

Overview

Applicable laws that oversee cultural resources management in the United States include the National Historic Preservation Act, Archaeological Resources Protection Act, and numerous other laws and regulations at various levels of government. Despite the host of laws in place to mandate and oversee the detailed cultural resources surveys undertaken on behalf of Resolution Copper, it is likely that some portion of currently buried or otherwise undetected prehistoric (Native American only) and historic (Native American and Euro-American) artifacts and resources could be lost to mine-related construction and operation. This is especially true in areas such as Oak Flat, the Queen Creek watershed, and the Superior area, which have long histories of human habitation. Even those sites and artifacts that researchers have recorded and archived would be irrevocably altered.

3.12 Cultural Resources

3.12.1 Introduction

Cultural resources consist of the physical aspects of the activities of past or present cultures, including archaeological sites, historic buildings and structures, trails, roads, infrastructure, traditional cultural properties, and other places of traditional, cultural, or religious importance. Cultural resources can be human-made or natural features and are, for the most part, unique, finite, and nonrenewable. Cultural resources are often discussed in terms of historic properties under the National Historic Preservation Act (NHPA); however, the term “historic properties” has a very specific definition that may omit other resources that are critical to NEPA analysis but do not qualify as historic properties. This analysis is designed to capture potential impacts on cultural resources within the project area; however, it focuses on the potential impacts on historic properties (i.e., cultural resources that are listed in or have been determined eligible for listing in the National Register of Historic Places [NRHP]) and cultural resources that have not been evaluated for their NRHP status. The numbers and types of historic properties and those resources that may be historic properties represent the best possible information about cultural resources that can be verified and quantified.

3.12.2 Analysis Methodology, Assumptions, and Uncertain and Unknown Information

3.12.2.1 Analysis Area

There are three distinct analysis areas for this discussion: the direct impacts analysis area, the indirect impacts analysis area, and the atmospheric impacts analysis area. The direct impacts analysis area for each alternative consists of the complete footprint of all project elements, including the lands leaving Federal management under the land exchange. The analysis areas for cultural resources for the GPO correspond to the Section 106 of the NHPA direct and indirect areas of potential effects, defined by 36 CFR 800.16(d) as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties.”

For the direct analysis area, the analysis assumes that all areas within those boundaries or fence lines would be disturbed. Indirect impacts include visual impacts from project elements. The direct analysis area for the proposed project is defined by several factors: the acreage of ground disturbance expected for each mine component described in the GPO and the acreage of land leaving Federal stewardship as a result of the land exchange. The direct analysis area for the proposed action (GPO and land exchange) is approximately 40,988 acres and consists of the following, which includes access roads and other linear infrastructure:

- East Plant Site and subsidence area, including the reroute of Magma Mine Road

(1,539 acres that is partially within the Oak Flat Federal Parcel and includes private, NFS, and ASLD lands);

- 2,422-acre Oak Flat Federal Parcel of NFS land to be exchanged with Resolution Copper;
- 940-acre West Plant Site;
- 6.96-mile Silver King to Oak Flat transmission line;
- 169-acre MARRCO railroad corridor and adjacent project components;
- 553-acre filter plant and loadout facility; and
- Alternatives 2–6 tailings storage facilities and tailings corridors: tailings storage facility and tailings corridor for Alternatives 2 and 3; and Alternative 4 – Silver King, Alternative 5 – Peg Leg, and Alternative 6 – Skunk Camp, which have different locations and overall footprints from the GPO tailings storage facility and tailings corridor.

The indirect impacts analysis area consists of a 2-mile buffer around all project and alternative components. The 2-mile buffer is designed to account for impacts on resources not directly tied to ground disturbance and outside the direct analysis area. Potential indirect impacts include, but are not limited to, inadvertent damage, vandalism, unsanctioned collecting, and impacts caused by vibration from mine construction and operations.

The atmospheric impacts analysis area (including visual and auditory impacts) consists of a 6-mile buffer around all project and alternative components, which has been split into three distance zones: less than 1 mile, 1 to 3 miles, and greater than 3 miles from the project area. This distance is consistent with the indirect analysis area for visual impacts (see section 3.11), which is based on BLM visual guidance and Forest Service guidance for assessing visual effects. The atmospheric impacts analysis area encompasses approximately 729,674 acres for all project components under all alternatives. The analysis area for cultural resources is shown in figure 3.12.2-1.

Various permitted archaeological contractors over the past 15 years collected data through Class I records searches (records check at local, State, and Federal levels) and Class III pedestrian surveys (field crews systematically walk the analysis area and record resources). As of June 2019, crews had surveyed the direct analysis areas for cultural resources, except for portions of Alternative 6 – Skunk Camp and the pipeline routes not within previously surveyed areas. In addition, although previously surveyed, the East Plant Site underwent additional sample surveys in 2018. As many of the data that were available were used in this analysis. Please note that some survey results are preliminary and may change after the DEIS is published.

3.12.2.2 Impact Indicators

Direct impact on a historic property would consist of damage, loss, or disturbance caused by ground disturbance that would alter the characteristic(s) that make the property eligible for listing in the NRHP. Indirect impacts would consist primarily of visual impacts from alterations to setting, feeling, or association of a resource where setting is a significant component of its NRHP eligibility; however, other indirect impacts such as auditory impacts or inadvertent disturbance are also assessed.

Impact indicators for this analysis include the following:

- Loss, damage, or disturbance to resources listed in State or Federal registers;
- Loss, damage, or disturbance to resources that are eligible or may be eligible for State or Federal registers;
- Loss, damage, or disturbance to traditional cultural properties (TCPs); and
- Alterations to setting, feeling, or association for a historic property listed in or eligible to be listed in the National or State register under Criteria A, B, and/or C.

