

FINAL REPORT:
Colorado Plateau Cooperative Ecosystem Studies Unit
Task Agreement AAF-02
Native Plant Propagation, Heiser Spring Restoration
Wupatki National Monument, Arizona
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BACKGROUND AND OBJECTIVES. Wupatki National Monument encompasses three springs that were historically the sole sources of reliable perennial water within the monument - Wupatki, Heiser, and Peshlaki Springs. Beginning in the early 20th century, Heiser Spring was sequentially developed to supply water for ranching homesteads and livestock, a Civilian Conservation Corps labor camp, and lastly for a National Park Service (NPS) operations and employee housing area. As a result, the spring is among the most severely impacted natural resources within the monument. Based upon historic records, Heiser Spring has reliable flow and good water quality, and can be potentially restored to natural vegetation and wildlife habitat. The NPS formally abandoned operations at Heiser Spring in 2002, and since 2006 has been restoring the spring area to native vegetation and wildlife habitat.

A management objective for the spring site is to establish approximately 1/8 to 1/4 acre of native vegetation composed of species that occur at other nearby springs. NPS revegetation policy is to maintain local genetic integrity by using locally-sourced native plant materials for disturbed area revegetation. The Natural Resource Program for the Flagstaff Area National Monuments (NR Program) completed advance field reconnaissance of local springs, seeps, and riparian corridors, and identified the best existing plant material sources. Under this CPCEU Task Agreement, and the Arboretum at Flagstaff (Arboretum) cooperated to propagate 1 or 2 *Populus fremontii* (Fremont cottonwood), 5 to 10 *Forestiera pubescens* (desert olive), and 5 to 10 *Rhus trilobata* (fragrant sumac) plants for out-planting at the spring.

NATIVE PLANT PROPAGATION. The Arboretum provided a staff botanist/horticulturist with expertise in plant propagation to oversee plant materials collection and propagation. Source plant cuttings were taken at the optimum time(s) to ensure survival, and subsequently propagated at Arboretum facilities. During March 2009, the cooperators collected cuttings from *Rhus trilobata*, *Forestiera pubescens*, and *Populus fremontii* from upper Heiser Wash, Peshlaki Spring, and Spice Seeps within Wupatki National Monument. The field cuttings were placed in ziplock bags with moist paper towels, sealed, and then placed into a cooler for transportation. The *Populus* cuttings were immediately submerged in a 5 gallon bucket of water for transportation. Within 3 days of field collection, cuttings were processed at the Arboretum and placed under mist. The *Rhus* and *Forestiera* were soaked in a mild bleach solution before placement. All cuttings were treated with Hormex #16.

In May of 2009, surviving cuttings were placed in tree pots (10" and 14" long, both have 3" diameter), in a mixture of potting soil and were watered daily. The short tree pots were grown in the Arboretum greenhouse. The cuttings remained in the greenhouse for the winter, and were given bi-weekly watering, and fertilized again in March, 2010. The *Populus* tall tree pots were placed outside in a shade house for the summer, then brought into the greenhouse in October for over-wintering. All plants were watered bi-weekly, and were fertilized with slow-release granule fertilizer. On August 1, 2010, the Arboretum delivered all surviving plants to the NPS for out-planting at Heiser Spring, including 9 *Rhus trilobata*, 19 *Forestiera pubescens*, and 2 *Populus fremontii* plants.

Table 1. Summary of field collection and propagation methods, *Rhus trilobata*.

Collection Site	Number Cuttings	Length	Propagation Method
upper Heiser Wash	24	5 – 8 inches	placed in perlite on mist bench
Spice Seeps	5	5 – 8 inches	placed in perlite on mist bench
upper Heiser Wash	23	8 – 10 inches	placed in sand in gallon pots; watered daily
Spice Seeps	8	8 – 10 inches	placed in sand in gallon pots; watered daily

Table 2. Summary of field collection and propagation methods, *Forestiera pubescens*.

Collection Site	Length	Number Cuttings	Propagation Method
upper Heiser Wash	5 – 8 inches	12	placed in perlite on mist bench
Spice Seeps	5 – 8 inches	12	placed in perlite on mist bench
upper Heiser Wash	8 – 10 inches	18	placed in sand in gallon pots; watered daily
Spice Seeps	8 – 10 inches	22	placed in sand in gallon pots; watered daily

Table 3. Summary of field collection and propagation methods, *Populus fremontii*.

Collection Site	Length	Number Cuttings	Propagation Method
Peshlaki Spring	1 – 3 feet	12	pole cuttings placed in sand in 2 feet treepots; watered daily