JURISDICTIONAL WATERS DETERMINATION FOR THE NEAR WEST ANALYSIS AREA, PINAL COUNTY, ARIZONA

Prepared for: U.S. Army Corps of Engineers

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INTRODUCTION

WestLand Resources, Inc. (WestLand), was retained by Resolution Copper Mining, L.L.C. (RCM; the Applicant) to evaluate an approximately 14,273-acre area (the Analysis Area), for the presence of potential waters of the U.S. (Waters). This formal Jurisdictional Determination (JD) request is being submitted by WestLand on behalf of the Applicant. Agent Designation and Authorization for Federal Access documentation is included as ***Attachment 1***. Directions to the Analysis Area are provided as ***Attachment 2***.

This evaluation was conducted in general accordance with the June 5, 2007 *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (the Guidebook) and its attachments (revised December 2008). The format of this memorandum has been developed to facilitate the completion of the *Approved Jurisdictional Determination Form* (the Form; Appendix B of the Guidebook). We have prepared an electronic database capable of producing a separate JD Form for each individual ephemeral drainage reach identified within the Analysis Area. This technical memorandum provides supporting documentation for the information included on each JD Form. An electronic copy of the JD Forms is included for Corps use.

SECTION I. PROJECT LOCATION AND BACKGROUND INFORMATION

The Analysis Area was developed in support of evaluating alternatives for RCM's Resolution Copper Project and is located in proximity to the Town of Superior, Pinal County, Arizona (***Figure 1***). The Analysis Area is comprised of federal lands managed by the Tonto National Forest (approximately 14,221 acres) and RCM-owned private (approximately 51 acres) lands (***Figure 2***). The Analysis Area is located adjacent to and north of Highway 60 less than one mile west of Superior in portions of Sections 13-15, 22-28, and 33-36, Township 1 South, Range 11 East, portions of Sections 17-22, and 37-34, Township 1 South, Range 12 East, portions of Sections 1-3, Township 2 South, Range 11 East, and portions of Sections 4-6, Township 2 South, Range 12 East (***Figure 1***). Hydrologically, the Analysis Area occurs within the Middle Gila River watershed, specifically the Upper Queen Creek subwatershed (HUC 1505010004). The nearest designated downstream traditionally navigable water (TNW) to the Analysis Area is the 6.9-mile reach of the Gila River between Powers Butte and Gillespie Dam. An aerial overview of the intervening landscape between the Analysis Area and the TNW reach of the Gila River is provided in ***Figure 3***.

It should be noted that the potential flow path from the Analysis Area to the designated TNW reach of the Gila River at Powers Butte shares many segments and characteristics with two previously completed JD requests: 1) the Lost Dutchman Heights/Portalis Project (Corps File No. SPL-2008-00674-SDM; hereafter Lost Dutchman), and 2) the RCM West Plant and East Plant Analysis Areas near Superior (Corps File No. SPL-2009-00315-MB; hereafter West and East Plant). The approved Lost Dutchman and West and East Plant JDs each indicated findings of "no significant nexus" between the evaluated ephemeral drainage features and the TNW reach of the Gila River between Powers Butte and Gillespie Dam. The most significant drainage feature in the Lost Dutchman significant nexus analysis (SNA) was Siphon Draw, with a watershed of over 45 square miles. The drainage watersheds within the current

Analysis Area (maximum of 17.76 square miles) are much smaller than those in the Lost Dutchman SNA and are located at a greater distance from the TNW. Drainages within the Lost Dutchman Project Area lay approximately 91 river miles from the TNW, while those within the Near West Analysis Area lay approximately 113 river miles from the TNW.

As with the West and East Plant JD, potential flows from the ephemeral drainages in the Analysis Area face a significant impediment to downgradient transmission, the Whitlow Ranch Dam on Queen Creek. The outflow structure of the Whitlow Ranch Dam limits the discharge capacity of flows to Queen Creek downgradient of the dam, effectively limiting the potential for these flows to be transmitted downstream. Information on the Whitlow Ranch Dam, published by the Corps, acknowledges that outflow from the dam "usually percolates into the alluvial plain below the dam and rarely travels more than a few miles downstream" (Corps 2011). Further, as with the Lost Dutchman JD, stormwater flows within the ephemeral reach of Queen Creek downgradient of the dam are also impounded at the Central Arizona Project (CAP) Canal, east of the Town of Queen Creek. Stormwater flows from the impoundment at the CAP Canal would discharge to an ephemeral reach of Queen Creek, be intercepted by the East Maricopa Floodway, and then discharge to an ephemeral reach of the Gila River at the floodway outfall.

Given the above, it would appear that the SNAs completed for the Lost Dutchman property and the West and East Plant would greatly inform this SNA for the current Analysis Area.

SECTION II. SUMMARY OF FINDINGS

All of the potential surface water features within the Analysis Area are ephemeral drainages, flowing only briefly in direct response to storm events. Past human alteration of some of the drainage features have created impoundments (cattle tanks) that do hold water for short periods of time following storm events. However, none of the drainage features qualify as either TNWs (they have not been used, and are not susceptible for use, in interstate commerce) or relatively permanent waters (RPW; they do not flow continuously on a year-round or seasonal basis). No wetlands or other special aquatic sites were identified within the Analysis Area.

Per the December 2008 Corps/Environmental Protection Agency (EPA) guidance entitled *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in* *Rapanos v. United States and Carabell v. United States* (the Guidance), the onsite ephemeral drainages were evaluated to determine whether or not they constitute non-navigable, non-RPW tributaries possessing a significant nexus with a TNW. In Arizona's surface water quality standards, the reach of Queen Creek immediately downgradient of the Analysis Area and east of Potts Canyon is classified as an effluent-dependent water; and the reach of Queen Creek immediately downgradient of the Analysis Area and west of Potts Canyon is classified as an intermittent stream (A.A.C. Title 18, Chapter 11, Article 1). However, Queen Creek itself is not included in the Analysis Area.

The significant nexus evaluation found that none of the drainage features within the Analysis Area have more than an insubstantial or speculative effect on the physical, chemical, or biological integrity of the

downgradient TNW reach of the Gila River between Powers Butte and Gillespie Dam. Accordingly, none of the ephemeral drainage features within the Analysis Area possess a significant nexus with a downgradient TNW. Therefore, all of the drainage features considered in this analysis are non-jurisdictional.

Mapped drainages within the Analysis Area are shown in ***Attachment 3***. For the purposes of determination of significant nexus, a JD Form for each individual relevant drainage reach is provided in the included electronic database. ***Attachment 4*** provides representative ground photographs of the characteristics of the evaluated drainages. Locations of these representative ground photographs are shown in the maps provided in ***Attachment 3***.

SECTION III. CLEAN WATER ACT ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

There are no TNWs or wetlands adjacent to TNWs in the Analysis Area. The nearest downgradient confirmed TNW is the 6.9-mile reach of the Gila River between Powers Butte and Gillespie Dam, located over 113 river miles from the Analysis Area.

B. CHARACTERISTICS OF TRIBUTARY AND ITS ADJACENT WETLANDS

1. Characteristics of Non-TNWs That Flow Directly or Indirectly into TNW

Prior to conducting a field visit, WestLand interpreted regional and site-specific available aerial photography (NAIP 2010) and USGS topographical maps for the Analysis Area (Superior and Picketpost Mountain 7.5-minute Quadrangles) to identify drainages and other points of interest.

WestLand personnel visited the Analysis Area between November 26 and December 20, 2012 to assess site conditions and to document the physical characteristics of potentially jurisdictional features. WestLand collected data for drainage features at field-determined intervals. Drainage characteristics were measured at selected points where appropriate, and photographs were taken at each data point, generally alternating between upgradient and downgradient views. WestLand personnel revisited the Analysis Area in March 2013, to document the physical characteristics of identified potential wetland areas. Based upon the data collected during the field reconnaissance and review of aerial photographs and site topography, the selected data points and photo locations were digitally transferred onto a recent aerial photograph using ArcGIS. Wetland sample points and photo locations were digitized in a similar manner.

Analysis of the physical characteristics of the evaluated drainages was informed by the August 2008 delineation manual *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*, the July 2010 update to the same, and the 2007 *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* and its attachments. Evaluation of potential wetland areas was conducted following the procedures described in the 1987

Corps of Engineers Wetlands Delineation Manual and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* to that document.

In WestLand's judgment, using the practices typically utilized by the Corps in assessing ephemeral channels in the arid southwest, an OHWM is present in approximately 444,000 linear feet of ephemeral channel within the Analysis Area. OHWM characteristics consisted mainly of evidence of sediment sorting, destruction of terrestrial vegetation, and a change in substrate in the drainage as compared to the surrounding upland area. A clear, definable bed and bank was not visible for many of the drainages within Analysis Area, only being consistently present in the larger, mainstem drainages. In addition, a number of drainage features exhibited no OHWM and these features were photodocumented as well. Based on the observed width of the drainages, the estimated total area of potential non-wetland Waters is approximately 134.62 acres in the Analysis Area. The photos included in ***Attachment 4*** (which reference photo point locations reflected on ***Attachment 3***) document the drainage characteristics at the data point locations. No wetlands or other special aquatic sites were identified in the Analysis Area. ***Attachment 5*** provides documentation of wetland sampling and representative photographs for those sampling locations shown on ***Attachment 3***.

Lengths of each analyzed drainage feature were calculated using ArcGIS and included drainage meanders. The area of the identified drainages (in acres) was calculated in ArcGIS using a combination of measured feature OHWM widths at known locations and aerial photography. Average widths were calculated by dividing calculated feature areas by total feature lengths. ***Figure 4*** shows an overview of the entire Analysis Area with all delineated drainage features containing characteristics of an OHWM. Consistent with the Guidance, the following sections analyze the factors relating to the potential for a hydrological, chemical or biological nexus between the drainages in the Analysis Area and the downgradient TNW.

Hydrological Nexus Factors

Hydrology

The natural topography of the Analysis Area remains largely unaltered by human activity, but there are portions that have been influenced by historic mining activities and associated features including the underground Bomboy Mine which operated from 1916 through 1971; the Silver King Mine which operated from 1875 through 1900; and several other abandoned mine workings as indicated on the USGS quadrangle maps reviewed for the Analysis Area (Superior and Picketpost 7.5' USGS Quadrangles). Some alteration of drainages in the Analysis Area has occurred from the construction of stock tanks and the use of some of the larger mainstem drainages as access roads over the last century.

The drainages within the Analysis Area generally trend from the northeast to the southwest and consist mainly of six drainage systems (Drainages A, E, G, H, J, and K), all of which occur within the Upper Queen Creek watershed (USGS Hydrologic Unit Code [HUC] 1505010004] of the Middle Gila sub-basin. These drainages are direct tributaries to Queen Creek, which is less than one river mile downgradient of the Analysis Area. The particular reach of Queen Creek that receives flows from the Analysis Area

drainages occurs between the Town of Superior and the Bomboy Mine Road junction with Hewitt Station Road. Ultimately, all ephemeral drainages within the Analysis Area are directly or indirectly tributary to Queen Creek south of the Analysis Area.

Although several man-made impoundments and diversions are located between the Analysis Area and the downgradient TNW, a general flow path between the Analysis Area and the TNW can be discerned via a review of topographic maps and recent aerial photography (***Figure 3***). The potential flow path from the Analysis Area to the TNW includes reaches of Queen Creek, the East Maricopa Floodway (the EMF; also sometimes identified as the Roosevelt Canal), and the Gila River (***Figure 3***). In Arizona's surface water quality standards, Queen Creek is designated as effluent-dependent from the Town of Superior wastewater treatment plant to Potts Canyon, intermittent from Potts Canyon to the Whitlow Ranch Dam and the Queen Valley golf course, and ephemeral until it enters the Gila River at S. Arizona Avenue immediately south of Phoenix (A.A.C. Title 18, Chapter 11, Appendix B). Potential flows originating from the Analysis Area would discharge to both the intermittent and effluent-dependent reaches of Queen Creek.