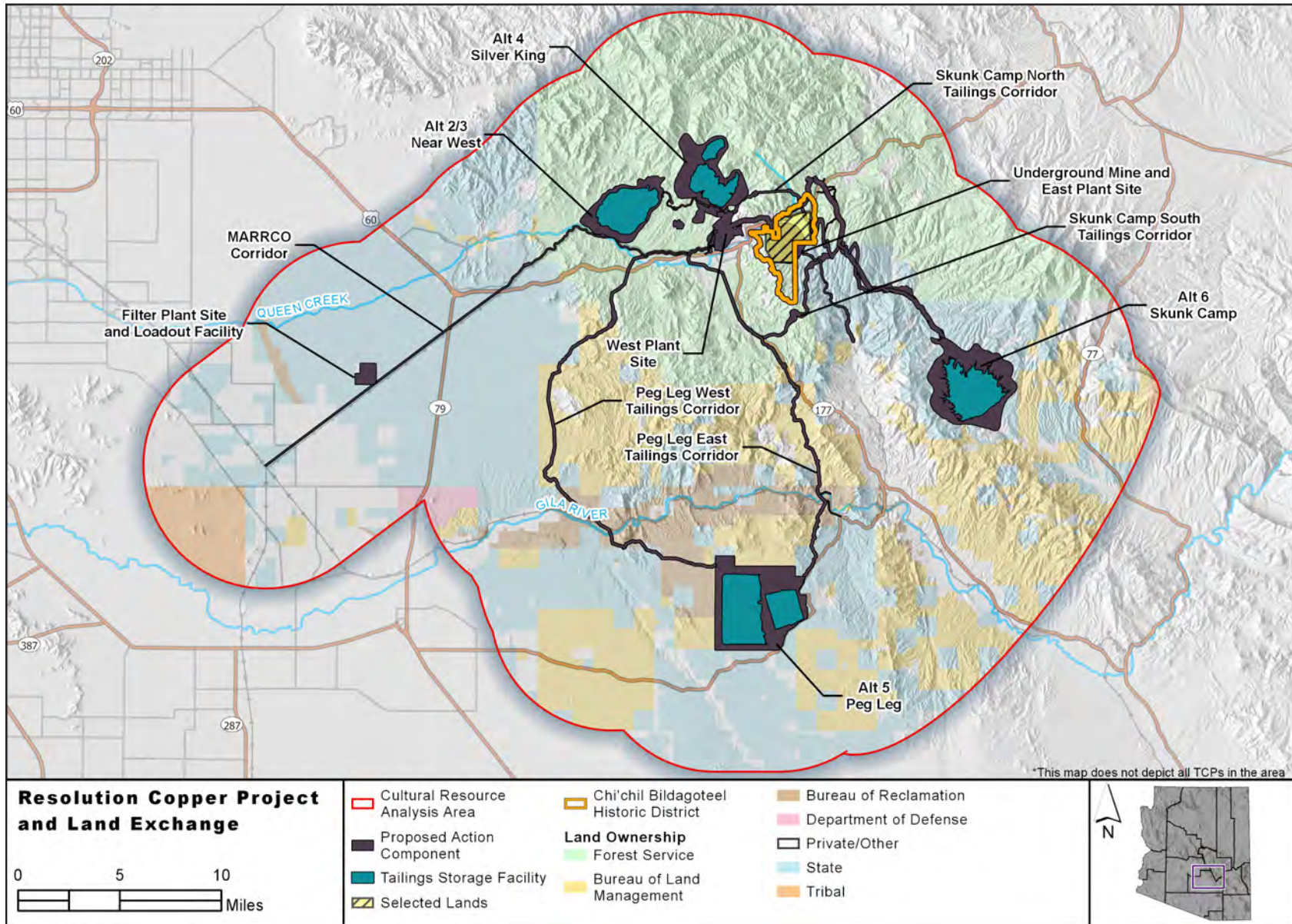


Figure 3.12.2-1. Direct and indirect analysis areas for cultural resources

Adverse impacts on historic properties would be avoided, minimized, or mitigated through the NHPA Section 106 process.

3.12.3 Affected Environment

3.12.3.1 Relevant Laws, Regulations, Policies, and Plans

The primary Federal, State, and agency regulations, policies, and guidelines used to analyze potential impacts on cultural resources in the project analysis area are shown in the accompanying text box.

A complete listing and brief description of the legal authorities and agency guidance used in this cultural resources impacts analysis may be reviewed in Newell (2018a).

3.12.3.2 Existing Conditions and Ongoing Trends

Human occupation of east-central Arizona spans from the Paleoindian period to today, with the primary occupation in the project area vicinity from the Formative era to the Late Historic period. Detailed summaries of the cultural history of the area can be found in many reference reports (see, for example, Lindeman and Whitney (2005) and Buckles (2009)). The following section is a brief overview to provide context for discussing potential impacts from the proposed project.

Cultural History

PALEOINDIAN PERIOD

The earliest human occupation of the Southwest and Arizona is known as the Paleoindian tradition and associated with hunters living in the end of the Pleistocene glaciations (9500–8500 B.C.). The Paleoindian tradition is defined by a series of large projectile (spear) points that are often found in association with late Pleistocene megafauna such as the mammoth and bison. Clovis, the earliest Paleoindian complex, is characterized by distinctive lanceolate points. Following Clovis is the

Regulations, Policies, and Guidelines Used in the Cultural Resources Effects Analysis

- National Historic Preservation Act (NHPA) of 1966 (54 U.S.C. 300101 et seq.)
- Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. 470aa–470mm)
- American Indian Religious Freedom Act (AIRFA) of 1978 (42 U.S.C. 1996)
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 U.S.C. 3001–3013)
- Executive Order 13007 (May 24, 1996), “Indian Sacred Sites”
- Executive Order 13175 (November 6, 2000), “Consultation and Coordination with Indian Tribal Governments”
- Arizona Antiquities Act of 1960 (ARS 41-841 through 41-844)
- State Historic Preservation Act of 1982 (ARS 41-861 through 41-865)
- Tonto National Forest Land and Resource Management Plan

Folsom complex (8900–8200 B.C.), identified by a smaller fluted point most commonly found in association with bison remains. Most Folsom finds in Arizona come from the Colorado Plateau. The Folsom tradition is followed by a series of other poorly dated and sometimes overlapping complexes, including the Plainview, Agate Basin, and Cody complexes. Most of the point types (Plainview, Agate Basin, Eden, and Scottsbluff) associated with these complexes have also been found on the Colorado Plateau.

ARCHAIC PERIOD

The Archaic period spans roughly from 8000 B.C. to A.D. 300 in the Southwest, beginning around the time of the Pleistocene-Holocene transition and the extinction of the Pleistocene big game. Archaeologists divide the Archaic period based on projectile point styles: Early Archaic (8000–5000 B.C.), Middle Archaic (5000–ca. 2000 B.C.), and Late Archaic–Early Agricultural (ca. 2000 B.C. up to A.D. 250). Archaic groups were hunter-gatherers specializing in exploiting small-game and plant resources. They traveled in a seasonal pattern exploiting specific resources in their territory as those resources became available or ripe. Archaic remains are represented by campsites or resource procurement and/or processing sites.

