

## MEMORANDUM

---

**To:** Vicky Peacey, Mary Morissette - Resolution Copper  
**From:** Doug Oliver - WSP | Parsons Brinckerhoff  
**Date:** April 14, 2017  
**Project Name:** Resolution Copper  
**Project Number:** 31400706  
**Subject:** Climbing Resources Inventory

---

## SUMMARY

### INTRODUCTION AND PURPOSE

The area in and around the Resolution Copper (RC) planned block cave underground mine and East Plant Site contains climbing resources, including both rock climbing and bouldering, in what is collectively referred to as the Queen Creek Canyon climbing area (or Queen Creek climbing area). The Queen Creek Canyon climbing area extends from Queen Creek Canyon, south along Apache Leap and east across Oak Flat to Devils Canyon. Much of the Queen Creek climbing area, including the entire Oak Flat bouldering area, is within the Land Exchange area.

The purpose of this study is to quantify climbing resources and to assess potential losses for the Environmental Impact Statement (EIS) and to help identify needs for potential mitigation. Aside from a climbing resources inventory, this memorandum also provides background information related to climbing resources, including a description of areas within the Queen Creek climbing area.

The primary cliffs, crags, and bouldering areas within the Queen Creek Canyon climbing area (see Figures 1 and 2) are:

- The Pond (north of US 60 in Queen Creek Canyon; owned by RC)
- Atlantis (south of US 60 in Queen Creek Canyon; owned by RC)
- Apache Leap (immediately west of the existing East Plant; owned by RC near the East Plant and on USFS land farther south)
- The Mine Area (climbing area, not to be confused with the block cave mine; area immediately southwest of the existing East Plant, between the Magma Mine Road and Apache Leap; most climbing is on USFS land within the Land Exchange area)
- Oak Flat bouldering area (south of Oak Flat Campground; on USFS land within the Land Exchange area)
- Euro Dog Valley (between the Magma Mine Road and existing East Plant; on USFS land within the Land Exchange area)
- Northern Devils Canyon (north of US 60; on USFS land)
- Upper Devils Canyon (south of US 60, east of Oak Flat Campground; on USFS and State Trust Land)
- Lower Devils Canyon (including lower Hackberry Canyon and the Refuge in upper Hackberry Canyon; on USFS and State Trust Land)

### KEY FINDINGS

The key findings from this study are as follows:

1. Based on the most comprehensive, publically available documents, the Queen Creek climbing area contains:

- 814 documented climbing routes, of which 538 are sport routes (bolt protected) and 250 are traditional routes (naturally protected)
- 1,143 documented boulder problems (bouldering is a form of climbing typically done unroped on stand-alone boulders or low cliffs that are typically less than 15-feet tall), of which 770 are standard boulder problems and 373 are hybrid top-rope boulder problems (typically a little taller than a standard boulder problem and climbed on a rope).

Details concerning numbers of routes and boulder problems in each sub-area as well as land ownership and access agreement status are provided in Table 1.

2. The primary areas that would be impacted due to mining activities (e.g., potential land subsidence or construction of facilities) are Oak Flat bouldering area, Euro Dog Valley, and the Mine Area climbing area (Shaft 12 and other infrastructure at the East Plant are planned in this area). Within these areas there are (see Table 2):

- 24% of the documented climbing routes at the Queen Creek climbing area (149 sport routes and 38 traditional routes)
- 97% of the documented boulder problems at Queen Creek (747 standard boulder problems and 367 top-rope boulder problems).

Additional information pertaining to the above key findings as well as additional findings are provided in the Detailed Findings section of this memorandum.

## DETAILED FINDINGS AND METHODOLOGY

### INTRODUCTION

The area in and around the Resolution Copper planned block cave underground mine and East Plant Site contains climbing resources, including both rock climbing and bouldering, in what is collectively referred to as the Queen Creek Canyon climbing area (or Queen Creek climbing area). The Queen Creek climbing area covers a much larger area than just Queen Creek Canyon and extends from Queen Creek Canyon, south along Apache Leap and east across Oak Flat to Devils Canyon. The area includes Federal Land (USFS Tonto National Forest), Arizona State Trust Lands, and privately-owned land (primarily owned by RC). Federal lands include areas where RC has unpatented mineral rights and the Oak Flat withdrawal area. Much of the Queen Creek climbing area, including the entire Oak Flat bouldering area, is within the Land Exchange area.

Since 2004, RC has been working with local and national climbing groups to establish access for climbers.

