West Access Route 4a and follows a small drainage/swale for approximately 1,100 feet after it diverges from its common alignment with West Access Route 4a. With implementation of BMPs, the impacts associated with this alternative, when compared to the proposed action would be negligible.

Effects of Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.3. Wildlife (Issue 3)

3.3.1. Affected Environment

The PAA is located within three different biotic communities (Brown 1980). The majority of the PAA lies within areas classified as interior chaparral, with a very small portion in the northeastern corner (near Top of the World) located in Madrean evergreen woodland. The portions of the PAA west and south of the Apache Leap escarpment are classified as the Arizona Upland subdivision of Sonoran desertscrub.

Additional biotic communities described by Brown (1994), including interior riparian deciduous forest and riparian scrublands, are also present in the PAA vicinity. While not present within the PAA itself, these hydroriparian communities are patchily distributed along the perennial and intermittent drainages nearby (RCM 2008). Relatively isolated patches of xeroriparian and mesoriparian vegetation associated with ephemeral drainages are also located within and near the PAA.

Typical of the interior chaparral biotic community, vegetation in the central portion of the PAA is dominated by scrub live oak (*Quercus turbinella*), pointleaf manzanita (*Arctostaphylos pungens*), and catclaw mimosa (*Mimosa acerosa*). Due to high shrub cover, thin to absent soil, and low annual precipitation, this biotic community has a characteristically low density of herbaceous cover. Vegetation surrounding much of the central portion of the PAA has been impacted by recreation and cattle grazing. This is most evident along existing roadways, on the level areas adjacent to roadways, and around cattle tanks.

The far western portion of the PAA, located below the Apache Leap escarpment, is significantly lower in elevation than the rest of the PAA. This region supports vegetation consistent with the Arizona Upland subdivision of the Sonoran desertscrub biotic community. Typically wetter than other desert communities (averaging 12 to 18 inches annual rainfall), the Arizona Upland subdivision is characterized by its appearance as a scrubland or low woodland of leguminous trees with shrubs and perennial succulents in the open areas (Brown 1994). The Jojoba-Mixed Scrub series dominates the area west of the Apache Leap. Found at the upper limits of the Arizona Upland subdivision and in transition zones between Sonoran desertscrub and interior chaparral, this series is distinguished from other desertscrub series by its characteristic chaparral-like appearance.

Arizona is at the northern limit of Madrean evergreen woodland and this is one of the few regions where this biotic community forms an ecotone with the drier interior chaparral. A small section in the northeastern portions of the PAA are consistent with Brown's description of this woodland, with two oak species—Arizona white oak (*Quercus arizonica*) and Emory oak (*Quercus emoryi*)—dominating the canopy layer and five intolerant species such as one-seeded juniper (*Juniperus monosperma*). Understory layers in this region generally comprise chaparral-associated species, such as pointleaf manzanita, catclaw mimosa, scrub live oak, and skunkbush (*Rhus trilobata*).

The general vicinity of the PAA supports a variety of mammal species, although many of these species are rarely seen because they avoid contact with humans and/or are nocturnal. Seventeen species of bats are potentially found in this area, including the pallid bat (*Antrozous pallidus*), big brown bat (*Eptesicus fuscus*), and small-footed myotis (*Myotis ciliolabrum*) that were mist netted on the PAA in 2004 (WestLand 2004). Other mammals known or expected to be in the area include ungulates including the mule deer (*Odocoileus hemionus*) and white-collared peccary (*Pecari tajacu*), carnivores such as black bear and mountain lion, smaller carnivores such as the ringtail (*Bassariscus astutus*) and coati (*Nasua narica*), and numerous species of rodents such as the white-throated woodrat (*Neotoma albigula*), deer mouse (*Peromyscus maniculatus*), and rock squirrel (*Spermophilus variegatus*).

The PAA also provides suitable breeding habitat for a variety of bird species and additional species use the site during winter or migrations. Raptors, such as Cooper's hawk (*Accipiter cooperi*), peregrine falcon (*Falco peregrinus*), and zone-tailed hawk (*Buteo albonotatus*) are known to nest in vicinity of the PAA. Various surveys conducted in the vicinity of the PAA have identified 108 bird species from 33 families (54 species from 25 families in the winter and 94 species from 29 families during the breeding season).

3.3.2. Environmental Consequences: Direct and Indirect Effects

A number of commenters expressed concern regarding the impacts of the Pre-feasibility Activities to wildlife within or in the vicinity of the PAA. The sections that follow provide our analysis of effects to wildlife from the alternatives considered in this EA.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Wildlife

There would be no new surface disturbing activities from implementation of the Pre-feasibility Activities. Closure and reclamation of existing, previously authorized drill sites on National Forest Service Lands would be implemented. The level of daily human activity, particularly along FR 315 would be decreased from current levels, particularly during the work week when recreational uses are typically at their lowest levels.

Wildlife Effects of Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action Alternative to Wildlife

Pre-feasibility Activities would take place in non-contiguous areas dispersed across four townships. Within the PAA, approximately 38.66 acres of previously undisturbed National Forest System Lands would be impacted, with the majority of the Impact Area immediately adjacent to previously disturbed

roadway areas. Approximately 28.58 acres of interior chaparral, 0.16 acre of Madrean evergreen woodland, and 9.92 acres of Sonoran desertscrub habitat would be affected, primarily along 16.9 miles of existing roadways (Table 3-7). No mixed conifer, grassland, riparian, or aquatic habitat would be impacted by Pre-feasibility Activities.

Table 3-7. Approximate Acreage of New Disturbance within the Different Vegetation Communities found within the Pre-feasibility Activity Area

Vegetation Community	Sites	Acreage
Interior Chaparral	All except those noted below	28.58
Madrean Evergreen Woodland	Small portion of FR 320	0.16
Arizona Upland	QC-04, MB-03 and access (FR 2440), western portion of H-C access (FR 315)	9.92
	Total	**38.66**

Some impacts to Management Indicator Species (MIS) individuals are possible during Pre-feasibility Activities, but impacts to these species as a whole are expected to be transitory and extremely limited. The marginal nature and relatively small size of the PAA makes it unlikely that the habitat disturbance associated with Pre-feasibility Activities would impact any MIS to a detectable degree. Because the relatively small impact area is spread over a very large area of National Forest System Lands, and because most of the impact area is located immediately adjacent to existing disturbance, Pre-feasibility Activities are not expected to result in detectable population level impacts to MIS species.

Wildlife Effects from Mitigation Implemented Under the Proposed Action

Four mitigation measures outlined in Chapter 2 would benefit wildlife. The implementation of biological monitoring during road and drill pad construction, implementation of the requirements of a fire plan, management actions required by the noxious weed management program, and minimizing the size of safety pull outs would further reduce the anticipated negligible impacts to wildlife habitat and benefit wildlife.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Wildlife

This alternative component of the Pre-feasibility Activities would increase the acreage of Interior Chaparral habitat impacted by approximately 0.25 acre. This increase is only 0.65 percent of the total impacts estimated for the Pre-feasibility Activities and only 0.88 percent of the total estimated impacts from implementation of the Pre-feasibility Activities that occur within Interior Chaparral. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Wildlife Effects of Mitigation Implemented Under the North OF-2 Drill Site Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Wildlife

This route and its associated drill sites would increase impacts to Interior Chaparral habitats on National Forest System Lands in the vicinity of the PAA by 2.82 acres (9.9 percent). It would create approximately 0.80 mile of new road on National Forest System Lands and State lands between FR 315 and drill site RES-13. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Wildlife Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Wildlife

This route and its associated drill sites would increase impacts to Interior Chaparral habitats in the vicinity of the PAA by 3.24 acres (11.4 percent). It would create approximately 0.95 mile of new road on National Forest System Lands and State lands between FR 315 and drill site RES-13. The difference in any direct or indirect impacts compared to the proposed action would be negligible.

Wildlife Effects from Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.4. Arizona Hedgehog Cactus (Issue 4)

3.4.1. Affected Environment

The Arizona hedgehog cactus is classified by the U.S. Fish and Wildlife Service (USFWS) as an Endangered Species, without designated Critical Habitat. The PAA was surveyed for Arizona hedgehog cactus in July and September 2007 and in January, February, March, and September 2008. The survey area included the PAA, as well as buffer areas surrounding the PAA. The total width of the survey area along proposed access roads was 100 feet or more on the roadway centerline. Survey areas at proposed drill sites were approximately 200 feet by 200 feet, providing a survey buffer of at least 50 feet on all sides.

There is some confusion with regard to the identification of this taxon, as published descriptions vary significantly across the region (Cedar Creek Associates 1994). The Arizona hedgehog cactus, as currently defined, is found in Pinal County in the vicinity of Dripping Springs, the Superstition and Mescal mountains, the highlands between Globe and Superior, and in Devils Canyon and Queen Creek along the

Gila/Pinal County line (AGFD 2008). Known habitat requirements include open slopes (or the understory of a more open canopy) and cracks and crevices between boulders.

The distribution of the Arizona hedgehog cactus within its range appears to be closely associated with four major rock types: Tertiary Apache Leap tuff (dacite), Cretaceous or Tertiary Schultze granite, Precambrian Apache Group Pioneer quartzites, and Precambrian Pinal schist. Observations of more than 1,000 specimens located during field surveys for the nearby Carlota Project indicate that the Arizona hedgehog cactus prefers stable rock formations such as the Apache Leap tuff and Schultze granite (Cedar Creek Associates 1994). These rock types weather very slowly, form stable ridges and outcrops and provide opportunities for cacti to establish and grow. The remaining two rock types that are known to be associated with the Arizona hedgehog cactus are either poorly distributed within the known range of the species (Pioneer quartzites) or weather more rapidly (Pinal schist). These rock types create a soil substrate that is colonized by dense stands of vegetation and do not appear to be colonized by Arizona hedgehog cactus to the same extent as the tuff or granite. Notably, there are large areas of the various rock types typically associated with Arizona hedgehog cactus, such as Apache Leap Tuff, that have been surveyed extensively for this species where none have been detected. The geologic substrate should be considered informative as to habitat suitability but not determinative.

Sixty-three Arizona hedgehog cacti were located during survey of the PAA and buffer on National Forest System Lands. Twenty-six additional individuals were located and recorded just outside of the survey area and along FR 898, within privately owned lands. Generally, Arizona hedgehog cacti were found in the northeastern portions of the PAA, within areas that support vegetation that is consistent with interior chaparral as described by Brown (1994).

3.4.2. Environmental Consequences: Direct and Indirect Effects

Several commenters expressed concern that the proposed Pre-feasibility Activities; specifically the proposed road widening, construction of new roads and construction of new drill sites may impact Arizona hedgehog cactus and its habitat in the PAA. The Forest Service has determined that the proposed action may affect but it not likely to adversely affect Arizona hedgehog cactus, and we have initiated informal consultation with the USFWS. The sections that follow provide our analysis of the effects of the alternatives considered in this EA to Arizona hedgehog cactus.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Arizona Hedgehog Cactus

The no-action alternative would not have any direct or indirect affect to Arizona hedgehog cactus.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Arizona Hedgehog Cactus

The Forest Service has determined that the proposed action, the implementation of the Pre-feasibility activities may affect but is not likely to adversely affect Arizona hedgehog cactus. The modifications of proposed road improvements, relocation of drill sites, and implementation of mitigation and monitoring measures make the potential for direct and indirect impacts to Arizona hedgehog cactus insignificant and discountable. As a result of a comprehensive species-specific survey, sixty-three individual Arizona hedgehog cacti were found in the immediate vicinity of Pre-feasibility Activities. The locations of these individuals were provided to RCM during the planning of Pre-feasibility Activities, and these activities were designed to avoid direct effects to individual Arizona hedgehog cacti by avoiding the plants. Approximately 22.68 acres of potentially suitable habitat would be disturbed by Pre-feasibility Activities. As no Critical Habitat has been designated for this species, none would be affected by Pre-feasibility Activities.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the Proposed Action Alternative

Five mitigation measures outlined in Chapter 2 would benefit Arizona hedgehog cactus. The implementation of biological monitoring during road and drill pad construction, placement of rock guards over cactus on the down hill side of proposed road and drill site construction areas, implementation of the requirements a fire plan, management actions required by the noxious weed management program, and minimizing the size of safety pull-outs will avoid impacts to Arizona hedgehog cactus and minimize potential adverse impacts to its potential habitat.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Arizona Hedgehog Cactus

Survey did not detect any Arizona hedgehog cacti on or in the vicinity of North OF-2 and implementation of this alternative would not impact any hedgehog cacti.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the North OF-2 Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Arizona Hedgehog Cactus

Survey did not detect any Arizona hedgehog cacti on or in the vicinity of this access alternative and associated drill sites. Implementation of this action alternative site would be the same as the impacts of the proposed action.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Arizona Hedgehog Cactus

Survey did not detect any Arizona hedgehog cacti on or in the vicinity of this access alternative and associated drill sites. Implementation of this action alternative site would be the same as the impacts of the proposed action.

Arizona Hedgehog Cactus Effects from Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be the same as for the proposed action.

3.5. Recreational Activities In and Around Oak Flat (Issue 5)

3.5.1. Affected Environment

General Use Patterns. Recreation uses in the vicinity of the PAA include hiking, camping, hunting, bird watching, and four-wheel driving. Rock climbing is a popular recreational activity east of Apache Leap, in Devils Canyon, and several areas along U.S. Highway 60, in the general vicinity of the PAA. In addition to less formal, non-organized events, rock climbers participate in organized climbing events at Oak Flat, and until 2005 hundreds attended the Phoenix Boulder Blast, an outdoor climbing festival and bouldering competition. A smaller climbing event, the Flapper Fest, continues at Oak Flat (Coates 2007). A majority of this competition occurs west of Oak Flat Campground in Queen Creek Canyon and Euro Dog Valley Climbing Area.

The Oak Flat Withdrawal Area is approximately 4 miles east of the Town of Superior along U.S. Highway 60, and the Oak Flat Campground offers year-round, rustic camping but no drinking water. Designated and dispersed campsites within the Oak Flat Withdrawal Area can be accessed by a network of paved and dirt roads. The Oak Flat Withdrawal Area and surrounding National Forest System Lands are used for dispersed recreation including camping, four-wheel driving, hunting, and hiking. The primary season for recreational use is September through April. It is used by small groups and families for camping and picnicking and by larger groups for events. Other users include Boy Scout troops, rock climbers, off-road vehicle user groups, and fraternal organizations. The greatest degree of user activity in the vicinity of PAA is Oak Flat Campground and adjacent areas such as the Euro Dog Valley Climbing Area. There are no detailed data available regarding the number of people who use the designated and dispersed camping opportunities within the Withdrawal Area. One record reported that the current recreational usage at the Oak Flat Withdrawal Area was 6,600 Recreational User Days (Memo to Hilton Cass, Arizona Zone Office from Mr. James L. Kimball, Forest Supervisor Tonto National Forest, August 27, 1985).

To inventory and classify National Forest System Lands for planning and managing a range of recreational experiences and settings, the Forest Service commonly uses the Recreation Opportunity Spectrum (ROS). The ROS provides a framework for defining the types of outdoor recreation opportunities the public might desire, and identifies that portion of the spectrum that a given National Forest might provide. The ROS is based on three primary criteria: physical, social, and managerial. Each of these criteria can be classified along a range of values and once classified and considered together they help to establish the ROS. Table 3-8 summarizes Recreational Opportunity Spectrum classes.

In the vicinity of the PAA three Recreational Opportunity Spectrum classes are delineated. The majority of the Pre-feasibility Activities are located within areas designated as either Semi-Primitive Motorized or Roaded Natural ROS class designation. PAA locations immediately adjacent to U.S. Highway 60 or S.R. 177 are primarily classified as Roaded Natural while Pre-feasibility Activities farther from those major roads would generally take place within the Semi-Primitive Motorized class. The Oak Flat Withdrawal Area occurs within the Roaded Natural ROS class, which is characterized by moderate evidence of anthropogenic activities or disturbance. A very small portion of the PAA near the town of Superior, along FR 2440, lies within an area classified as Urban on the ROS.