The Late Archaic is also referred to as the Early Agricultural period. The introduction of agriculture transformed cultures in the Southwest, but there is still debate about when and how this transformation occurred. Maize was introduced from Mexico before A.D. 1, and possibly as early as 2100 B.C. The Late Archaic–Early Agricultural period sees the beginning of village life, with agricultural communities appearing on floodplains. However, while maize and other crop cultivation became increasingly important over time, wild resources continued to play a large role in Late Archaic–Early Agricultural subsistence patterns. The end of the Late Archaic–Early Agricultural period is signaled by the adoption of ceramic vessels.

FORMATIVE PERIOD

Hohokam

The Formative era begins with the appearance of pottery in the archaeological record. In central Arizona, the best-documented and most common archaeological remains are attributed to the Hohokam culture. The Hohokam lifeway was characterized by a mixed subsistence pattern of wild resources and agricultural products, pottery (both plain and decorated red-on-buff wares), pit houses, and canal irrigation. Later Hohokam participated in large exchange networks and constructed ball courts and platform mounds. However, by the Late Formative, the Hohokam were in decline due to overpopulation, loss of agricultural production, and droughts.

Salado

During the Late Formative, Salado ceramics began to appear in central Arizona. The Salado culture was centered on the Tonto Basin in the Late Formative, and, while heavily influenced by Hohokam culture, developed with a unique set of traits and patterns. Salado culture is characterized by polychrome pottery and aboveground masonry structures within compounds. Evidence of trade networks can be seen in the spread of polychrome pottery in southern Arizona. At the end of the Formative, a reorganization of Salado sites can be seen, with many villages abandoned in favor of a smaller number of larger settlements, possibly due to conflicts. The Salado went into decline likely due to environmental factors and population pressure, and by the end of the Formative period most Salado sites were abandoned.

PROTOHISTORIC AND HISTORIC NATIVE AMERICAN

The project area is within the traditional territories of the Western Apache, the Yavapai, and the Akimel O'odham or Upper Pima. The histories of the Western Apache—a group that includes ancestors of the White Mountain, San Carlos, Cibecue, and Tonto Apache—tell of migrations into Arizona where they encountered the last inhabitants of villages along the Gila and San Pedro Rivers. The Western Apache

practiced a mixed subsistence strategy of farming in the summer in the north, and hunting and gathering in the winter in the south. In the 1870s, the Apache were forced onto reservations, which curtailed much of their seasonal round. However, not all Apache stayed on the reservations, and some continued to use the vicinity of the project area into the twentieth century. Like the Western Apache, the Yavapai practiced a mixed subsistence strategy with an emphasis on hunting and gathering. Yavapais had little contact with Euro-Americans until the 1860s, and also like the Apache, after silver was discovered in Arizona, they were forced onto reservations in the 1870s. The Akimel O'odham were primarily farmers who also practiced hunting and gathering of wild resources. They and other O'odham groups are the likely descendants of the Hohokam, and like the Hohokam, lived along the Gila River to the west of the project area. The year-round source of water allowed them to settle large villages and cultivate more crops with irrigation agriculture than some of the other O'odham groups in harsher areas of the desert while still gathering resources from the surrounding areas.

HISTORIC EURO-AMERICAN

Spanish, Mexican, and Euro-American settlers began to arrive in appreciable numbers in the eighteenth century. The ensuing period of historical exploitation was marked by mining, ranching, and homesteading interests. These historical pursuits included the construction of new canals, as well as the reuse of prehistoric ones. With the acquisition of southern Arizona from Mexico in 1853, the United States became the most current heir to the American Southwest. The discovery of gold in California, the 1862 Homestead Act, and development of gold and silver mines in western and central Arizona heralded the arrival of a large number of Euro-American settlers by

the mid-1870s. During the late 1800s, cattle and mining industries were established. Technological innovations (such as pumps) and improvements in irrigation methods led to intensified agricultural development and population growth into the twentieth century.

Inventories of the Direct Impacts Analysis Area

To date, 33 cultural resource surveys, inventories, or monitoring projects have been completed within the direct analysis area.⁶⁹ Fourteen surveys have been conducted in the selected lands and/or East Plant Site (Benz 2006; Buckles 2008; Buckles and Granger 2009; Chamorro 2014a, 2015; Deaver 2010, 2017; Dolan and Deaver 2007; Lindeman 2003; Lindeman and Whitney 2005; Prasciunas and Chamorro 2012; WestLand Resources Inc. 2009). Five surveys or inventories were conducted within the West Plant Site (Chamorro 2015; Deaver 2012; Steely 2011). Five surveys or monitoring projects were conducted within the tailings storage facility and corridor (Chamorro 2014b; Chamorro et al. 2016; Hooper 2014; Hooper and Tinseth 2015). Seven surveys were conducted within the MARRCO corridor and the filter plant and loadout facility (Buckles 2007; Buckles and Jerla 2008; Buckles et al. 2012; Cook 2007a, 2007b; King and Buckles 2015; Ryden et al. 2004). Surveys of the Silver King and Peg Leg sites have been completed or partially completed (Chamorro, Brown, et al. 2019; Chamorro, Tinseth, et al. 2019). Please note that these reports are still in draft form; any changes in the final report will be reflected in the FEIS. The surveys of Skunk Camp and Peg Leg pipeline routes are still underway. Reports are not available, but preliminary data for completed areas are available and have been used in the DEIS. These surveys and inventories have resulted in the recordation of 721 archaeological sites and three historical buildings or structures within the direct analysis area.

69. Two of the surveys listed cover more than one mine facility. Readers should note that while all references and citations for the EIS are made available via the EIS website, reports containing locational information of cultural resources are considered to be sensitive; therefore, only redacted versions may be made available, subject to the decision of the Forest Supervisor.

Incomplete or Missing Information

Survey of Alternative 5 – Peg Leg pipeline route options and some small areas of other project components that have moved as a result of design changes will occur in 2019. The results will be updated in the FEIS.

Inventory of the Indirect Impacts Analysis Area

For the indirect impacts analysis area, SWCA Environmental Consultants (SWCA) conducted a Class I records search of the area. The cultural resources team searched AZSITE—the online cultural resources database that contains records from the SHPO, BLM, and the ASLD—as well as records housed at the Tonto National Forest Phoenix Office and the BLM Tucson and Lower Sonoran Field Offices, for all recorded archaeological sites within 2 miles of the direct analysis area. The NRHP database was also searched for historic properties listed within 2 miles of the direct analysis area.

