



# LOST CITY GULLY EROSION PROJECT

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**T**HE DESERT RESEARCH INSTITUTE (DRI) and NATIONAL PARKS SERVICE (NPS) are collaborating to develop and test simple methods to document, protect, and monitor archaeological sites threatened by gully erosion at the Lost City archaeological site, located within Lake Mead National Recreation Area in southern Nevada.

DRI scientists are currently conducting a case study at a 15-room roomblock within the Lost City's "Main Ridge site." This study area is prone to gully erosion during extreme precipitation events (e.g. monsoon rains) and the potential for damage or destruction is high. Although intensively excavated in the 1920s, portions of the site remain unexcavated and many of its material remains (i.e. buried deposits, structures) have not been considered under modern theoretical perspectives and technological approaches in archaeology.

The DRI team is: 1) using unmanned aerial systems (UAS) or drone technology to collect imagery documenting the current conditions of structures threatened by gully erosion and to create 3-D models and digital elevation models of the existing site topography; and 2) developing and testing various mitigative measures for erosion control to prevent further damage, in partnership with stakeholders such as local American Indian Tribes.

Future plans (contingent upon approval) include a paired treatment study in which selected gullies of comparable characteristics are treated with erosion control structures (simple brushwood structures), and others are left untreated in order to determine if such treatments are effective in reducing erosion.

The research team is working to involve the community by providing UAS and 3-D modeling demonstrations, as well as lectures and discussions about the importance of preservation archaeology at local events.

## TASKS INVOLVED:

- **UAS photogrammetry surveys**
- **Photogrammetric modeling**
- **Geomorphological investigations of the gully networks**
- **Design of erosion control treatments**
- **Modeling of extreme precipitation events for prediction of likely erosion locations and rates**
- **Public outreach for STEM education and DRI Science Distilled events to increase community stewardship and knowledge of archaeological sites**



## NEVADA SCIENCE, GLOBAL SOLUTIONS

The Desert Research Institute (DRI) is a recognized world leader in investigating the effects of natural and human-induced environmental change and advancing technologies aimed at assessing a changing planet. For almost 60 years DRI research faculty, students, and staff have applied scientific understanding to support the effective management of natural resources while meeting Nevada's needs for economic diversification and science-based educational opportunities. With more than 400 employees and two main campuses in Reno and Las Vegas, DRI serves as the non-profit environmental research arm of the Nevada System of Higher Education.

