

Final Report
Herbarium Specimen Preparation, Seep & Spring Flora Inventory
Wupatki National Monument

Colorado Plateau Cooperative Ecosystem Studies Unit
Cooperative Agreement # H1200-004-0002
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Wupatki encompasses three springs that were historically the sole sources of reliable perennial water within the monument - Wupatki, Heiser, and Peshlaki Springs. All three springs have been variously modified, first for sheep and cattle watering and homesteading, and later to supply water for a CCC era labor camp and NPS operations. Of the three springs, Heiser Spring has the greatest potential for ecological restoration. Most NPS facilities were removed from nearby the spring during the 1990's, and the operations area was formally abandoned in the 2002 General Management Plan/Environmental Impact Statement for Wupatki National Monument.

A project to remove the remaining water diversion infrastructure and revegetate the spring area was implemented between 2007 and 2010. For establishing restoration objectives, presettlement (or "reference") vegetation of the springs at Wupatki can only be speculated upon, as all springs in the area were heavily impacted before they were adequately described or studied. Most other springs within the surrounding landscape are in similar or worse condition, but a few have surviving riparian vegetation and may serve as reference communities and plant material sources for Heiser Spring. The revegetation objectives identified for the project thus pragmatically included establishing approximately $\frac{1}{8}$ to $\frac{1}{4}$ acre of native vegetation composed of species that occur at nearby seeps and springs which were impacted to a lesser degree. In 2008, the NPS completed a floristic inventory at local seeps, springs, and riparian areas within and nearby Wupatki National Monument to identify potential plant species for use as plant material sources for Heiser Spring.

Under this Task Agreement, the NPS and NAU cooperated to document the vascular flora of surveyed springs and seeps with herbarium voucher specimens. The NPS completed field collection, and pressed and dried specimens, while NAU confirmed each specimen's taxonomy and prepared herbarium sheets for each. Herbarium specimen label data includes: collection number, species identification, collector, date of collection, UTM coordinates of collection site, habitat/plant association description, and NPS Automated National Cataloging System (ANCS)

record number. All specimens were verified using standard floras and manuals, and by comparison with specimens deposited in the reference collections at the NAU Deaver Herbarium. The NPS Museum Curation Specialist assigned accession record numbers for the NPS Automated National Cataloging System (ANCS) database.

A total of 150 plant specimens were to be processed under the Task Agreement. The seep and spring inventory at Wupatki yielded 121 specimens, with full set of 75 specimens accessioned into the NPS natural history collections at the Museum of Northern Arizona (MNA), and 51 duplicate specimens under long-term loan to the Deaver Herbarium at NAU. The Cooperator also processed an additional 24 plant specimens from Walnut Canyon National Monument that were collected for other vegetation management projects over the 2008 field season. These were accessioned as duplicate sets of 12 plant specimens into the NPS and Deaver collections. ANCS accession numbers for the specimen sets are given in Table 1.

Table 1. NPS ANCS catalog numbers and number of herbarium specimens processed under Task Agreement NAU-298.

NPS ANCS Catalog Numbers, WUPA-00591	
Full set of 75 specimens deposited at MNA	27723 - 27797
Partial set of 51 duplicate specimens deposited at Deaver Herbarium	27798 - 27848
NPS ANCS Catalog Numbers, WACA-00341	
12 specimens deposited at MNA	8363 - 8375
12 duplicate specimens deposited at Deaver Herbarium	8431 - 5443