Inventory of the Atmospheric Impacts Analysis Area

For the atmospheric impacts analysis area, SWCA conducted a Class I records search of the area. The cultural resources team searched AZSITE, the Tonto National Forest Phoenix Office records, and the BLM Tucson and Lower Sonoran Field Offices records. Personnel also searched the NRHP for resources listed in or eligible for listing in the NRHP (historic properties) under Criteria A, B, and/or C. Historic properties eligible for the NRHP under Criteria A, B, and/or C are more likely to be sensitive to impacts on setting than properties determined to be eligible under Criterion D.

Direct Analysis Area

ARCHAEOLOGICAL SITES

Within the direct impacts analysis area, 721 archaeological sites have been recorded. This total includes preliminary data from the Silver King, Peg Leg, and Skunk Camp alternatives. Of the 721 sites,

523 are recommended or determined eligible for the NRHP, 118 are recommended or determined not eligible for the NRHP, 78 are undetermined, and two are exempt from Section 106 compliance.

The archaeological sites range in age from the Archaic to Historic periods and several sites have two or more temporal components. Cultural site components are attributed to Archaic peoples (19), Hohokam (81), Hohokam-Salado (73), Salado (330), Apache-Yavapai (25), Native American (116), Euro-American (189), and unknown (4). Archaeological sites found in the analysis area represent short- and long-term habitations, agricultural sites, resource procurement and processing sites, campsites, a historic-age campground, communication sites, ranching sites, mining sites, soil conservation, utilities, transportation (roads and trails), recreation activities, water management, and waste management.

TRADITIONAL CULTURAL PROPERTY

One NRHP-listed TCP is located within the direct analysis area: the *Chi'chil Bildagoteel* Historic District. The *Chi'chil Bildagoteel* Historic District was listed on the NRHP in 2016 as an Apache TCP and its boundaries contain 38 archaeological sites that contribute to the overall eligibility of the district, in addition to sacred places, springs, and other significant locations. See Section 3.14, Tribal Values and Concerns, for a more detailed discussion of the resource. Of the 38 archaeological sites within the TCP, six are found within the direct impacts analysis area.

HISTORIC BUILDINGS AND STRUCTURES

Twenty-one historic buildings or structures have been recorded within the direct analysis area. Seventeen of the historic buildings or structures are associated with the Magma Mine; however, all but three have been demolished as part of a reclamation plan. No formal recommendation or determination of eligibility has been made for the Magma Mine resources. The remaining four resources are in-use historic-era linear resources (roads and utility lines). All four are found in the Peg Leg alternative and are recommended not eligible for the NRHP.

Indirect Analysis Area

The Class I records search of the indirect analysis area resulted in 568 cultural resources. Of the 568, eight are listed in the NRHP, 257 are eligible for listing in the NRHP, 245 are unevaluated, and 58 are not eligible. The majority of the eligible resources are Prehistoric and Historic archaeological sites eligible under Criterion D for their information potential. The eight listed resources are the Gabel House, The Eleven Arches, the Erskine P. Caldwell House, the Magma Hotel, the Boyce Thompson Arboretum, the Butte-Cochran Charcoal Ovens, the Queen Creek Bridge, and the Devil's Canyon Bridge.

Atmospheric Analysis Area

The Class I records search of the atmospheric analysis area for historic properties listed in or eligible for listing in the NRHP under Criterion A, B, or C resulted in 13 historic buildings, structures, or districts listed in the NRHP and 37 archaeological sites eligible for listing in the NRHP. The historic buildings include several houses and a hotel. Historic structures include five bridges, charcoal ovens, and the Boyce Thompson Arboretum. One district is also present within the indirect analysis area: the *Chi'chil Bildagoteel* Historic District. Archaeological sites include Civilian Conservation Corps features, mining sites, roads and highways, railroads, and transmission lines, as well as prehistoric artifact scatters and petroglyph sites.

3.12.4 Environmental Consequences of Implementation of the Proposed Mine Plan and Alternatives

3.12.4.1 Alternative 1 – No Action

Direct Impacts

Under the no action alternative, the Forest Service would not approve the GPO, and current management plans would be in place. Resolution Copper would continue current activities on private property. As

described in section 2.2.2, the no action alternative analysis analyzes the impacts of (1) the Forest Service's not approving the GPO, and (2) the land exchange's not occurring.

If the GPO is not approved, the proposed Resolution Copper Project would not occur, and no adverse direct impacts on cultural resources would be anticipated. If the land exchange does not occur, the selected lands would remain under Federal management, and no direct adverse impacts on cultural resources would be anticipated. Current management of historic properties and other cultural resources would continue as it is today.

Indirect Impacts

If the GPO is not approved, the mine would not occur, and no adverse indirect impacts on cultural resources would be anticipated. If the land exchange does not occur, the selected lands would remain under Federal management, and no indirect adverse impacts on cultural resources would be anticipated.

Atmospheric Impacts

If the GPO is not approved, then none of the proposed mining facilities would be constructed, so no adverse indirect impacts on cultural resources would be anticipated from mining facilities. If the land exchange does not occur, no adverse indirect impacts on cultural resources would be anticipated.

3.12.4.2 Impacts Common to All Action Alternatives

Effects of the Land Exchange

The land exchange would have effects on cultural resources.

The Oak Flat Federal Parcel would leave Forest Service jurisdiction. The role of the Tonto National Forest under its primary authorities in the Organic Administration Act, Locatable Regulations (36 CFR 228 Subpart A), and Multiple-Use Mining Act is to ensure that mining

activities minimize adverse environmental effects on NFS surface resources; this includes cultural resources. The removal of the Oak Flat Federal Parcel from Forest Service jurisdiction negates the ability of the Tonto National Forest to regulate effects on these resources. If the land exchange occurs, 31 NRHP-eligible archaeological sites and one TCP within the selected lands would be adversely affected. Under Section 106 of the NHPA and its implementing regulations (38 CFR 800), historic properties leaving Federal management is considered an adverse effect, regardless of the plans for the land, meaning that, under NEPA, the land exchange would have an adverse effect on cultural resources.

The offered lands parcels would enter either Forest Service or BLM jurisdiction. Entering Federal management would offer additional protection for any cultural resources on these lands.

Effects of Forest Plan Amendment

The Tonto National Forest Land and Resource Management Plan (1985b) provides guidance for management of lands and activities within the Tonto National Forest. It accomplishes this by establishing a mission, goals, objectives, and standards and guidelines. Missions, goals, and objectives are applicable on a forest-wide basis. Standards and guidelines are either applicable on a forest-wide basis or by specific management area.