Potts Canyon (Drainage G) serves as the bisecting feature of the Queen Creek reaches for drainages in the Analysis Area; therefore, the drainage systems in the western portion of the Analysis Area (Drainages A through G12) would discharge to the reach of Queen Creek classified as intermittent, and the drainage systems within the eastern portion of the Analysis Area would discharge to the effluent-dependent reach of Queen Creek (Drainages H through M2). Effluent-dependent waters are defined in Arizona's water quality standards regulations "as surface water that, without the…discharge of wastewater, would be an ephemeral water" (A.A.C. Title 18, Chapter 11, Article 1). The last ephemeral reach of Queen Creek includes an approximately 11-mile stretch of the EMF, a flood control channel which alternates earthen and concrete-lined reaches. The Gila River downstream of the confluence with the EMF is classified as ephemeral to the confluence with the Salt River. Beginning at the confluence of the Gila and Salt Rivers, the Gila River is an effluent-dependent water for the remainder of the 40 river miles to the TNW reach at Powers Butte (A.A.C. Title 18, Chapter 11, Appendix B). As noted here, there are no perennial reaches between the Analysis Area and the downstream TNW.

Distance to TNW

As described above, the nearest designated downstream TNW to the Analysis Area is the reach of the Gila River between Powers Butte and Gillespie Dam. Assuming the flow route described in ***Section I***, above, the drainages within the Analysis Area lie approximately 113 river miles (87 aerial miles) from this TNW.

Watershed Comparison to TNW

The watershed of the TNW reach of the Gila River, as measured at the Gillespie Dam, is 49,650 square miles. The largest system of drainages within the Analysis Area, Drainage G (Potts Canyon) and its tributaries, has an approximate watershed size of 17.76 square miles. This watershed represents approximately 0.036 percent, or less than four hundredths of a percent, of the watershed of the downgradient TNW. The remaining drainage watersheds (10.43 to 0.026 square miles) within the Analysis Area range between 0.02 and 0.00005 percent of the TNW reach of the Gila at Powers Butte.

Mean Annual Precipitation

No gages for the measurement of precipitation are located within the Analysis Area. Measures of the mean annual precipitation in the vicinity of the Analysis Area were obtained from the Western Regional Climate Center (WRCC), and are based on data collected at the National Climate Data Center (NCDC) station located in Superior (Station ID 028348) roughly 4.5 miles east of the approximate center of the Analysis Area (WRCC 2013). The records from this station show a mean annual precipitation of 18.32 inches between the years 1920 and 2006 (***Attachment 6***). For the purposes of this evaluation, mean annual precipitation for the Analysis Area is conservatively assumed to be 18 inches. The vast majority of this precipitation comes in the form of rain, although light snow is possible. The mean annual snowfall recorded by the Superior Station was 1.4 inches. The snowfall in the vicinity of the Analysis Area generally functions in the same capacity as rainfall, usually melting and running off in the course of a single day. Snowfall in the area never forms a "snow pack" in the traditional sense of that term.

Flow Event Data

No gages for the measurement of stream flow are located within the Analysis Area. The nearest downstream gages that provide stream flow data are located on Queen Creek at the Whitlow Ranch Dam. There are three gages on the dam, each maintained by a different entity: ID 6739 by the Flood Control District of Maricopa County (FCDMC), ID 09478500 by the USGS, and an unnumbered gage maintained by the Corps. Eight additional gages are located along the path of interest between the Whitlow Ranch Dam and the gage on the Gila River at Gillespie Dam, the downstream end of the TNW reach.

WestLand is aware that in documentation submitted in support of at least five previously approved jurisdictional determinations within Arizona (Wood, Patel & Associates, Inc. 2007, EcoPlan Associates, Inc. 2008, Cardno WRG 2009, CMX 2009, and WestLand 2011), other applicants evaluated the hydrologic connectivity (or lack thereof) of drainages on project sites with the nearest TNW by analyzing instances of possible coincident streamflow between the project drainages and the TNW. The West and East Plant approved JD completed by WestLand on behalf of the Applicant contained such an evaluation prepared by JE Fuller Hydrology & Geomorphology, Inc. (JEF). This evaluation of potential hydrologic connectivity included much of the flowpath from the current Analysis Area to the downgradient TNW, as the current Analysis Area lies adjacent to and west of the West and East Plant Analysis Areas for which the coincident streamflow analysis was conducted. The coincident flow analysis contained in the JEF (2011) memorandum is relevant to the potential downgradient flowpath from the current Analysis Area and is discussed in the *Potential Hydrologic Connectivity to TNW* section below.

Estimated Onsite Peak Flows

In the absence of direct gage data for flows in Analysis Area drainages, WestLand utilized the USGS Regression Equations for Region 13 (USGS 1999) to estimate a peak discharge value for the 2-year return interval (Q_2) storm event and the 100-year return interval (Q_{100}) storm event within the watershed of each of the six largest systems of drainages, Drainages A, E, G, H, J, K and their tributaries, in the Analysis Area. The equations for the USGS method were developed based on the characteristics of the various physio-geographic regions of Arizona and recorded flow events at gage stations within each region.

Although the USGS Regression Equations have a published lower watershed bound of 0.1 square miles (64 acres), these equations represent the best available estimate of flows within these watersheds in the absence of direct measurement and modeling for each tributary drainage. It is widely accepted that for watersheds less than 0.1 square miles in size, the USGS Regression Equations significantly overestimate potential peak discharge and therefore provide a highly conservative estimate of the actual flows contributed by these tributary drainages. Values for peak discharges of the Q_2 and Q_{100} recurrence interval event for selected drainage features within the Analysis Area are provided below.

Drainages A, E, G, H, J, and K are the six largest mainstem drainage features within the Analysis Area, and their watersheds, therefore, include the watershed areas of their tributary drainages. Drainage G, identified on the USGS maps as Potts and Whitford Canyons, has the largest watershed in the Analysis Area, at approximately 11,367 acres or 17.76 square miles. Using the Regression Equations for Region 13, the Q_2 recurrence interval event in Drainage G is estimated at 589 cubic feet per second (cfs), and the Q_{100} recurrence interval event at 6,405 cfs. The watershed of Drainage A (Roblas Canyon), the second largest drainage is approximately 6,672 acres or 10.43 square miles. The Q_2 and Q_{100} peak discharges for Drainage A are estimated at 450 cfs and 4,937 cfs, respectively. The remaining watershed sizes within the Analysis Area are between 4,200 acres (6.56 square miles) and 16.64 acres (0.026 square miles), and these drainages exhibit commensurately smaller flow values.

Potential Hydrologic Connectivity to TNW

Given the USGS Regression Equation discharge values calculated above, the ephemeral flow characteristics of the onsite drainages, the incidence of transportation losses through percolation (see below), and the presence of several man-made impoundment features (e.g. the Whitlow Ranch Dam, the Sonoqui Dike, gravel pit operations) along the route of potential flow, it is unlikely that potential flows in the Analysis Area reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events (i.e., greater than the 100-year storm). As described above, the potential flow path from the Analysis Area to the TNW includes reaches of Queen Creek, the EMF, and the Gila River (see ***Figure 3***). The presence of the constructed impoundments and disturbances, coupled with the great distance to the downgradient TNW (113 river miles), vastly lessens, if not removes entirely, the possibility for a more than insubstantial hydrologic connection to exist between the Analysis Area and the downgradient TNW.

The most significant of the impoundments between the Analysis Area and the TNW is the Whitlow Ranch Dam, located on Queen Creek north of Florence Junction in Pinal County approximately 2.5 river miles downgradient of the Analysis Area. The Whitlow Ranch Dam is an earthfill dam constructed by the Corps in 1960 to provide flood protection to farmland and developed areas in the eastern portion of the Phoenix Basin. The dam detains stormwater flood flows and slowly meters out water impounded in the reservoir of the dam, limiting peak discharge while increasing flow duration. The Corps' reservoir regulations website acknowledges that outflow from the dam "usually percolates into the alluvial plain below the dam and rarely travels more than a few miles downstream" (Corps 2011). The reservoir behind the dam has a total volume of 30,000 acre-feet with a peak outflow at this volume of approximately 1,004 cfs (Corps 2011).

A second impoundment, the Sonoqui Dike, is located on Queen Creek immediately upgradient of the CAP Canal, and approximately 15 miles downstream of the Whitlow Ranch Dam. This dike is part of series of flood protection structures built by the Bureau of Reclamation to protect the CAP Canal from floods. The dike, like the Whitlow Ranch Dam, is designed to detain stormwater flood flows and slowly release these potential flows downstream. The detention of flows allows sediments conveyed by stormwater to settle out of the flow and be retained behind the dike. A Public Notice for a Corps Section 404 Permit for discharge related to the proposed Queen Creek Channel Improvements Project (Corps File No. SPL-2010-00916-WHM) illustrates the effectiveness of sediment trapping behind the Sonoqui Dike. The loss of sediment supply and increased flow duration were identified in the Public Notice as contributing to the severe erosion and lateral migration of 2,400 feet of the Queen Creek channel downgradient of the dike, threatening a Pinal County-maintained bridge crossing.

In addition to the impoundments described above, potential flows within the reach of Queen Creek between the CAP Canal and the Gila River at the outfall of the EMF are further impounded by the presence of in-stream sand-and-gravel mining operations. The entirety of the channel of Queen Creek at North Schnepf Road in Queen Creek, Arizona, already restricted by housing developments and agricultural operations, is disturbed by a sand-and-gravel mining operation. Flows within this reach of the creek are impounded by existing gravel pits within the operation. A second sand-and-gravel mining operation is located in the channel of the Gila River, approximately 7 miles downstream of the outfall of the EMF into the river. A direct fluvial connection of low flow channels is visible in aerial photography between the EMF outfall and the existing gravel pits of this operation. Again, given the man-made impediments to flow and the channel disturbances described above, it is extremely unlikely that potential flows in the Analysis Area reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events.

Similar to other previously approved SNA's completed in Arizona (Wood, Patel & Associates, Inc. 2007, EcoPlan Associates, Inc. 2008, Cardno WRG 2009, CMX 2009, and WestLand 2011) an evaluation of potential coincident stream flow between drainages in the Analysis Area was performed using gage data from instruments located along the path of interest between the Whitlow Ranch Dam and the gage on the Gila River at Gillespie Dam, the downstream end of the TNW reach.

JEF (2011) identified ten gaged locations along the path of interest from the Whitlow Ranch Dam to the Gila River at the Gillespie Dam all of which are relevant to the Near West Analysis Area (***Figure 5***). These locations and their associated gages (operated by various entities including the Corps, the USGS, the FCDMC, and Pinal County) are presented in ***Table 1*** below. The flow recorded at the gages of the Whitlow Ranch Dam were used as a proxy indicator of flow in the ungaged drainages of the West and East Plant which likely greatly overestimated the frequency and duration of any potential flows within those drainages due to the distance from Whitlow Ranch Dam, the intervening ephemeral (losing) reach of Queen Creek, the relatively small size of the drainages and their associated watersheds relative to the watershed of the dam, and the detaining effect of the dam. As this previous evaluation included the entirety of the flow path between the current Analysis Area and the downgradient TNW, its findings are highly relevant to the current SNA.

Table 1. Summary of Gages used in Coincident Flow Analysis

Gage Name	Operator	Gage ID	Dates of Operation
Whitlow Ranch Dam	FCDMC	6739	8/2/2000 to 2011
Queen Creek below Whitlow Dam NR Superior, AZ	USGS	09478500	1917-59 and 2001 to 2011
Whitlow Ranch Dam	Corps	None	1917, 1948-59 and 2011
Queen Creek at CAP	FCDMC	6723	1/14/1999 to 2011
Queen Creek at Ironwood Rd.	Pinal County	719	5/22/2008 to 2011
Queen Creek at Rittenhouse Rd.	FCDMC	6707	9/14/1993 to 2011
EMF at Arizona Ave.	FCDMC	6598	2/10/1989 to 2011
Gila at Maricopa Rd.	FCDMC	778	4/9/1995 to 2011
Gila River near Maricopa, AZ	USGS	09479350	5/19/1995 to 2011
Gila River near Laveen, AZ	USGS	09479500	1916, 1926, 1940-95
Gila River at 116th Ave.	FCDMC	6848	12/16/1998 to 2011
Gila at Estrella Parkway	FCDMC	6853	12/2/1992 to 2011
Gila River at Estrella Parkway near Goodyear, AZ	USGS	09514100	10/1/1992 to 2011
Gila River below Gillespie Dam, AZ (Low Water Gage)	USGS	09519501	10/1/1992 to 2011

(Adapted from JEF 2011 Table 4)

Data measurements for the available period of record of each of the gages were downloaded and overlain in a matrix for the coincident flow analysis. The analysis identified an overlapping period of concurrent operation of slightly more than 10 years, between the year 2000 and 2011 (JEF 2011). Mean daily flow rate data from the gages for these 10 years, a period from 2000 to 2010, was then analyzed for instances of non-zero flow at each gage, and these instances correlated to identify potential concurrent flow in the path of interest between Whitlow Ranch Dam and the Gila River at Gillespie Dam. For the purposes of this analysis, potential concurrent flow was defined as recorded flow at all gages in the reach of interest in the same day.

