The following article contains images of deceased animals in museum collections.

Arsenic Encapsulation Project

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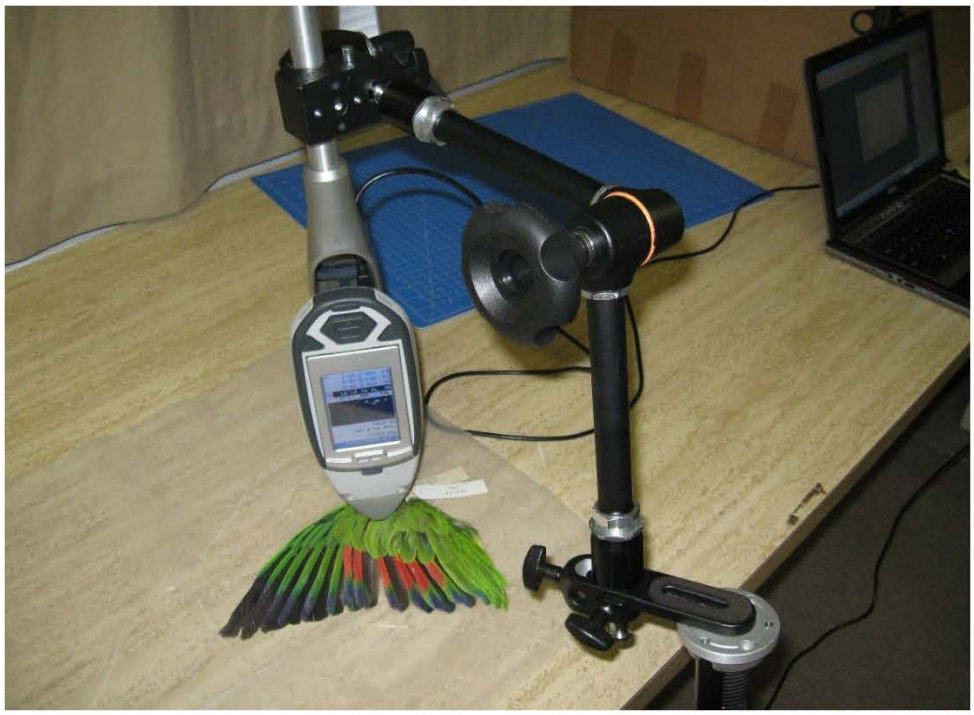
In 2017, the Flagstaff Area National Monuments (FLAG) which include Sunset Crater Volcano, Walnut Canyon, and Wupatki National Monuments, received funding for a Museum Collection Condition Survey (CCS). A CCS is a required baseline document aimed at guiding National Park Service units in the proper preservation conditions for museum collections. The majority of the FLAG collections are housed at the Museum of Northern Arizona (MNA), a private institution founded in 1928 to preserve artifacts from the Colorado Plateau. FLAG has a Memorandum of Understanding with MNA that allows FLAG to store its artifacts, archives, and scientific specimens, and to provide office space for the FLAG Curator at MNA.

The 2017 – 2018 survey of FLAG artifacts, archives, and scientific specimens at MNA was conducted by both an MNA Conservator, as well as the Senior Conservator from the Western Archeological and Conservation Center (WACC) in Tucson. Funding for the project resulted in an extensive survey report. In addition, the MNA Conservator and Museum Technician completed conservation treatment and/or rehousing of over a thousand FLAG artifacts at MNA.

Perhaps most importantly, the project allowed for the WACC Conservator to test a representative sample of FLAG bird and mammal study skins for the presence of heavy metal contaminants. She accomplished this by utilizing an XRF, or X-ray florescence devise.



XRF (X-ray florescence) device testing for heavy metal contaminants in bird feathers

The Museum of Northern Arizona had run a similar pilot study with cotton-swab arsenic test kits a few years prior.