A review of all components of the 1985 forest plan was conducted to identify the need for amendment due to the effects of the project, including both the land exchange and the proposed mine plan (Shin 2019). A number of standards and guidelines (10) were identified as applicable to management of cultural resources. None of these standards and guidelines were found to require amendment to the proposed project, either on a forest-wide or management area-specific basis. For additional details on specific rationale, see Shin (2019).

Summary of Applicant-Committed Environmental Protection Measures

A number of environmental protection measures are incorporated into the design of the project (the GPO, not the land exchange) that would act to reduce potential impacts on cultural resources. These are non-discretionary measures and their effects are accounted for in the analysis of environmental consequences.

Applicant-committed environmental protection measures by Resolution Copper to reduce impacts on cultural resources are covered in detail in the Programmatic Agreement (appendix O). Specifically, Resolution Copper would do the following:

- Develop and implement treatment plans to resolve adverse effects on cultural resources from the project. Plans would be prepared to address adverse effects on historic properties, including archaeological sites, historic buildings or structures, historic districts, and TCPs.
- Develop a monitoring and treatment plan for inadvertent discoveries. If previously unidentified cultural resources are discovered during construction activities on Tonto National Forest, work would cease within 100 feet of the location, and the Forest Service would be contacted for instruction before work would continue at that location.

3.12.4.3 Alternative 2 – Near West Proposed Action

Direct Impacts

Under Alternative 2, 132 cultural resources would be impacted: 101 NRHP-eligible and 31 undetermined archaeological sites. Ninety-six percent (10,213 acres) of the total alternative has been surveyed at the time of this review. Table 3.12.4-1 presents the number of cultural resources that are listed in or eligible for the NRHP or are of undetermined NRHP status within each project element. Some sites would be impacted by more than one project element; hence, the total numbers in the following tables are different from the total number of sites overall.

In addition, Alternative 2 would adversely impact one NRHP-listed TCP in the East Plant Site and undetermined historic buildings in the West Plant Site; this is true for Alternatives 2 through 6.

Indirect Impacts

Within the indirect impact analysis area for Alternative 2, 29 cultural resources may be impacted: two listed, eight eligible, and 19 unevaluated. Nine of those resources are within 2 miles of the tailings facility, one is within 2 miles of the East Plant Site and subsidence area (the *Chi'chil Bildagoteel* Historic District), four are within 2 miles of the West Plant Site, one is within 2 miles of Silver King Mine Road, 12 are within 2 miles of the MARRCO corridor (including the Boyce Thompson Arboretum), and three are within 2 miles of the transmission line corridor.

Atmospheric Impacts

Outside of the proposed project footprint, but within the atmospheric analysis area of 6 miles around Alternative 2, there are 13 historic buildings or structures listed in the NRHP and 35 archaeological sites eligible for the NRHP under Criterion A, B, or C. The *Chi'chil*

Table 3.12.4-1. Cultural resources directly impacted by Alternative 2

GPO Component	Number of NRHP Listed or Eligible Sites	Number of NRHP Undetermined Sites	Total
Oak Flat Federal Parcel	31	0	31
East Plant Site and subsidence area	27	0	27
West Plant Site	9	0	9
Tailings facility and corridor	29	27	56
Silver King Mine Road realignment	7	0	7
MARRCO corridor	39	3	42
Transmission line	14	1	15

Note: Some sites would be impacted by more than one project element; hence, total numbers in this table are different from the total number of sites overall.

Bildagoteel Historic District is less than 1 mile from the East Plant Site/subsidence area, the West Plant Site, and the Silver King to Oak Flat transmission line corridor. In addition to the historic district, one historic bridge and nine archaeological sites are also within 1 mile of the East Plant Site/subsidence area. Within 1 mile of the West Plant Site, there is one historic bridge, one hotel, and six archaeological sites, in addition to the historic district. There is one archaeological site within 1 mile of the tailings facility. One historic property and two archaeological sites are within 1 mile of Silver King Mine Road, four historic buildings and structures and 10 archaeological sites are within 1 mile of the transmission line corridor, and one historic building and five archaeological sites are within 1 mile of the MARRCO corridor. Table 3.12.4-2 gives the numbers of historic properties listed in or eligible for listing in the NRHP under Criterion A, B, or C. Please note that some properties would be impacted by more than one project component.

Table 3.12.4-2. Historic properties within the atmospheric analysis area for Alternative 2

Facility	Historic Properties within 1 mile	Historic Properties within 1 to 3 miles	Historic Properties farther than 3 miles
East Plant Site and subsidence area	11	9	33
West Plant Site	9	11	39
Tailings facility and corridor	1	6	46
Silver King Mine Road realignment	3	13	41
Silver King to Oak Flat transmission line	14	10	34
MARCO corridor, including filter plant	6	17	36

Note: Some sites may be located by more than one project element; hence, total numbers in this table are different from the total number of sites overall.

3.12.4.4 Alternative 3 – Near West – Ultrathickened

Direct Impacts

The direct impacts of Alternative 3 on cultural resources are the same as Alternative 2.

Indirect Impacts

The indirect impacts of Alternative 3 on cultural resources are the same as Alternative 2.

Atmospheric Impacts

The atmospheric impacts of Alternative 3 on cultural resources are the same as Alternative 2.

3.12.4.5 Alternative 4 – Silver King

Direct Impacts

Seventy-two percent (8,231 acres) of Alternative 4 has been surveyed at the time of this review. Under Alternative 4, 137 cultural resources would be adversely impacted: 122 NRHP-eligible and 15 undetermined archaeological sites. Table 3.12.4-3 presents numbers of cultural resources that are listed in or eligible for the NRHP or are of undetermined NRHP status within each project element. Alternative 4 would adversely impact four more NRHP-eligible or undetermined sites than Alternative 2 or 3. Some sites would be impacted by more than one project element; hence, the total numbers in the tables are different from the total number of sites overall.

Indirect Impacts

Within the indirect impact analysis area for Alternative 4, 25 cultural resources may be impacted: two listed, 11 eligible, and 12 unevaluated. Five of those resources are within 2 miles of the tailings facility, one is within 2 miles of the East Plant Site and subsidence area (the *Chi'chil*

Table 3.12.4-3. Cultural resources directly impacted by Alternative 4

Facility	Number of NRHP-Listed or Eligible Sites	Number of NRHP-Undetermined Sites	Total
Oak Flat Federal Parcel	31	0	31
East Plant Site and subsidence area	27	0	27
West Plant Site	12	2	14
Silver King tailings facility and corridor/ pipeline corridor	50	10	60
MARRCO corridor	39	3	42
Filter plant and loadout facility	2	0	2
Transmission line	14	1	15
Roads	3	0	3

Note: Some sites would be impacted by more than one project element; hence, total numbers in this table are different from the total number of sites overall.