Based on the analysis of gage data, no flow was present at the Whitlow Ranch Dam for approximately 98 percent of the 10-year period of record (JEF 2011). Similarly, no flow was recorded for 97 percent of the period of record on Queen Creek at the CAP Canal (Gage 6723), and 96 percent of the period of record on the EMF at Arizona Avenue (Gage 6598), the point at which the EMF enters the Gila River. Analysis of the 10-year period of record identified no instances of potential concurrent flow within the reach of interest. JEF (2011) selected five different two-week periods of gage data correlated with known sizeable precipitation events in central Arizona: January 2005, February 2005, January 2008, January 2010, and March 2010. In only one of these two-week periods, from January 17 through January 30, 2010, was flow recorded at all gages within the reach of interest over a period of several days (JEF 2011).

Although the data do not illustrate instances of coincident flow along the entire path of interest, the analysis of these five two-week periods do show instances of coincident flow from the Whitlow Ranch Dam on Queen Creek to the Gila River at the EMF outfall (JEF 2011). The data suggest large transmission losses, likely due to percolation, along Queen Creek to the Sonoqui Dike and the EMF, and within the EMF itself upstream of the outfall into the Gila River. The data also suggest that those stormwater flows which do discharge to the Gila River from the EMF are lost through percolation into the alluvium of the Gila River and are not transmitted downstream (JEF 2011). The Natural Resource Conservation Service (NRCS) soil survey data maps the soils along the segment of Queen Creek immediately downgradient of the Whitlow Ranch Dam as Carrizo family-Brios-Riverwash complex, 0 to 5 percent slopes (NRCS 2009). The NRCS characterizes the Carrizo family-Brios-Riverwash complex as excessively drained soils formed in alluvium from mixed sources with a hydrologic soil group rating of A. Group A soils typically consist of more than 90 percent sand or gravel with high infiltration rates, even when thoroughly wetted. The low runoff potential of the local soils and the low slope gradient of the downgradient alluvial fans and basin fills can be expected to contribute to the percolation of potential stormwater flows.

Given the USGS Regression Equation discharge values calculated above, the flow characteristics of the onsite drainages, the incidence of transportation losses through percolation, and the presence of several man-made impoundment features (e.g. the Whitlow Ranch Dam, the Sonoqui Dike, gravel pit operations) along the route of potential flow, it is highly unlikely that potential flows in the Analysis Area reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events (i.e., greater than the 100-year storm). The runoff calculations, the previous analysis performed by JEF (2011) and geomorphology of the flow path provide evidence that normal flows, as well as flows as high as the 100-year runoff event, from the Analysis Area would not reach the Gila River for potential transmission to the TNW reach at Powers Butte. Although potential concurrent flow is infrequently present (less than two percent, or 87 days, of the 10-year period of record) between the Whitlow Ranch Dam and the EMF at Arizona Avenue, gage data suggest that these flows are not transmitted downstream, but rather lost to percolation before reaching the gage on the Gila River at Maricopa Avenue, less than 13 river miles downstream of the EMF and more than 59 river miles upstream of the TNW reach at Powers Butte. The evidence presented in the above discussion suggests that very little potential exists for hydrologic connectivity between the ephemeral drainages within the current Analysis Area and the downstream TNW.

Physical/Chemical Nexus Factors

The significant distance between the Analysis Area and the downgradient TNW, as well as the presence of several constructed impediments to flow, suggests that there is no potential for the drainages within the Analysis Area to have more than an insubstantial or speculative effect on the physical or chemical integrity of the TNW. Within the Analysis Area, potential pollutant sources consist mainly of historic mining features and other abandoned mine workings as indicated on the USGS quadrangle maps (Superior and Picketpost 7.5' USGS Quadrangles). The reach of Queen Creek downgradient from the Analysis Area to Whitlow is currently listed as impaired for copper in the 2010 Arizona Department of Environmental Quality (ADEQ) 303(d) Impaired Waters List (ADEQ 2012). Considering the proximity

of the impaired segment of Queen Creek, it is possible that the previous mining activities within the Analysis Area over the last century have contributed to the impairment status of this reach. Unconsolidated sediment from unpaved roads within the Analysis Area, particularly those roads which utilize drainage bottoms, is also a potential pollutant source.

Of particular concern for the Gila River (including the designated TNW stretch) are the effects of nitrogen and phosphorous contamination from agricultural fertilizers and residues of agricultural pesticides. Of note, most of the TNW reach of the Gila River is listed as impaired (ADEQ 2012) for waterborne concentrations of the elements boron and selenium, as well as concentrations of DDT metabolites, toxaphene, and chlordane found in fish tissue, all a result of current and historic agricultural activities. No agricultural activities exist in the Analysis Area or in immediate proximity to the area. Therefore, even if there were regular hydrologic connectivity between the ephemeral drainages of the Analysis Area and the TNW, these would not be expected to contribute the pollutants causing current impairment in the TNW.

The reach of the Gila River between its confluences with the Salt River and Waterman Wash (which lies downstream of the Analysis Area and above the TNW reach of the Gila River) has been sampled for copper by ADEQ as part of the agency's CWA 303(d) impaired waters assessment program. There were no exceedances of copper concentrations in this reach of the Gila River identified by this sampling effort.

As evidenced in the previous section, there is little to no hydrological connection between the Analysis Area drainages and the Gila River, even in the 100-year runoff event. Additionally, transport of sediment from the Analysis Area would be significantly impeded, if not completely precluded, by the presence of the Whitlow Ranch Dam, the Sonoqui Dike, and other man-made impoundments and disturbances along the downstream flow path. Whitlow Ranch Dam is known to function as an effective sediment trap, as is the Sonoqui Dike, evidenced by the Section 404 Permit Public Notice for the Queen Creek Channel Improvements Project (Corps File No. SPL-2010-00916-WHM). Additionally, the ephemeral drainages within the Analysis Area do not possess the required surface flow and hyporheic zone identified by Alexander et al. (2007) as important in the removal of upstream pollutant inputs, particularly nitrogen compounds. Therefore, the drainages in the Analysis Area are not expected to either contribute or filter pollutants, or contribute sediments at an amount or frequency that would affect the chemical or physical integrity of the downstream TNW.

Based on the above analysis, the drainages within the Analysis Area do not have more than an insubstantial or speculative effect on the physical or chemical integrity of the TNW. No potential sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff), have been identified in the Analysis Area. Potential sediment transport from the Analysis Area is precluded or at least significantly impeded by the presence of numerous impoundments along the downstream flow path, particularly Whitlow Ranch Dam and the Sonoqui Dike.

Biological/Ecological Nexus Factors

In discussing biological considerations, the Guidance notes that ephemeral tributaries in the arid west may provide habitat for wildlife and aquatic organisms in downstream TNWs. The drainages within the Analysis Area are all ephemeral and do not provide habitat or life cycle support functions for aquatic

species. Winter (2007) notes that "nearly all streams need to have some contribution from ground water in order to provide reliable habitat for aquatic organisms." Moreover, the significant distance (113 river miles and 87 aerial miles) between the drainages in the Analysis Area and the TNW effectively limits the ability of these drainages to provide habitat for species that also use the TNW.

Native vegetation along the ephemeral drainages in the Analysis Area is characteristic of the Arizona Upland subdivision of Sonoran Desertscrub as described by Brown (1994). Native vegetation between the Analysis Area and the Gila River is generally xeroriparian in nature and characteristic of the Arizona Upland and Lower Colorado River subdivisions of the Sonoran Desertscrub biotic community (Brown 1994). These xeroriparian habitats support a variety of common plant species, most of which also occur within adjacent upland habitats. The xeroriparian habitats subject to this analysis are interrupted downstream from the Analysis Area by man-made impoundments (described above) and residential and commercial development in the East Phoenix Valley. The drainages within the Analysis Area do not provide significant habitat or life cycle support functions for any species population found within the TNW reach of the Gila River beginning at Powers Butte. This lack of life cycle support can be extended to include potential contributions of nutrients and organic carbon to species within the TNW.

Headwater streams provide an input of dissolved organic matter and particulate matter that is transported downstream to receiving waters (Wipfli et al. 2007). The drainages within the Analysis Area are ephemeral streams and do not contain aquatic resources that are dependent upon allochthonous inputs to establish and maintain the energy and nutrient dynamics of these systems. Desert streams depend more on nutrient inputs from surrounding land than on upstream inputs. The xeroriparian habitats associated with the downstream ephemeral waters are not expected to be dependent upon energy or nutrient inputs from the Analysis Area. Almost all of the species found within these habitats are also found in adjacent uplands, and many of the species are able to fix nitrogen. These systems do not provide significant nutrient cycling and energy functions to downstream habitats. Given these conditions, the drainages within the Analysis Area do not significantly affect the integrity of the aquatic habitat or the amount of nutrient transport to the TNW reach of the Gila River.

Although a full biological evaluation has not been completed for this significant nexus analysis, a preliminary screening analysis (***Attachment*** *7*) shows that one federally listed and two candidate species have some potential to occur on or within the vicinity of the Analysis Area: Acuña cactus (*Echinomastus erectocentrus* var. *acunensis*), Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*), and the Sonoran desert tortoise (*Gopherus agassizii*). None of these species are aquatic or riparian, and there is no designated critical habitat within the Analysis Area or along the downgradient flow path to the nearest TNW. Based on the above, the Analysis Area drainages do not have more than an insubstantial or speculative effect on the ecological or biological integrity of the TNW.

2. Characteristics of Wetlands Adjacent to Non-TNW That Flow Directly or Indirectly into TNW

As described above, no wetlands were identified within the Analysis Area. ***Attachment 5*** provides documentation of wetland sampling and representative photographs for those sampling locations shown on ***Attachment 3***.

C. Significant Nexus Determination

Based on the information provided in Section III.B, above, none of the drainage features within the Analysis Area possesses a significant nexus with a designated TNW. A summary of drainage features possessing the physical characteristics of an OHWM is provided as ***Attachment 8***. All surface water features identified within the Analysis Area are delineated on recent aerial photography in ***Attachments 3a and 3b*** of this document. The drainage features within the Analysis Area constitute non-navigable, non-RPW tributaries, which do not possess a significant nexus with a downgradient TNW. Therefore, none of the subject drainages are jurisdictional Waters

D. Determinations of Jurisdictional Findings

As described above, none of the ephemeral drainages within the Analysis Area have more than an insubstantial or speculative effect on the physical, chemical, or biological integrity of the downgradient TNW reach of the Gila River between Powers Butte and Gillespie Dam.

E. Isolated Waters, the Use, Degradation, or Destruction of Which Could Affect Interstate Commerce Connection

WestLand and the Applicant have analyzed the drainages in the Analysis Area using a significant nexus analysis under the Rapanos Guidance. None of the drainage features within the Analysis Area were considered as isolated Waters.

F. Non-Jurisdictional Waters

All of the surface water features considered in this analysis are non-jurisdictional. A summary of drainage features possessing the physical characteristics of an OHWM is provided as ***Attachment 8***. All surface water features identified within the Analysis Area are delineated on recent aerial photography in ***Attachments 3a and 3b*** of this document.