Noise. The sound environment in the Oak Flat Withdrawal Area is predominantly background natural sounds with sound from cars or trucks on U.S. Highway 60, Magma Mine Road, or within the Oak Flat Withdrawal Area. Sound level measurements were made at three locations within the Oak Flat Campground. Each measurement was taken for a 5-minute period, and the average sound level for each was 40 A-weighted decibels (dBA). The sound level stayed fairly constant during each 5-minute reading (WestLand 2009a). For comparison, 40 dBA is relatively quiet and can be equated to several conditions including the noise level of a residential area at night, background noise in a library or small conference room, or soft radio music in an apartment.

Table 3-8. Recreation Opportunity Spectrum, Tonto National Forest (Source: USFS 2005b)

Class	Setting Characteristics (for descriptive purposes only)
Primitive (P)	Area is characterized by essentially unmodified natural environment of fairly large size. Interactions between users are very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls. Motorized use within the area is not permitted.
Semi-Primitive Non-Motorized (SPNM)	Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size, interactions between users are low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is not permitted.
Semi-Primitive Motorized (SPM)	Area is characterized by a predominantly natural or natural-appearing environment of moderate-to-large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted.
Roaded Natural (RN)	Area is characterized by predominantly natural-appearing environments with moderate evidence of the sights and sounds of man. Such evidence usually harmonizes with the natural environment. Interactions between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.
Rural (R)	Area is characterized by substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and interactions between users are often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorized use and parking are available.
Urban (U)	Area is characterized by a substantially urbanized environment, although the background may have natural-appearing elements. Renewable resource modification and utilization practices are to enhance specific recreation activities. Vegetative cover is often exotic and manicured. Sights and sounds of humans, on-site, are predominant. Large numbers of users can be expected, both on-site and in nearby areas. Facilities for highly intensified motor use and parking are available with forms of mass transit often available to carry people throughout the site.

Visual Resources. All lands in the Tonto National Forest have been characterized with respect to scenic quality, which, in turn, have been translated into management objectives. Visual Quality Objectives (VQOs), which are derived from public concerns for the scenic quality of a landscape and diversity of natural features, specify the degree to which alterations to that landscape are permissible. In general, the higher the scenic quality of a landscape, the less alternative is allowed. Conversely, a greater degree of landscape alteration is acceptable in landscapes that are characterized as less scenic, seen from a greater distance, or seen from less sensitive locations. Forest Service VQOs are provided in Table 3-9.

Table 3-9. USDA Forest Service Visual Quality Objectives

Preservation (P): Except for very low visual impact recreation facilities, management activities are prohibited. This VQO allows for only "ecological" changes and is applicable to wilderness areas, primitive areas, other special classified areas and some unique management units that do not justify other special classification.
Retention (R): Management activities must not be visible to the casual forest visitor. Modifications must repeat form, line, color and texture which are frequently found in the characteristic landscape.
Partial Retention (PR): Modifications must be integrated into and visually subordinate to the characteristic landscape. Activities may repeat form, line, color or texture common to the landscape, but they should be visually subordinate to the characteristic landscape.
Modification (M): Management activities may visually dominate the characteristic landscape; however, they must borrow from naturally established form, line, color or texture so that the visual characteristics are those of natural occurrences within the surrounding area.
Maximum Modification (MM): Modifications may visually dominate the characteristic landscape. However, when viewed from background distance, activities must appear as natural occurrences within the landscape. Alterations in foreground and middleground views may be out of scale or contain detail which is incongruent with natural occurrences.

The PAA falls within Management Area 2F of the Tonto National Forest Land Management Plan, which requires the Forest to manage the PAA for Retention and Partial Retention. The area is generally characterized by significant topographic variability and expansive views into mostly undeveloped open spaces. Within the vicinity of the PAA, evidence of human modifications to the landscape include utility lines and towers (one north of the Oak Flat Withdrawal and the other running through the Oak Flat Withdrawal along its eastern boundary), the Superior East Plant Site where the existing head frame is a prominent element of the views from Oak Flat to the west. A new head frame structure is under construction at the Superior East Plant Site and old exploration drill roads and drill sites, existing drilling activities, and the recreational improvements and roads within the Oak Flat Campground provide further evidence of human use of this landscape.

Viewer sensitivity reflects the degree of public concern for change in scenic quality of the landscape from key viewing areas. Type of viewpoint, the distance from the viewer and viewer concern for change, volume of use, public and agency concerns, influence of adjacent land use, and viewing duration all can affect viewer sensitivity. The most common viewers of the PAA are motorists on U.S. Highway 60, which include both commuters and tourists who have limited views of some of the drill sites. The majority of the Pre-feasibility Activities are not visible from U.S. Highway 60 or the Oak Flat Campground.

Visual character and scenic quality are determined by the views offered to visitors and residents in the region. While there is an inherent degree of subjectivity in ranking scenic quality, areas that are generally undeveloped and free from evidence of human activities are generally considered to have higher scenic value than developed areas. The PAA is located within the Central Highlands Physiographic Province and is topographically varied with generally expansive views of undeveloped open space. U.S. Highway 60 is a designated scenic roadway that supports high quality visual experience.

The segment of U.S. Highway 60 which runs between Superior and Miami is a heavily-traveled roadway of approximately 14 miles that skirts the northern edge of the PAA. Since it connects the Phoenix metropolitan area with Roosevelt Lake, the White Mountains, and other recreational destinations, many of the motorists traveling this roadway during weekends and holidays are likely pursuing leisure activities. Their sensitivity to the visual landscape will be high. During the week the roadway appears to be dominated by commercial traffic and viewers' sensitivity would be expected to generally be average to low for those individuals who routinely travel this highway. The posted speed limit along the road varies from 50 to 55 miles per hour and for most of its length it is a two-lane road. Along this stretch of U.S. Highway 60 there is little to no shoulder, no posted scenic view pull-outs, and numerous unpaved pull-outs, many of which appear to compromise traveler safety (WestLand 2009b). Due to the challenging roadway alignment, narrow pavement section, and the fact that many users appear to become impatient with slower-moving sightseers, it is difficult to safely enjoy the scenery that the roadway offers.

Traffic. Access to the Oak Flat Withdrawal Area and the Superior East Plant Site from U.S. Highway 60 is provided by Magma Mine Road.[6] Magma Mine Road is a two-lane paved road that was constructed in 1974 to provide access to the Superior East Plant Site. Magma Mine Road enters the Oak Flat Withdrawal Area near the center of the northern boundary, turns to the west, crossing through the northwest portion of the Oak Flat Withdrawal Area, then south and eventually northwest to the Superior East Plant Site. Oak Flat Campground within the Oak Flat Withdrawal Area is also accessed from Magma Mine Road. Shortly after turning off of U.S. Highway 60, individuals wishing to access Oak Flat Campground, dispersed campsites within the Oak Flat Withdrawal Area, or to travel through the Oak Flat Withdrawal Area on one of several Forest Roads or user-created roads would turn left from Magma Mine Road into the Oak Flat Campground on FR 2438 or FR 469. Drill site M, one of the previously authorized exploration drill sites on National Forest System Lands and drill site RES-13 on State lands are located south of the Oak Flat Withdrawal Area are accessed using roads within the Oak Flat Withdrawal Area.

Two groundwater monitoring wells, the DOE well and HRES-3 are located within the withdrawal area. The DOE well site was constructed by the Department of Energy in 1990 as part of a larger national effort to identify long term storage solutions for nuclear waste. According to ADWR records, the DOE well (ADWR Well Registry Number 526592) was drilled to a depth of 936 feet, has a 10-inch diameter, was completed on April 28, 1990, and is registered to the Forest Service. While ultimately another site was selected for development of a nuclear waste repository, the presence of the DOE well provided an opportunity to study groundwater movement in the underlying geological features. HRES-3 is a new well constructed adjacent to the existing DOE well. Construction of HRES-3 was authorized by the Forest Service in an August 2003 amendment of the Exploratory Drilling Plan of Operations No. 01-12-002. This well was constructed in 2004 and is approximately 1,200 feet in depth. HRES-3 was constructed

[6] By convention, the road used to access the Oak Flat Campground and the Superior East Plant Site is referred to as the Magma Mine Road from its intersection with U.S. Highway 60 to the entrance of the Superior East Plant Site. The Magma Mine Road, as it was constructed in 1974, actually starts at Old U.S. Highway 60. The segment of road from U.S. Highway 60 to the Magma Mine Road is officially identified as FR 469 and FR 315 and is clearly present on aerial photographs that predate 1956. Throughout this document and in accordance with current convention, we will continue to refer to the entire length of the access route from U.S. Highway 60 to the Superior East Plant Site as the Magma Mine Road.

using current well construction technologies that will allow for more detailed and technologically advanced investigations of groundwater. This well was located next to the DOE well to build on the information provided by past studies at the DOE well site. RCM has reported that the location of the DOE well constructed in 1990 and HRES-3 constructed in 2004 have formed the basis for the location of other existing hydrologic monitoring wells and future monitoring wells proposed in the Pre-feasibility Plan of Operations. Both wells would be monitored as part of the Pre-feasibility Activities proposed by RCM. Monitoring activities have been ongoing since the wells were constructed. Typically, monitoring consists of quarterly testing to collect groundwater quality data. Groundwater for testing purposes would be collected from each well using a small-capacity electric submersible pump. Constant-rate pumping tests are also periodically conducted to evaluate aquifer condition and function.

Commercial, mine-related traffic on Magma Mine Road has fluctuated in the approximately 35 years since it was first constructed. Peak use of the road occurred during periods of operation of the underground mine at the Superior East Plant Site, when employees and contractors at this site used the road to get to and from work on a daily basis. Current commercial/mine-related traffic levels on this road includes providing access to the six drill sites located along FR 315 and the prefeasibility study activities at the Superior East Plant Site.

A draft traffic impact analysis was done by Aztec Engineering in January 2009 (U.S. Highway 60 and Magma Mine Road Intersection Improvements. APN: AZE0820-06). Aztec measured daily traffic to the Superior East Plant Site guard shack for a given week in November 2008 and average daily traffic on Magma Mine Road south of U.S. Highway 60 using a machine counter. The Monday through Friday peak two-way traffic to the Superior East Plant Site was 756 (328 entering and 328 exiting), and the Monday through Friday minimum was 558 (269 entering and 269 exiting). Peak hour traffic in the morning is assumed to be 30 percent trucks and the remaining traffic (70 percent) are employees and their personal vehicles. In the afternoon peak hour traffic is assumed to be 50 percent trucks.

3.5.2. Environmental Consequences: Direct and Indirect Effects

The public expressed concern during scoping that implementation of the Pre-feasibility Activities may adversely impact recreational users experience within the Oak Flat Withdrawal Area and adjacent dispersed recreational areas. We have evaluated the potential for adverse impacts to recreational users through specific studies of noise, visual impacts, and traffic effects.

Noise effects were estimated based upon actual field measurement of a working exploration drill rig and modeling sound attenuation for the OF-1, OF-2, North OF-2, and OF-3 drill sites (WestLand 2009a). The views to drill sites from designated campsites and roads within the Oak Flat Campground and dispersed campsites and roads within the larger Oak Flat Withdrawal Area were determined in the field by raising balloons. Four-foot helium filled weather balloons were raised to 12-foot and 80-foot elevations above the OF-1, OF-2, North OF-2, and OF-3 drill sites to simulate the height of drilling equipment. The balloon tethered at 80-feet represented the top of the drilling mast for an exploration drill rig. Observers at each

the designated and dispersed campsites and at selected observation points along roads within the Oak Flat Withdrawal Area then recorded which of the two balloons at each drill site could be seen. This determined the points where it was likely that drill rigs at the evaluated drill sites would be seen. Traffic impacts were determined for roads within Oak Flat Campground using trip data generated for the Air Emissions study (Malcolm Pirnie 2009). To understand the variation in potential traffic impacts to recreational users at the Oak Flat Campground and its vicinity, the total number of drill sites adjacent to the Oak Flat Withdrawal Area occupied at any given time varied from zero to six (WestLand 2009d).

The potential visual impacts of the Pre-feasibility Activities to motorists traveling on U.S. Highway 60 was evaluated using helium filled weather balloons that were 4 feet in diameter and were raised to the height of 80 feet, GIS analysis using USGS topographic data, and field observations along the U.S. Highway 60 corridor in the vicinity of the PAA (WestLand 2009b).

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Recreation

Noise Effects. Under this alternative, noise levels in the Oak Flat Campground are expected to stay at their current levels.

Visual Effects. Under this alternative there would be no drill rigs or drilling masts on National Forest System Lands visible from the designated campsites, dispersed campsites, or the roadways within the campground. The drilling mast of a drill rig at RES-13 on State land would continue to be visible from some dispersed campsites and along roads within the Oak Flat Withdrawal Area when this drill site is being utilized.

Traffic Effects. Under the no action alternative, current management plans would continue to guide management of the PAA and its general vicinity and RCM would continue with pre-feasibility studies on its private lands and on State lands. One drill site, RES-13, located on State lands immediately south of the Oak Flat Withdrawal Area, would continue to be used for exploration drilling purposes. Access to this drill site for mobilization and demobilization of drilling equipment, service vehicles and personnel is through Oak Flat Campground and would continue. The volume of traffic accessing this drill site would be approximately 6 to 14 vehicle trips per day. As the potential for viable drilling targets at RES-13 and State lands south of the Oak Flat Withdrawal Area diminish, the total number of vehicle trips to access these sites will be reduced.

Recreation Effects of Mitigation Implementation Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Recreation

The proposed action would establish three new exploration drill sites along the south (Sites OF-1 and OF-3) and west (Site OF-2) boundary of the Oak Flat Withdrawal Area. Access to Site OF-1 and Site OF-3 would be through Oak Flat Campground. When these drill sites are occupied, workers accessing these drill sites would add to the existing traffic by access requirements for Site M on Forest Service lands and Site RES-13 on State lands. This access is achieved by using the FR 2438 to the user-created 2438 Bypass,[7] then south on FR 3153. Site OF-2 is located on what is known as the Boulder Campsite, a disturbed area on the west side of the Magma Mine Road. This is not an officially designated campsite within the Tonto National Forest, but is well known to the rock climbing community and provides access to the Euro Dog Valley Climbing Area to the west. The proposed action would preclude the use of this campsite and eliminate a parking and access point to the Euro Dog Valley Climbing area.

Monitoring of a groundwater well at the DOE Well Site has been ongoing within the Oak Flat Withdrawal Area since DOE first constructed a well in 1990. HRES-3 has been used for groundwater investigations since it was first constructed by RCM in 2004. Periodic groundwater monitoring and testing at this site would continue at this site near the Oak Flat Campground as part of the proposed action.

A more detailed discussion of the noise, visual, and traffic related effects to recreational users of the Oak Flat Campground follows.

Noise Effects. A computer model was used to determine sound levels within a study area that included the Oak Flat Withdrawal Area and the Euro Dog Valley Climbing Area (WestLand 2009a). The model had three noise sources representing exploration drill rigs at sites OF-1, OF-2, and OF-3 for the proposed action. For this model it was assumed that each noise source produced 81 dBA at 50 feet in all directions from the drill rig. The model was run with a background level of 40 dBA which was the daytime measured background levels within the Oak Flat Withdrawal Area and with assumed background noise levels of 30 and 35 dBA to simulate extremely quiet periods such as very still nights. The model was run using measured background noise levels of 40 dBA and assumed levels of 35 and 30 dBA is (Table 3-10).

Figure 3-3 shows sound level contours representing the results of the computer modeling at 40dBA background. According to the model, there would be no increase in sound levels at the designated campsites in Oak Flat Campground from drilling activities under the proposed alternative. The model predicted that sound levels at all of the dispersed campsites shown in Figure 3-3 would increase by less than 1 dBA; 3 dBA is usually considered the minimum noticeable change in sound level (ADOT 2009).