Bildagoteel Historic District), four are within 2 miles of the West Plant Site, one is within 2 miles of the access roads, 12 are within 2 miles of the MARRCO corridor (including the Boyce Thompson Arboretum), one is within 2 miles of the pipeline corridor, and three are within 2 miles of the transmission line corridors.

Atmospheric Impacts

For Alternative 4, the atmospheric impacts on all project components except for the Silver King tailings facility and pipeline corridor are the same as Alternative 2. For the Silver King tailings facility and pipeline corridor, the Magma Hotel and three archaeological sites are within 1 mile, four historic buildings and 12 archaeological sites are between 1 and 3 miles, and 13 historic buildings or structures and 35 archaeological sites are more than 3 miles from the tailings facility and pipeline corridor.

Table 3.12.4-4. Cultural resources directly impacted by Alternative 5 with the east pipeline route

Facility	Number of NRHP-Listed or Eligible Sites	Number of NRHP-Undetermined Sites	Total
Oak Flat Federal Parcel	31	0	31
East Plant Site and subsidence area	27	0	27
West Plant Site	12	2	14
Peg Leg tailings facility and corridor/ east pipeline	72	18	90
Silver King Mine Road realignment	7	0	7
MARRCO corridor	39	3	42
Transmission line	14	1	15
Roads	0	9	9

Note: Some sites would be impacted by more than one project element; hence, total numbers in this table are different from the total number of sites overall.

3.12.4.6 Alternative 5 – Peg Leg

Direct Impacts

For Alternative 5, there are two potential pipeline corridor routes: an east route option and a west route option. Please note that pipeline routes have not been entirely surveyed yet; additional data may change the numbers in the following analysis. For the east pipeline route, 78 percent (13,905 acres) of the entire alternative has been surveyed; for the west pipeline route, 74 percent (13,497 acres) has been surveyed. Under Alternative 5 with the east pipeline route, 152 cultural resources would be adversely impacted: 125 NRHP-eligible and 27 undetermined archaeological sites. Under Alternative 5 with the west pipeline route, 125 cultural resources would be adversely impacted: 114 NRHP-eligible and 11 undetermined.

Tables 3.12.4-4 and 3.12.4-5 present numbers of cultural resources that are listed in or eligible for the NRHP or are of undetermined NRHP status for each pipeline corridor route. Alternative 5 with the east

Table 3.12.4-5. Cultural resources directly impacted by Alternative 5 with the west pipeline route

Facility	Number of NRHP-Listed or Eligible Sites	Number of NRHP-Undetermined Sites	Total
Oak Flat Federal Parcel	31	0	31
East Plant Site and subsidence area	27	0	27
West Plant Site	12	2	14
Peg Leg tailings facility and corridor/west pipeline	66	9	75
Silver King Mine Road realignment	7	0	7
MARRCO corridor	39	3	42
Transmission line	14	1	15
Roads	0	0	0

Note: Some sites would be impacted by more than one project element; hence, total numbers in this table are different from the total number of sites overall.

pipeline route would impact 30 more sites than Alternative 2 or 3, and 15 more than Alternative 4. Alternative 5 with the west pipeline route would impact seven fewer than Alternative 2 or 3, and 12 fewer than Alternative 4.

Indirect Impacts

Within the indirect impact analysis area for Alternative 5 with the east pipeline route, 44 cultural resources may be impacted: two listed, 23 eligible, and 19 unevaluated. Four resources are within 2 miles of the West Plant Site, one is within 2 miles of the East Plant Site and subsidence area (the *Chi'chil Bildagoteel* Historic District), nine are within 2 miles of the access roads, 12 are within 2 miles of the MARRCO corridor (including the Boyce Thompson Arboretum), 18 are within 2 miles of the pipeline corridor, one is within 2 miles of Silver

King Mine Road, and three are within 2 miles of the transmission line corridors.

Within the indirect impact analysis area for Alternative 5 with the west pipeline route, 29 cultural resources may be impacted: one listed, 16 eligible, and 12 unevaluated. Four resources are within 2 miles of the West Plant Site, 12 is within 2 miles of the MARRCO corridor (including the Boyce Thompson Arboretum), 12 are within 2 miles of the pipeline corridor, one is within 2 miles of Silver King Mine Road, and three are within 2 miles of the transmission line corridors.

Atmospheric Impacts

For Alternative 5 with the east pipeline option, no historic properties listed or eligible for listing under Criterion A, B, or C are within 1 mile of the Peg Leg tailings facility, one historic building and six archaeological sites are within 1 mile of the pipeline corridor, six historic buildings or structures and 12 archaeological sites are within 1 to 3 miles of the tailings facility and pipeline corridor, and 13 historic buildings or structures and 35 archaeological sites are within 6 miles of the facility and pipeline corridor. One archaeological site is within 1 mile of a planned access road, and two historic buildings or structures and two archaeological sites are within 1 to 3 miles of the access road. However, no indirect impacts are expected from the access road.

For Alternative 5 with the west pipeline option, no historic properties listed or eligible under Criterion A, B, or C are within 1 mile of the Peg Leg tailings storage facility, one historic building and four archaeological sites are within 1 mile of the pipeline corridor, five historic buildings or structures and 11 archaeological sites are within 1 to 3 miles of the tailings and pipeline corridor, and 13 historic buildings or structures and 35 archaeological sites are within 6 miles of the facility and pipeline corridor. For the access road, one archaeological site is within 1 mile, and one historic building and one archaeological site are within 1 to 3 miles. However, no indirect impacts are expected from the access road.

Table 3.12.4-6. Cultural resources directly impacted under Alternative 6 with the north pipeline route

Facility	Number of NRHP-Listed or Eligible Sites	Number of NRHP-Undetermined Sites	Total
Oak Flat Federal Parcel	31	0	31
East Plant Site and subsidence area	27	0	27
West Plant Site	12	2	14
Skunk Camp tailings facility and corridor/ north pipeline*	252	1	253
Skunk Camp transmission line	12	0	12
Silver King Mine Road realignment	7	0	7
MARRCO corridor	39	3	42
Transmission line	14	1	15
Roads	8	0	8

Note: Some sites would be impacted by more than one project element; hence, total numbers in this table are different from the total number of sites overall.

* Numbers represent surveyed portion of pipeline corridor only.