REFERENCES

Army Corps of Engineers. 2011. *Whitlow Ranch Dam*. Los Angeles District, Reservoir Regulations webpage. Available at:http://www.spl.usace.army.mil/Missions/CivilWorks/Media/FactSheets/tabid/1321/Article/2716/dam-safety-program.aspx

Alexander, Richard B., Elizabeth W. Boyer, Richard A. Smith, Gregory E. Schwartz, and Richard B. Moore. 2007. The Role of Headwater Streams in Downstream Water Quality. *Journal of the American Water Resources Association*, 43(1):41-59.

Arizona Department of Environmental Quality (ADEQ). 2012. *2010 Status of Water Quality, Arizona's Integrated 305(b) and 303(d) Listing Report*. EQR-12-01. June 2012.

Brown, D.E. (ed.). 1994. *Biotic communities: Southwestern United States and Northwestern Mexico*. University of Utah Press: Salt Lake City.

Cardno WRG. 2009. *Sonoran Solar Energy Project Significant Nexus Analysis*. Army Corps of Engineers File No. SPL-2009-00397-JD2. Cardno WRG, Scottsdale Arizona

CMX, LLC. 2009. *Jurisdictional Delineation Report Section 20*. Army Corps of Engineers File No. SPL-2009-00557-RWF. CMX, LLC, Phoenix Arizona.

EcoPlan Associates, Inc. 2008. *Lost Dutchman Heights, Apache Junction, Arizona: Significant Nexus Analysis* (Revised). Army Corps of Engineers File No. SPL-2008-00674-SDM. EcoPlan Associates, Inc., Arizona.

JE Fuller Hydrology and Geomorphology, Inc. (JEF). 2011. *Resolution Copper: Significant Nexus Evaluation*. JE Fuller Hydrology and Geomorphology, Inc., Phoenix, Arizona.

U.S. Geological Survey (USGS). 1999. *The National Flood-Frequency Program: Methods for Estimating Flood Magnitude and Frequency in Arizona*. U.S. Geological Survey Fact Sheet 111-98.

Western Regional Climate Center (WRCC). 2013. Period of Record Monthly Climate Summary for Superior, Arizona Station (028348). Available at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?az8348. Website accessed February 7, 2013.

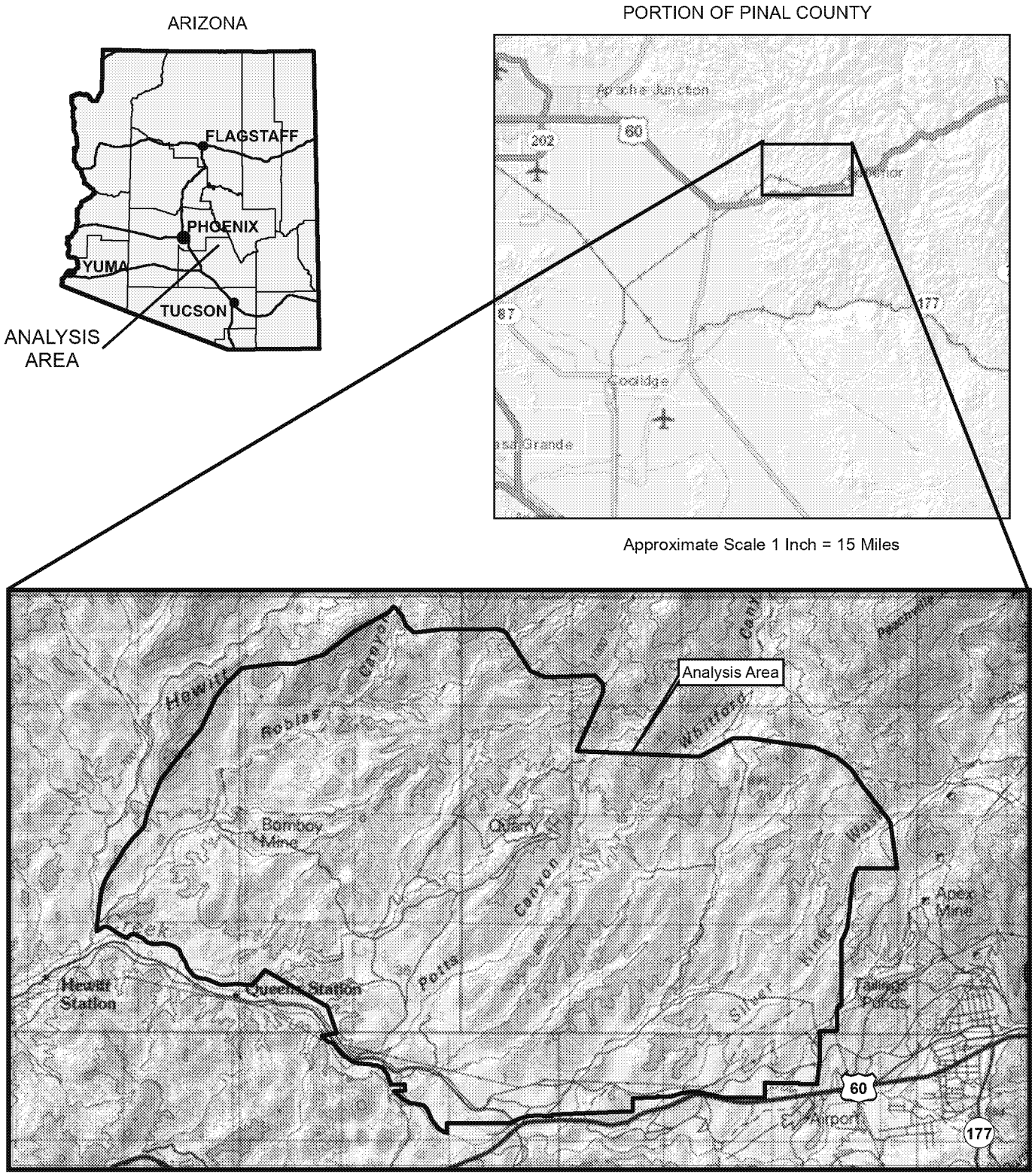
WestLand Resources, Inc. 2011. *Jurisdictional Determination for the Resolution West Plant and East Plant Analysis Area* (revised). Corps File No. SPL-2009-00315-MB. WestLand Resources, Inc., Tucson, Arizona.

Winter, Thomas C. 2007. The Role of Ground Water in Generating Streamflow in Headwater Area and in Maintaining Base Flow. *Journal of the American Water Resources Association*, 43(1):15-25.

Wipfli, Mark S., John S. Richardson, and Robert J. Naiman. 2007. Ecological Linkages Between Headwaters and Downstream Ecosystems: Transport of Organic Matter, Invertebrates, and Wood Down Headwater Channels. *Journal of the American Water Resources Association*, 43(1):72-85.

Wood, Patel & Associates. 2007. *Flow Characteristics of Washes at the Trillium Development, Maricopa, Arizona*. WP# 062878.01/Army Corps of Engineers File No. SPL-2008-00333-SDM-JD1. Wood, Patel & Associates, Phoenix, Arizona.

FIGURES



T1S R11E Portion of Sections 13-15, 22-28, 33-36,
T1S R12E Portion of Sections 17-22, 27-34,
T2S R11E Sections 1-3; T2S R12E Sections 4-6,
Pinal County, Arizona,
Pickpost Mountain & Superior USGS 7.5' Quadrangle
Projection: UTM NAD83, Zone 12
Service Layer Credits: Sources: Esri, DeLorme,

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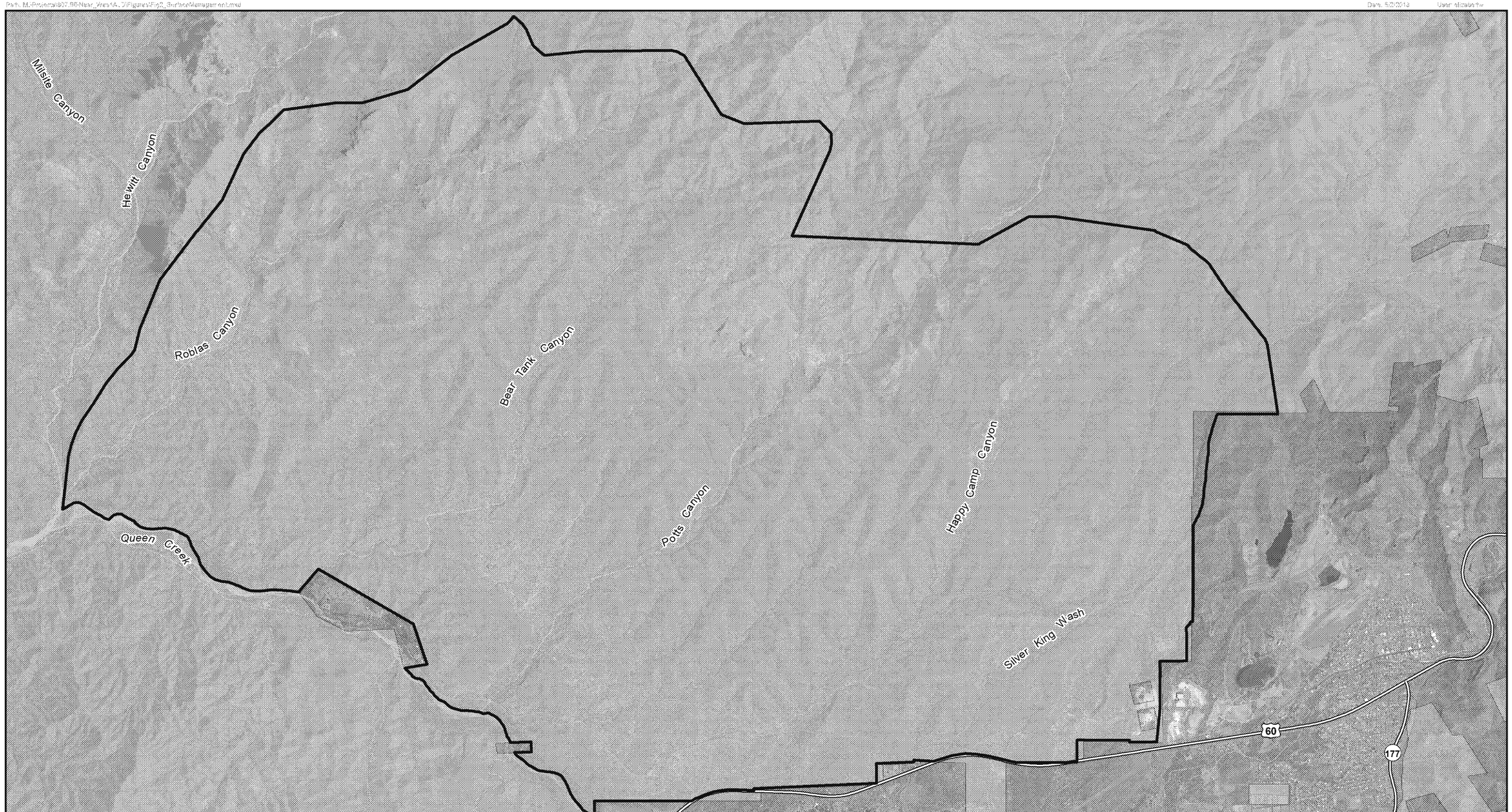
N

0 3,500 7,000 Feet

NEAR WEST ANALYSIS AREA
Jurisdictional Waters Determination

ANALYSIS AREA VICINITY MAP
Figure 1



T1S R11E Portion of Sections 13-15, 22-28, 33-36,
T1S R12E Portion of Sections 17-22, 27-34,
T2S R11E Sections 1-3; T2S R12E Sections 4-6,
Pinal County, Arizona,
Projection: UTM NAD83, Zone 12
Image Source: NAIP 2010

N

0 1,500 3,000 Feet

Legend

Analysis Area

Surface Management

Private Land (No Color)

Tonto National Forest (USFS)

NEAR WEST ANALYSIS AREA

Jurisdictional Waters Determination

ANALYSIS AREA OVERVIEW WITH LAND OWNERSHIP

Figure 2

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Path: M:\Projects\807.90\Near_West\AJD\Figures\Fig3_TNW_Regional_Overview.mxd

T1S R11E Portion of Sections 13-15, 22-28, 33-36,
T1S R12E Portion of Sections 17-22, 27-34,
T2S R11E Sections 1-3; T2S R12E Sections 4-6,
Pinal County, Arizona.
Projection: UTM NAD83, Zone 12
Service Layer Credits: Source: Esri, i-cubed, USDA,