### PURPOSE

The purpose of this study is to quantify climbing resources to assess potential losses and inform potential mitigation needs. This is intended to help RC understand the issues related to climbing. This study provides a quantitative inventory regarding the number of documented routes and boulder problems in each area and current land ownership to assist RC in understanding the existing climbing resources and to assess potential losses for the EIS.

### LAND OWNERSHIP AND LAND EXCHANGE

Ownership of land within the Queen Creek climbing area includes the Federal Government (USFS Tonto National Forest), State of Arizona (State Trust Land), and private property that is primarily owned by RC (see Figure 1). The USFS land includes unpatented mine claims (owned by RC) and the 760-acre Oak Flat mineral withdrawal area (see Figure 1).

The 760-acre "Oak Flat Picnic and Camp Ground" area was withdrawn from mineral entry on September 30, 1955 (Federal Register October 1, 1955) by a Public Land Order (PLO 1229) signed by Assistant Secretary of the Interior, Fred Aandahl, during the Eisenhower administration. The purpose of the withdrawal was to protect the Federal Government's interest in the capital improvement of the existing campground. The Oak Flat withdrawal was part of a package of 24 campgrounds, fire lookouts, and picnic and recreation area withdrawals in the Tonto and Coconino National Forests in Arizona, along with 19 similar withdrawals for campgrounds, fire lookouts, and other sites in the Apache National Forest in New Mexico.

The Land Exchange will transfer ownership of 2,422 acres of USFS land including the 760-acre Oak Flat withdrawal area plus unpatented mining claims adjacent to the withdrawal area and other RC property. In exchange, RC will give the federal government 5,300 acres of high-priority conservation lands throughout southeastern Arizona. Climbing areas within the Land Exchange are Oak Flat (East and West), Euro Dog Valley, and the Mine area. Congress approved the Southeast Arizona Land Exchange Conservation Act as part of the 2015 National Defense Authorization Act (signed into law by President Obama on December 19, 2014).

### BLOCK CAVE MINING AND ZONES OF SUBSIDENCE

The block cave mine is expected to cause subsidence of the land surface above the mine. Subsidence is expected to occur as the material above the block cave mine gradually moves downward to replace the ore that has been mined. The settling amount will be less than the amount of ore removed due to bulking of the rock underground, but the footprint of the impact



is predicted to be slightly greater than the mine footprint. Empirical and numerical simulations have been conducted and predict a series of potential subsidence zones through time with the maximum extent of subsidence occurring after 40 years, at the end of mining. The subsidence zones are defined as follows:

- Caved Rock Zone where there will be collapse of the land surface effectively leaving a sinkhole (generally directly above the area mined)
- Fractured Zone where there will be observable fractures in the land surface (surrounding the Caved Rock Zone)
- Continuous Subsidence Zone where strains can be measured, but no visible evidence of surface subsidence will be evident (surrounding the Fractured Zone)
- Stable Zone where there will be no subsidence (surrounding the Continuous Subsidence Zone).

Modeling predicts that subsidence will occur at the land surface above the block cave mine. However, the Apache Leap will be within the Stable Zone more than 1,500 ft from the maximum extent of the zone of continuous subsidence (see Figure 2). The East Plant Site surface infrastructure is predicted to be within the outer areas of the Zone of Continuous Subsidence. Several areas within the Queen Creek climbing area, Oak Flat in particular, are predicted to be within the subsidence area and thus public access will need to be limited as subsidence progresses.

## **DESCRIPTION OF QUEEN CREEK CANYON CLIMBING AREA**

The Queen Creek Canyon climbing area extends from Queen Creek Canyon immediately east of Superior, south along Apache Leap and east across the block cave mine area and Oak Flat to Devils Canyon (see Figures 1 and 2). Oak Flat and the surrounding area was the location of the Phoenix Bouldering Contest, one of the largest and longest-running bouldering competitions in the United States, held annually 1983-2004. A much smaller event, the Queen Creek Boulder Comp, was held in the area annually 2014-2016, but was not held in 2017.