3.12.4.7 Alternative 6 – Skunk Camp

Direct Impacts

For Alternative 6, there are two potential pipeline routes: a north route option and a south route option. Under Alternative 6 with the north pipeline, 323 cultural resources would be adversely impacted: 318 NRHP-eligible and five undetermined archaeological sites. Under Alternative 6 with the south pipeline, 360 cultural resources would be adversely impacted: 343 NRHP-eligible and 17 undetermined archaeological sites. Tables 3.12.4-6 and 3.12.4-7 present NRHP-eligible and undetermined archaeological sites within Alternative 6 by pipeline

Table 3.12.4-7. Cultural resources directly impacted under Alternative 6 with the south pipeline route

Facility	Number of NRHP-Listed or Eligible Sites	Number of NRHP-Undetermined Sites	Total
Oak Flat Federal Parcel	31	0	31
East Plant Site and subsidence area	27	0	27
West Plant Site	12	2	14
Skunk Camp tailings facility and corridor/ south pipeline	286	15	301
Silver King Mine Road realignment	7	0	7
MARRCO corridor	39	3	42
Transmission line	23	1	24
Roads	6	0	6

Note: Some sites would be impacted by more than one project element; hence, total numbers in this table are different from the total number of sites overall.

route. This alternative would impact a minimum of 193 more sites than Alternative 2, 3, 4, or 5.

Please note that portions of the proposed pipeline corridors for the Skunk Camp alternative have not been completely surveyed. At this time, 16,049 acres (96 percent) of the alternative has been surveyed for Alternative 6 and the north pipeline route option, and 16,559 acres (96 percent) has been surveyed for Alternative 6 and the south pipeline route option.

Indirect Impacts

Within the indirect impact analysis area for Alternative 6 with the north pipeline route, 25 cultural resources may be impacted: two listed, 12 eligible, and 11 unevaluated. Four resources are within 2 miles of the West Plant Site, one is within 2 miles of the East Plant Site and subsidence area (the *Chi'chil Bildagoteel* Historic District), one (The Eleven Arches) is within 2 miles of the tailings facility, five are within 2 miles of the access roads, 12 are within 2 miles of the MARRCO corridor (including the Boyce Thompson Southwest Arboretum), six are within 2 miles of the pipeline corridor, one is within 2 miles of Silver King Mine Road, one is within 2 miles of the Skunk Camp transmission line corridor, and three are within 2 miles of the transmission line corridors.

Within the indirect impact analysis area for Alternative 6 with the south pipeline route, 41 cultural resources may be impacted: two listed, 19 eligible, and 20 unevaluated. Four resources are within 2 miles of the West Plant Site, one is within 2 miles of the East Plant and subsidence area (the *Chi'chil Bildagoteel* Historic District), one (The Eleven Arches) is within 2 miles of the tailings facility, two are within 2 miles of the access roads, 12 are within 2 miles of the MARRCO corridor (including the Boyce Thompson Arboretum), 21 are within 2 miles of the pipeline corridor, one is within 2 miles of Silver King Mine Road, and four are within 2 miles of the transmission line corridors.

Atmospheric Impacts

For Alternative 6 with the north pipeline, six historic buildings or structures and five archaeological sites are within 1 mile of the Skunk Camp tailings facility and pipeline corridor, 21 historic properties are within 1 to 3 miles, and 45 historic properties are over 3 miles. Two historic buildings or structures and five archaeological sites are within 1 mile of planned access roads, and 23 historic properties are within 1 to 3 miles of the access roads. However, no visual impacts are anticipated from access roads.

For Alternative 6 with the south pipeline, six historic buildings or structures and four archaeological sites are within 1 mile of the Skunk Camp tailings facility and pipeline corridor, 22 historic properties are within 1 to 3 miles, and 45 historic properties are over 3 miles. Two historic buildings or structures and five archaeological sites are within 1 mile of planned access roads, and 14 historic properties are within 1 to 3 miles of the access roads. However, no visual impacts are anticipated from access roads.

3.12.4.8 Cumulative Effects

The Tonto National Forest identified the following reasonably foreseeable future actions as likely, in conjunction with development of the Resolution Copper Mine, to contribute to cumulative impacts on archaeological sites and other resources of traditional, cultural, or religious importance within the analysis area identified in section 3.12.2.1. As noted in section 3.1, past and present actions are assessed as part of the affected environment; this section analyzes the effects of any RFFAs, to be considered cumulatively along with the affected environment and Resolution Copper Project effects.

- *Pinto Valley Mine Expansion.* The Pinto Valley Mine is an existing open-pit copper and molybdenum mine located approximately 8 miles west of Miami, Arizona, in Gila County. Pinto Valley Mining Corporation is proposing to expand mining activities onto an estimated 1,011 acres of new disturbance (245 acres on Tonto National Forest land and 766 acres on private land owned by Pinto Valley Mining Corporation) and extend the life of the mine to 2039. An EIS for this proposed action is currently being developed by the Tonto National Forest, and cultural resource surveys of the proposed action and alternative facility locations are concurrently being conducted. However, potential impacts on specific cultural sites are not yet known.
- *Ripsey Wash Tailings Project.* Mining company ASARCO is planning to construct a new tailings storage facility to support its Ray Mine operations. The environmental effects of the

project were analyzed in an EIS conducted by the USACE and approved in a ROD issued in December 2018. As approved, the proposed tailings storage facility project would occupy an estimated 2,574 acres and be situated in the Ripsey Wash watershed just south of the Gila River approximately 5 miles west-northwest of Kearny, Arizona. As documented in the EIS and ROD, construction of the approved tailings storage facility would adversely and directly affect 22 NRHP-eligible sites and also indirectly affect two historic properties eligible for listing in the NRHP.

- *Ray Land Exchange and Proposed Plan Amendment.* ASARCO is also seeking to complete a land exchange with the BLM by which the mining company would gain title to approximately 10,976 acres of public lands and federally owned mineral estate located near ASARCO's Ray Mine in exchange for transferring to the BLM approximately 7,304 acres of private lands, primarily in northwestern Arizona. The land exchange would adversely impact 58 cultural resources because those resources would be leaving Federal management.
- *Silver Bar Mining Regional Landfill and Cottonwood Canyon Road.* A private firm, Mineral Mountain LLC, is proposing to develop a landfill on land the company owns approximately 6 miles southeast of Florence Junction and 4 miles due east of SR 79. This private property is an inholding within an area of BLM-administered lands and cannot be accessed without crossing BLM land. The company received Master Facility Plan Approval for the proposed landfill from ADEQ in 2009 and a BLM right-of-way grant in 2017. As noted in the EA and FONSI for the right-of-way, road improvements to allow for heavy truck haul traffic across BLM lands would adversely affect six cultural sites. Of the six sites, three are presently of unknown eligibility and would require eligibility testing; the other three sites have been recommended eligible for the NRHP and would require data recovery. Additionally, one cultural resource site that is outside the area of potential effects, but

sufficiently close enough that it may be impacted, has been recommended NRHP eligible.