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N

0 3 6 Miles

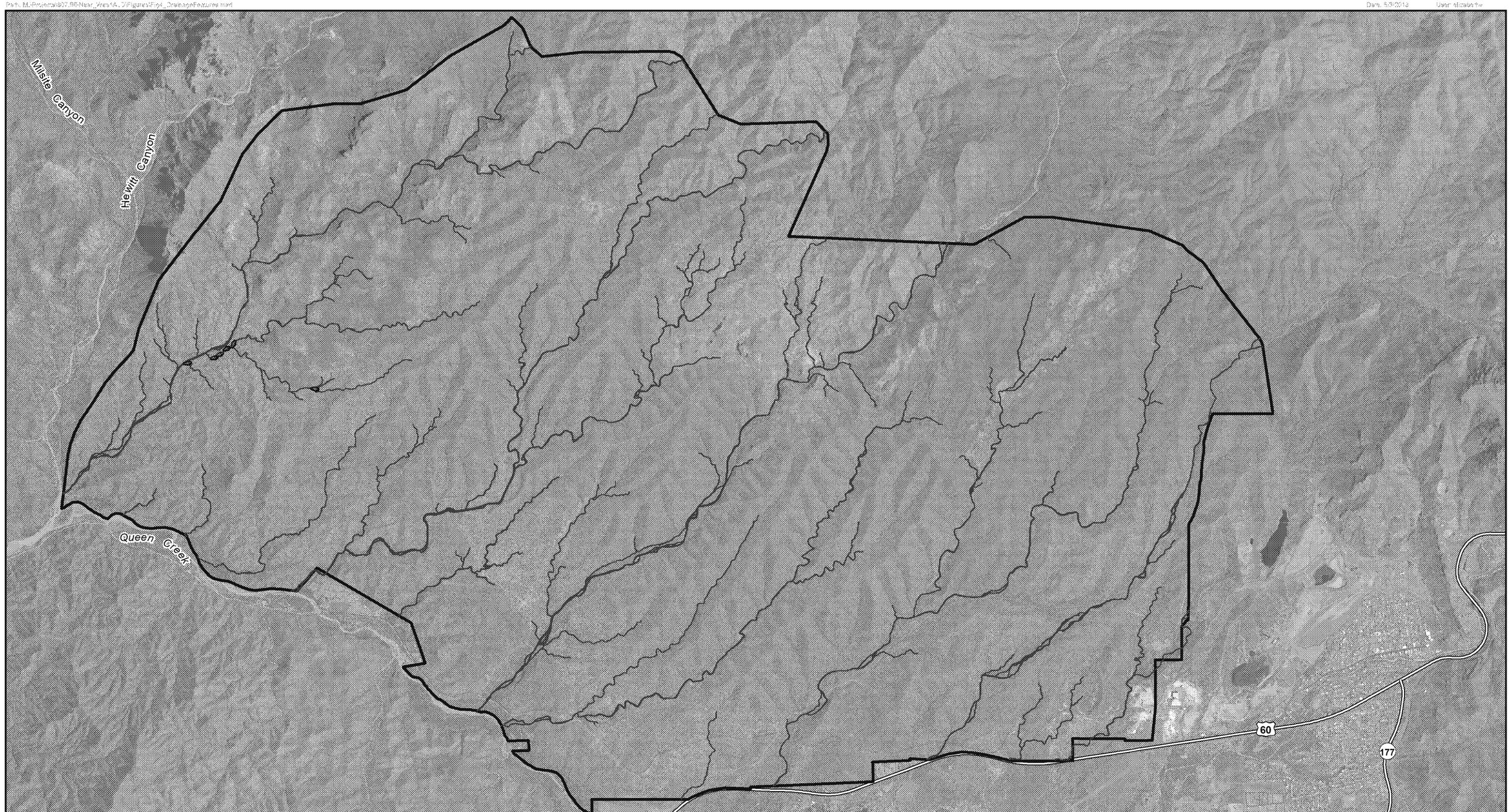
LEGEND

- General Downstream Flow Path
- Traditional Navigable Water
- Analysis Area

NEAR WEST ANALYSIS AREA

Jurisdictional Waters Determination

REGIONAL OVERVIEW
Figure 3



T1S R11E Portion of Sections 13-15, 22-28, 33-36,
T1S R12E Portion of Sections 17-22, 27-34,
T2S R11E Sections 1-3; T2S R12E Sections 4-6,
Pinal County, Arizona,
Projection: UTM NAD83, Zone 12
Image Source: NAIP 2010

N

0 1,500 3,000 Feet

Legend

- Flow Arrow
- Drainage Feature
- Analysis Area

NEAR WEST ANALYSIS AREA
Jurisdictional Waters
Determination

DELINEATED DRAINAGE FEATURES
Figure 4

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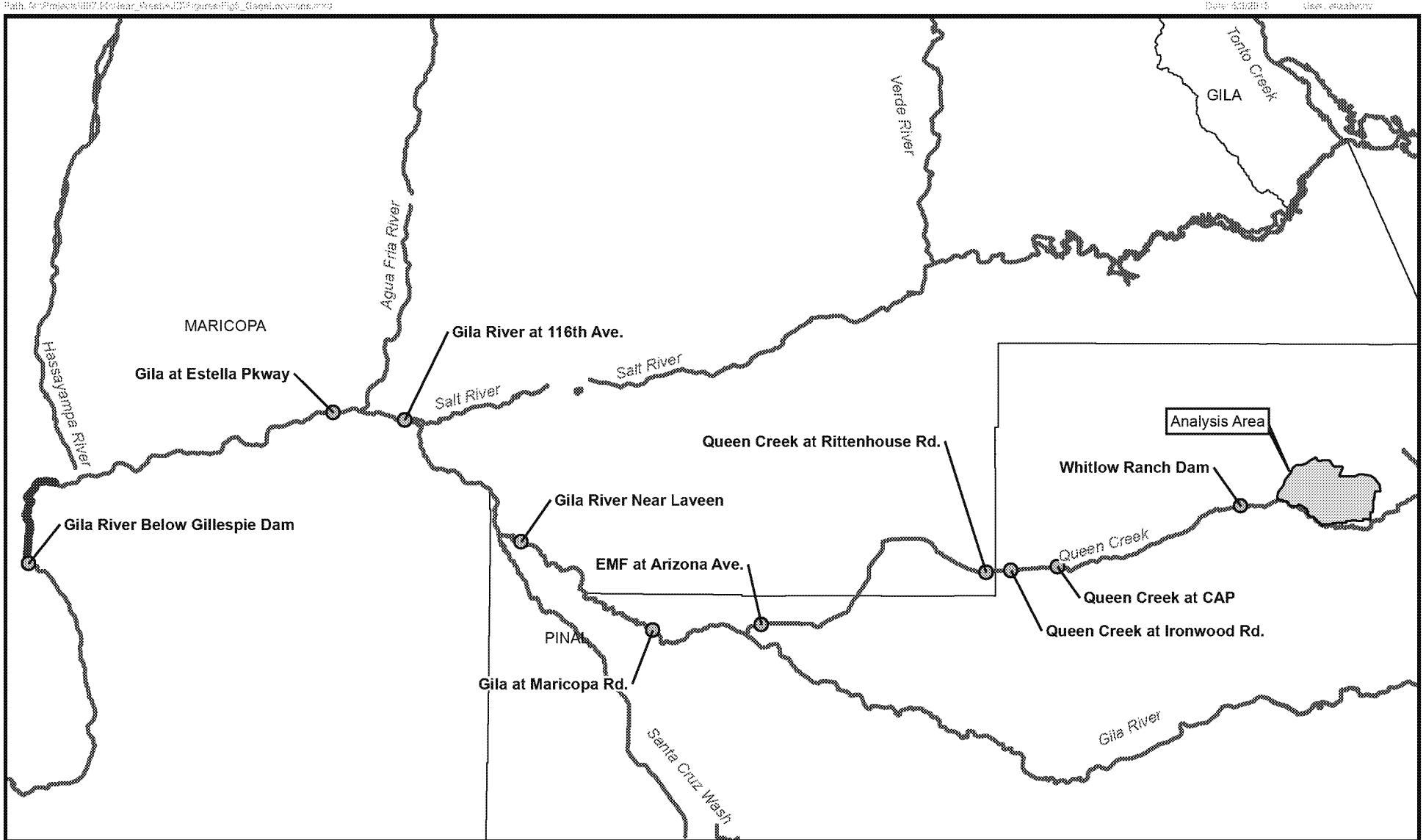

Legend

- Analysis Area
- Stream Gage between Analysis Area and TNW
- Traditional Navigable Water (TNW)

N

0 5 10 Miles

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NEAR WEST ANALYSIS AREA

Jurisdictional Waters Determination

GAGE LOCATIONS

Figure 5

ATTACHMENT 1

AGENT DESIGNATION AND AUTHORIZATION FOR FEDERAL ACCESS

Resolution Copper Mining

102 Magma Heights - P.O. Box 1944
Superior, AZ 85273
Tel.: (520) 689-9374 - Fax: (520) 689-9304

January 24, 2014

Ms. Sallie Diebolt
US ARMY CORPS OF ENGINEERS
3636 North Central Avenue
Suite 900
Phoenix, Arizona 85012

RE: JURISDICTIONAL WATERS DETERMINATION FOR THE NEAR WEST ANALYSIS AREA, PINAL COUNTY, ARIZONA
AGENT DESIGNATION AND ACCESS AUTHORIZATION

Dear Ms. Diebolt:

I am sending this letter to designate WestLand Resources, Inc. as my agent for the purposes of any necessary Clean Water Act Section 404 permitting at the above project. The agent contact information is:

Mr. Brian Lindenlaub
WestLand Resources, Inc.
4001 E. Paradise Falls Drive
Tucson, Arizona 85712
(520) 206-9585

The Analysis Area subject to this jurisdictional determination represents a mix of privately and publically held lands. Publically held lands within the Analysis Area are managed by the Tonto National Forest. The Owner of Record of the privately held lands within the Analysis Area is:

Name: Resolution Copper Company
Mailing Address: 102 Magma Heights
City/State/Zip Code: Superior, Arizona 85273
Telephone Number: 520-689-3313

ACCESS AUTHORIZATION:

I hereby authorize the Army Corps of Engineers and other federal employees the right to access the private property to conduct field investigations for the jurisdictional delineation and for Clean Water Act Section 404 permitting purposes.

If you have any questions or require additional information, please do not hesitate to contact me.