Rock climbing at Queen Creek climbing area includes traditional ("trad") routes, bolt-protected sport routes, as well as boulder problems. Sport and trad climbing rely on the use of ropes for safety. Sport climbs have expansion bolts installed every 5 to 15 feet to provide protection, while trad routes are protected with natural protection – metal cams or chocks that are wedged into cracks and pockets in the rock but often include some bolts where there are no cracks for protection. Bolts are also used as anchors to allow climbers to descend from the top of a route. It should be noted that bolts used for outdoor rock climbing in the U.S. are not regulated or certified in any way and may break, particularly as they age. Most routes at Queen Creek climbing area are single-pitch (less than 150 feet tall), but some multi-pitch routes (up to 250 feet tall) are on Apache Leap and in Upper Devils Canyon. Bouldering is done rope-less and typically involves climbing fewer than 15 feet above the ground. To reduce the risk of injury while bouldering, crash pads (foam mats) are set on the ground beneath a boulder problem and used to cushion a fall. Although bouldering generally is done without a rope, the Oak Flat area includes a significant number of top-rope boulder problems, most of which were established for the Phoenix Bouldering Competition. These represent a hybrid between roped climbing and bouldering and are typically 15-25 feet tall and used where the boulder problems were too tall to be climbed without a rope (e.g. >15 feet) or had bad landings (uneven ground, boulders, bushes, yuccas, cacti, and other hazards). Top ropes were typically set up from a single bolt installed at the top of the boulder with a tree or traditional protection or a second bolt as a backup. Outside of the bouldering competitions, these top-rope boulder problems are seldom climbed, if at all.

The climbing at Queen Creek is on the Tertiary Apache Leap Tuff and is characterized by rough textured rock with pockets, edges (desert varnish), knobs, and cracks somewhat similar to the climbing at Smith Rock, Oregon, Cochiti Mesa, New Mexico, Enchanted Tower, New Mexico, and Owens River Gorge, California, which are also all on tuff. The bouldering is most similar to that of the Happy Boulders and Sad Boulders near Bishop, California, which are also on tuff.

The primary cliffs, crags, and bouldering areas within the Queen Creek Canyon climbing area are (see Figures 1 and 2):

- The Pond (north of US 60 in Queen Creek Canyon; owned by RC)
- Atlantis (south of US 60 in Queen Creek Canyon; owned by RC)
- Apache Leap (immediately west of the East Plant; owned by RC near the East Plant and on USFS land farther south)
- The Mine Area (area immediately southwest of the East Plant, between the Magma Mine Road and Apache Leap; most climbing is on USFS land, but is within the Land Exchange area)
- Oak Flat (south of Oak Flat Campground; on USFS land, but is within the Land Exchange area)
- Euro Dog Valley (between the Magma Mine Road and East Plant; on USFS land, but is within the Land Exchange area)
- Northern Devils Canyon (north of US 60; on USFS land)
- Upper Devils Canyon (south of US 60, east of Oak Flat Campground; on USFS and state trust land)
- Lower Devils Canyon (including lower Hackberry Canyon and the Refuge in upper Hackberry Canyon; on USFS and state trust land)

These are described in more detail below.

**The Pond.** The Pond area is on the north side of (above) US 60 in Queen Creek Canyon and is essentially the northern extension of the Apache Leap cliff north of Queen Creek. It is characterized by cliffs up to 100 -tall and has a high density of sport routes. This is the most popular sport climbing area at Queen Creek climbing area; it is owned by RC and will remain permanently open to climbing. This is within the stable zone and will not be affected by mining. The Sunday School Wall area is just east of the Pond area on the north side of US 60 with some routes very close to the highway.

**Atlantis.** Atlantis is on the south side of (below) US 60 in Queen Creek Canyon and is characterized by cliffs up to 100-feet tall that rise above the stream bed and a high density of sport routes. This is also a popular sport climbing area at Queen Creek climbing area and is owned by RC and will remain permanently open to climbing. This is within the stable zone and will not be affected by mining. The Queen's Sceptre and Little England Wall are also in this area and are large cliffs (greater than 100-feet tall) above Queen Creek but below Apache Leap, directly below the East Plant. The Old Tunnel area along US 60 is above and west of Atlantis.

**Apache Leap.** Apache Leap is the large west-facing cliff above Superior that extends south for approximately two miles from Queen Creek Canyon below the East Plant. This cliff is quite tall, up to 300-feet in areas, and has several multi-pitch traditional routes. Apache Leap is largely undeveloped (unclimbed because access to the area is difficult, generally requiring a one-hour, demanding hike to reach. Apache Leap is within the stable zone and will not be affected by mining, but access via the Magma Mine Road likely will be lost at some point after mining starts. Thus alternate access will be needed to maintain climbing in this area after mining starts. This is on a combination of RC property and USFS land.