[7] This user-created road has existed and is clearly evident on 1948 USGS topographic maps and earlier maps and photographs.

Table 3-10. Predicted Sound Levels at Oak Flat and Dispersed Designated Campsites based on OF-1, North OF-2, OF-3, and Background Levels of 30, 35, and 40 dBA (results rounded to nearest whole decibel). Campsite numbers refer to campsite labels provided on Figure 3-3.

Campsite ID	Predicted Sound Level (dBA)		
	30 dBA Background Level	35 dBA Background Level	40 dBA Background Level
21	30	35	40
22	30	35	40
23	30	35	40
24	30	35	40
25	30	35	40
29	42	43	44
30	31	35	40
33	30	35	40
40	31	35	40
42	31	35	40
44	31	35	40
46	31	35	40
47	31	35	40
60	30	35	40

Other sources of noise from the Pre-feasibility Activities that were not modeled include noise impacts from drill site mobilization and demobilization, service vehicles, and shift changes. These sources of noise are transitory and for lighter service vehicles and trucks used during shift changes would not be distinguishable from vehicle noise generated by other recreationists.

Visual Effects. The proposed Pre-Feasibility Activities are consistent with the current level of manmade alterations to the existing landscape and would not compromise the management goals set by Tonto National Forest for visual quality in the project vicinity. The majority of the drill sites identified in the Pre-feasibility Plan of Operations are of a more temporary nature (less than one year in duration) and/or is not within view of the campground area. A detailed analysis was undertaken to determine whether recreational visitors at designated campsites, dispersed campsites, and on the most highly used road areas within the Oak Flat Campground would see any of the proposed new exploration drill sites; OF-1, OF-2, and OF-3 *(*WestLand 2009c). This study determined that recreationists at all of the designated and some of the dispersed campsites cannot see any of these three drill sites. While views of these drill sites are largely screened from the campsites, drivers utilizing Forest Roads in the campground area would frequently view the proposed drill sites. However, several existing man-made features are currently visible from these same roads including ongoing mining operations and power lines. These existing features are composed of strongly vertical elements. A brief summary of a recreation user's ability to see OF-1, OF-2, and OF-3 from key observation points at designated campsites, dispersed campsites, Forest Roads, and user-created roads within the Oak Flat Withdrawal area is provided below. The campsite and the road analysis view points are depicted on Figures 3-4, 3-5, and 3-6.

Drill site OF-1:

- The most distant from the designated campsites (about 0.75 mile); existing vegetation in the Oak Flat Campground blocked the views of all of the 4-foot weather balloons tethered 12 and 80 feet above the ground from the designated campsites evaluated.

- Both the 12-foot and 80-foot balloons were visible from dispersed campsites 40, 42, and 60.

- Both the 12-foot and 80-foot balloons at drill site OF-1 were visible while driving south on Forest Road 2438 (Points 39, 40, 12, 13, and 14). Both balloons were visible from a spur road heading west from Forest Road 2438 to several dispersed campsites (Points 31, 32, 41, 42). No balloons were visible at the end of the road where camping was noted (Points 43 and 44).

- Driving east on Forest Road 2438, the highest balloon at drill site OF-1 was visible from Points 49 through 51 and both balloons were visible from point 52. As Forest Road 2438 turns north and then west, OF-1 was no longer visible.

- From Forest Road 3153, both balloons at drill site OF-1 were visible from Points 5, 6, 7, 10, 31 and 32. Only the balloon tethered 80 feet above the ground surface was visible from Points 8 and 9.

- None of the balloons at drill site OF-1 were visible from the Magma Mine Road or from Forest Road 469.

Drill site OF-2:

- None of the balloons at OF-2 were visible from the designated campsites evaluated in the Oak Flat Campground.

- Both balloons were visible from dispersed campsite 29 and the 80-foot balloon was visible from dispersed campsite 44.

- Both balloons were visible from Magma Mine Road only at Point 29 (Boulder Campsite). Only the high balloon was visible from Point 28 along Magma Mine Road.

- From Points 16 and 17 on the spur road east of Forest Road 469, only the high balloon was visible.

- From Forest Road 2438, the high balloon was visible from Points 43, 44 and 52.

- None of the balloons at the OF-2 site were visible from any of the other observation points due to vegetation and topography.

Drill site OF-3:

- No balloons were visible from the designated campsites evaluated in Oak Flat Campground, Magma Mine Road, or FR 469 because of vegetation and topography.

- Both balloons were visible from dispersed campsites 40 and 60 and only the 80-foot balloon was visible from dispersed campsite 42.

- This site is visible from the following locations along FR 3153 and FR 2438. Points 10, 11, 13, 14, 32, and 40 all had views of both balloons. From Point 31 only the low balloon was visible, from Point 31, only the high balloon could be seen. From FR 3153, Points 0, 1, 5, 6, and 8 were able to see both balloons. Points 3, 4, and 7 could only see the high balloon.

- Heading west on FR 2438 both balloons were seen at OF3 from Points 45, 50, 51, 52, 55, 56, 57 and 60. Only the high balloons could be seen from Points 46 and 59.

Additional exploration of impacts to visual resources in the project vicinity was performed and described in Resolution Plan of Operations Pre-Feasibility Activities: Visual Management System Analysis (WestLand 2009b). Except for the four proposed drill sites near the Oak Flat Campground, all other drill sites would be of a temporary nature and/or not within view of the general public. Access roads to the drill sites may be visible to the general public, depending on location and orientation of the viewer.

Some of the drill sites and associated roads are visible from U.S. Highway 60; however, they are seen for very brief periods of time. In addition, the views are often perpendicular to the direction of the traveler. This makes it difficult for the driver to maintain visual contact with the site or road and safely navigate

All other proposed access roads and associated drill sites were not visible from the Superior to Miami segment of U.S. Highway 60.

Traffic Effects. Access to Pre-Feasibility Activity sites is required by several vehicle types including, but not limited to, drill rigs, service vehicles, and supervisor and worker vehicles. Some proposed action drill sites would require access via Forest Roads which traverse the Oak Flat Campground. The traffic increase on Forest Roads which traverse the Oak Flat Campground is outlined in the Resolution Plan of Operations Pre-feasibility Activities Oak Flat Campground Traffic Analysis memorandum by WestLand Resources (2009c).

There are several scenarios which exist for drill rig deployment on drill sites during the implementation of the proposed action. Only a portion of the proposed drill sites would impact campground traffic. To estimate traffic increase the Oak Flat Traffic Analysis quantifies five scenarios of rig activity ranging from the minimum campground traffic increase to the maximum increase. The road specific traffic increase for these five scenarios is shown on Figure 3-7. Analysis of the scenario which includes simultaneous drilling at all sites adjacent to the Oak Flat Campground (long-term exploration sites south

of Oak Flat Campground [sites OF-1, OF-3, M and RES-13]; deep groundwater well at site H-L; and tunnel characterization borehole PVT-4) indicated that these combined activities would generate approximately 88 vehicle trips entering the Oak Flat Campground on FR 2438 (WestLand 2009d). Approximately 32 of these vehicle trips would turn on the existing user-created road in the northeast corner of the FR 2438 loop and proceed to drill sites H-L and PVT-4. The remaining 56 vehicle trips would turn on the FR 2458 bypass and then head south out of the Oak Flat Campground on FR 3153 to drill sites OF-1, OF-3, M, and RES-13 (Figure 3-7).

Recreation Effects of Mitigation Implemented Under the Proposed Action

Numerous mitigation measures were identified to specifically address issues relating to recreational uses of the Oak Flat Withdrawal Area. RCM would be required to develop an administrative traffic control plan to reduce the risks of accidents between vehicles using campground roads to access drill sites and recreationists. Several mitigation measures were identified to minimize visual impacts. Boulders would be preserved in place along the eastern edge of OF-3, next to the existing Forest Road. An assessment of the need for visual screening would be made by the Forest Service following drill setup at OF-1 and OF-3. RCM would place camouflage netting materials on these exploration drill sites where they face Oak Flat Campground if screening from existing boulders or vegetation is not sufficient to block views if necessary. The material would be placed so that views of the drill equipment to a maximum height of 15-feet from the Oak Flat Withdrawal Area would be blocked. RCM shall, to the extent practical, collect and set aside suitable boulders within the footprint of the proposed disturbance areas, to be incorporated in the landscape during drill site and road reclamation activities. RCM would also minimize nightlighting effects by directing or shielding lights to minimize night-light effects to recreational areas. Where appropriate, RCM would identify any disturbed areas associated with the construction of new roads, improvements of existing roads, and construction of drill sites suitable for rock staining and stain those surfaces with simulated desert varnish to minimize visual impact. In addition, riprap and aggregate used for road preparation will be angular and the color shall match native soil color. Aggregate surfacing placed on drill sites will be removed or buried at closure. All of these measures would collectively minimize the adverse effects of the proposed action to recreational users in the general vicinity of Oak Flat.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative on Recreation

Selection of the North OF-2 exploration drill site alternative allows the continued use of the Boulder Campsite. This dispersed recreation campsite was identified in the Pre-feasibility Plan of Operations as the proposed location for drill site OF-2. This would also maintain an existing access point to the Euro Dog Valley Climbing Area.

Noise Effects. The noise effects for designated and dispersed campsites within the Oak Flat Withdrawal Area are the same as the proposed action. Noise levels at the Boulder Campsite would range from 42 dBA at a background noise level of 30dBA to 44 dBA at a background noise level of 40 dBA.

Visual Effects. A summary of the seen and unseen analysis of North OF-2 is provided below. The campsite locations and the analysis view points are depicted on Figures 3-4, 3-5, and 3-6.

- Topography and vegetation blocked the views of both balloons from the designated campsites in Oak Flat Campground.
- The 80-foot balloon was visible from the Boulder Campsite (Point 29).
- While detailed analysis was not completed, it appears that portions of the Euro Dog Valley Climbing Area would have views of North OF-2.
- Both the 12-foot and 80-foot balloons were visible from Magma Mine Road at Point 28.
- From FR 469, only the high balloon was visible from Point 19.
- From FR 2438 heading south, only the low balloon was visible at Point 38. Heading west on FR 2438, no balloons at North OF-2 were visible as topography hid both of them from view. The spur heading west of FR 2438 also did not have views of any balloons set at North OF-2. From Points 16 and 18, only the high balloon was visible.
- From Point 9, along FR 3153, only the high balloon was visible.

Traffic Effects. The North OF-2 Exploration Drill Site Location will not affect traffic within Oak Flat Campground or alter general patterns of traffic use or intensity on the Magma Mine Road.

Recreation Effects of Mitigation Implemented Under the North OF-2 Drill Site Alternative

The mitigation measures outlined for impacts of the proposed action to recreational resources would also apply to this alternative and the impacts would be the same. An additional mitigation measure would apply to the North OF-2 drill site. In the noise assessment (WestLand 2009a), it was assumed that each drill rig produced 81 dBA in every direction from the rig. As can be seen in Figure 3-8, this is a conservative estimate based on measurements made at an existing drill rig (WestLand 2009a). A supplemental study using the each of the four source values in Figure 3-9 was performed to see what effect the configuration of the drill site components on the North OF-2 drill site would have on the predicted sound levels at the Boulder Campsite. The results of that analysis are summarized in Table 3-11.

Table 3-11. Predicted Sound Level at the Boulder Campsite as a Function of North OF-2 Drill Rig Orientation. Reference sound level based on field measurements at Drill Site D (Figure 3-9).

Reference Sound Level 50 feet from North OF-2 Based on Orientation	Predicted Sound Level by Background Sound Level (dBA)		
	30 dBA Background Level	35 dBA Background Level	40 dBA Background Level
81	42	43	44
76	38	39	42
75	37	39	41
71	34	37	41

At a 30 or 35 dBA background noise level, which might be experienced on a quite night, the effective reduction in noise level at the Boulder Campsite would be substantial. Based upon the results of this investigation, the drilling equipment at the North OF-2 drill site would be configured so that the power pack is oriented away from the Boulder Campsite to minimize noise impacts to the recreational users at that location.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative on Recreation

Generally this alternative would reduce Pre-feasibility Activity impacts to recreational users of the Oak Flat Campground and the Oak Flat Withdrawal Area by routing drill site traffic outside of the campground.

Noise Effects. Noise impacts to the recreational users of Oak Flat Campground from fixed drill site locations (e.g., OF-1, OF-2, North OF-2 and OF-3) would be the same as the proposed alternative (Figure 3-3). While noise effects from fixed sources would be unchanged, the overall noise impacts to recreational users of Oak Flat Campground would be reduced because of the reduced volume of traffic from drill site mobilization and demobilization, service vehicles, and shift changes.

Visual Effects. The rough terrain through which the road would be constructed would require substantial grading efforts. Based on a visual analysis that relies on topography users who travel FR 315 may be able to see a short segment of this road. Users that travel south through the Oak Flat Withdrawal Area to State land may be able to see a small portion of this road on State land as they approach RES-13.

Traffic Effects. The West Access Route 4a alternative would route much of the Pre-feasibility Activity traffic associated with drilling activities outside of the Oak Flat Campground and total vehicle trips within the Oak Flat Campground generated by the Pre-feasibility Activities would be substantially less. The only drilling traffic use in Oak Flat Campground would be of relatively short duration and associated with the construction at H-L and PVT-4. Once these sites are constructed, travel through Oak Flat Campground

would be for groundwater monitoring at the DOE Well Site, H-L, and PVT-4, if it is selected for groundwater monitoring and testing. Figure 3-10 depicts the anticipated traffic patterns for the West Access Route and alternatives. Notably, implementation of the seasonal restriction for well and bore hole drilling at PVT-3, PVT-4 and H-L would further reduce traffic impacts to recreational users by limiting drilling activities at these two sites to the off-peak recreation season.

Recreation Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The effects of the mitigation measures implemented under the West Access Route 4a alternative would be the same as the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Recreation

Generally this alternative would reduce Pre-feasibility Activity impacts to visitors of Oak Flat Campground by routing exploration drill site traffic outside of the campground.

Noise Effects. Noise impacts at the Oak Flat Campground and dispersed campsites in the Oak Flat Withdrawal Area would be the same as the West Access Route 4a alternative.

Visual Effects. Visual impacts from FR 315 and FR 3153 would be the same as the West Access Route 4a alternative. The portion of West Access Route 4b that deviates from West Access Route 4a would be screened from views by topography and is expected to be less visible than West Access Route 4a.

Traffic Effects. The traffic impacts to recreational users in the Oak Flat Withdrawal Area would be the same as impacts associated with the West Access Route 4a alternative.

Recreation Effects of Mitigation Implemented Under the West Access Route 4b Alternative

The effects mitigation measures implemented in association with this alternative to recreation would be the same as the mitigation effects to recreation from implementation of the West Access Route 4a alternative.

3.6. Safety (Issue 6)

3.6.1. Affected Environment

The U.S. Highway 60/Magma Mine Road intersection is currently stop-sign controlled, with Magma Mine Road traffic stopping for U.S. Highway 60. Average daily traffic volumes on U.S. Highway 60 are

approximately 10,000 vehicles per day. There are approximately 400 vehicles per hour during the morning peak hour and 500 vehicles per hour during the afternoon peak hour. The peak hour for turning movements at this intersection occurs from 5:30 am to 6:30 am and 3:15 pm to 4:15 pm (Aztec 2009).

Traffic volume and speeds along U.S. Highway 60 created a safety issue at the Magma Mine Road turn-off when vehicles would turn from U.S. Highway 60 to the north to access the OMYA Superior Limestone Quarry and the Salt River Project substation, or to the south onto Magma Mine Road. In 2008, improvements were made at the intersection of Magma Mine Road and U.S. Highway 60 that included a right hand turn lane within the Arizona Department of Transportation (ADOT) right of way (ROW) of U.S. Highway 60. This addition of a turn lane has improved the safety for motorists at this intersection. Currently, Magma Mine Road is in need of maintenance and pavement rehabilitation.