Respectfully,

Signature of Owner Representative	Date
Ms. Vicky Peacey	(520) 689-3313
Typed/Printed Name of Representative	Phone Number

Senior Manager – Environment and External Affairs
Title of Representative

ATTACHMENT 2

DIRECTIONS TO SITE

Google

Directions to Silver King Mine Rd, Superior, AZ 85173
56.2 mi – about **59 mins**

A I-10 E

1. Head **south** on **I-10 E**	go 0.3 mi total 0.3 mi
2. Slight right onto **US-60 E** (signs for **Mesa - Globe**) About 49 mins	go 53.7 mi total 54.0 mi
3. Turn left onto **Silver King Mine Rd** About 10 mins	go 2.2 mi total 56.2 mi

B Silver King Mine Rd, Superior, AZ 85173

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ED_013248_00000351-00028

ATTACHMENT 3

CWA SECTION 404 JURISDICTIONAL DETERMINATION

SEE WEBSITE

https://maps.westlandresources.com/maps/nearwestjd/

ATTACHMENT 4

REPRESENTATIVE GROUND PHOTOGRAPHS

SEE WEBSITE

https://maps.westlandresources.com/maps/nearwestjd/

ATTACHMENT 5

WETLAND SAMPLING DOCUMENTATION

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC State: AZ Sampling Point: 1

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): cattle tank Local relief (concave, convex, none): concave Slope (%): <1

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3076 Long: -111.1423 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling Point 1 is on the fringe of a cattle tank, just uphill from the water line. See photos 2534-2544 (sampling points 1 and 2).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *N/A*			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Lycium sp.*	trace	N	UPL
2.			
3.			
4.			
5.			
	<1	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Sisymbrium irio*	15	Y	UPL
2. *Malva sp.*	1	N	UPL
3. *Lotus sp.*	1	N	UPL
4. *Erodium cicutarium*	1	N	UPL
5. *Cryptantha sp.*	1	N	UPL
6. *Brassica tournefortii*	1	N	UPL
7.			
8.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	20 (A)		100 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/2	100					Loamy sand	
7+	N/A						gravel	Restrictive gravel bar

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Gravel

Depth (inches): 7

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
✓ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 2

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Four wetland hydrology indicators are present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC State: AZ Sampling Point: 2

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): cattle tank Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3076 Long: -111.1423 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling Point 2 is located along the upper slope of a cattle tank. See photos 2534-2544 (sampling points 1 and 2).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis velutina*	10	Y	FACU
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Lycium sp.*	1	N	UPL
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	3	Y	UPL
2. *Erodium cicutarium*	1	Y	UPL
3. *Brassica tournefortii*	1	Y	UPL
4. *Sphaeralcea sp.*	trace	N	UPL
5. *Lotus sp.*	trace	N	UPL
6. *Pectocarya*	trace	N	UPL
7. *Amsinckia sp.*	trace	N	UPL
8. *Schismus*	trace	N	UPL
	5 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	5	x 5 =	25
Column Totals:	15 (A)		65 (B)

Prevalence Index = B/A = 4.33

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-11	7.5YR 4/3	100					Loamy sand	
11+	N/A						cobble	Restrictive cobble bar

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: cobble

Depth (inches): 11

Hydric Soil Present? Yes _____ No ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators are present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC State: AZ Sampling Point: 3

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): wash Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3096 Long: -111.1410 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling Point 3 is located in a sandy-bottom wash atop a grassy shelf. See photos 2545-2548.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis velutina*	3	N	FACU
2. *Parkinsonia microphylla*	1	N	UPL
3.			
4.			
	4 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Ambrosia ambrosioides*	<1	N	UPL
2.			
3.			
4.			
5.			
	<1 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	5	Y	UPL
2. *Amsinckia sp.*	trace	N	UPL
3. *Pectocarya*	trace	N	UPL
4. *Rafinesquia sp.*	trace	N	UPL
5.			
6.			
7.			
8.			
	5 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	5 (A)		25 (B)

Prevalence Index = B/A = 5.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100					sand	
6-10	10YR 3/3	100					gravelly sand	
10+	7.5 YR 3/2	100					gravelly sand	
								Particles become more coarse with increasing depth.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No wetland hydrology indicators are present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC State: AZ Sampling Point: 4

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): wash Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3095 Long: -111.1410 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling Point 4 is located within the channel bottom of a sandy-bottom wash. See photos 2549-2552.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*	50	Y	FACW
2.			
3.			
4.			
	50 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Ambrosia ambrosioides*	1	N	UPL
2. *Baccharis sarothroides*	trace	N	FACU
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	20	Y	UPL
2. *Cynodon dactylon*	20	Y	FACU
3. *Lupinus sp.*	trace	N	UPL
4. *Lillium sp.*	trace	N	UPL
5. *Sphaeralcea sp.*	trace	N	UPL
6. *Lotus sp.*	trace	N	UPL
7.			
8.			
	40 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	21	x 5 =	105
Column Totals:	91 (A)		285 (B)

Prevalence Index = B/A = 3.13

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					sand	
4-6	5YR 3/2	100					sand	
6-12	10 YR 4/2	100					clay loam	restrictive root layer at 12 in.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: root layer

Depth (inches): 12

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
✓ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Only one secondary wetland hydrology indicator is met. Wetland hydrology is not present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC State: AZ Sampling Point: 5

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): wash Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3092 Long: -111.1413 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling Point 5 is located immediately upstream of a dam built within a sandy-bottom wash. See photos 2553-2556.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*	30	Y	FACW
2. *Prosopis velutina*	1	N	FACU
3.			
4.			
	31	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Ambrosia ambrosioides*	trace	N	UPL
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	35	Y	FACU
2. *Mimulus guttatus*	2	N	OBL
3. *Lupinus sp.*	trace	N	UPL
4.			
5.			
6.			
7.			
8.			
	37	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 63 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	36	x 4 =	144
UPL species	0	x 5 =	0
Column Totals:	68 (A)		206 (B)

Prevalence Index = B/A = 3.03

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/1	100					sand	Gravel/cobble mixed in
10+	N/A						N/A	Water table

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
✓ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
✓ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes ✓ No _____ Depth (inches): 10

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 5

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Four primary and one secondary wetland hydrology indicators are present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC State: AZ Sampling Point: 6

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): wash Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3090 Long: -111.1414 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

Sampling Point 6 is located downstream of a dam built within a sandy-bottom wash. See photos 2557-2560.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis velutina*	5	Y	FACU
2. *Parkinsonia florida*	5	Y	UPL
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Lycium sp.*	1	N	UPL
2.			
3.			
4.			
5.			
	1	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	15	Y	UPL
2. *Brassica tournefortii*	3	N	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	18	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 82 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	24	x 5 =	120
Column Totals:	29 (A)		140 (B)

Prevalence Index = B/A = 4.83

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 3/1	100					sand	
5+	N/A						N/A	Bedrock restrictive layer.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Bedrock

Depth (inches): 5

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 5

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 1

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary and one secondary wetland hydrology indicators are present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC. State: AZ Sampling Point: 7

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3097 Long: -111.1424 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling Point 7 is located within a mesquite bosque. Hackberry trees are also present. One willow tree is present within the narrow channel bed. The water table appears to be very deep below the surface. See photos 2561-2566.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis velutina*	40	Y	FACU
2. *Celtis reticulata*	10	N	FAC
3. *Salix laevigata*	8	N	FACW
4. *Ziziphus obtusifolia*	3	N	UPL
	61	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Ziziphus obtusifolia*	3	N	UPL
2.			
3.			
4.			
5.			
	3	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	50	Y	UPL
2. *Brassica tournefortii*	30	Y	UPL
3. *Lamium amplexicaule*	10	N	UPL
4. *Amsinckia sp.*	trace	N	UPL
5.			
6.			
7.			
8.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	8	x 2 =	16
FAC species	10	x 3 =	30
FACU species	40	x 4 =	160
UPL species	96	x 5 =	480
Column Totals:	154 (A)		686 (B)

Prevalence Index = B/A = 4.45

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	7.5YR 3/2	100					loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators are present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Near West City/County: Pinal County Sampling Date: 3-5-2013

Applicant/Owner: Resolution Copper Mining, LLC State: AZ Sampling Point: 8

Investigator(s): T. Embrey, M. Wendell Section, Township, Range: _____

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): LRR D (Interior Deserts) Lat: 33.3095 Long: -111.1419 Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Sampling Point 8 is located within a mesquite bosque. Hackberry trees are also present. One willow tree is present within the narrow channel bed. The water table appears to be deep below the surface. See photos 2567-2573.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Prosopis velutina*	25	Y	FACU
2. *Salix laevigata*	5	N	FACW
3. *Parkinsonia florida*	2	N	UPL
4.			
	32	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Ziziphus obtusifolia*	10	Y	FACU
2. *Lycium sp.*	2	N	UPL
3.			
4.			
5.			
	12	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	40	Y	UPL
2. *Brassica tournefortii*	20	Y	UPL
3. *Lamium amplexicaule*	7	N	UPL
4. *Bowlesia incana*	3	N	FACU
5. *Galium aparine*	1	N	FACU
6. *Amsinckia sp.*	1	N	UPL
7. *Erodium cicutarium*	trace	N	UPL
8.			
	72	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1. *N/A*			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 28 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	39	x 4 =	156
UPL species	72	x 5 =	360
Column Totals:	116 (A)		526 (B)

Prevalence Index = B/A = 4.53

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

Salix laevigata (one large individual) looks nearly dead. Hydrophytic vegetation not present. Neither dominance nor prevalence index tests were passed.

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 4/2	100					sandy clay loam	
6-8	10YR 3/2	100					sand	
8+	10YR 3/2	100					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks:

Hydric soil indicators are not present. Hydric soil criteria is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators are present.

ATTACHMENT 6

SUPERIOR
(STATION ID 028348)
PRECIPITATION DATA

SUPERIOR, ARIZONA

Period of Record General Climate Summary - Precipitation

Station:(028348) SUPERIOR														
From Year=1920 To Year=2006														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.		>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year
	in.	in.	-	in.	-	in.	dd/yyyy or yyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	2.00	11.29	1993	0.00	1924	2.56	24/1943	5	4	2	0	0.3	6.4	1933
February	1.98	7.34	2005	0.00	1924	2.53	13/2005	5	4	1	0	0.5	7.5	1939
March	2.02	7.48	1992	0.00	1933	3.66	22/1954	5	4	2	0	0.3	6.0	1922
April	0.80	3.89	1952	0.00	1937	1.49	02/1999	3	2	1	0	0.1	2.5	1921
May	0.34	2.60	1992	0.00	1929	1.73	02/1941	2	1	0	0	0.0	0.0	1921
June	0.26	2.06	1955	0.00	1923	1.24	23/1972	1	1	0	0	0.0	0.0	1921
July	1.91	5.84	1921	0.04	1995	2.00	18/1976	7	4	1	0	0.0	0.0	1921
August	2.80	11.03	1963	0.47	1952	3.80	14/1990	8	5	2	1	0.0	0.0	1920
September	1.48	5.36	1983	0.00	1928	2.75	18/1946	4	3	1	0	0.0	0.0	1920
October	1.18	8.68	1972	0.00	1934	3.72	30/1959	3	2	1	0	0.0	0.0	1920
November	1.41	5.85	1931	0.00	1929	2.66	13/1941	4	2	1	0	0.0	3.0	1964
December	2.11	10.43	1965	0.00	1929	2.92	15/1967	5	4	2	1	0.2	4.5	1968
Annual	18.30	35.77	1978	4.90	2002	3.80	19900814	54	35	13	4	1.4	8.0	1976
Winter	6.09	23.65	1993	0.12	2006	2.92	19671215	16	11	4	1	1.0	9.0	1969
Spring	3.16	11.57	1941	0.01	1955	3.66	19540322	10	6	2	1	0.4	8.0	1976
Summer	4.97	11.22	1990	0.81	2002	3.80	19900814	16	10	3	1	0.0	0.0	1921
Fall	4.07	12.21	1972	0.20	1938	3.72	19591030	11	8	3	1	0.0	3.0	1964

Table updated on Oct 31, 2012

For monthly and annual means, thresholds, and sums:
Months with 5 or more missing days are not considered
Years with 1 or more missing months are not considered
Seasons are climatological not calendar seasons

Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May

Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

Western Regional Climate Center, wrcc@dri.edu

ATTACHMENT 7

SPECIAL STATUS SPECIES SCREENING FOR THE ANALYSIS AREA

ATTACHMENT 7

SPECIAL STATUS SPECIES SCREENING ANALYSIS FOR THE NEAR WEST ANALYSIS AREA

A screening analysis for federally listed and protected species is provided below (***Table 1***). The criteria used to classify the potential for occurrence of the species included in this screening analysis are defined as follows:

1) Present: Habitat characteristics suitable for the taxon are present within the Analysis Area, the taxon has been recently recorded within the Analysis Area, and the taxon is expected to occupy the Analysis Area on a regular basis.

2) Possible: Habitat characteristics suitable for the taxon are present in the Analysis Area, the currently known geographic and elevational distribution of the taxon includes the Analysis Area, but the taxon has not been documented within the Analysis Area.

3) Unlikely: Habitat characteristics suitable or marginally suitable for the taxon are present within the Analysis Area, the Analysis Area is outside, but within the vicinity of, the currently known geographic or elevational distribution of the taxon, and this distribution is not considered highly restricted (see below). Taxa are also considered unlikely to be present within the Analysis Area if suitable habitat characteristics are not present, but the taxon of interest is highly mobile (e.g. most bats and birds), and thus could pass over or through the Analysis Area.

4) None: The Analysis Area is outside of the currently known geographic or elevational distribution of the taxon, and habitat characteristics suitable for the taxon are not present. Taxa with highly restricted ranges and limited mobility (e.g., springsnails) are considered to have no potential to occur if the site is outside their known ranges, even if the suitable habitat characteristics are present onsite.