**The Mine Area.** The Mine Area (climbing area; not to be confused with the planned block cave mine area) is immediately south of the East Plant and east of (above) Apache Leap and is accessed from the Magma Mine Road at the East Plant security guard gate. It is characterized by boulders and small cliffs and has a significant number of short sport routes (25-50 feet long). The Upper and Lower Looner Land areas at the Mine are fairly popular areas. Most of this area is in the stable zone although some is predicted to be within the zone of continuous subsidence. It appears climbing in this area would be impacted, particularly given that some surface infrastructure including Shaft 12 is planned for this area. This is on a combination of RC property and USFS land, but with the Land Exchange would all be RC property.

**Euro Dog Valley.** Euro Dog Valley is on the west side of the Magma Mine Road east of the East Plant. It is along a small canyon (headwaters of Queen Creek) downstream of Oak Flat West, but upstream of Queen Creek Canyon. The canyon walls host numerous sport routes and trad routes. There are also some bouldering areas, of which the Campground Boulder, just west of the Magma Mine Road, is quite popular, although limited (only ~20 boulder problems). Most of this area is predicted to be in the stable zone although some of this area is predicted to be within the zone of continuous subsidence. This is primarily on USFS land, but with the Land Exchange would be RC property.

**Oak Flat.** The Oak Flat bouldering area is 0.5 to 1 mile southwest of Oak Flat Campground and east of the Magma Mine Road. This area has been divided into Oak Flat East and Oak Flat West in guidebooks, but the nature of both areas is the same — free-standing boulders and small cliff-lined canyons where the cliffs are less than 25-feet tall. Not to be confused with the area called Atlantis in Queen Creek Canyon, there are also bouldering areas at Oak Flat West called Atlantis I and Atlantis II. Oak Flat is the primary bouldering area at the Queen Creek climbing area and is a well-recognized bouldering area within the climbing community. Much of this area lies within the caved-rock zone and the fracture zone with a limited area within the zone of continuous subsidence. This is primarily on USFS land, but with the Land Exchange would be RC property. Further, with the Land Exchange, more of this area is likely to be within the caved-rock zone and the fracture zone.

**Northern Devils Canyon.** Northern Devils Canyon is on the north (west) side of US 60, upstream of where it crosses Devils Canyon Creek (about 1.5 miles past the Magma Mine Road). It is a newer addition to the Queen Creek climbing area and is characterized by cliffs up to 100-feet tall, but most routes are half this height. It has a mix of sport and trad routes with some bouldering. Primary access to this area is via Forest Road 342 or from a picnic area along US 60. This is within the stable zone and will not be affected by mining. This is on USFS land.

**Upper Devils Canyon.** Upper Devils Canyon is directly east of Oak Flat Campground and is characterized by cliffs generally less than 100-feet tall, but up to 200-feet tall at the Nacho Wall, where there are multi-pitch routes. It has a mix of sport and trad routes. Primary access to this area is dirt roads beneath the Power Lines reached via Forest Road 469 from the Oak Flat Campground area. This is in the stable zone east of the zone of subsidence. This is on USFS land and State Trust land in the southern areas.

**Lower Devils Canyon.** Lower Devils Canyon and the Refuge are along Devils Canyon and Hackberry Creek. Climbs along lower Hackberry Creek are considered part of Lower Devils Canyon whereas the area along upper Hackberry Creek is called the Refuge, a newer addition to the Queen Creek climbing area. The climbing is characterized by cliffs less than 150-feet tall, with numerous free-standing pinnacles and towers. It has a mix of sport and trad routes. This is within the stable zone and will not be affected by mining, but the primary access to this area is via Forest Road 315 south of the Magma Mine Road. This is primarily on State Trust land, but access will be across RC property once the Land Exchange is completed and the current access (Forest Road 315) is across the continuous subsidence zone. As such, a new access route may need to be established after mining is initiated.

## STUDY METHODOLOGY

To quantify the climbing resources in the RC area, the following steps were followed:

- Obtain available published information on the Queen Creek climbing area (both printed guides and on-line sources)
- Review guides and identify sub-areas, particularly those relevant to the East Plant Site and zones of subsidence (caved rock zone, fractured zone, and continuous subsidence zone)
- Determine land ownership and mine plans
- Count routes and boulder problems for each sub-area using the guides
- Field check the primary climbing and bouldering areas that are on RC property, within the East Plant area, within the block cave mine area and zones of subsidence (caved rock zone, fractured zone, and continuous subsidence zone) to evaluate the

nature of the resource and make general observations regarding quality, popularity, and use. Some routes in the Mine Area were located with GPS to enable accurate plotting on maps of the East Plant and proposed infrastructure (e.g., Shaft 12).