Access to the Oak Flat Withdrawal Area and the Superior East Plant Site from U.S. Highway 60 is provided by Magma Mine Road. Magma Mine Road is a two-lane paved road that was constructed in 1974 to provide access to the Superior East Plant Site. Magma Mine Road enters the Oak Flat Withdrawal Area near the center of the northern boundary, turns to the west, crossing through the northwest portion of the Oak Flat Withdrawal Area, then turns south and eventually northwest to the Superior East Plant Site. The Forest Service's designated campsites within the Oak Flat Withdrawal Area is also accessed from Magma Mine Road. Shortly after turning off of U.S. Highway 60, individuals wishing to access the designated campsites at Oak Flat Campground, dispersed camping and picnicking sites within the Oak Flat Withdrawal Area, or to travel through the withdrawal on one of several Forest Roads would turn left from Magma Mine Road into the Oak Flat Campground on FR 2438. Drill site M, one of the previously authorized exploration drill sites on National Forest System Lands and drill site RES-13 on State lands are located south of the Oak Flat Withdrawal Area and are accessed using roads within the Oak Flat Withdrawal Area. One commenter during public scoping reported a near miss involving the commenter's personal vehicle and a truck associated with the Previously Authorized Activities within the Oak Flat Campground.

3.6.2. Environmental Consequences: Direct and Indirect Effects

Issues raised by the public concerning safety were associated with vehicle use of the Oak Flat Campground generated by the Pre-feasibility Activities. Traffic volumes associated with the proposed action and alternatives utilizing roads which traverse the Oak Flat Campground were evaluated in the Oak Flat Picnic and Campground Withdrawal Area Traffic Analysis (WestLand 2009d). Vehicles that would require access to drill sites include but are not limited to drill rigs; service vehicles such as water trucks and pipe trucks; and supervisor/worker vehicles. Number and types of vehicles and the frequency that they would need to access a particular drill site were obtained as weekly or bi-weekly estimates from RCM. One vehicle trip was defined as a vehicle traveling either to or from a specific location; a vehicle making a round trip was counted as two vehicle trips. Vehicle trips are presented in values which represent maximum numbers estimated during standard operating conditions for RCM.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Safety.

The Oak Flat Traffic Analysis indicated that approximately 6 to 14 vehicle trips per day would traverse the Oak Flat Campground. This volume would be associated with access and service to the existing exploration drill site RES-13 located on State lands immediately south of the Oak Flat Campground. All vehicles would enter the Oak Flat Campground on FR 2438 then turn southwest on an existing user-created route which bypasses the outer FR 2438 loop, and then south on FR 3153 to exit the Oak Flat Campground. Traffic would only occur during periods of active drilling at RES-13.

Traffic levels along the Magma Mine Road would not be expected to change from the existing conditions measured in November 2008 (Aztec Engineering 2009). The Monday through Friday peak two-way traffic to the guard shack at the Superior East Plant Site was 756 (328 entering and 328 exiting), and the Monday through Friday minimum was 558 (269 entering and 269 exiting). Entering peak hour traffic in the morning is assumed to be 30 percent trucks and the remaining traffic employee's personal vehicles. In the afternoon peak hour traffic is assumed to be 50 percent trucks. Similarly, traffic at the U.S. Highway 60/Magma Mine Road intersection would not change. This intersection is currently stop-sign controlled, with Magma Mine Road stopping for U.S. Highway 60.

The volumes of traffic and inherent safety risks associated with these measured volumes of traffic are not expected to change under the no action alternative.

Safety Effects of Mitigation Implemented Under the No Action Alternative

No mitigation and monitoring measures would be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Safety

Under the proposed action, all traffic would enter the Oak Flat Campground on FR 2438 from the Magma Mine Road. Vehicles supporting the geotechnical and groundwater drill sites PVT-4 and H-L would veer off Old U.S. Highway 60 in the northeast corner of the FR 2438. Vehicles supporting exploration drill sites OF-1, OF-3, M and RES-13 would turn on an existing user-created road which bypasses the outer FR 2438 loop then turn south on FR 3153 to the drill sites.

Safety and potential traffic conflicts to recreational users of the Oak Flat Campground are expected to be directly related to the volumes of traffic generated by the proposed action. Analysis of the scenario which includes simultaneous drilling at all sites adjacent to the Oak Flat Campground (long-term exploration sites south of Oak Flat Campground [sites OF-1, OF-3, M and RES-13]; deep groundwater well at site H-L; and tunnel characterization borehole PVT-4) indicated that these combined activities would generate approximately 44 to 88 vehicle trips entering the Oak Flat Campground on FR 2438 (WestLand 2009d). Approximately 32 of these vehicle trips would turn on the existing user-created road in the northeast

corner of the FR 2438 loop and proceed to drill sites H-L and PVT-4. The remaining 56 vehicle trips would turn on the FR 2438 Bypass and then head south out of the Oak Flat Campground on FR 3153 to drill sites OF-1, OF-3, M, and RES-13.

Vehicle support associated with the drilling of groundwater well DHTW-01 at site H-L would be needed for a period of 6 to 8 weeks. Vehicle support associated with the drilling of geotechnical boreholes at site PVT-4 would be needed for a period of 4 to 5 weeks. Vehicle support associated with the drilling activities at exploration sites OF-1, OF-3, M and RES-13 could be needed for a period up to 5 years.

Within the Oak Flat Campground the increased volumes of traffic associated with the proposed action is expected to result in a proportional increase in the risk of an accident between recreationists and vehicles traversing the Oak Flat Campground to access drill sites. This risk may increase because recreationists using the Oak Flat Campground may not be aware of or expect commercial traffic within these areas. Traffic volume along the Magma Mine Road is expected to remain within the general limits reported by Azetc Engineering (2009) summarized for the no action alternative.

Safety Effects of Mitigation Implemented Under the Proposed Action

Development of an administrative traffic control plan that would provide systematic means of implementing administrative traffic controls could include: 1) a signage plan, 2) training programs and documentation, 3) performance standards and specific policies to identify problems and terminate offenders, 4) plans for limiting traffic during periods of high-use public events, 5) plans to incorporate traffic safety issues into regular “lunch box” safety meetings on site, and 6) a plan to provide a traffic monitor when and where appropriate. These actions are intended to increase awareness of traffic related safety issues and provide specific mechanisms to enhance safety performance. These measures are expected to reduce the risks of accidents by increasing the awareness of all users of the campground of the risks of traffic related accidents potentially associated with increased use of the roads in the area. It would also provide a means of systematic enforcement and negative consequences for workers using the Oak Flat Campground to access drill sites constructed as part of the proposed action.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of North OF-2 Drill Site Alternative to Safety

Traffic safety consequences of this alternative would be the same as for the proposed action.

Safety Effects of Mitigation Implemented Under the North OF-2 Drill Site Alternative

The effects of mitigation implemented as part of the North OF-2 drill site alternative would be the same as the effects of mitigation implemented as part of the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Safety

The West Access Route 4a would re-route traffic that would otherwise utilize existing roads within the Oak Flat Campground. Vehicle use for the Pre-feasibility Activities within the Oak Flat Withdrawal Area and the Oak Flat Campground would be substantially less if the West Access Route 4a alternative was constructed. RCM's only traffic use in Oak Flat Campground would be for a relatively short period required for construction of a groundwater testing and monitoring well at H-L and a geotechnical bore hole PVT-4, which would be restricted to the off-season use of Oak Flat Campground. Once these are constructed, traffic associated with the Pre-feasibility Activities through Oak Flat Campground would be for groundwater monitoring at the DOE Well Site, H-L, and PVT-4 if it is selected for groundwater monitoring and testing. The West Access Route 4a alternative would substantially reduce the potential for vehicle related accidents between Pre-feasibility Activity service vehicles and recreationists.

Safety Effects of Mitigation Implemented Under the West Access Route 4a Alternative

The general benefits of a traffic management plan would remain similar to those outlined in the proposed action.

Alternative 5 – West Access Route 4b

The direct and indirect consequences of this alternative to traffic related safety concerns would be the same as for West Access 4a alternative.

3.7. Conflicts the with Oak Flat Withdrawal Area (Issue 7)

3.7.1. Affected Environment

Portions of Oak Flat have been reserved for recreation purposes since the 1930s. A Forest Service 1930s/1940s recreation plan provides the following summary with regard to recreational uses at Oak Flat (USDA Forest Service 1947).

> "One thousand acres of reasonably flat land at the head of Queen Creek has been fenced and reserved for public recreation use. It is traversed by U.S. Highway 80-70. A unit plan was prepared and approved on March 3, 1932. Reconstruction of the highway has been completed through the area. No improvements have been built north of the highway but to the south about two miles of service roads provide access to several developments. Two low dams trap flood water and creat[e] small lakes that are more or less permanent. Picnic and camping facilities

have been installed at several locations where shade is available. There are a total of 19 sets with ample garbage pits and latrines….."

In May of 1952, President Truman issued executive order 10355 delegating authority to the Secretary of the Interior to withdrawal or reserve lands of the United States for public purposes. As part of this order, in October of 1952, the Forest Supervisor for the Crook National Forest sent a letter to the District Rangers in the Crook National Forest, informing them that former withdrawals by the regional or chief forester are revoked. He went on to inform the District Rangers that they "have received instructions to formally withdrawal our recreation areas, administrative sites, and wild and wilderness areas." He further directed that "withdrawals should be limited to those areas where there is reasonable possibility of conflict with mining activities." (Allan G. Watkin, Forest Supervisor, Crook, communication to district rangers, September 4, 1952). Mr. John Pomeroy responded and recommended three areas for withdrawal, including the "Big Oak Flat Forest Camp." Following this, Public Land Order (PLO 1229) establishing the withdrawal of Oak Flat Picnic and Campground (the Oak Flat Withdrawal Area), as well as other areas in Arizona, was published in the Federal Register in October of 1955.

PLO 1229 dated September 27, 1955, and published in the Federal Register (20 FR 7336) on October 1, 1955 reserved 18 specifically described areas within National Forest System Lands in Arizona for use as campgrounds, recreation areas, or other public purposes. These areas, subject to valid existing rights were "withdrawn from all forms of appropriation under the public-land laws, including the mining but not the mineral-leasing laws, and reserved for use of the Forest Service, Department of Agriculture, as camp grounds, recreation areas, or for other public purposes as indicated." In 1971 (Federal Register, Vol. 36. No. 187 – Saturday September 25, 1971) PLO 1229 was modified by PLO 5132. PLO 5132 specifically modified the restrictions of PLO 1229 for Jones Water Forest Camp, Oak Flat Picnic and Campground, Pioneer Pass Picnic Grounds, and Federal Highway 9-K Roadside Zone. For these sites PLO 5132 allowed "all forms of appropriation under the public land laws applicable to national forest lands, except under the U.S. mining laws." PLO 5132 goes on to state that on October 20, 1971, these lands were "open[ed] to such forms of disposal as may by law be made of national forestlands except appropriation under the U.S. mining laws."

The Oak Flat Withdrawal Area covers approximately 760 acres and contains over 3 miles of service roads which provide access to designated and dispersed camping and picnic sites.

3.7.2. Environmental Consequences: Direct and Indirect Effects

During scoping, the public expressed concern that directional drilling may allow RCM to drill under the Oak Flat Withdrawal Area in violation of PLO 1229 as modified by PLO 5132. This key issue is addressed for each of the five alternatives considered in this EA in the sections that follow.

Alternative 1 – No Action

Conflicts with Oak Flat Withdrawal Area, Direct and Indirect Impacts of the No Action Alternative

There would be no new surface disturbing activities and the proposed Pre-feasibility Activities would not be implemented. Exploration drill sites near the Oak Flat Withdrawal Area boundary would not be constructed and exploration drilling activities would not take place on National Forest System Lands in proximity to the Oak Flat Withdrawal Area. Closure and reclamation of existing, previously authorized drill sites on Forest Service Lands near the Oak Flat Withdrawal boundary, specifically, drill site M would be implemented. There would be no drilling in these areas and the potential for violations of the Oak Flat Withdrawal Area would be essentially eliminated.

Conflicts with Oak Flat Withdrawal Area, Effects of Mitigation for the No Action Alternative

No mitigation and monitoring measures would be implemented under the no action alternative.

Alternative 2 – Proposed Action

Conflicts with Oak Flat Withdrawal Area, Direct and Indirect Impacts of the Proposed Action

Exploration drilling activities would occur at drill sites OF-1, OF-2, OF-3, and M as described in the Pre-feasibility Plan of Operations. Any exploration drilling under the Oak Flat Withdrawal Area would be considered a mineral entry or appropriation in violation of the withdrawal. RCM has committed to the Forest Service that it would not drill under the Oak Flat Withdrawal Area.

Conflicts with the Oak Flat Withdrawal Area, Effects of Mitigation for the Proposed Action

Implementation of proposed mitigation that would require annual reporting to the Forest Service would provide assurances that RCM is operating in conformance with the requirements of PLO 1229 as modified by PLO 5132.

Alternative 3 – North OF-2 Drill Site

The direct and indirect effects of this alternative with regard to the Oak Flat Withdrawal Area and potential conflicts of drilling operations for mining adjacent to the Oak Flat Withdrawal Area would be as described for the proposed action.

Alternative 4 – West Access Route 4a

The direct and indirect effects of this alternative with regard to the Oak Flat Withdrawal and potential conflicts of drilling operations for mining adjacent to the Oak Flat Withdrawal Area would be as described for the proposed action.

Alternative 5 – West Access Route 4b

The direct, and indirect effects of this alternative with regard to the Oak Flat Withdrawal Area and potential conflicts of drilling operations for mining adjacent to the Oak Flat Withdrawal Area would be as described for the proposed action.

3.8. Travel Management (Issue 8)

3.8.1. Affected Environment

In 2005, the Forest Service published a new rule for providing motor vehicle access to National Forests and Grasslands. The final rule requires each National Forest and Grassland to designate those roads, trails, and areas open to motor vehicle use. Designated routes and areas will be identified on a motor vehicle use map. Motor vehicle use outside of designated routes and areas will be provided for fire, military, emergency, and law enforcement purposes and for use under Forest Service permit. The rule itself does not designate roads or areas for motor vehicles but provides a framework for making those decisions at the local level.

The Tonto National Forest, in coordination with the public and interested groups, state, county, and local governments, is currently in the process of designating roads, trails, and areas for motor vehicle use. Designations will include class of vehicle and, if appropriate, time of year. Some single-track trails may be designated for motorcycle use only. Other trails will accommodate a wider range of vehicles. Some trails will be managed for non-motorized use.

Many of the roads proposed for use in the Pre-feasibility Activities are part of the currently designated system of Forest Roads. Others are user-created roads, some of which have existed for many years and others will be constructed as part of the Pre-feasibility Activities. As the Forest Service proceeds with its Travel Management directive established by the 2005 rule, the ultimate designation of the roads that are part of the Pre-feasibility Activities will be established. Until this process is complete, final designations are not known.

3.8.2. Environmental Consequences: Direct and Indirect Effects

The scoping issue raised by the ID team during analysis of the Pre-feasibility Activities is related to the timing of this action and our Travel Management planning efforts. The roads that would be utilized by RCM during Pre-feasibility Activity operations and the reclamation and closure proposed in the Pre-feasibility Plan of Operations may not conform to Forest Service's Travel Management goals that may become established during the Forest Service's current planning effort.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Implementation of Travel Management

There would no change in current use patterns or designations for the existing roads within the National Forest System Lands. Forest Roads that would have been improved to a Level 2 maintenance standards by the proposed action or any of the action alternatives would remain in their current condition. Roads currently designated for Level 2 maintenance would continue to deteriorate absent management actions by the Forest Service. If a future closure determination is made for any of these roads through the Forest Services' travel management planning process, the Forest Service would be responsible for implementing closure as its budget allows. Similarly, if existing roads that do not meet their currently designated use/maintenance level, or if the use/maintenance level of a road is increased to make it more accessible to meet Forest Service Travel Management objectives, then the Forest Service would be responsible for management activities required to achieve desired road condition.