FLAG Curator, Gwenn Gallenstein (facing camera), participating in study skin cotton swab testing workshop at MNA

The impetus for both testing projects was the growing body of knowledge in the museum community that study skins world-wide were prepared for storage with arsenic prior to the 1960s. Arsenic helps to protect organic museum collections from pest infestations, but is also a contaminant that adversely affects humans. While the MNA study found some arsenic contamination in the study skin specimens, the WACC Conservator discovered that over 90% of the FLAG bird and mammal study skins were contaminated with arsenic and in some cases lead. An XRF devise is expensive but sensitive enough to show a wider range of contamination.

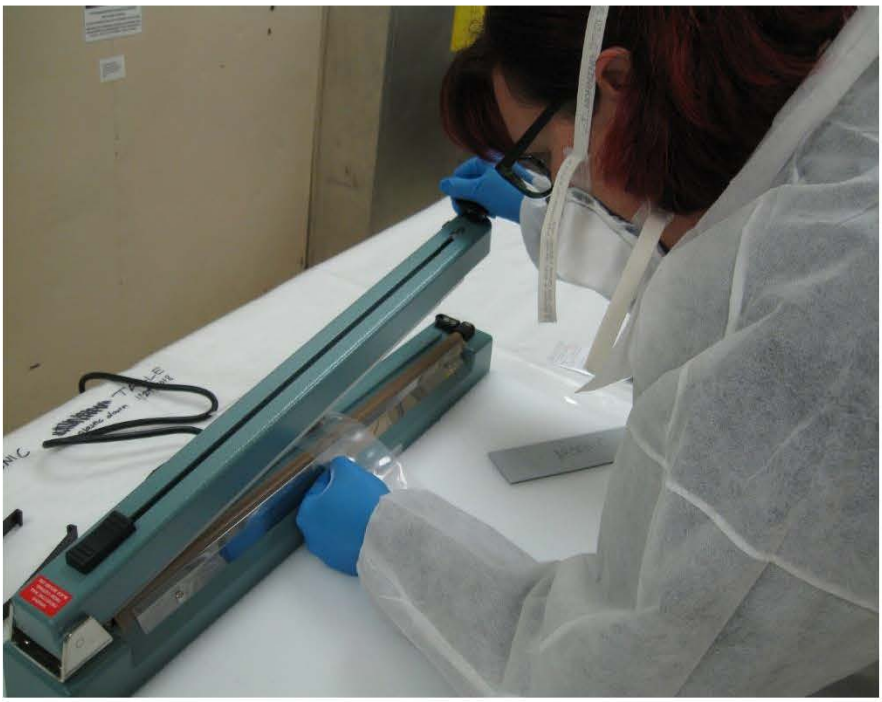
The WACC Conservator also determined that the wooden cases where the study skins had been housed had become cross-contaminated with arsenic.

Old MNA wooden cabinets where bird and mammal study skins were stored

Committed to safety, FLAG leadership made the decision, with MNA support, to add funding to the CCS project to purchase supplies to encapsulate the study skins and their corresponding labels in plastic. Due to the high percentage of contaminated specimens, MNA and FLAG collections personnel made the decision to encapsulate **all** bird and animal study skins since testing of many thousands of specimens was unrealistic.

The use of clear plastic allows a researcher the ability to still see a specimen, but prevents arsenic cross contamination, and provides for safe handling. If a researcher needs to access the actual specimen, s/he can still open an edge of the container and then heat-seal it shut again.

WACC Senior Conservator, Dana Senge, providing training on encapsulation procedures



Dana Senge demonstrating proper heat-sealing techniques

Museum Technician, Charles Mogen, hired to encapsulate contaminated birds

Additional project funding was also used to purchase new metal storage cabinets in the Easton Collection Center (ECC) to provide an enhanced storage environment for the specimens.

New cabinetry for the study skins in the ECC

MNA contributed the drawers for the encapsulation project

Example of a completed avian study skin, with label heat-sealed into a separate area of the plastic "sleeve" to prevent cross-contamination from the study skin to the label

The project ended in March of 2019 with the encapsulation of 5,135 bird study skins! Additional funding is needed to encapsulate the mammal collection.