Available published information on the Queen Creek climbing area that was reviewed for this study included:

- *The Rock Jock's Guide to Queen Creek Canyon* (Karabin, 1996)
- *The Mine Area, Rock Climbing and Bouldering Guide* (Karabin, 1998)
- *Climbers Guide to Lower Devils Canyon* (Karabin, 1993)
- *Upper Devils Canyon* (Karabin, 2003)
- *Road Area Queen Creek Canyon* (Karabin, 2008)
- *Northern Devils Canyon* (Karabin, 2009)
- *The Refuge Rock Climbing Area: Lower Devils* (Heimsath and Sampson, 2012)
- *Rock Climbing Arizona* (Green, 1999)
- Dr. Topo On-line Guide: A Little Bouldering Guide to Oak Flats (<http://www.drtopo.com>)
- Mountain Project (<http://www.mountainproject.com/v/queen-creek-canyon>)

The most comprehensive guides for Queen Creek are those prepared by Marty Karabin. In the climbing vernacular, guidebooks are referred to as "topos", but more often than not have nothing to do with topo maps. Routes are usually named and rated by the first person to climb them. Routes are identified in the various guides by any or all of the following means:

- maps (most commonly hand drawn maps, but sometimes actual topo maps or aerial imagery)
- drawings of the cliff faces with routes shown as solid or dotted lines
- photographs of the cliffs with routes shown as solid or dotted lines
- written descriptions.

The next step was to identify the various climbing sub-areas within the Queen Creek climbing area (described earlier in this memorandum) and then to identify land ownership and plans for mine infrastructure and predicted zones of subsidence. Areas of land ownership, unpatented mine claims, and planned infrastructure were from figures in the General Plan of Operations (Resolution Copper Mining, 2016). Zones of subsidence were provided by RC.

To quantify the climbing resources at the Queen Creek climbing area, the number of routes and boulder problems in each sub-area were counted using the guides listed above. For each sub-area, only the largest numbers identified for a given area are reported in this memorandum. Route counts are divided between sport routes (fully bolted-protected routes), trad routes (primarily naturally protected routes, but may include some bolts), top-rope routes, and aid routes (very few of these were identified; thus they will not be discussed further). Projects (routes that have been attempted, but not successfully climbed) were counted as sport routes if bolted, otherwise they were counted as top-rope routes. Boulder problem counts are divided between standard boulder problems and top-rope boulder problems.

## DETAILED FINDINGS

The key findings from this work are as follows:

1. Based on the most comprehensive, publically available documents, the Queen Creek climbing area contains:
  - 814 documented climbing routes, of which 538 are sport routes (bolt-protected) and 250 are traditional routes (naturally protected)
  - 1,143 documented boulder problems, (bouldering is a form of climbing typically done unroped on stand-alone boulders or low cliffs that are typically less than 15-feet tall), of which 770 are standard boulder problems and 373 are hybrid

top-rope boulder problems (typically a little taller than a standard boulder problem and climbed on a rope).

Details concerning numbers of routes and boulder problems in each sub-area as well as land ownership and access agreement status are provided in Table 1. There are newer routes that have yet to be documented (climbed after guides were published) as well as routes that were never documented.

2. The primary areas within the Queen Creek climbing area that would be impacted due to mining activities (e.g., potential land subsidence or construction of facilities) are (see Figure 2):
  - Oak Flat (Oak Flat East and Oak Flat West)
  - Euro Dog Valley
  - The Mine Area (Shaft 12 as well as other infrastructure at the East Plant are planned for part of this area).

Within these areas there are (see Table 2):