Travel Management, Effects of Mitigation for the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Implementation of Travel Management

The issue raised by the ID Team during scoping relating to access and roads was that implementation of the Pre-feasibility Activities may not conform to the Forest Service's final travel management plan currently under development. Travel management planning is underway and the Forest Service cannot predict with any certainty the outcome of this planning process with regard to any of the specific system and user-created roads proposed for improvement, maintenance, or construction in the Pre-feasibility Plan of Operations. In some cases a road proposed for use by RCM as part of their Pre-feasibility Activities may be identified for closure by the Forest Service at the conclusion of its travel management planning process. Or, conversely, travel management planning may identify a particular road proposed in this plan for improvement to a maintenance level greater than the level currently identified by the Forest Service or proposed as part of the maintenance plan proposed in the Pre-feasibility Plan of Operations. There is insufficient information available at this time to know the outcome of the travel management planning process with regard to the proposed action.

Travel Management, Effects of Mitigation for the Proposed Action

Mitigation measures outlined in Chapter 2 would require that the road system utilized by the Pre-feasibility Activities conform to the Travel Management goals that may be developed during the period of time proposed for implementation of the Pre-feasibility Activities. This mitigation measure would apply during use and at reclamation and closure. For example, if a road is selected for closure

during the period of use outlined in the Pre-feasibility Plan of Operations, gates or other suitable means would be used to close those roads or specific road segments to the public. Identification of a road identified by RCM for access to its drill sites for closure during travel management planning process would not preclude the use of that road identified by RCM, nor would it restrict maintenance activities to a level less than outlined in the Pre-feasibility Plan of Operations. Similarly, if a particular road was identified for a high level of service, RCM would not be required to construct/reconstruct that particular road to meet the new higher standard. At the conclusion of the Pre-feasibility Activities, reclamation of roads identified in the travel management planning process would have to meet the closure standards established by the Forest Service.

Alternative 3 – North OF-2 Drill Site

The direct and indirect effects of this alternative to the Forest Service's travel management program would be the same as for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Travel Management

The West Access Route 4a alternative will reroute traffic that would otherwise utilize existing roads within the Oak Flat Withdrawal Area, including the Oak Flat Campground, away from these areas reducing potential conflicts with recreation users of the Oak Flat Withdrawal Area. This would be a user-created road and would not be opened to the public. At the conclusion of the Pre-feasibility Activities, West Access Route 4a would be closed and reclaimed and would not become part of the Forest Road system unless it was determined during travel management planning that the West Access Route 4a should become a permanent part of the Forest Road system.

Travel Management, Effects of Mitigation for the West Access Route 4a Alternative

The effects of mitigation would be the same as for the proposed action.

Alternative 5 – West Access Route 4b

The direct and indirect effects and the effects of mitigation for this alternative would be the same as for West Access Route 4a alternative.

3.9. Cultural Resources (Issue 9)

3.9.1. Affected Environment

The consideration of cultural resources has been and continues to be a critical component of Forest Service management of public lands within the National Forest System. As a matter of practice and regulatory requirement the Tonto National Forest has required the applicant to conduct a complete archaeological survey of the entire footprint of the Pre-feasibility Activities plus a buffer. These surveys were instrumental in determining the location of various elements of the Plan of Operations. Prior to our acceptance of their plan as administratively complete, RCM worked closely with us to move certain elements of the plan located near cultural resources to avoid adverse impacts to those resources. This has been an integral component of our review of the Pre-feasibility Plan of Operations.

Government to government and tribal consultation in accordance with the requirements of the National Historic Preservation Act were initiated shortly after a Plan of Operations was submitted to us and we determined that it was administratively complete. Prior to the public scoping meeting, the Forest Service sent letters inviting Tribal representatives from 10 Tribes to comment on the proposed action and informing them of the scheduled public meeting. Following this mailing and prior to the public open house, the Forest Service were invited to a meeting with the Western Apache Coalition to present information about the proposed action and answer any questions they may have had. Native American groups were also invited to attend the public open house held by the Forest Service in Superior during the public scoping period. On September 15, 2008, a copy of the Class III survey report for the PAA was provided to Native American groups seeking their comments on the report and specifically requesting their input regarding traditional cultural places and practices. Tribal consultation is ongoing and will formally conclude for this action when we make our final decision regarding RCM's Pre-feasibility Plan of Operations, although Tribal views may be considered at any time over the life of the Pre-feasibility Activities.

The Pinal Mountains contain a mixture of archaeological sites that represent prehistoric, protohistoric, and historic occupation of the region (MacNider and Effland 1989). The vicinity of the PAA includes the headwaters of Queen Creek, Mineral Creek, and Pinto Creek and these drainages provide possible routes of prehistoric human population movements, interaction, and communication westward to the Hohokam along the Gila River, northward to the Mogollon and Salado culture centers, and southward to the Hohokam and Salado culture areas along the middle Gila River and lower San Pedro River. Previous archaeological investigations within the Pinal Mountains, including block surveys and excavation projects, have revealed evidence of this diversity during the Ceramic Period (A.D. 1-1500). Few Archaic Period (6500 B.C. – A.D. 1) sites have been found in the region, suggesting a more limited occupation at this time. Prehistoric subsistence patterns relied on the region's natural resources that included the harvesting of acorns and agave caudices and the hunting of both large and small game. Dry farming also played an important role in the lives of Native Americans with the region's numerous upland alluvial basins providing an environment that was conducive to dry-farming.

The Pinal Mountains were within the territory of the Western Apache during the Protohistoric and Historic periods (A.D. 1500-1870s) (Goodwin 1942). Most of the Western Apache sites in these mountains are related to resource procurement and processing. Conflict between the Western Apaches and European and Hispanic settlers and the U.S. military in the late 1800s is a common theme that is reflected in the archaeological record of the region. The Pinal Mountains including the general vicinity of the PAA have been traditionally used by the Western Apache for resource procurement and religious practice. Apache still frequent this portion of the Pinal Mountains to collect acorns. In the PAA the areas most often visited include Oak Flat Campground, the Pinal Mountain area and nearby National Forest System Lands along U.S. Highway 60.

The historic occupation of the Pinal Mountains has been most closely tied to mining and ranching. Historic mining activities are represented on the landscape by small hand-dug test pits and extensive mine workings (Lindeman and Whitney 2005). Ranching in the Pinal Mountains has been ongoing since the late 1870s, and ranching-related features such as cattle tanks, ranch roads, and stone cattle fences pepper the landscape. In addition, historic features such as pack trails, highways, utility lines, and Civilian Conservation Corps camps, have left a tangible reminder of the early development of the area.

A Class III cultural resources survey of the proposed Pre-feasibility Activities and the alternatives has been completed (WestLand 2008). The survey buffer around the drill sites encompassed 200 feet and the access road surveys were 100 feet in width. Areas that had been previously surveyed were resurveyed to ensure that any sites or loci within sites were identified and mapped in relation to the Pre-feasibility Activities and action alternatives. Eighteen cultural resource sites were identified within the survey area. These sites are representative of the Salado, Western Apache, and historic occupations in the Western Pinal Mountains. Eleven of the identified sites are eligible for inclusion in the NRHP.

3.9.2. Environmental Consequences: Direct and Indirect Effects

Several commenters expressed concern that the proposed action would have any undue impact on prehistoric resources. In the sections that follow, we evaluate the effects of the proposed action and alternatives on cultural resources.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Cultural Resources

The no action alternative would not adversely impact any cultural resource sites.

Cultural Resource Effects from Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Cultural Resources

The proposed action will result in no direct effects to cultural resources. All of the cultural resources within the PAA that are eligible for inclusion in the NRHP will be avoided and/or protected by specific measures during project activities (WestLand 2008). The access road improvements could result in increased visitation to archaeological sites adjacent to or near these roadways. Increased site visitation can result in the loss of non-renewable cultural resources through amateur surface artifact collection and excavation. However, these effects on cultural resources are nearly impossible to predict or quantify.

Cultural Resource Effects from Mitigation Implemented Under the Proposed Action

Four mitigation measures have been identified to ensure that the Pre-feasibility Activities will not adversely affect any cultural resource sites. Because some Pre-feasibility Activities occur near known cultural resource sites, an archaeological monitor will be onsite during all road and drill site construction activities. If any previously undetected cultural resources are discovered during construction, construction activities would cease at that location and the Forest Service archaeologists would be contacted for instruction before work continues at that location. To avoid contributing to the ongoing degradation of the early 1920's Superior-Miami Highway, RCM will fill the numerous existing potholes with clean fill material prior to using the road to access a proposed drill site. The configuration of a particular drill site proposed for construction will be such that runoff from the site will not impact a known archaeological site detected during Class III survey. The effect of all of these mitigation measures is to avoid adverse direct effects to cultural resources during the implementation of the Pre-feasibility Activities.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Cultural Resources

The North OF-2 drill site alternative will not have any direct or indirect adverse impact to any identified cultural resources.

Cultural Resource Effects from Mitigation Implemented Under the North OF-2 Drill Site Alternative

The effects of mitigation would be similar to the mitigation effects described for the proposed action.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Cultural Resources

The West Access Route 4a alternative and drill sites 4E and 4W alternative would not have any direct or indirect adverse impact to cultural resource sites.

Cultural Resource Effects from Mitigation Implemented Under the West Access Route 4a Alternative

The effects of mitigation would be similar to the mitigation effects described for the proposed action.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Cultural Resources

The West Access Route 4b and drill sites 4E and 4W alternative would not have any direct or indirect adverse impact to cultural resource sites.

Cultural Resource Effects from Mitigation Implemented Under the West Access Route 4b Alternative

The effects of mitigation would be similar to the mitigation effects described for the proposed action.

3.10. Native American Religious Practices (Issue 10)

3.10.1. Affected Environment

EO 13007 requires that each executive branch agency with statutory or administrative responsibility for the management of Federal lands shall, as appropriate, promptly implement procedures for the purposes of carrying out the provisions of Section 1 of the order, including, where practicable and appropriate, procedures to ensure reasonable notice is provided of proposed actions or land management policies that may restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites. In all actions pursuant to this section, agencies shall comply with the Executive memorandum of April 29, 1994, "Government-to-Government Relations with Native American Tribal Governments." In the context of this executive order, a sacred site "means any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." Consultation to identify sacred sites that might be affected by the proposed action or any alternatives considered to the proposed action has been initiated. No specific sites were identified but in a comment letter prepared by Apache legal counsel, it was stated that "Oak Flat, Apache Leap, Devils Canyon and the related canyons, geologic formations, and springs in the area of proposed activity are holy, sacred, and consecrated lands."

3.10.2. Environmental Consequences: Direct and Indirect Effects

Concern was expressed during the scoping period that the Pre-feasibility activities may have an undue impact on Native Americans' free exercise of religion at sites identified as sacred within or in the vicinity of the PAA.

Alternative 1 – No Action

Direct and Indirect Impacts of the No Action Alternative to Native American Religious Practices

The no action alternative would not affect Native American religious practices. It is not expected to increase the accessibility of any sacred sites to Native Americans nor would it limit access.

Native American Religious Practices, Effects from Mitigation Implemented Under the No Action Alternative

Mitigation and monitoring measures described in Section 2.3 would not be implemented under the no action alternative.

Alternative 2 – Proposed Action

Direct and Indirect Impacts of the Proposed Action to Native American Religious Practices

A number of commenters have stated that the Oak Flat area is sacred to Native Americans affiliated with Apache cultural traditions. With the exception of the immediate footprint of the drill sites and for the specific areas of the roads being improved at any given time to provide access to the drill sites, Native American groups would not be precluded from using the Oak Flat Withdrawal Area and surrounding National Forest System Lands while the Pre-feasibility Activities are underway. Some effect to their subjective religious experience may occur from the proposed action but it is not anticipated that this experience would be substantially burdened. In the context of the Religious Freedom Restoration Act of 1993, a substantial burden would exist for the Tribes if the proposed activities forced them to violate their religious beliefs or if they were penalized for their religious activities. Neither of these conditions would arise as a consequence of the proposed drilling activities.

Native American Religious Practices, Effects from Mitigation Implemented Under the Proposed Action

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

Alternative 3 – North OF-2 Drill Site

Direct and Indirect Impacts of the North OF-2 Drill Site Alternative to Native American Religious Practices

Information has not been provided that would suggest that this alternative drill site would affect access to a sacred site, or in any other way substantially burden a Native American Tribes expression of religious freedom.

Native American Religious Practices, Effects from Mitigation Implemented Under the North OF-2 Drill Site Alternative

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

Alternative 4 – West Access Route 4a

Direct and Indirect Impacts of the West Access Route 4a Alternative to Native American Religious Practices

Information has not been provided that would suggest that this alternative access route and two new drill sites would affect access to a sacred site, or in any other way substantially burden a Native American Tribes expression of religious freedom.

Native American Religious Practices, Effects from Mitigation Implemented Under the West Access Route 4a Alternative

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

Alternative 5 – West Access Route 4b

Direct and Indirect Impacts of the West Access Route 4b Alternative to Native American Religious Practices

No information that would suggest that West Access Route 4b and two new drill sites would affect access to or in any other way substantially burden a Native American Tribes expression of religious freedom has been provided.

Native American Religious Practices, Effects from Mitigation Implemented Under the West Access Route 4b Alternative

During ongoing consultation, Native American Tribes have not provided information on specific sacred sites within or near the PAA. No mitigation measures have been proposed.

3.11. Cumulative Effects

3.11.1. Context: Past, Present, and Reasonably Foreseeable Future Actions

As defined in 40 CFR Part 1508.7 (regulations for implementing NEPA) a cumulative effect is an impact to the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In this section, context for the cumulative effects analysis is presented for each of the key issues. Past and present actions commonly influence the baseline condition and trend of a resource, while reasonably foreseeable future actions can be expected to influence future trends. Collectively, information regarding past, present, and reasonably foreseeable future actions and the baseline conditions provided in the effected environment section for each key issue provides the context for the cumulative effects analysis presented in this EA.

Past, present, and reasonably foreseeable future actions considered in this cumulative impacts assessment are identified in Table 3-12. Within Table 3-12, the spatial context of these activities is provided by zone. Zone A includes the PAA and land within 1 mile of the PAA; Zone B includes all of those lands from 1 to 5 miles from the PAA; Zone C is greater than 5 miles and less than 10 miles from the PAA; and Zone D is greater than 10 miles from the PAA. Past, present, and reasonably foreseeable future actions considered in our analysis are also depicted on Figure 3-11. A larger geographic context for this analysis, particularly with regard to air resources is provided in Figure 3-12.

Table 3-12. Past, Present, and Reasonably Foreseeable Future Activities. The identified activity and a brief description of the activity and its effects are provided in the first column. The second column is a summary of the cumulative effects context that includes the distance, by zone, from the PAA, a temporal context, and the potential cumulative effects. The locations of the activities considered here are depicted in Figure 3-11. Environmental resources listed in the cumulative effects context summary column in bold print indicate that potential or realized effects are considered beneficial to that resource. Resources listed twice, once in bold print and once in a normal print, indicate that both beneficial and adverse effects may have occurred. Surface disturbance estimates listed in this table were estimated using a 1"=3,000' National Agriculture Imagery Program aerial image flown in summer 2007.

Spatial Zones from the PAA:

Zone A encompasses the PAA and areas within a mile of the PAA.
Zone B is greater than 1 mile and less than or equal to 5 miles from the PAA.
Zone C is greater than 5 miles and less or equal to 10 miles from the PAA.
Zone D is greater than 10 miles from the PAA.