- *Superior to Silver King 115-kV Relocation Project.* At the request of Resolution Copper, SRP intends to relocate an approximately 1-mile segment of the existing Superior-Silver King 115-kV transmission line approximately 0.25 mile to the northwest to accommodate future Resolution Copper Mine-related facilities. In this area the transmission line corridor is located entirely on Resolution Copper-owned private property. The proposed relocation of the line has the potential to affect one historic property that is recommended NRHP eligible and may also impact other, as-yet-unknown archaeological sites.
- *Tonto National Forest Plan Amendment and Travel Management Plan.* The Tonto National Forest is currently in the process of revising its Forest Plan to replace the plan now in effect, which was implemented in 1985. Simultaneously, the Tonto National Forest is developing a Supplemental EIS to address certain court-identified deficiencies in its 2016 Final Travel Management Rule EIS. Both documents and their respective implementing decisions are expected within the next 2 years. Cultural resources may be impacted for any new road construction; however, the Tonto National Forest would conduct the appropriate surveys, consultation, and mitigation. Impacts on these sites would cumulatively impact cultural resources in the area in combination with the loss of sites that would take place with the Resolution Copper Project.

Other ongoing and future mining activity, infrastructure improvement projects (including construction of new roadways, water and sewer systems, power transmission lines, and other utilities), and private and commercial land development is likely to occur in this area of south-central Arizona during the foreseeable future life of the Resolution Copper Mine (50–55 years). Each of these developments may contribute, both individually and cumulatively, to adverse effects on prehistoric and historic archaeological sites and other places of cultural importance.

3.12.4.9 Mitigation Effectiveness

Mitigation of adverse effects on historic properties eligible for the NRHP under Criterion D, the potential to provide significant information about the past, most often consists of data recovery to gather the information prior to disturbance. A Programmatic Agreement (see appendix O) is currently being developed to address adverse effects on historic properties under Section 106 of the NHPA. Mitigation of adverse effects on historic properties eligible for the NRHP under Criterion A, B, or C would be developed in consultation with the appropriate Indian Tribes, SHPO, and other interested parties and would be outlined in a historic properties treatment plan and/or a TCP Redress Plan as stipulated by the PA. Mitigation of adverse impacts under NEPA that do not fall under Section 106 would also be developed in consultation with the tribes and interested parties. Data recovery is generally considered an effective mitigation for historic properties eligible for the NRHP for their information potential; however, mitigation strategies for historic properties eligible under other criteria may or may not be completely effective.

The Forest Service is in the process of developing a robust mitigation plan to avoid, minimize, rectify, reduce, or compensate for resource impacts that have been identified during the process of preparing this EIS. Appendix J contains descriptions of mitigation concepts being considered and known to be effective, as of publication of the DEIS. Appendix J also contains descriptions of monitoring that would be needed to identify potential impacts and mitigation effectiveness. As noted in chapter 2 (section 2.3), the full suite of mitigation would be contained in the FEIS, required by the ROD, and ultimately included in the final GPO approved by the Forest Service. Public comment on the EIS, and in particular appendix J, will inform the final suite of mitigations.

Mitigation Measures Applicable to Cultural Resources

Conduct cultural and archaeological data recovery via the Oak Flat HPTP (RC-209): The Oak Flat Historic Properties Treatment Plan (HPTP) sets out a plan for treatments to resolve the adverse effects

on 42 historic properties that have been identified within the Oak Flat Federal Parcel. In accordance with the plan, Resolution Copper would conduct archaeological data recovery on sites eligible under Criterion D that would be adversely affected. Project materials and archaeological collections would be curated in accordance with 36 CFR 79 (Curation of Federally-Owned and Administered Archaeological Collections) with Gila River Indian Community, Salt River Pima-Maricopa Indian Community, and the Arizona State Museum. This measure is applicable to all alternatives and would be noted in the ROD/Final Mining Plan of Operations.

Conduct cultural and archaeological data recovery via the Research Design and data recovery plans (RC-210): The GPO Research Design and data recovery plans detail treatments to resolve adverse effects on historic properties within the GPO project area with the exception of those in the Oak Flat Federal Parcel. Data recovery would be conducted on archaeological sites eligible under Criterion D within the GPO project area. Project materials and archaeological collections would be curated in accordance with 36 CFR 79 (Curation of Federally-Owned and Administered Archaeological Collections) with Gila River Indian Community, Salt River Pima-Maricopa Indian Community, and the Arizona State Museum. This measure is applicable to all alternatives and would be noted in the ROD/Final Mining Plan of Operations.

Mitigation Effectiveness and Impacts

Archaeological data recovery can reduce a portion of the adverse effect by sampling historic properties that are eligible for their scientific information potential under Criterion D of the NRHP. However, there are several limitations to data recovery's effectiveness. Data recovery by nature is destructive, and although archaeological investigative techniques are continually evolving, even today's state-of-the-art research strategies would not be able to recover all the data potential at the project area sites. Data recovery can record and preserve some of the materials from the sites, but it cannot preserve the current integrity of setting, association, workmanship, feeling, location, and design.

Unavoidable Adverse Effects

Cultural resources and historic properties and uses would be directly and permanently impacted. These impacts cannot be avoided within the areas of surface disturbance, nor can they be fully mitigated. The land exchange is also considered an unavoidable adverse effect on cultural resources.

3.12.4.10 Other Required Disclosures***Short-Term Uses and Long-Term Productivity***

Physical and visual impacts on archaeological sites, tribal sacred sites, cultural landscapes, and plant and mineral resources caused by construction of the mine would be immediate, permanent, and large in scale. Mitigation measures cannot replace or replicate the historic properties that would be destroyed by project construction. The landscape, which is imbued with specific cultural attributions by each of the consulted tribes, would also be permanently affected.

Irreversible and Irretrievable Commitment of Resources

The direct impacts on cultural resources and historic properties from construction of the mine and associated facilities constitute an irreversible commitment of resources. Archaeological sites cannot be reconstructed once disturbed, nor can they be fully mitigated. Sacred springs would be eradicated by subsidence or tailings storage facility construction and affected by groundwater water drawdown. Changes that permanently affect the ability of tribal members to use known TCPs for cultural and religious purposes are also an irreversible commitment of resources.