

FELLOWSHIP BRIEF

Measurement and Meaning of Mormon Cricket Outbreaks in the Intermountain West

Li Murphy - Master of Environmental Science '26

The Need.

Mormon cricket outbreaks overwhelm communities across the Intermountain West. At peak density, marching cricket bands shut down highways, cause traffic accidents, strip rangeland forage, and inundate homes, schools, and hospitals. Although native insects, their sudden appearance in the millions is difficult to anticipate, and drought, fire, and extreme weather are reducing the reliability of past patterns. Land managers and residents raise the same questions every season: Where will bands form? How will they move across the terrain? Which responses work, and at what ecological or financial cost? Outbreaks also carry meanings beyond ecology. Some people interpret cricket surges through historical, spiritual, or cultural frames; others see them as indicators of drought or state inaction. Across ranches, reservations, and rural towns, residents hold knowledge about where crickets gather and what predicts a heavy year. What is missing is a shared framework linking lived experience with ecological dynamics to support proactive, community-centered management.

The Project.

Li conducted a multi-method study across Nevada, Idaho, and Utah to generate practical, sharable insights. The work produced three components: (1) integration of new technology to understand drivers of collective motion, including drone-based tracking of Mormon cricket band movement, the first field-based virtual reality (VR) system powered by portable solar units, and the use of a microcamera mounted on swarming individuals; (2) documentation of real-time perspectives on outbreaks through structured memos from conversations at ranch gates, RV parks, gas stations, and community centers and contextualized these with longer historical sources such as pioneer diaries, federal and state records, railroad archives, church documents, and congressional hearings; (3) collection of underrepresented community priorities from harder-to-reach communities through volunteering and participation in community events near Mormon cricket outbreak areas.

The Findings.

Key findings from Li's and collaborator's research include:

- (1) Mormon crickets respond to a "Push" cue, a swarm behind the individual, rather than the "Pull" cue, a swarm ahead which is characteristic of locusts. Lateral and Pull stimuli were ineffective for driving marching behavior.
- (2) Concern about the effects of Mormon cricket herbivory and their presence around human and livestock food and water sources was widespread. While pesticide application was the most common response to outbreak, there is public support for non-lethal repellants for Mormon crickets including sonic deterrents, biological control methods, and effective fencing structures.

Persistent concerns around roadway safety due to massive insect kill slicks in Elko prompted a public records request to the Nevada Department of Transportation, putting in perspective the extremely small scale of the public cost of cricket removal efforts from roadways compared to other “acts of nature” related to snow-removal and weather.

(3) Many people were worried about animal roadkill increasing near cricket crossings and questions surfaced about the relationship between outbreak years and native salmonid restoration efforts by Sho-Pai Fish & Parks in the Owyhee River. Interestingly, while Mormon cricket harvesting is commonly seen as a 1800’s subsistence practice, there were multiple stories of household-level traditional harvests of Mormon crickets happening as recently as the 1980’s in Northern Nevada. The State entomologists described callers concerned about spraying on public land affecting the food safety of wild harvested Mormon crickets.



Fig 1. Mormon cricket female with insect-mounted wireless microcameras (.78 g) temporarily adhered to its exoskeleton.

The Impact.

This research advances both the science and governance of Mormon cricket management at a moment when climate-driven outbreak unpredictability is increasing. The findings on collective motion cues (Push vs. Pull) may inform the design of more targeted deterrents and barrier systems. The community and archival dimensions of the project challenge the framing of crickets as simply a pest problem, surfacing Indigenous and rural knowledge as legitimate, place-specific data for regional management plans and public outreach. This work resulted in an op-ed published in the [Salt Lake Tribune](#) and a news story from the epicenter of this summer’s Mormon cricket outbreak [Elko Daily Free Press](#). Also, by grounding the research in partnerships with Sho-Pai Fish & Parks and the Noowuh Knowledge Center, this work builds toward a more equitable model of environmental research — one that links management science with community priorities. Findings will be shared in peer-reviewed manuscripts and presentations across scientific and public forums to extend outreach.



The Student.

Li Murphy, MEd, is an NSF Graduate Research Fellow at the Yale School of the Environment and a student of Religion and Ecology at Yale Divinity School. She grew up in Pocatello, Idaho, and studied Biology and Geology at Harvard University before spending a decade teaching out of BioBus, a mobile laboratory serving New York City public schools. Her work focuses on pests, with a special interest in insects. Li serves on the board of [Nonhuman Teachers](#) and the [Society for Ecological Restoration Northeast Chapter](#). She uses field, archival, and historical methods to ask how and why “pestwork” gets done — one big project centers on Mormon crickets (*Anabrus simplex*). She is interested in tribal sovereignty and the future of public lands in the American West. Her work has appeared in [PNAS](#), [Nautilus Magazine](#), and elsewhere.