Resource Categories based on Key Issues indentified during public scoping:

AHC = Arizona Hedgehog Cactus
AQ = Air Quality
AR = Access and Roads
CR = Cultural Resources
ES = Erosion and Sedimentation
NARP = Native American Religious Practices
RA = Recreational Activities
S = Safety
W = Wildlife

Activity and Effects (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
1. Pinto Valley Mine – Open pit copper mine located 4 miles north of the PAA. Currently under care and management with no new mining operations underway. Has not initiated closure activities, therefore, reasonably foreseeable future mining related activities are assumed. Largely private, but uses some National Forest System Lands for support facilities. The mine is approximately 2,300 acres of surface disturbance. Has existing ADEQ air permits and AZPDES permits for stormwater discharges. A tailings embankment failure at the mine impacted Pinto Creek. Pinto Creek drains north away from the PAA and is in a different watershed. Mine activities contribute to emissions affecting air quality and affecting wildlife by impacting wildlife habitat. Arizona hedgehog cactus surveys at the mine have been negative. Future operations that could expand the mine footprint may impact cultural resources and require mitigation.	Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR
2. Carlota Mine – Open pit copper mine located about 4 miles north of the PAA. In beginning phases of new mining and milling operations. Approximately 700 acres. Located on private and National Forest System Lands. A plan of operations was reviewed in accordance with the requirements of the NEPA. Impacted AHC and mitigation was provided as part of Forest Service Section 7 Consultation. Mine activities contribute to emissions affecting air quality. Affects wildlife and wildlife habitat. Implementation of data recovery for historic and pre-historic archaeological resources has been completed.	Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, CR
3. Harborlite Perlite Mining Operations – Open pit perlite mining operation located 2 miles west of the PAA. Approximately 50 acres of surface disturbance. Activities contribute to emissions affecting air quality and wildlife effects from direct loss of habitat. Not known if development adversely affected cultural resources.	Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
4. Mine Properties near Miami, Arizona – Freeport McMoran Copper and BHP each own various mine properties that are contiguous or near one another near Miami, Arizona. Multiple open pit copper mines located 6 miles northeast of the PAA. BHP has initiated closure on portions of its facilities within this area. FMI Mining operations have ceased and smelter operations continue. Ongoing reclamation of the tailings at these facilities have reduced fugitive dust emissions. The FMI Miami Mining facility has not initiated closure activities, therefore, future mining activities could occur within portions of this complex of mine properties depending on market conditions. Combined, these mine properties are over 8,000 acres. Past mining activities contributed to groundwater impacts that resulted in Pinal Creek Water Quality Assurance Revolving Fund (WQARF) status. Pinal Creek is in a different watershed than the PAA. Activities associated with ongoing and future mining contribute to emissions of air pollutants affecting air quality and wildlife effects by loss of habitat. Mining activities over the past 100 years may have impacted Arizona hedgehog cactus and cultural resources,	Spatial Context: Zone C Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ/**AQ,** W, CR, AHC
5. Pinal Creek Remediation WQARF Project – Groundwater remediation project located 12 miles north-northeast of the PAA. Ongoing remediation project for monitoring, extraction, and treatment of contaminated groundwater in the Pinal Creek alluvial aquifer. Pinal Creek drains north away from the PAA and is in a different watershed. State Superfund project that operates under a consent order to improve groundwater quality in the alluvial Pinal Creek Aquifer. Resulted from decades of mining activities conducted before modern permitting or regulatory protections. Project includes both source control at participating mine properties and direct pump and treatment of impacted water in the aquifer. Have been substantial habitat benefits from the project associated with mitigation measures for the Clean Water Act (CWA) Section 404 permit required to implement remedial actions. Improvements of water quality and riparian habitat increases along lower Pinal Creek have resulted in substantial benefits to this watershed, which discharges into the Salt River through the Salt River Wilderness Area. Since the implementation of the remediation program, the reaches of Pinal Creek, Miami Wash, and Bloody Tanks Wash have been removed from the State's list of impaired water bodies.	Spatial Context: Zone D Temporal Context: Past, Present, and Future Potential Cumulative Effects: **W, ES**
6. Old Dominion Mine Closure – Closed copper mine located 10 miles east-northeast of the PAA on private land. Mine closure and reclamation activities initiated 5 years ago. Reclamation and closure have benefitted wildlife species and contributed to source control in support of ongoing Pinal Creek Group activities. Stabilization of mine workings may have reduced fugitive dust emissions	Spatial Context: Zone D Temporal Context: Past Potential Cumulative Effects: **W, AQ, ES**

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
7. ASARCO Ray Mine Operations and Bureau of Land Management Land Exchange – Located approximately 8 miles southeast of the PAA. Activities include ongoing mining operations, a proposed land exchange with BLM (currently in litigation), and CWA reauthorization for activities associated with ongoing mining activities. Activities associated with the mine contribute to emissions affecting air quality and wildlife habitat. Previous permitting efforts in the mid 1980s required implementation of data recovery efforts to mitigate for unavoidable project impacts to cultural resource sites. Project established an off-site mitigation area along the San Pedro River that includes Cooks Lake to mitigate impacts of tailings, leach pads, and development rock stock piles to waters of U.S. Construction of diversion dam and tunnel to route unimpacted surface water flows around mine has benefited water quality downstream.	Spatial Context: Zone C Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR
8. RCM exploration and Well Development on State and Private Lands – Development of RCM exploration drill sites and well sites on State and private land to support ongoing exploration and groundwater studies. These activities would temporarily and locally affect air quality through dust emissions and increase in vehicle emissions during construction and monitoring periods. Other effects include surface disturbance, a temporary increase in noise in these areas, a temporary increase in local roadway travel, and a temporary effect on visual resources. Activities contribute to potential effects associated with erosion and sedimentation, wildlife, Arizona hedgehog cactus, cultural resources, recreational uses on Oak Flat, traffic safety, and Native American religious practices.	Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, ES, W, AHC, CR, OFR, S, NARP
9. Number 9 Shaft Dewatering and No. 10 Shaft Sinking – RCM Pre-feasibility Activities on private land. These activities would temporarily and locally affect air quality through dust emissions and an increase in vehicle emissions during construction. Increased roadway traffic on Magma Mine Road. New head frame visible from parts of Oak Flat Withdrawal Area. Conducted within existing disturbed areas.	Spatial Context: Zone A Temporal Context: Present and Future Potential Cumulative Effects: AQ, OFR, S
10. Superior West Plant Site closure – Stabilization and reclamation work. Stabilization work could temporarily contribute to dust emissions; however, the work will likely cause a decrease in dust emissions over time. Wildlife could be directly impacted during closure work and indirectly impacted from the noise associated with stabilization and closure.	Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: **AQ**, **W, ES**
11. RCM's MARRCO Waterline – Placement of a water pipeline within the MARRCO right-of-way to transport water collected from the No. 9 Shaft and treated at an existing water treatment facility on RCM property to an irrigation canal operated by NMIDD near Florence, Arizona. Construction activities result in impacts to Sonoran desertscrub habitat and would affect the wildlife using that habitat. Vegetation clearing activities would temporarily result in an increase in fugitive dust emissions and maintenance of the water line would temporarily result in minor increases in mobile sources of air pollution.	Spatial Context: Zones B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: AQ, W

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
12. MARRCO Railroad – Past, present and potential future use of MARRCO railroad for mining or other commercial purpose. Railroad built between 1914 and 1915. Approximately 9.5 miles on TNF. Past steam operations and present diesel operation affects air quality. The railroad may also act as a barrier to some small wildlife species.	Spatial Context: Zones B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, CR
13. OMYA Superior Limestone Quarry – Ongoing limestone quarry located about 0.5 mile northwest of the PAA. Indirect effects to the Arizona hedgehog cactus from clearance of potential habitat. Approximately 90 acres of surface disturbance. Activities contribute to emissions affecting air quality and affecting wildlife habitat. Air emissions from fugitive and combustion sources. Access road crossings of Queen Creek stabilized to reduce sedimentation.	Spatial Context: Zone B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, ES/**ES**
14. RCM Previously authorized exploration activities – On private, state, and National Forest Service Lands. Previously authorized exploration activities approved by the Forest Service under Plan of Operations No. 01-12-02-002. Previously authorized activities include: 1) nine combination exploration and groundwater monitoring well sites; 2) one groundwater monitoring well; 3) improvement and maintenance of six Forest Service system and user-created roads for drill site access; and, 4) placement of aboveground plastic pipe and tanks for potable water transfer and storage. Approximately 4.34 acres of surface disturbance. Effects to air quality from fugitive dust emission and combustion emissions. Other effects include noise effects, increase in vehicle travel on roads, visual resource effects, erosion and sedimentation, wildlife, and traffic safety. Forest Service review of effects to Arizona hedgehog cactus, cultural resources, and Native American religious practices determined no adverse effect.	Spatial Context: Zone A Temporal Context: Past and Present Potential Cumulative Effects: AQ, ES, W, OFR, S
15. Hedgehog cactus withdrawal area – Approximately 400-acre area withdrawn from mineral entry as mitigation for Carlota Mine project. Located just outside the PAA. Removal of these lands from mineral entry provides a benefit to Arizona hedgehog cactus and wildlife.	Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: **W**, **AHC**
16. Development of a deep underground mine – It is anticipated that future mining activities would use underground mining methods as opposed to open pits. The surface disturbance associated with underground facilities would be substantially less than open pit mining. The surface disturbance would be dependent upon the amount of waste deposited to the surface, haul and access road requirements, and other surface facilities.	Spatial Context: Zone A Temporal Context: Future Potential Cumulative Effects: Unknown.
17. Future Pre-feasibility Drilling Activities –Future activities for exploration purposes could be pursued on private, State, and/or Forest Service Lands. These activities would temporarily and locally affect air quality through dust emissions, and an increase in vehicle emissions during construction and monitoring periods. Surface disturbance, a temporary increase in noise, a temporary increase in local roadway travel, and a temporary effect on visual resources; could all contribute to potential effects associated with roadway sediment and erosion control, wildlife, Arizona hedgehog cactus, cultural resources, recreational uses at Oak Flat, traffic safety, and Native American religious practices. Until a specific proposal would be submitted the location and nature of those effects would be speculative.	Spatial Context: Zone A Temporal Context: Future Potential Cumulative Effects: AQ, ES, W, AHC, OFR, S, CR, NARP

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
18. Turn lane off U.S. Highway 60 at Magma Mine Road – Turn lane constructed for safety reasons along east-bound U.S. Highway 60 at Magma Mine Road.	Spatial Context: Zone A Temporal Context: Past Potential Cumulative Effects: ES, **OFR, S**
19. U.S. Highway 60 realignment and improvements – Improvements planned along U.S. Highway 60 from Florence Junction to Globe. May provide safer access at Magma Mine Road. Planned improvements will not necessarily increase the frequency of animal-vehicle collisions, but will likely result in greater surface disturbance in areas used by wildlife. Construction activities could temporarily increase air emissions from combustion and fugitive dust sources. Direct impacts to Arizona hedgehog cactus are probable. Surface disturbance could potentially affect cultural resources and recreational uses in the Oak Flat area.	Spatial Context: Zones A, B, and C Temporal Context: Future Potential Cumulative Effects: AQ, RSEC, W, AHC, CR, **OFR, S,** NARP
20. U.S. Highway 60 improvements at Pinto Valley turn-off – Four-mile passing lane under construction between the Pinto Valley Mine turnoff and Top of the World. Temporary, local, dust emissions would affect air quality and erosion and sedimentation. Combustion emissions from construction equipment. Wildlife habitat impacts. Safety benefits are expected. Cultural resource clearance and review by Forest Service and ADOT	Spatial Context: Zone B Temporal Context: Present and Future Potential Cumulative Effects: AQ, ES, W, **S**
21. TNF Integrated Vegetation Management to Treat Noxious Weed Infestations - Forest Service proposes to authorize ADOT to conduct annual treatment programs using EPA approved herbicides to contain, control, or eradicate noxious, invasive, and native plant species that pose safety hazards or threaten native plant communities on road easements and National Forest System Lands up to 200 feet beyond the road easement. Treatments along roadways may affect roadway sediment and erosion control by reducing vegetation cover. Beneficial effects for native vegetation and wildlife. Potential reduction in fire risk.	Spatial Context: Zones A, B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: ES, **W**, **AHC, S**
22. Salt River Project (SRP) and Arizona Public Service (APS) power lines and SRP substation – Several above-ground power lines occur in vicinity of the PAA. Existing APS 500 kV power line runs in a north-south direction east of Oak Flat (Cholla to Saguaro line). SRP received permission from the Forest Service for ROW (but has not yet been obtained) immediately to the west of this corridor to add a 230 kV line to service the Kerney/Ray Mine area. SRP Silver King Substation is located in Zone A and B. Existing 115 kV SRP power line runs from Silver King to Oak Flat. This segment ends at the Superior East Plant Site substation. Another existing SRP 115 kV line runs along Queen Creek and into Superior (Silver King to Trask line). Future construction of power lines in the region would temporarily affect air quality if their construction requires grading activities. Some impacts to wildlife. The presence of power lines affect visual aesthetics, which in turn affects recreational uses.	Spatial Context: Zones A and B Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, CR, OFR, NARP
23. Grazing on Federal and State Land – Most Federal and State lands currently used for livestock grazing purposes. Livestock grazing has historically occurred in PAA and continues today. Surface disturbance and habitat modification associated with grazing have potential to affect wildlife, vegetation (including the Arizona hedgehog cactus), erosion and sedimentation, and cultural resources located on the surface.	Spatial Context: Zones A, B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: W, AHC, ES, CR

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
24. Wildfire – Natural wildfire is a form of disturbance common in many vegetation communities. Wildfire can affect air quality, wildlife, Arizona hedgehog cactus, erosion and sedimentation potential, and recreational uses. Long-term effect of fire on a landscape varies by vegetation type. Chaparral habitats are typically considered to be a fire-adapted plant community.	Spatial Context: Zones A, B, C, and D Temporal Context: Past and Future Potential Cumulative Effects: AQ, ES, W/**W**, AHC, CR, OFR, S
25. Development of State Lands –State lands periodically auctioned for development to fund public schools. Lands west of the PAA and east of Phoenix metropolitan area are largely State owned and could potentially be auctioned for development purposes to accommodate Arizona's population growth. Short term air quality effects from construction activities would be expected and development would result in loss of wildlife habitat. Increased population and proximity will increase demands for recreational activities on National Forest System Lands and increase in number of recreational users and associated impacts to natural resources. Increased recreational activities may affect air quality through fugitive and combustion emissions, increase mechanical erosion from road surfaces, affect wildlife, and cultural resources.	Spatial Context: Zone D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, ES, W, CR, OFR
26. Tonto National Forest Travel Management Planning – The Forest Service is updating its Travel Management designations to limit cross-country travel on Forest Roads that are designated for that use.	Spatial Context: Zones A, B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: **W, AHC,** OFR, **S**, **CR, NARP**
27. Oak Flat recreational uses – The Oak Flat Withdrawal Area provides designated and dispersed recreation opportunities that can be accessed by a network of paved and dirt roads. Uses contribute to air pollution from combustion and fugitive emissions. Can affect native wildlife and vegetation. Safety concerns arise when the area experiences high-traffic loads due to recreational uses.	Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, **OFR,** S
28. Recreational uses of Forest and user-created road – Off-highway vehicle driving is a popular recreational use on National Forest System Lands in vicinity of PAA and throughout TNF. Contributes to air pollution from combustion and fugitive dust emissions. Can adversely affect wildlife and vegetation. Safety concerns arise when the area experiences high-traffic loads due to recreational uses. Cultural resources affected.	Spatial Context: Zones A, B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, **OFR,** S, CR
29. Wilderness Area recreational uses – Wilderness areas occur within the vicinity of the PAA; White Canyon Wilderness approximately 6 miles south, Superstition Wilderness approximately 6 miles northwest, Salt River Canyon Wilderness approximately 15 miles northwest, Sierra Ancha Wilderness approximately 26 miles northwest, Salome Wilderness approximately 26 miles north, and Four Peaks Wilderness approximately 22 miles northwest of the PAA. Recreational opportunities include camping, hiking, bird watching, and non-motorized vehicle use. While effects are generally less than on other National Forest System Lands, these uses contribute to air emissions associated with mobile sources from recreationists traveling to these area. Limitations of road access within these areas benefits wildlife and vegetation.	Spatial Context: Zones B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ/**AQ**, W/**W, CR**