- 197 documented climbing routes, of which 149 are sport routes and 38 are traditional routes. This represents 24% of the documented climbing routes at the Queen Creek climbing area
  - 1,114 documented boulder problems, of which 747 are standard boulder problems (representing 97% of the documented boulder problems at Queen Creek) and 367 documented top-rope boulder problems (representing 98% of the top-rope boulder problems at Queen Creek).
3. The bulk of the bouldering resources at the Queen Creek climbing area are in the Oak Flat West, Oak Flat East, and Euro Dog Valley areas so impacts due to mining activities effectively closes all bouldering at the Queen Creek climbing area as there are only 29 documented boulder problems (3%) outside of the closed areas. As a result, the user group that likely will be impacted the most by mining are boulderers.
  4. There are 587 documented climbing routes in areas that are planned to remain open, which includes the Pond Area, Atlantis, Apache Leap, Northern Devils Canyon, Upper Devils Canyon, Lower Devils Canyon, and the Refuge (Upper Hackberry Creek). By far, the most popular sport climbing areas are the Pond and Atlantis, both of which are on RC property and would not be impacted by mining activities. With the Land Exchange, RC would take ownership of Oak Flat bouldering area (East and West), Euro Dog Valley, and the Mine Area climbing area.
  5. Resolution Copper has worked with local climbing groups through the years to enhance climbing opportunities in the area including maintaining access to the Pond and Atlantis areas, both very popular sport climbing areas on RC property.
  6. Currently the Lower Devils Canyon area, Hackberry Canyon, and the Refuge are accessed via the Magma Mine Road and FR 315. These areas will not be impacted by subsidence, but these access roads cross the area predicted to be within the caved-rock zone and thus would be impacted after mining starts. Closure of the Magma Mine Road and the Mine Area would make access to these areas as well as northern Apache Leap near the East Plant Site (e.g., Rim Gym, Staging Area, Punk Rock, Headstone, Citadel, the Draw, and Musicland Wall areas) much more difficult. To maintain relatively easy access to these areas, new access routes would need to be established. Upper Devils Canyon is accessed via FR 469 (north of Oak Flat campground) and is likely to be outside the zone of subsidence.



## REFERENCES

Green, S.M., 1999. Rock Climbing Arizona. A Falcon Guide. Morris Book Publishing, LLC. 245 p.

Heimsath, A.M., and D.A. Sampson, 2012. The Refuge: Lower Devils, Superior, Arizona. The Refuge Rock Climbing Area. ed. M. Lew, August 2012. 25 p.

Karabin, M., 1993. Climbers Guide to Lower Devils Canyon, Arizona. October 1993.

Karabin, M., 1996. The Rock Jock's Guide to Queen Creek Canyon, Superior, Arizona. 387 p.

Karabin, M., 1998. The Mine Area, Rock Climbing and Bouldering Guide No. 2. Queen Creek Canyon Area. March 1998.

Karabin, M., 2003. Upper Devils Canyon, No. 3. Queen Creek Canyon Area. July 2003.

Karabin, M., 2008. Road Area, Queen Creek Canyon, Superior, Arizona. September 2008.

Karabin, M., 2009. Northern Devils Canyon, Queen Creek Canyon Area. October 2009.

Resolution Copper Mining, 2016. General Plan of Operations, Resolution Copper Mining. Revision 2: January 12, 2016.

### **On-Line Resources**

DrTopo.com. Dr. Topo On-line Guide: A Little Bouldering Guide to Oak Flats (website discontinued in 2009)

MountainProject.com. Mountain Project (<http://www.mountainproject.com/v/queen-creek-canyon>)

Table 1

Climbing resources summarized by area  
Queen Creek Canyon Climbing Area  
Superior, Arizona

Climbing Area	Roped Climbing Routes					Boulder Problems			Primary Ownership	Primary Reference
	sport routes	trad routes	top-rope routes	aid routes	total routes	boulder problems	top-rope boulder problems	total boulder problems		
Oak Flat (East and West)	2		3		5	527	268	795	USFS (RC with Land Exchange)	Karabin, 1996
Euro Dog Valley	37	8	2	1	48	179	99	278	USFS (RC with Land Exchange)	Karabin, 1996
The Mine Area	100	27	3		130	41		41	USFS and RC (RC with Land Exchange)	Karabin, 1998
Apache Leap (location of routes relative to property boundaries unclear)	11	23	1		35				USFS and RC (in East Plant area)	Karabin, 1996
Atlantis Area (including Little England Wall, Queen's Scepter, Old Tunnel)	49	22	2	1	74				RC	Karabin, 2008; Karabin, 1996
The Pond (including Sunday School)	95	25			120				RC	Karabin, 2008; Karabin, 1996
Northern Devils Canyon	94	41	5		140	23	6	29	USFS	Karabin, 2009
Upper Devils Canyon	77	24	1	1	103				USFS and State Trust	Karabin, 2003
Lower Devils Canyon (including the Refuge and FR 315 routes)	73	80	6		159				USFS and State Trust	Karabin, 1996; Heimsath&Sampson, 2012
Totals	538	250	23	3	814	770	373	1143		

Table 2

Future status of climbing resources  
Queen Creek Canyon Climbing Area  
Superior, Arizona