ED_013248_00000351-00053

Table 1. Special Status Species Screening Analysis for the Near West Analysis Area. Species range and habitat data were obtained primarily from information provided by Arizona Game and Fish Department (AGFD) Heritage Data Management System (HDMS) abstracts (AGFD 2013), unless otherwise specified.

Species and ESA Status*	Known Geographic Range and Habitat Preference(s)	Potential to occur within the Analysis Area
PLANTS		
Nichol's Turk's head cactus (*Echinocactus horizonthalonius* var. *nicholii*) **Federal Listing Status:** Endangered (USFWS 1979b) **Critical Habitat:** No **Recovery Plan:** Yes (USFWS 1986a)	**Range:** The main range of the species (*E. horizonthalonius*) is centered in New Mexico and Texas. The nearest known population is in the Waterman Mountains west of Tucson in Pima County approximately 65 mi (105 km) from the Analysis Area. Also known from the Vekol Mountains in southwestern Pinal County. **Habitat:** Sonoran Desertscrub habitats at the foot of limestone mountains and on inclined terraces and saddles within limestone mountains. **Elevation:** Between 2,400 to 4,000 ft (730 to 1,220 m) **Reference(s):** AGFD 2008	**Potential to occur**: None. The Analysis Area is outside of the known geographic range of this species, but because the species has highly disjunct populations in northern Mexico, southern Arizona, and geology matching the apparent habitat requirements (Paleozoic rock) are found in small outcroppings and hills in the northwestern corner of the Analysis Area. Survey for this cactus was conducted. No Nichol's Turk's head cactus were observed during survey.
Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*) **Federal Listing Status:** Endangered (USFWS 1979a) **Critical Habitat:** No **Recovery Plan:** Draft (Fletcher 1983)	**Range:** Central Arizona, from Pinal and Gila counties. This includes the Pinal, Dripping Springs, Superstition and Mescal mountains. It also can be found in the highlands between Globe and Superior. **Habitat:** Open slopes and cracks and crevices between boulders in Interior Chaparral and Madrean Evergreen Woodland habitats. Associated with Apache Leap Tuff, Cretaceous or Tertiary Granite, and Pinal Schist substrates. **Elevation:** Between 3,300 and 6,360 ft (1,006 and 1,940 m) **Reference(s):** AGFD 2003	**Potential to occur**: None. The Analysis Area is below the known elevation range and does not contain the vegetation communities with which this species is associated. Because the Analysis Area contains areas of Pinal Schist, some survey for this plant was conducted, focusing on the Pinal schist rock type in the areas above 3,000 ft (914 m) elevation. No AHC were observed during survey.
Acuña cactus (*Echinomastus erectocentrus* var. *acuñensis*) **Federal Listing Status:** Endangered (USFWS 2013b) **Critical Habitat:** Yes (USFWS 2013b) **Recovery Plan:** No	**Range:** Western Pima, Maricopa, and Pinal counties **Habitat:** Arizona Upland Sonoran Desertscrub on open knolls and ridges in granitic soils between major washes. **Elevation:** Between 1,300 and 2,625 ft (400 and 800 m) **Reference(s):** AGFD 2011a; USFWS 2013a	**Potential to occur**: Possible. The nearest known population is the hills between Florence and Kearny (SEINet 2013). Because the Analysis Area contains suitable habitat of Arizona Upland Sonoran Desertscrub, granitic soils, and is within the elevation range of the species, some survey for this plant was conducted, focusing on the granitic soils. No Acuña cactus were observed during survey.

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Species and ESA Status*	Known Geographic Range and Habitat Preference(s)	Potential to occur within the Analysis Area
	F I S H	
Desert pupfish (*Cyprinodon macularius*) **Federal Listing Status:** Endangered (USFWS 1986b) **Critical Habitat:** Yes (USFWS 1986b) **Recovery Plan:** Yes (USFWS 1993a)	**Range:** Historically occurred throughout the lower Gila River basin in the U.S. and Mexico. No natural populations persist in Arizona; currently managed at discrete natural and artificial refuge sites. **Habitat:** Occupies shallow, clear waters with soft substrates. **Elevation:** Between1,200 and 3,450 ft (366 and 1,052 m) **Reference(s):** AGFD 2001a	**Potential to occur**: None. No suitable aquatic habitat is present in the Analysis Area. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.
Gila chub (*Gila intermedia*) **Federal Listing Status:** Endangered (USFWS 2005) **Critical Habitat:** Yes (USFWS 2005) **Recovery Plan:** No	**Range:** Santa Cruz River (Cienega Creek, Sabino Creek, and Sheehy Spring), Middle Gila River (Eagle, Bonito, and Harden Cienega Creeks and San Carlos and Blue Rivers), San Pedro River (Bass, O'Donnell, and Redfield Canyons, Babocomari River and Turkey Creek), Agua Fria River (Silver and Sycamore Creeks), Salt River (Fish and Cave Creeks), and Verde River (Spring and Walker Creeks) **Habitat:** Smaller headwater streams, pools, springs, and cienegas in a diversity of aquatic habitats including vegetated backwaters, deep pools, riffles and undercut banks. **Elevation:** 2,700–5,500 ft (829- 1,652 m) **Reference(s):** AGFD 2002a	**Potential to occur**: None. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.
Roundtail Chub (*Gila robusta*) **Federal Listing Status:** Candidate (USFWS 2009) **Critical Habitat:** No **Recovery Plan:** No	**Range:** Tributaries of Little Colorado River Basin River (2 tributaries), Bill Williams River (8 tributaries), Salt River (4 tributaries), Verde River (5 tributaries), Aravaipa Creek, and Eagle Creek. **Habitat:** Mid-elevation streams and rivers of moderate temperatures. Adults use deep pools, up to 6.5 ft (2 m) deep, adjacent to riffles and runs. Cover usually present including large boulders, down dead woody debris, undercut banks, bedrock, and root masses. **Elevation:** 1,000–7,500 ft (305 – 2,286 m) but most often between 2,000 to 5,000 ft (610 – 1,524 m) **Reference(s):** AGFD 2002b, USFWS 2009	**Potential to occur:** None. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.

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Species and ESA Status*	Known Geographic Range and Habitat Preference(s)	Potential to occur within the Analysis Area
Spikedace (*Meda fulgida*) **Federal Listing Status:** Endangered (USFWS 2012b) **Critical Habitat:** Yes (USFWS 2012b) **Recovery Plan:** Yes (USFWS 1990b)	**Range:** Currently found in Arizona in Aravaipa Creek and may still be present in the upper Verde River basin and the Gila River from the San Pedro River to the Ashurst-Hayden Dam. Recent reintroductions have occurred at Fossil Creek, Gila County; Hot Springs and Redfield canyons, Cochise and Graham Counties; and Bonita Creek in Graham County. **Habitat:** Found in mid-water runs, pools and swirling eddies. Often congregate at the downstream ends of riffles and eddies. In larger streams they are generally found only at mouths of creeks. Juveniles inhabit backwaters over silt and sand. Periodic scouring floods are important for spikedace to withstand exotic species invasions. **Elevation:** Between 1,620 to 4,500 ft (494 – 1,372 m) **Reference(s):** AGFD 2002d, USFWS 2012b	**Potential to occur:** None. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.
Gila topminnow (*Poeciliopsis occidentalis occidentalis)* **Federal Listing Status:** Endangered (USFWS 1967) **Critical Habitat:** No **Recovery Plan:** Yes (Draft: USFWS 1999)	**Range:** Historically distributed throughout the Gila River Basin. **Habitat:** Headwater springs, vegetated margins and backwater areas of intermittent to perennial streams and rivers. **Elevation:** 1,300-7,500 ft (396 – 2,286 m) but most populations occur below 5,000 ft (1,524 m) **Reference(s):** AGFD 2001b	**Potential to occur**: None. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.
Loach minnow (*Tiaroga cobitis*) **Federal Listing Status:** Endangered (USFWS 2012b) **Critical Habitat:** Yes (USFWS 2012b) **Recovery Plan:** Yes (USFWS 1990a)	**Range:** Historically distributed throughout the Gila River Basin. **Habitat:** Turbulent, rocky riffles of mainstream rivers and tributaries with gravel or cobble bottoms. Sometimes associated with dense filamentous algae. Restricted almost exclusively to a bottom dwelling habitat. **Elevation:** 2,325-8,240 ft (709 – 2,512 m) **Reference(s):** AGFD 2010a	**Potential to occur:** None. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.

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Species and ESA Status*	Known Geographic Range and Habitat Preference(s)	Potential to occur within the Analysis Area
Razorback Sucker (*Xyrauchen texanus*) **Federal Listing Status:** Endangered (USFWS 1991) **Critical Habitat:** Yes (USFWS 1994) **Recovery Plan:** Yes (USFWS 1998, 2002a)	**Range:** Endemic to large rivers throughout the Colorado River Basin. Natural populations occur in Lake Mohave, Green River Basin, and upper Colorado River Basin. Designated critical habitat includes parts of the Colorado, Gila, Salt, and Verde rivers. **Habitat:** Found in a variety of slow-water habitats in medium to large rivers including backwaters. In impoundments, prefer depths of one meter over mud, sand, or gravel. Optimal temperatures occur between 71-77°F. Records in Arizona occur between 180-5,000 feet. **Elevation:** Below 6,000 ft (1,829 m) **Reference(s):** AGFD 2002c	**Potential to occur:** None. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.
R E P T I L E S		
Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) **Federal Listing Status:** Candidate (USFWS 2010a) **Critical Habitat:** No **Recovery Plan:** No	**Range:** Occurs from Pima County in the Avra and Santa Cruz Valleys and from western Pinal and a portion of Maricopa counties. **Habitat:** Creosote-mesquite flood plain habitats, with soils described as soft, sandy loams with sparse gravel. **Elevation:** 785-1,662 ft (240 – 507 m) **Reference(s):** AGFD 2010b	**Potential to occur:** None. The Analysis Area is outside the known geographic and elevational range of this species.
Sonoran Desert Tortoise (*Gopherus morafkai*) **Federal Listing Status:** Candidate (USFWS 2010b) **Critical Habitat:** No **Recovery Plan:** No	**Range:** Occurs throughout Arizona's Sonoran desert with appropriate habitat. Eastern edge of range extends to the middle San Pedro River. **Habitat:** Found primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub; also found associated with caliche caves (shelter sites) along lower Sonoran desert washes. **Elevation:** 510 – 5,300 ft (155 – 1615 m) **Reference(s):** AGFD 2010c	**Potential to occur:** Present. Because the Analysis Area is within geographic range and suitable habitat is present, survey was conducted for this species. Sonoran desert tortoise was observed within the Analysis Area.

Species and ESA Status*	Known Geographic Range and Habitat Preference(s)	Potential to occur within the Analysis Area
Northern Mexican garter snake (*Thamnophis eques megalops*) **Federal Listing Status:** Proposed Threatened (USFWS 2013c) **Critical Habitat:** Proposed (USFWS 2013d) **Recovery Plan:** No	**Range:** Populations are generally found south of Gila River. **Habitat:** Inhabits densely vegetated habitats along water sources. **Elevation:** 3,000 to 5,000 ft (914 to 1,524 m) **Reference(s):** Brennan and Holycross 2006, AGFD 2012	**Potential to occur**: None. The Analysis Area is outside the known geographic range for the species and does not contain suitable aquatic habitat.
B I R D S		
Yellow-billed cuckoo (*Coccyzus americanus*) **Federal Listing Status:** Proposed Threatened (USFWS 2013f) **Critical Habitat:** No **Recovery Plan:** No	**Range:** A late spring migrant from South America, cuckoos breed throughout the western U.S. They occur in west, central and southeastern Arizona. **Habitat:** Typically associated with rivers and streams supporting dense, humid, riparian woodlands (e.g., cottonwood, willow, tamarisk galleries, and mesquite bosques). In southeastern Arizona they are known to nest along intermittent streams supporting dense stands of mesquite and netleaf hackberry. **Elevation:** Below 6,700 ft (2,042 m) but more typically below 5,000 ft (1,524 m) **Reference(s):** AGFD 2011b, Corman and Wise-Gervais 2005	**Potential to occur**: None. No suitable riparian habitat occurs within the Analysis Area.
Southwestern willow flycatcher (*Empidonax traillii extimus*) **Federal Listing Status:** Endangered (USFWS 1995a) **Critical Habitat:** Yes (USFWS 2013e) **Recovery Plan:** Yes (USFWS 2002b)	**Range:** A late spring migrant from South America, cuckoos breed throughout the western U.S. They occur in west, central and southeastern Arizona. **Habitat:** Typically associated with rivers and streams supporting dense, humid, riparian woodlands (e.g., cottonwood, willow, tamarisk galleries, and mesquite bosques). In southeastern Arizona they are known to nest along intermittent streams supporting dense stands of mesquite and netleaf hackberry. **Elevation:** Below 6,700 ft (2,042 m) but more typically below 5,000 ft (1,524 m) **Reference(s):** AGFD 2011b, Corman and Wise-Gervais 2005	**Potential to occur**: None. No suitable riparian habitat occurs within the Analysis Area.