Table 3-12. (Continued)

Activity (Number references Activity ID on Figure 3-11)	Cumulative Effects Context Summary
30. Tonto National Forest Sonoran Desert Trail System Project – Project underway in the Mesa Ranger District to designate public access points for non-motorized use, a system of non-motorized trails, and trail and trailhead names to promote awareness of Sonoran Desert in the TNF. Provides accessible interpretive trail, reclamation of prospecting pits, open mines near proposed system trails, and installation of fencing and signage to deter motorized vehicle use.	Spatial Context: Zone D Temporal Context: Present and Future Potential Cumulative Effects: W/**W**, **ES, OFR**, CR/**CR**
31. Tonto National Forest Recreational Facility Analysis – Process to assist TNF in creating a sustainable program that aligns recreation sites and facilities with visitor needs.	Spatial Context: Zones A, B, C, and D Temporal Context: Present and Future Potential Cumulative Effects: **OFR**
32. Apache Leap recreational uses – Small user-created hiking trails have been placed from FR 315 northeast to the top of Apache Leap. Affect native wildlife and vegetation in the area.	Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: W, **OFR**
33. Devils Canyon recreational uses – Recreational uses include hiking, canoeing, bird watching, and canyoneering. These uses contribute to air emissions associated with mobile sources and affect native wildlife and vegetation in the area.	Spatial Context: Zone A Temporal Context: Past, Present, and Future Potential Cumulative Effects: AQ, W, AHC, **OFR**
34. Arizona Trail – Continuous 800+ mile trail across Arizona from Mexico to Utah. Traverses the Tonto National Forest Globe Ranger District approximately 3 miles west of Superior, approximately 7 miles west of PAA. The trail could potentially put humans in areas where interaction with wildlife becomes more likely.	Spatial Context: Zones B, C, and D Temporal Context: Past, Present, and Future Potential Cumulative Effects: W

3.11.2. Air Quality (Issue 1)

Cumulative Air Quality Effects of the No Action Alternative

The spatial scale for evaluating air quality cumulative effects is generally bounded by the Globe-Miami area to the east, the eastern Phoenix metropolitan area to the west, the Tortilla Mountains to the south, and the southern edge of the Salt River Canyon Wilderness Area to the north. All categories of past, present, and reasonably foreseeable future activities directly and indirectly contribute to air pollutant emissions in the region (Table 3-12). The biggest contributors have been urban growth of the Phoenix metropolitan area and Pinal County. Past mining activities in the region have affected air resources by their generation of combustion and fugitive dust emissions and point source discharges from smelters and other metals processing facilities.

As discussed in Section 3.1.2 of this EA, the airshed in the far eastern portion of the PAA, known as the Miami Planning Area, is designated by EPA as nonattainment for PM_{10} particulate matter. The Hayden nonattainment area for PM_{10} extends north from Hayden. While still officially designated as a nonattainment area, the last exceedance of the 24-hour standard occurred in 1997 and the last annual standard exceedance occurred in 1988. The 8-hour average ozone concentrations and one-hour ozone maximum concentrations in Pinal County have generally decreased from 1993 to 2007 (Figure 3-2 and Figure 3-3). Air quality trends support the notion that over time, impacts to air resources associated with past mining actions and mobile sources have become less substantial.

Dust and NO_x emissions associated with vehicular travel can be associated with all the present and reasonably foreseeable future activities; however, most of these activities that could substantially affect air quality would require compliance with applicable ADEQ air quality control regulations. Future activities, such as implementation of the Forest Service Travel Management planning activities, may or may not reduce the annual discharge of vehicular emissions and fugitive dust emissions. This would be due to an overall reduction in the number of recreational user miles traveled on Forest Roads. Some future actions, such as improvements to U.S. Highway 60, will likely result in an increase in short term combustion and fugitive dust emissions during construction activities. Increased population growth in the region and the associated increase in vehicle trips for work and recreation may cause an increase in fugitive and combustion emissions but these increases may be offset by increasing regulatory restrictions on air emissions from motor vehicles. Cumulatively, increasing regulatory requirements have resulted in improvements in process and control technologies that have reduced ozone and PM_{10} levels in the region over time despite the increase in population throughout the State, particularly the Phoenix metropolitan area.

Development of the deep copper ore deposit that underlies portions of the PAA is a reasonably foreseeable future action. However, its development is speculative (refer to Section 1.4). Currently there is no proposed mining plan to develop the deep copper ore deposit. It is anticipated that future mining activities would use underground mining methods as opposed to open pits. The surface disturbance

associated with underground facilities would be substantially less than open pit mining. The surface disturbance would be dependent upon the amount of waste deposited to the surface, haul and access road requirements, and other surface facilities. While all of these elements of a mine have the potential to generate pollutants, this action is too speculative to attempt to identify how much or even where air pollutant emissions would occur. Temporally, air emissions from development of an underground mine would occur after any pre-feasibility activities on State and private lands are complete.

The cumulative effects associated with the no action alternative and the activities outlined in Table 3-12 are not expected to change the decreasing trend in ozone concentrations recorded in Pinal County or result in any exceedances of the PM_{10} standard. The spatially and temporally separate emissions from this alternative and other past, present, and reasonably foreseeable actions would not result in significant cumulative impacts.

Cumulative Air Quality Effects of the Proposed Action

The regional trend in ambient pollution concentrations at the nearest measuring locations appears to be improving. Temporally, air emissions from development of an underground mine would occur after the Pre-feasibility Activities are complete. Therefore, implementation of the proposed action would have similar cumulative effects as the no action alternative and is not expected to result in significant cumulative impacts on air resources.

Cumulative Air Quality Effects of the North OF-2 Alternative

Air emissions from North OF-2 drill site are not expected to be different from the emissions estimated using the OF-2 drill site in the proposed action. Therefore, cumulative effects to air resources are expected to be similar to those associated with the proposed action.

Cumulative Air Quality Effects of the West Access Route 4a Alternative

The increase in air emissions from construction of this alternative, compared to the proposed action, would be minimal. The total miles traveled to access Pre-feasibility Activities drill sites south of the Oak Flat Withdrawal Area (OF-1, OF-3, M, and RES-13) over the duration of the Pre-feasibility Activities would be less than the proposed action. Therefore, cumulative impacts on air resources are expected to be less than those associated with the proposed action.

Cumulative Air Quality Effects of the West Access Route 4b Alternative

The difference in air emissions from construction of this alternative would be minimally greater than the proposed action. The miles traveled to access Pre-feasibility Activities drill sites south of the Oak Flat

Withdrawal Area (OF-1, OF-3, M, and RES-13) would be less than the proposed action and only slightly more than the West Access Route 4a alternative. Therefore, cumulative impacts on air resources are expected to be less than those associated with the proposed action and marginally greater than those associated with the West Access Route 4a alternative.

3.11.3. Erosion and Sedimentation (Issue 2)

Cumulative Erosion and Sedimentation Effects of the No Action Alternative

The spatial scale for evaluating cumulative effects associated with roadway sediment and erosion control includes Zone A. Existing recreational use patterns of the roads in Zone A may change based on future Travel Management designations. The nature of vegetation cover and extent of bedrock formations that extend to the surface in the PAA limit adverse impacts from these uses. No significant cumulative effects from sedimentation of drainages or erosion of land surfaces are anticipated.

Cumulative Erosion and Sedimentation Effects of the Proposed Action

Potential impacts resulting from the proposed action have been determined to be negligible. Therefore, there are no project related impacts to be added to past, present, or reasonably foreseeable future actions to determine whether significant cumulative impacts may occur.

Cumulative Erosion and Sedimentation Effects of the North OF-2 Alternative

Evaluation of the North OF-2 alternative is similar to the proposed action, no significant cumulative effects are anticipated.

Cumulative Erosion and Sedimentation Effects of the West Access Route 4a Alternative

Evaluation of the West Access Route 4a alternative is similar to the proposed action, no significant cumulative effects are anticipated.

Cumulative Erosion and Sedimentation Effects of West Access Route 4b Alternative

Evaluation of the West Access Route 4b alternative is similar to the proposed action, no significant cumulative effects are anticipated.

3.11.4. Wildlife (Issue 3)

Cumulative Wildlife Effects of the No Action Alternative

Because most wildlife are highly mobile, particularly avian species, the spatial scale for evaluating cumulative effects on wildlife resources includes Zones A, B, C, and D. Cumulative effects to wildlife within these four zones would result from the loss of habitat as a result of surface disturbance, mortalities from animal-vehicle collisions, and displacement caused by human intrusion. At the local scale, all four types of past, present, and reasonably foreseeable future actions affect wildlife (mining and mining-related activities; land use, access and road improvements; recreational uses; and utilities and infrastructure improvements), but at a regional scale, localized impacts that result or would result from these actions become less substantial. Negative impacts to wildlife resources from mining activities have been offset to some degree by remediation and reclamation projects in the region, such as the Pinal Creek remediation project and the Old Dominion Mine reclamation. Major roads in the region, such as U.S. Highway 60, continue to impact wildlife. The planned improvements to U.S. Highway 60 will not necessarily increase the frequency of animal-vehicle collisions, but will likely result in greater surface disturbance and encroachment into adjacent areas used by wildlife. Forest roads in the region are managed to limit cross country travel to areas that are designated for that use, which limits the probability of impacts to wildlife from traffic in more remote, less used areas. The presence of power lines located in the region may impact bird populations, particularly raptors. Newer pole and tower designs limit the risk of electrocution but older poles and towers that have not been updated pose electrocution risk, and losses from collisions are still likely.

Indirect effects associated with the no action alternative result from the level of daily human activity, particularly along FR 315. Traffic would be decreased from current levels, particularly during the work week when recreational uses are typically at their lowest levels, decreasing the likelihood of animal-disturbance. The slower road speeds of most Forest Roads limit the potential risk of vehicle collisions. However, periods of peak use associated with four-wheel drive recreational traffic and other recreational uses may increase because of the elimination of drilling activities along FR 315, increasing the likelihood of potential disturbance.

The no action alternative would not result in significant adverse cumulative effects to wildlife.

Cumulative Wildlife Effects of the Proposed Action

Cumulative effect analysis zones A, B, C, and D are largely comprised of public lands, primarily National Forest System Lands with Bureau of Land Management and State lands included as well. While State lands, particularly towards Florence and Florence Junction may be developed at some point in the future, the vast majority of lands in the analysis area is protected and will not be adversely impacted by the present and reasonably foreseeable future actions. The relative small area of impact from the Pre-feasibility Activities are spread over a large area of National Forest System Lands and are located

immediately adjacent to existing disturbance areas. Potential impacts resulting from the proposed action have been determined to be negligible, therefore there are no project related impacts to be added to past, present, or reasonably foreseeable future actions to determine whether significant cumulative impacts may occur.

Cumulative Wildlife Effects of the North OF-2 Drill Site Alternative

Because this alternative results in only a 0.65 percent increase in surface disturbance and the likelihood of animal-vehicle collision does not differ substantially from the Pre-feasibility Activities, the cumulative effects on wildlife do not substantially differ from those of the proposed action.

Cumulative Wildlife Effects of the West Access Route 4a Alternative

Because this alternative results in only a 9.9 percent increase in surface disturbance and the likelihood of animal-vehicle collision does not differ substantially from the proposed action, the cumulative effects on wildlife do not substantially differ from those of the proposed action.

Cumulative Wildlife Effects of the West Access Route 4b Alternative

Because this alternative results in only an 11.4 percent increase in surface disturbance over the proposed action and the likelihood of animal-vehicle collision does not differ substantially from the proposed action, the cumulative effects on wildlife do not substantially differ from those of the proposed action.

3.11.5. Arizona Hedgehog Cactus (Issue 4)

Cumulative Arizona Hedgehog Cactus Effects of the No Action Alternative

The spatial scale for evaluating cumulative affects to Arizona hedgehog cacti includes the species range, which is in Pinal County in the vicinity of Dripping Springs, the Superstition and Mescal mountains, the highlands between Globe and Superior, and in Devils Canyon and Queen Creek along the Gila/Pinal County line (AGFD, 2003). This area includes the northeastern portions of the PAA and areas north and east of the PAA and occur within portions of zones A, B, C and D identified in Table 3-12.

Mining and mining-related activities, land use access and road related activities, and recreational uses, all have the potential to directly and indirectly affect the Arizona hedgehog cactus in the PAA and its vicinity. Because of the patchy distribution of this species, some mining activities such as the Carlota Project, impacted a relatively large number of individuals, while other nearby properties, such as Pinto Valley, have not had any cactus detected in areas that have been contemplated for expansion over the past 10 to 15 years. Impacts from the Carlota Copper Project were offset by withdrawal of certain National Forest System Lands from mineral entry for Arizona hedgehog cactus conservation. Within the

cumulative effects analysis area for this species, private land ownership is a relatively small percentage of the overall land area. However, in these areas, private actions on private lands would not be subject to Endangered Species Act Section 7 consultation. Most recreational activities would not adversely impact this species because of its common habitat preference for steeper slopes in the cracks and crevices of boulders and rock outcrops. The implementation of travel management planning will likely have both beneficial and adverse effects to this species and those effects will vary across the species range.

The no action alternative would not have any direct or indirect effect on the Arizona hedgehog cactus; therefore, it would not contribute to any cumulative effects.

Cumulative Arizona Hedgehog Cactus Effects of the Proposed Action Alternative

Potential impacts resulting from the proposed action have been determined to be negligible, therefore there are no project related impacts to be added to past, present, and reasonably foreseeable future actions to determine whether significant cumulative impacts may occur.

Cumulative Arizona Hedgehog Cactus Effects from the North OF-2 Drill Site Alternative

The cumulative effects of the North OF-2 alternative would be the same as for the proposed action.

Cumulative Arizona Hedgehog Cactus Effects of the West Access Route 4a Alternative

The cumulative effects of construction of the West Access Route 4a alternative and drill sites 4W and 4E would be the same as for the proposed action.

Cumulative Arizona Hedgehog Cactus Effects of the West Access Route 4b Alternative

The cumulative effects of construction of the West Access Route 4a alternative and drill sites 4W and 4E would be the same as for the proposed action.

3.11.6. Recreational Activities In and Around Oak Flat (Issue 5)

Cumulative Recreation Effects of the No Action Alternative

The spatial scale and activities considered while evaluating cumulative effects associated with recreational uses in and around Oak Flat is represented by Zone A (Table 3-12 and Figure 3-11). Past and present mining and mining related activities have affected the visual resources of the area, which affects

visitors' recreational experiences; however, some of these impacts have been and will continue to be offset through reclamation and mitigation efforts. Most reasonably foreseeable future actions in the area would also cause relatively minor additional effects to visual resources and recreational uses in the area. Planned improvements to U.S. Highway 60 would result in both beneficial (improved access) and non-beneficial (increased traffic and traffic related noise) effects to recreational uses in the Oak Flat Campground. This alternative is not expected to cumulatively affect recreational uses in and around Oak Flat Campground.