Area	Roped Climbing Routes			Boulder Problems		
	sport routes	trad routes	total routes (1)	boulder problems	top-rope boulder problems (2)	total boulder problems
Routes and boulder problems to remain open						
On RC property to remain open permanently	144	47	194	0	0	0
On USFS and State Trust land to remain open	245	165	423	23	6	29
% of total routes or boulder problems	72%	85%	76%	3%	2%	3%
Routes and boulder problems that would be impacted by mining						
On RC property and Land Exchange (East Plant Site and subsidence zone)	149	38	197	747	367	1114
% of total routes or boulder problems	28%	15%	24%	97%	98%	97%

## FIGURES



**Figure 1**

**Climbing area overview with land ownership**

**Queen Creek Canyon Climbing Area**

**Superior, Arizona**

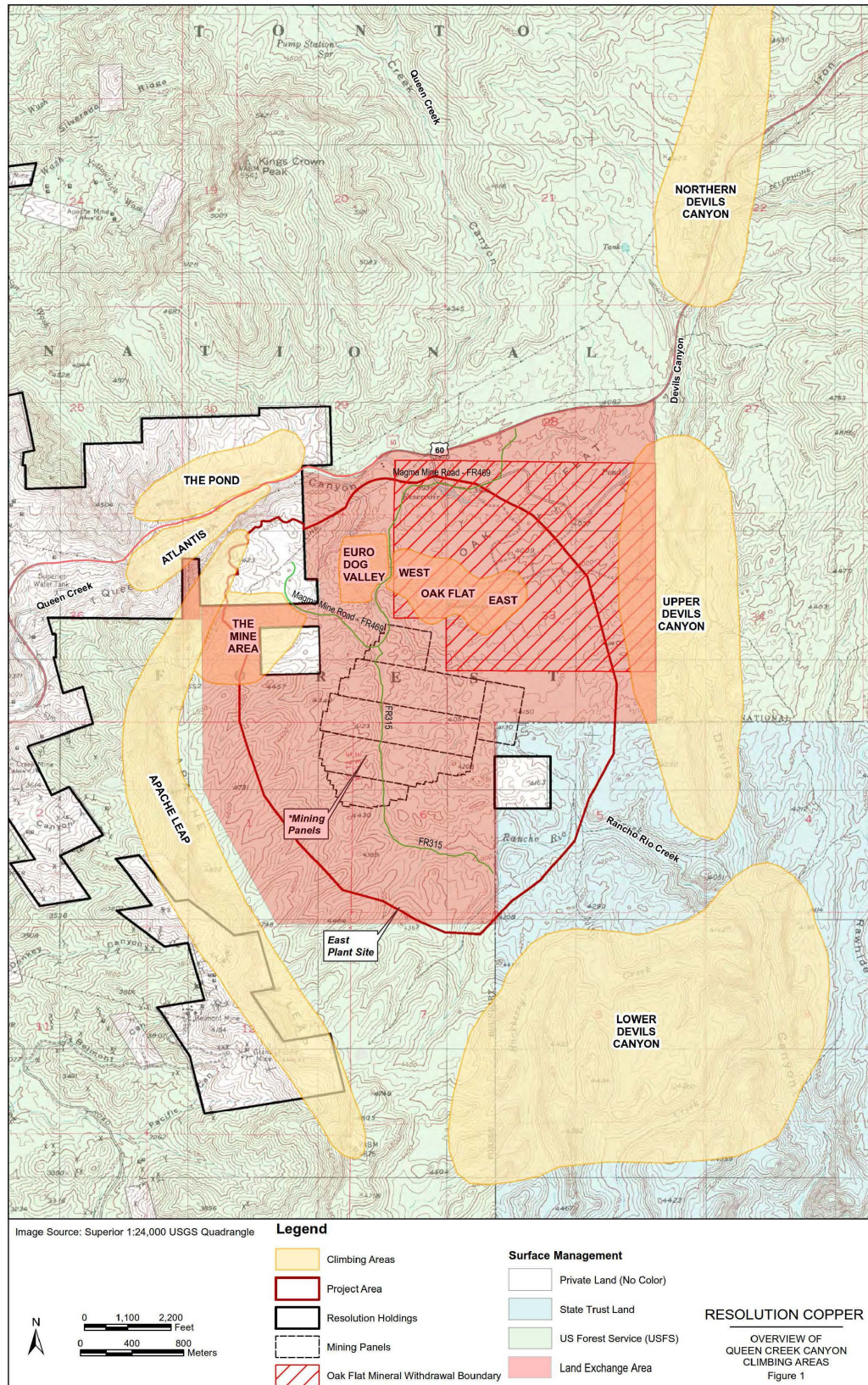


