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**ARIZONA HEDGEHOG CACTUS SURVEY  
OF PROPOSED RE-ALIGNMENT OF MAGMA MINE ROAD**

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## 1. INTRODUCTION

WestLand Resources, Inc. (WestLand) was retained by Resolution Copper Company to conduct surveys for Arizona hedgehog cactus (AHC; *Echinocereus arizonicus* var. *arizonicus*) in the vicinity of East Plant (*Figure 1*), along portions of the existing Magma Mine Road, and along the proposed re-alignment of Magma Mine Road (*Figure 2*).

AHC is federally listed as endangered without critical habitat throughout its entire range in Arizona. This species is one of 1,700 native plants that were proposed for listing as endangered by the U.S. Fish and Wildlife Service (USFWS) on June 16, 1976 (USFWS 1976). On October 25, 1979, the USFWS published the final rule listing the AHC as an endangered species (USFWS 1979).

AHC is known to occur in portions of the highlands of Pinal and Gila Counties. AHC are found in Pinal County in the vicinity of Dripping Springs, the Superstition and Mescal Mountains, the highlands between Globe and Superior, and in Devils Canyon and Queen Creek along the Gila/Pinal County line above 3,300 ft (1,000 m) (AGFD 2008, TNF 1996). This species occurs from 3,300 to 5,700 ft (1,000-1,740 m) (TNF 1996) on open slopes and cracks and crevices between boulders in Interior Chaparral and Madrean Evergreen Woodland habitats (Brown 1994).

## 2. METHODS

WestLand biological field technicians surveyed the Magma Mine Road for AHC during April, 2012. The survey was timed to coincide with the flowering season of the AHC when the brilliant red flowers enhance observers' ability to detect the plant.

[REDACTED]

[REDACTED] The total area of the survey was approximately 70 acres (28 ha).

The area was surveyed by observers walking parallel belt transects that averaged 30 ft (10 m) in width. During the ground search, transect widths were determined by the density of vegetation. In dense stands of vegetation transects, widths were reduced as appropriate in order to achieve full survey coverage. Within each transect, observers slowly walked in a zigzag pattern inspecting the ground surface to the front, sides, and rear. To facilitate control, the outside observer maintained position with the aid of a Trimble® Geo XH GPS unit into which the roadway boundaries had been programmed. Transects were organized to take advantage of topography, road cuts, vegetation openings, or other features of the landscape to ensure efficient and complete coverage of all portions of the surveyed area.

Upon locating an AHC, the plant was marked with a numbered metal tag, representative photos taken from the side and top of each plant, and the GPS coordinates in NAD 83 were stored in a handheld Garmin™ GPS. Data collected about each plant included the total number of stems, the height of each stem, the number of vegetative offsets (pups), any evidence of human disturbance or animal damage, and the four nearest woody plants to the AHC were identified. An intensive search for other AHC was conducted within the immediate vicinity of an AHC discovered during this survey.

Due to safety concerns, visual survey of inaccessible cliff walls and rock outcroppings were conducted by glassing with binoculars. Binocular surveys were conducted from a safe vantage point that offered the best view of the target area. The observer glassed the area in overlapping sweeps with the binoculars, choosing obvious landmarks to use as reference points.

All data, including scanned images of the field datasheets and photographs were entered into an Access database for analysis, management and record keeping purposes.

### 3. RESULTS

WestLand surveyed 70 acres (28 ha) along the existing and proposed realignment of Magma Mine Road. There were two AHC detected and tagged in the survey. [REDACTED]

[REDACTED]

[REDACTED] The field data sheets for each plant are provided in *Appendix B*. The data collected and links to each photo page and datasheet have been entered into an Access database for long-term record keeping.

### 4. REFERENCES

Arizona Game and Fish Department (AGFD). 2008. Heritage Data Management System. Species abstracts and maps. Available at internet site: [http://www.azgfd.com/w\\_c/edits/hdms\\_abstracts.shtml](http://www.azgfd.com/w_c/edits/hdms_abstracts.shtml). Accessed multiple dates June-July 2008.

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U.S. Fish and Wildlife Service (USFWS). 1976. Endangered and Threatened Wildlife and Plants: Proposed Endangered status for some 1,700 US vascular plant taxa. *Federal Register* 41: 24523-24572.

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## FIGURES





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**APPENDIX A  
AHC DETECTED  
DURING MAGMA MINE  
ROAD SURVEY**





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**APPENDIX B**  
**DATA SHEETS OF AHC**  
**OBSERVED IN SURVEY**