Cumulative Recreation Effects of the Proposed Action

Cumulative effects analyses Zone A is largely comprised of public land that provide a variety of recreational opportunities (Table 3-12). Activities within this zone that influence the baseline/trend for determining cumulative recreation effects are provided in Table 3-12 and include commercial transportation, power transmission, and previous and ongoing mining activities that have occurred in the vicinity of the Oak Flat Campground. Superior is a mining town and mining activities near and adjacent to Oak Flat have been ongoing since the early 1970s when the underground workings at the Superior East Plant Site were constructed. In 1990, DOE constructed a well to collect groundwater data in support of its search for a long-term nuclear waste storage facility. U.S. Highway 60 is present on 1948 aerial topographic maps of the Oak Flat area and was and remains one of the principal highways connecting the Phoenix metropolitan area with eastern Arizona. The roads within Oak Flat depicted on the 1948 topographic map and the 1981 map are the same as those seen in recent aerial photographs. Telephone and power lines are clearly delineated on the 1981 topographic maps, immediately north of Oak Flat Withdrawal Area, along the U.S. Highway 60 corridor. The large transmission line that traverses the eastern side of the Oak Flat Withdrawal Area is not depicted on the 1981 topographic map but this transmission line and its substation are clearly present on more recent aerial photographs.

Implementation of the proposed action will adversely impact some users of the Oak Flat Campground while others may not perceive the presence of the drill rigs as a new intrusion on the landscape. The increased levels of vehicle traffic during periods of peak drilling activity will be noticed, primarily at shift changes, which may coincide with meal times for campers or times when bird watchers that frequent the campground would be likely to be most active. At these times, the recreational users of Oak Flat may be most sensitive to the additional vehicles using the roads within the Oak Flat Withdrawal Area to access drill sites outside of the withdrawal area. It should be noted that at these same times, the commercial truck traffic climbing the grade up the Queen Creek Canyon can be heard from within the Oak Flat Withdrawal Area and four-wheel drive vehicle enthusiasts may be traveling through the campground to access State land as well.

There will be impacts from implementation of the proposed action to the recreational users of the Oak Flat Withdrawal Area. These impacts will likely be perceived by individuals differently, but in the context of this assessment they would not result in significant adverse cumulative effects.

Cumulative Recreation Effects of the North OF-2 Drill Site Alternative

Cumulative impacts to the users of the Euro Dog Valley Climbing Area would be reduced under this alternative because access to the Boulder Campsite and Euro Dog Valley Climbing Area would be preserved. In addition, noise impacts from drilling activities at the North OF-2 drill site would be mitigated and maintained at relatively low levels—somewhat less than the sound of a dishwasher within the next room, within 3 to 4 dBA of the measured baseline condition. The cumulative effects of visual, noise, and traffic impacts from implementation of the North OF-2 alternative would not differ from the cumulative effects of the proposed action.

Cumulative Recreation Effects of the West Access Route 4a Alternative

The cumulative effects of traffic related impacts to recreational users of the Oak Flat Campground and the Oak Flat Withdrawal Area would be substantially reduced from the proposed action. The cumulative effects of visual and noise related impacts to recreational users of the Oak Flat Withdrawal Area from drill sites located adjacent to the Oak Flat Withdrawal Area would not differ from the proposed action and would not be significant.

Cumulative Recreation Effects of the West Access Route 4b Alternative

The cumulative effects of visual and noise related impacts to recreational users of the Oak Flat Withdrawal Area associated with this alternative would not differ substantially from the proposed action. The cumulative effects of traffic related impacts would be the same as West Access Route 4a.

3.11.7. Safety (Issue 6)

Cumulative Safety Effects of the No Action Alternative

There would be no change in the existing conditions and no adverse cumulative effects from implementation of the no action alternative.

Cumulative Safety Effects of the Proposed Action

Reasonably foreseeable future actions within Zone A would result in both beneficial and non-beneficial effects relating to traffic safety. Improvements along U.S. Highway 60 would certainly provide for safer ingress and egress from the Oak Flat area and to accommodate forecasted increase in traffic in this area that could result from continued population growth in the Phoenix Metropolitan Area and the State generally. Traffic volumes will increase within the PAA as a result of increased population growth in the region that will contribute to increased demands for recreational opportunities on public land. The

proposed action within the PAA will contribute to this increase in traffic volume during the authorization period, contributing cumulatively to safety issues relating to traffic. However, traffic safety measures would be incorporated into the proposed action and no significant cumulative effects would be realized.

Cumulative Safety Effects of the North OF-2 Drill Site Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action

Cumulative Safety Effects of the West Access Route 4a Alternative

Because this alternative results in less direct and indirect effects, its cumulative effects would be less than those associated with the proposed action.

Cumulative Safety Effects of the West Access Route 4b Alternative

The cumulative consequences of this alternative would be the same as for the West Access 4a alternative.

3.11.8. Conflicts with Oak Flat Withdrawal Area (Issue 7)

Conflicts with Oak Flat Withdrawal Area, Cumulative Effects of the No Action Alternative

No impacts would occur under the no action; therefore, no cumulative effects would occur as a result of this alternative.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the Proposed Action

Impacts from the proposed action are not anticipated; therefore, no project related impacts can be added to past, present, or reasonably foreseeable actions to create cumulative effects.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the North OF-2 Drill Site

The cumulative effects of this alternative would be as described for the proposed action.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the West Access Route 4a Alternative

The cumulative effects of this alternative would be as described for the proposed action.

Conflicts with the Oak Flat Withdrawal Area, Cumulative Effects of the West Access Route 4b Alternative

The cumulative effects of this alternative would be as described for the proposed action.

3.11.9. Travel Management (Issue 8)

Travel Management, Cumulative Effects of the No Action Alternative

Selection of the no action alternative would not alter ongoing Forest Services Travel Management planning activities or the implementation of the Travel Management guidelines that will ultimately be developed for the Globe Ranger District. Selection of the no action alternative would not contribute to or result in any significant cumulative effects to the Forest Service's Travel Management planning effort.

Travel Management, Cumulative Effects of the Proposed Action

Selection of the proposed action alternative would not alter the Forest Service's planning and implementation of the Travel Management guidelines in the Globe Ranger District and thus would not contribute to or result in any significant cumulative effects. The activities designated during the Travel Management planning process would not be affected by the proposed Pre-feasibility Activities.

Travel Management, Cumulative Effects of the North OF-2 Drill Site

The cumulative effects of this alternative to the Forest Service's Travel Management program would be the same as for the proposed action.

Travel Management, Cumulative Effects of the West Access Route 4a Alternative

The cumulative effects would be the same as for the proposed action.

Travel Management, Cumulative Effects of the West Access Route 4b Alternative

The cumulative effects would be the same as for the proposed action.

3.11.10. Cultural Resources (Issue 9)

Cumulative Cultural Resource Effects of the No Action Alternative

The issue raised during public scoping pertained to impacts on historic, pre-historic, and other cultural resources within and in the vicinity of the PAA and we have evaluated potential cumulative effects within cumulative impact analysis Zones A, B, and C (Table 3-12). Pre-history cultures that are known from this area include Hohokam and Salado cultures. The area is also rich in historical cultural sites mainly associated with the Apache culture and historic mining and ranching. Prehistoric archaeological sites in the vicinity of the PAA are representative of the Salado, Western Apache, and historic occupations in the Western Pinal Mountains.

Roadway and cattle tank construction; mining and mineral exploration, livestock grazing, and recreational uses have impacted the surrounding landscape and have likely affected the integrity of cultural resources in the region. Past, present, and reasonably foreseeable mining and mining-related activities all have the potential to directly and indirectly affect cultural resources in the PAA and its vicinity. They include: land use, access and road improvements; recreational uses; and utilities and infrastructure improvements. Since the passage of the National Historic Preservation Act, many of these unavoidable impacts have been mitigated by avoidance of impacts or the implementation of specific data recovery efforts. Collectively this has helped to preserve information contained within these sites.

The no action alternative would not adversely impact any cultural resource sites and would not contribute to any cumulative effects to cultural resources.

Cumulative Cultural Resource Effects of the Proposed Action

The proposed action is not expected to adversely impact any cultural resource site. The mitigation measures outlined in this EA require active monitoring during construction of drill sites and roadway improvements to avoid adverse impacts to known cultural resource sites. If previously undetected cultural resource sites are detected, all construction activities would stop in the vicinity of the site until the Forest Service archaeologist has determined the appropriate treatment. The proposed action is not expected to adversely impact any known cultural resource site and would not result in any significant adverse impact to cultural resources.

Cumulative Cultural Resource Effects of the North OF-2 Drill Site Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action.

Cumulative Cultural Resource Effects of the West Access Route 4a Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action.

Cumulative Cultural Resource Effects of the West Access Route 4b Alternative

Cumulative effects associated with this alternative would be the same as those associated with the proposed action.

3.11.11. Native American Religious Practices (Issue 10)

Native American Religious Practices, Cumulative Effects of the No Action Alternative

The spatial scale for evaluating cumulative effects on Native American religious practices encompasses Oak Flat, Apache Leap, Devils Canyon, and the related canyons, geologic formations, and springs in the area of the Pre-feasibility Activities. Past actions within this area have included the construction of roadways; power lines and other infrastructure; mining and mining exploration activities; and a variety of recreational activities—all of which have contributed to surface impacts of this area. These past, present, and reasonably foreseeable activities may have had, and may in the future have an adverse impact on the subjective experience of Native American religious practices. However, information has not been provided regarding any instances when past and present activities have forced a Tribe to violate their religious beliefs or caused them to be penalized for their religious beliefs or activities. Nor has information been provided on any reasonably foreseeable future activities that would cause Native Americans to violate their religious beliefs or cause them to be penalized for their religious beliefs or activities.

Because the no action alternative would not affect Native American religious practices, it would not contribute to any cumulative effects on those practices.

Native American Religious Practices, Cumulative Effects of the Proposed Action

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

Native American Religious Practices, Cumulative Effects of the North OF-2 Drill Site Alternative

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

Native American Religious Practices, Cumulative Effects of the West Access Route 4a Alternative

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

Native American Religious Practices, Cumulative Effects of the West Access Route 4b Alternative

This alternative would not place a substantial burden on a Native American Tribe's religious practice and would therefore not result in significant adverse cumulative impact.

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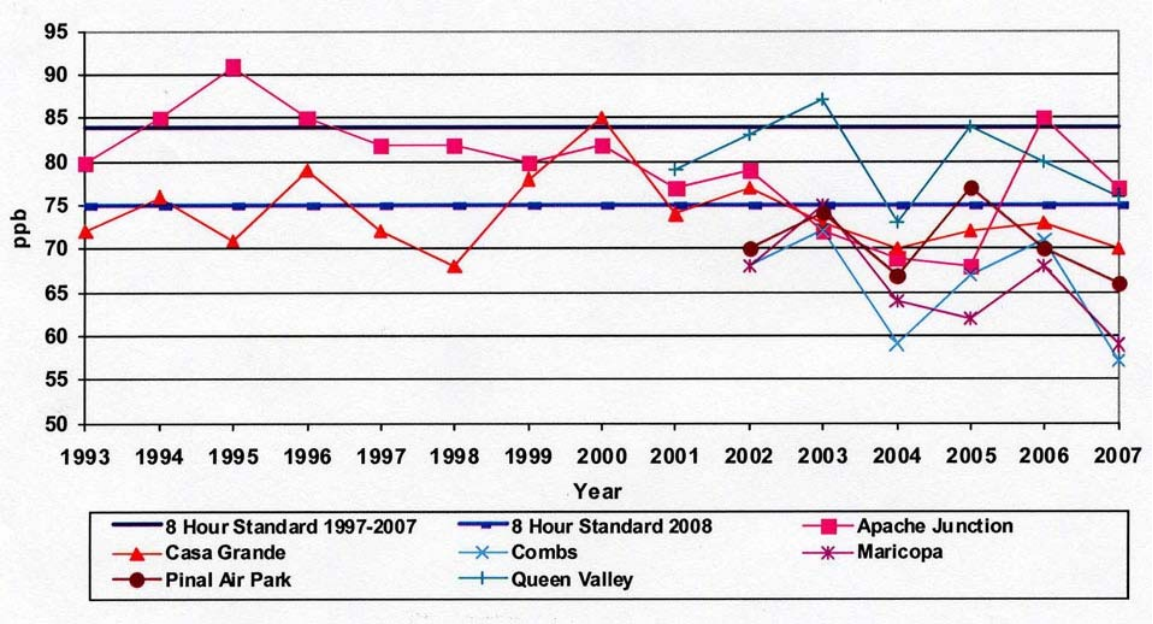

Figure 3-1. Eight-Hour Ozone Trends – Fourth Highest Concentration. [Source: Pinal County Air Quality Control District 2007 Ambient Monitoring Network Plan and Data Summary (final document dated June 16, 2008)]

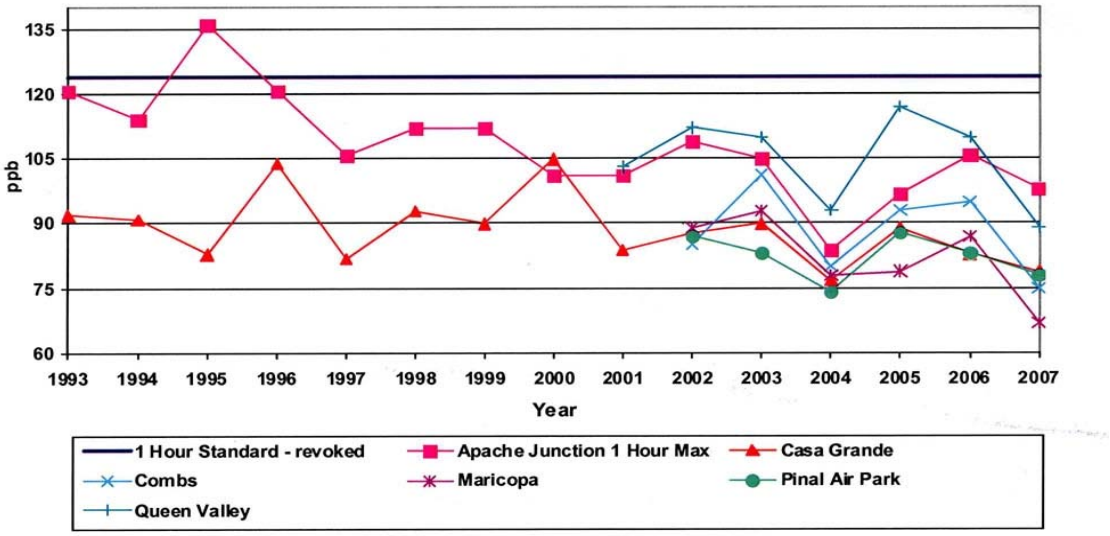

Figure 3-2. One-Hour Ozone Trends – Maximum Concentration. [Source: Pinal County Air Quality Control District 2007 Ambient Monitoring Network Plan and Data Summary (final document dated June 16, 2008)]

Insert Figure 3-3. Sound Level Contours Resulting from Noise Model of Alternative 1, the Proposed Action

Insert Figure 3-4 Visual Assessment of OF-1, OF-2, OF-3 and North OF-2 from Designated Campsites at Oak Flat Campground

Insert Figure 3-5 Visual Assessment of OF-1, OF-2, OF-3, and North OF-2 from Dispersed Campsites in the Oak Flat Withdrawal Area and at the Boulder Campsite

Insert Figure 3-6 Visual Assessment of OF-1, OF-2, OF-3, and North OF-2 from Key Observation Points along the Oak Flat Withdrawal Area

Insert Figure 3-7 Daily Traffic Generation as a Result of Pre-feasibility Activities using Proposed Action Routes

Insert Figure 3-8 Sound Level Contours Resulting from Noise Model of the Alternative 3 North OF-2

Insert Figure 3-9 Schematic Layout of Drill Site D with Noise Measurement Results used to Evaluate Effects of Drill Orientation

Insert Figure 3-10 Daily Traffic Generation as a Result of Pre-feasibility Activities Using Alternative Routes 4a and 4b

Insert Figure 3-11 Past, Present, and Reasonably Foreseeable Future Actions for Cumulative Effects Analysis

Insert Figure 3-12 Larger Geographic Context for Cumulative Effects, Particularly for Air Resources