

# Hualapai Mexican Vole PIT Tag Monitoring Plan

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Technical Report 41  
Nongame and Endangered Wildlife Program  
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June 1994

Recommended citation: Kime, K.A., J.D. Hanna, and D.W. Belitsky. 1994. Hualapai Mexican vole PIT tag monitoring plan. Nongame and Endangered Wildlife Program Technical Report 41. Arizona Game and Fish Department, Phoenix, Arizona.

Funding for this project was provided by: the Arizona Game and Fish Department's Heritage Fund; and Project W-95-M, Jobs 1 and 4, under the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act).

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## INTRODUCTION

The 1993-1994 Section 6 Project Job Description for the Hualapai Mexican vole (*Microtus mexicanus hualpaiensis*) describes goals and objectives for this program and the recovery plan (USFWS 1991) serves as a guideline for vole management. In order for our program to achieve these goals and objectives, more information is needed regarding vole population dynamics. We now know that Hualapai Mexican voles are primarily found in association with Gambel oak and ponderosa pine habitat in the Hualapai Mountains. However, during the previous three years of monitoring, vole activity has varied throughout the year and from one year to the next. Current survey methods to monitor these sites have allowed little opportunity to develop population trend information due to the abandonment of known vole sites. Factors determining these site fluctuations are unknown. Although, voles may be expiring at these sites or dispersing into adjacent sites due to seasonal variation in climatic or habitat conditions.

The purpose of this project is to develop a prototype marking technique to determine vole densities, recruitment rates, and affinity to specific sites. We can then extrapolate this information to other sites in the Hualapai Mountains with similar habitat. This information will assist biologists in determining what biological parameters are influencing fluctuations in vole activity and what future management strategies should be implemented.

## OBJECTIVES

1. Determine density of Hualapai Mexican voles from specific sites.
2. Investigate the relationship of dispersal or interchange between sites.
3. Determine age, sex ratios, and affinity to sites.
4. Monitor recruitment, site activity, and seasonal fluctuations in vole numbers.

## METHODS

### Site Selection

To date, 41 vole locations (14 historical locations from 1923-1990 and 27 recent locations from 1991-1994) occur in the Hualapai Mountains. Known and potential new locations will be surveyed by AGFD personnel and a monitoring site will be selected based on the following criteria:

1. A minimum of three locations with current vole activity will be documented in the Hualapai Mountains before implementation.
2. Vole activity is defined as a network of well-formed surface runways with fecal pellets, fresh grass clippings, and open burrow entrances. Current vole activity will be verified by setting live traps and capturing/releasing unmarked at least one vole at the site.
3. The area of the selected site will be measured in square meters. Sites larger than 1000 m<sup>2</sup> will not be considered for purposes of this study.
4. An area containing two active vole sites within 50 m of each other would be priority sites to investigate the relationship of dispersal or interchange.
5. Trapping will be conducted from July to October.

### **Trapping**

AGFD personnel will follow trapping procedures as outlined in the HVM PIT tag protocol (Kime et al. 1994). Because voles usually move about within established runways, a grid system will not be used for this study. The selected site will be trapped intensively for five consecutive days and the number of live traps used will depend upon the size of the active runway area (i.e. one trap every one to two meters of runway). If two sites are selected within one area, trapping will be conducted simultaneously.

### **Handling and Implant Procedure**

All voles captured in good physical condition will be implanted with a passive integrated transponder (PIT) tag by experienced personnel as outlined in the HVM PIT tag protocol (Kime et al. 1994).

### Monitoring of Active Vole Sites

Fourteen days after the initial session, the study site will be intensely trapped again. Trapping will be conducted for five consecutive days. Recaptures will be noted and new captures marked. During August, September, and October, the study site will be intensely monitored once a month with trapping techniques conducted in the same manner as the initial session.

### Data Analyses

The Lincoln-Petersen closed population model (Lincoln 1930) will be used to estimate fundamental demographic variables that may affect fecundity of active vole sites i.e., reproductive or birth rate, immigration rate, mortality rate, and emigration rate. Only a short time frame is required for sampling (i.e. one week). If vole sites are active during successive monitoring sessions, the open population model, Jolly-Seber (Jolly 1965, Seber 1965), will be used to estimate vole density at each sampling time as well as survival rates and birth numbers between sampling times.

## CONCLUSIONS

If successful, this technique will be used to monitor randomly selected active vole sites. A final report will be completed by June 1995.

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