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Species and ESA Status*	Known Geographic Range and Habitat Preference(s)	Potential to occur within the Analysis Area
Yuma Clapper Rail (*Rallus longirostris yumanensis*) **Federal Listing Status:** Endangered (USFWS 1967) **Critical Habitat:** No **Recovery Plan:** Yes (Draft: USFWS 2010a)	**Range:** Lower Colorado River and tributaries from Gulf of California to Topock Marsh (Havasu National Wildlife Refuge) **Habitat:** Freshwater or brackish marshes. Prefer the tallest, densest stands of cattails and bulrushes and inhabit the area where standing water is replaced by moist soils. **Elevation:** Below 4,500 ft (1,372 m) **Reference(s):** AGFD 2006, Corman and Wise-Gervais 2005	**Potential to occur**: None. No suitable marsh habitat is present within the Analysis Area.
Mexican spotted owl (*Strix occidentalis lucida*) **Federal Listing Status:** Threatened (USFWS 1993b) **Critical Habitat:** Yes (USFWS 2004) **Recovery Plan:** Yes (USFWS 2012d)	**Range:** Patchily distributed in forested area throughout Arizona. **Habitat:** Breed primarily on dense old growth mixed conifer forests. **Elevation:** Between 3,700 – 9,600 ft (1,128 – 2,926 m) in Arizona **Reference(s):** AGFD 2005	**Potential to Occur**: None. The Analysis Area is below the known elevation range for this species and well outside the designated critical habitat boundary.
M A M M A L S		
Ocelot (*Leopardus pardalis*) **Federal Listing Status:** Endangered (USFWS 1982) **Critical Habitat:** No **Recovery Plan:** Yes (USFWS 2010b)	**Range:** Established sightings in Arizona are rare for this species. A male was killed by a vehicle on US 60 between Globe and Superior in April 2010. **Habitat:** Occupies dense thickets that are almost impenetrable in chaparral and thornscrub. **Elevation:** Below 4,000 ft (1,200 m) **Reference(s):** AGFD 2010d	**Potential to occur**: Unlikely. The Analysis Area is outside the known geographic range for the species.

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Species and ESA Status*	Known Geographic Range and Habitat Preference(s)	Potential to occur within the Analysis Area
Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) **Federal Listing Status:** Endangered (USFWS 1988) **Critical Habitat:** No **Recovery Plan:** Yes (USFWS 1995b)	**Range:** A summer migrant that winters in Central America, Lesser Long-nosed bats are found locally in the U.S. only in southern Arizona and extreme southwestern New Mexico from April to late-September. Peripheral observations exist from the Phoenix area and the Pinaleño Mountains. **Habitat:** Sonoran desertscrub through semi-desert grasslands and into oak woodlands where columnar cacti and agaves occur. Roosts in caves, abandoned mines and occasionally old buildings. Forages at night on nectar, pollen, and possibly fruit of columnar cacti and agaves. **Elevation:** Between 1,200 – 7,300 ft (366 – 2,225 m) but more often below 5,500 ft (1,676 m) **Reference(s):** AGFD 2011c	**Potential to occur**: Unlikely. The Analysis Area is outside the known geographic range for the species.

* U.S. Fish & Wildlife Service Categories:

Endangered
Taxa in danger of extinction throughout all, or a significant portion, of its range.

Threatened
Taxa likely to become Endangered in the foreseeable future throughout all, or a significant portion, of its range.

Candidate
Taxa for which sufficient data exist to support proposals to list, but formal proposals to list the species as Threatened or Endangered have not been made by the USFWS because this action is precluded by other listing activity.

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REFERENCES

Arizona Game and Fish Department. 2001a. *Cyprinodon macularius*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.

_____. 2001b. *Poeciliopsis occidentalis occidentalis*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

_____. 2002a. *Gila intermedia.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 9 pp.

_____. 2002b. *Gila robusta.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

_____. 2002c. *Xyrauchen texanus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.

_____. 2002d. *Meda fulgida*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.

_____. 2002e. *Empidonax traillii extimus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

_____. 2003. *Echinocereus triglochidiatus* var. *arizonicus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.

_____. 2005. *Strix occidentalis lucida.* Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 11 pp.

_____. 2006. *Rallus longirostris yumanensis*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 11 pp.

_____. 2008. *Echinocactus horizonthalonius* var. *nicholii*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.

_____. 2010a. *Tiaroga cobitis*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

_____. 2010b. *Chionactis occipitalis klauberi*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.

_____. 2010c. *Gopherus morafkai*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 11 pp.

ED_013248_00000351-00061

_____. 2010d. *Leopardus pardalis*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.

_____. 2011a. Echinomastus erectocentrus var. acunensis. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.

_____. 2011b. *Coccyzus americanus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

_____. 2011c. *Leptonycteris curasoae yerbabuenae*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.

_____. 2012. *Thamnophis eques megalops*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.

Brennan, T.C., and A.T. Holycross. 2006. A Field Guide to Amphibians and Reptiles in Arizona. Arizona Game & Fish Department. Phoenix, AZ.

Corman, T.E., and C. Wise-Gervais. 2005. Arizona Breeding Bird Atlas. University of New Mexico Press, Albuquerque.

SEINet. 2013. Southwest Environmental Information Network. http://swbiodiversity.org/seinet/index.php. Accessed February 2013.

U.S. Fish & Wildlife Service. 1967. Office of the Secretary Native Fish and Wildlife Endangered Species. Federal Register 32 (48): 4001.

_____. 1979a. Determination that Echinocereus triglochidiatus var. arizonicus is an Endangered Species: Final Rule. Federal Register 44(208):61556

_____. 1979b. Determination that Echinocactus horizonthalonius var. nicholii is an Endangered Species. Federal Register 44 (209): 61927.

_____. 1982. Endangered and Threatened Wildlife and Plants, Proposed Endangered Status for U.S. Populations of Five Species. Federal Register 45 (145): 49844.

_____. Fletcher, R. 1983. Recovery Plan for the Arizona Hedgehog Cactus Echinocereus triglocidiatus Engelmann var. arizonicus (Rose ex Orcutt) L. Benson: Agency Review Draft.28 pp.

_____. 1986a. Nichol Turk's Head Cactus (*Echinocactus horizonthalonius* var. *nicholii*) Recovery Plan. Albuquerque, New Mexico. 74 pp.

_____. 1986b. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status and Critical Habitat for the Desert Pupfish. Federal Register 51 (61): 10842.

ED_013248_00000351-00062

_____. 1988. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Two Long-nosed Bats. Federal Register 53 (190): 38456.

_____. 1990a. Loach Minnow Recovery Plan. Albuquerque, New Mexico. 38 pp.

_____. 1990b. Spikedace Recovery Plan. Albuquerque, New Mexico. 38 pp.

_____. 1991. Endangered and Threatened Wildlife and Plants; The Razorback Sucker (*Xyrauchen texanus*) Determined to be an Endangered Species. Federal Register 56 (205): 54958

_____. 1993a. Desert Pupfish Recovery Plan. Phoenix, Arizona. 67 pp.

_____. 1993b. Endangered and Threatened Wildlife and Plants; Final Rule to List the Mexican Spotted Owl as a Threatened Species. Federal Register 58 (49): 14248.

_____. 1994. Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Colorado River Endangered Fishes: Razorback Sucker, Colorado Squawfish, Humpback Chub, and Bonytail Chub. Federal Register 59 (54): 13374.

_____. 1995a. Endangered and Threatened Wildlife and Plants; Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher. Federal Register 60 (38): 10694.

_____. 1995b. Lesser Long-nosed Bat Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 45 pp.

_____. 1998. Razorback sucker (*Xyrauchen texanus*) Recovery Plan. Denver, Colorado. 81 pp.

_____. 1999. Gila Topminnow (*Poeciliopsis occidentalis occidentalis*), Revised Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

_____. 2002a. Razorback Sucker (*Xyrauchen texanus*) Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan. U.S. Fish & Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado.

_____. 2002b. Southwestern Willow Flycatcher Recovery Plan. Albuquerque, New Mexico. i-ix +210 pp., Appendices A-O

_____. 2004. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Mexican Spotted Owl. Federal Register 69 (168): 53182.

_____. 2005. Endangered and Threatened Wildlife and Plants; Listing Gila Chub as Endangered With Critical Habitat. Federal Register 70 (211): 66664.

_____. 2009. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions. Federal Register 74 (215): 57804.

ED_013248_00000351-00063

_____. 2010a. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Tucson Shovel-nosed Snake (*Chionactis occipitalis klauberi*) as Threatened or Endangered with Critical Habitat. Federal Register 75(61): 16050-16065.

_____. 2010b. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Sonoran Population of the Desert Tortoise as Endangered or Threatened; Proposed Rule. Federal Register 75 (239): 78094-78146.

_____. 2010c. Endangered and Threatened Wildlife and Plants; Draft Yuma Clapper Rail (*Rallus longirostris yumanensis*) Recovery Plan, First Revision. Federal Register 75 (27): 6697.

_____. 2010d. Draft Ocelot (*Leopardus pardalis*) Recovery Plan, First Revision. U.S. Fish and Wildlife Service, Southwest Region, Albuquerque, New Mexico.

_____. 2012a. Endangered and Threatened Wildlife and Plants; 12-Month Finding for the Lemmon Fleabane; Endangered Status for the Acuña Cactus and the Fickeisen Plains Cactus and Designation of Critical Habitat. Federal Register 77 (192): 60510.

_____. 2012b. Endangered and Threatened Wildlife and Plants; Endangered Status and Designations of Critical Habitat for Spikedace and Loach Minnow; Final Rule. Federal Register 77 (36): 10810.

_____. 2012c. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions (NMGS and SDT and TSNS). Federal Register 77 (225): 69994.

_____. 2012d. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions; Proposed Rule. Federal Register 77 (225): 69994.

_____. 2012e. Final Recovery Plan, First Revision; Mexican Spotted Owl. Federal Register 77 (242): 74688.

_____. 2013a. Federally Listed Threatened, Endangered, and Candidate Species for Pinal County, updated February 5, 2013. Arizona Ecological Field Services Office. Available at: http://www.fws.gov/southwest/es/arizona/Documents/CountyLists/Pinal.pdf. Accessed May 28, 2013.

_____. 2013b. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Echinomastus erectocentrus var. acunensis (Acuña Cactus) and Pediocactus peeblesianus var. fickeiseniae (Fickeisen Plains Cactus) Throughout Their Ranges; Final Rule. Federal Register 78(190): 60608-60652.

ED_013248_00000351-00064

_____. 2013c. Endangered and Threatened Wildlife and Plants; Threatened Status for the Northern Mexican Gartersnake and Narrow-headed Gartersnake; Proposed Rule. Federal Register 78(132): 41500-41547.

_____. 2013d. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Northern Mexican Gartersnake and Narrow-Headed Gartersnake; Proposed Rule. Federal Register 78 (132): 41550-41608.

_____. 2013e. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Southwestern Willow Flycatcher. Federal Register 78 (2): 344.

_____. 2013f. Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*); Proposed Rule. Federal Register 78(192): 61622-61666.

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ATTACHMENT 8

SUMMARY OF DRAINAGE FEATURES EVALUATED

(CURRENTLY BEING DEVELOPED)