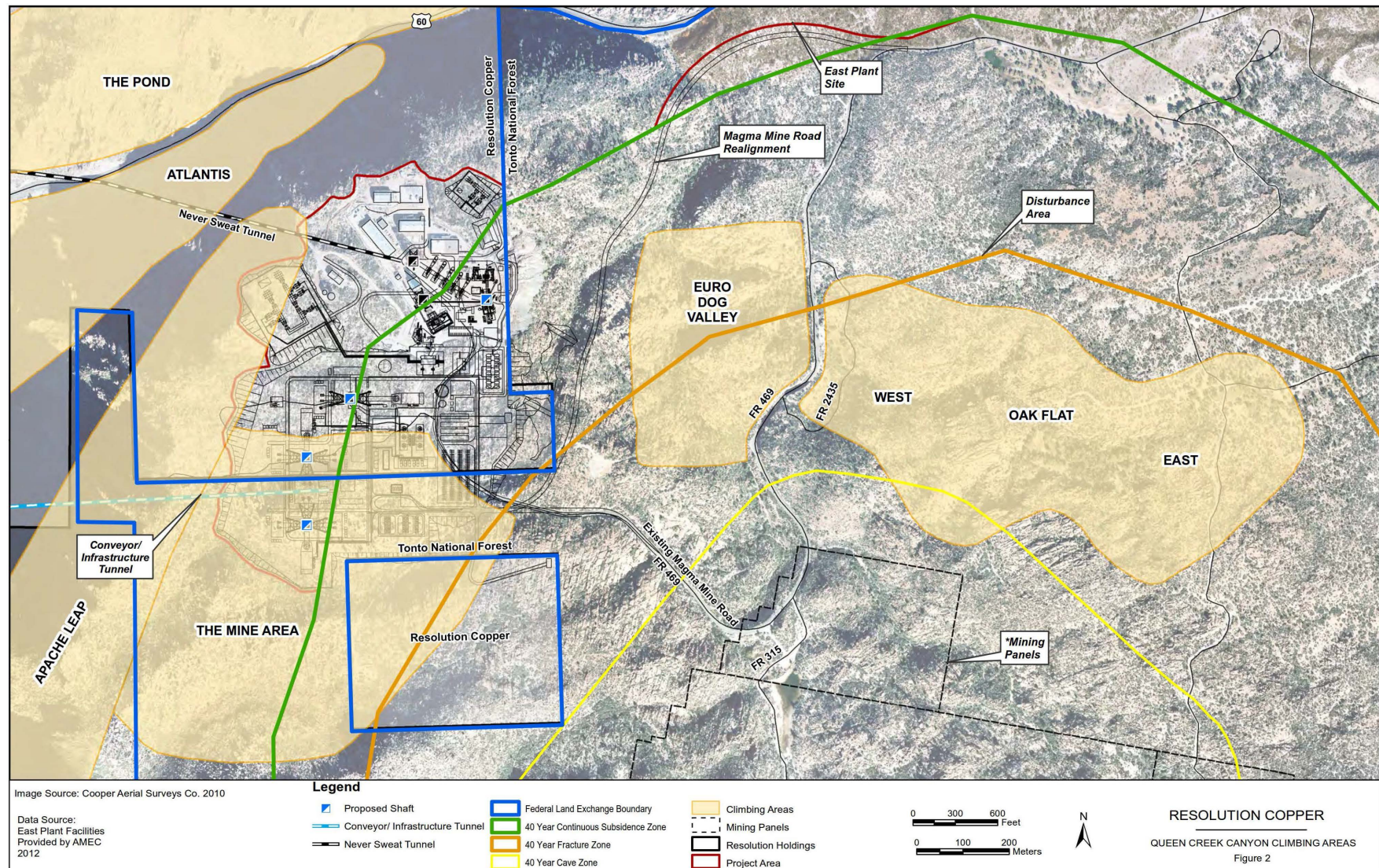


Figure 2

East Plant Site area detail with proposed above-ground infrastructure and predicted subsidence zones

Queen Creek Canyon Climbing Area

Superior, Arizona



## BIO

Mr. Oliver is a dedicated climber with over 30 years of experience, having climbed extensively throughout the US, and to a lesser extent in Europe and South America. He primarily sport climbs, but also trad climbs, boulders, and mountaineers. In a typical year he climbs 300-400 pitches, not counting indoor gym climbing. In his career, he has redpointed over 400 different 5.12s and 20 different 5.13s. He is a member of the Access Fund and Salt Lake Climbers Alliance, which help him understand the myriad access issues facing the climbing community in the US.