

Bat & Mine Related Issues in the West

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Bat & Mine Related Issues in the West

- Human Needs
- History
- Hazard
- Habitat



HUMAN NEEDS for MINERALS





History



HAZARDS



WARNING!

ABANDONED AND INACTIVE
MINES ARE DEATH TRAPS!
DON'T GET TRAPPED!
STAY OUT!



STAY ALIVE!
DANGERS AWAIT INSIDE:

- * HIDDEN DEEP SHAFTS
- * CAVE-INS OF LOOSE ROCK OR DECAYED TIMBERS
- * UNSAFE OR BROKEN LADDERS
- * BAD AIR AND POISONOUS GASES
- * DISCARDED EXPLOSIVES
- * POISONOUS SNAKES
- * FLOODED TUNNELS

Removal, destruction or tampering with this sign is a class 6 felony under A.R.S. 2730B (D)

DANGER!

ABANDONED MINE HAZARDS

ROTTEN STRUCTURES
DEADLY MINE OPENINGS

LETHAL GAS & LACK OF OXYGEN

DANGEROUS ANIMALS

UNSAFE LADDERS

CAVE-INS & DECAYED TIMBERS

UNSTABLE EXPLOSIVES

DEEP POOLS OF WATER

STAY OUT

STAY ALIVE







Hazardous Artifacts



HABITAT



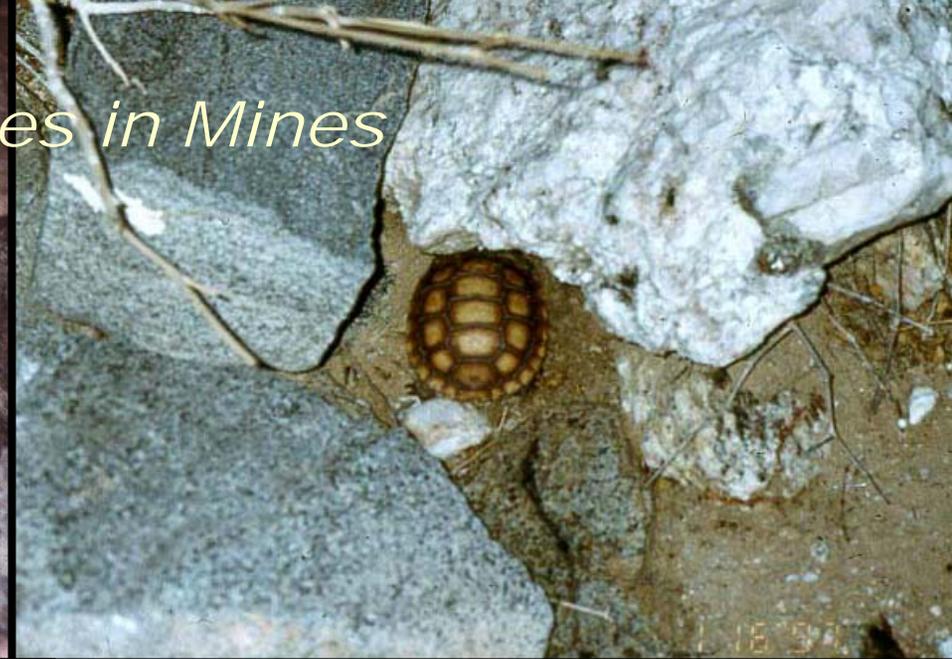
Wildlife in Mines

- All mines have some wildlife use
- 50 vertebrate species in the California desert have been documented in mines
- Bats are the primary species of concern, although nesting birds and tortoises occur in many mines
- 70 % of mines have some bat use
- 10-15% have significant use (maternity, large numbers of bats, sensitive species)
- Important to identify and protect the most important wildlife habitat

Townsend's Big-eared Bat



Desert Tortoises in Mines



Rattlesnakes





OWLS

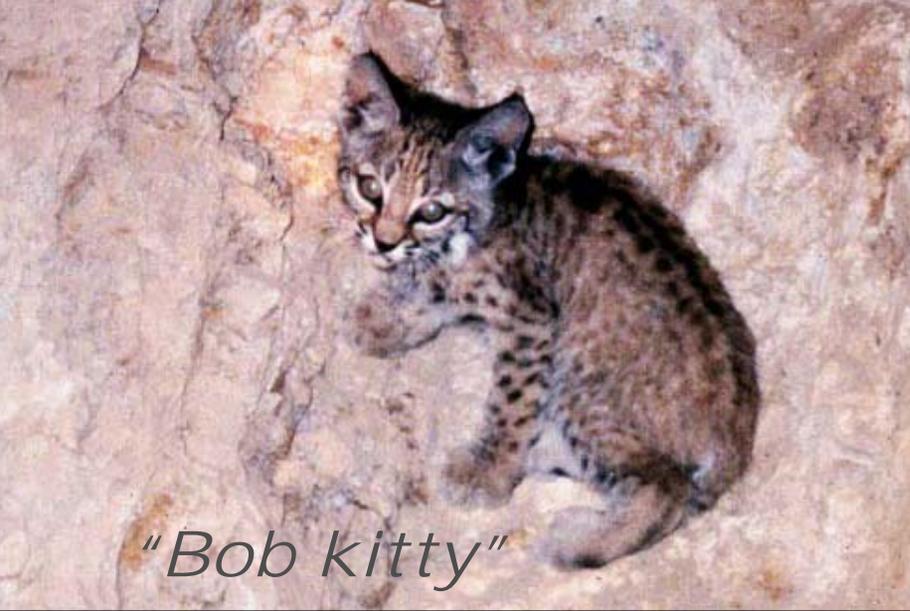


“Dear” mice



Say's phoebes





"Bob kitty"



Ring-tailed cat



Desert woodrat



Badger



Bio-assessment—Determining the Suitability of Mines for Bats and Other Wildlife

Mine and Bat Surveys: 1968-2008

- Visited over 4000 mine features in California Desert in every desert mountain range
- **Military Bases:** Ft. Irwin, Chocolate Mountains, Edwards AFB, China Lake, 29 Palms
- **Mining Companies:** U.S. Borax, Viceroy Gold, Pan American Silver, American Girl Mining, Picacho
- **State of California:** California Department of Fish and Game; State Lands Commission; and State Parks: Red Rock, Providence Mountains, Picacho, Anza Borrego
- **Bureau of Land Management** (all field offices): Bakersfield, Barstow, Bishop, Ridgecrest, Needles, Palm Springs, El Centro, Yuma, Lake Havasu
- **National Parks:** Joshua Tree, Mojave Preserve, Death Valley

Bio-assessment procedures

- Research to determine historic and current use by bats of caves and mines in the area: museum records, literature review, interviews with miners, cavers and bat biologists.
- Check historic sites for current bat use. Important to do this at appropriate season.
- If no information on bat occupancy is available on the site that is being assessed for closure, then a survey of the mine/cave should be conducted during the season with the most potential for bat use (based on habitat, elevation, thermal characteristics etc). If no bats are discovered, surveys at other seasons should be conducted.

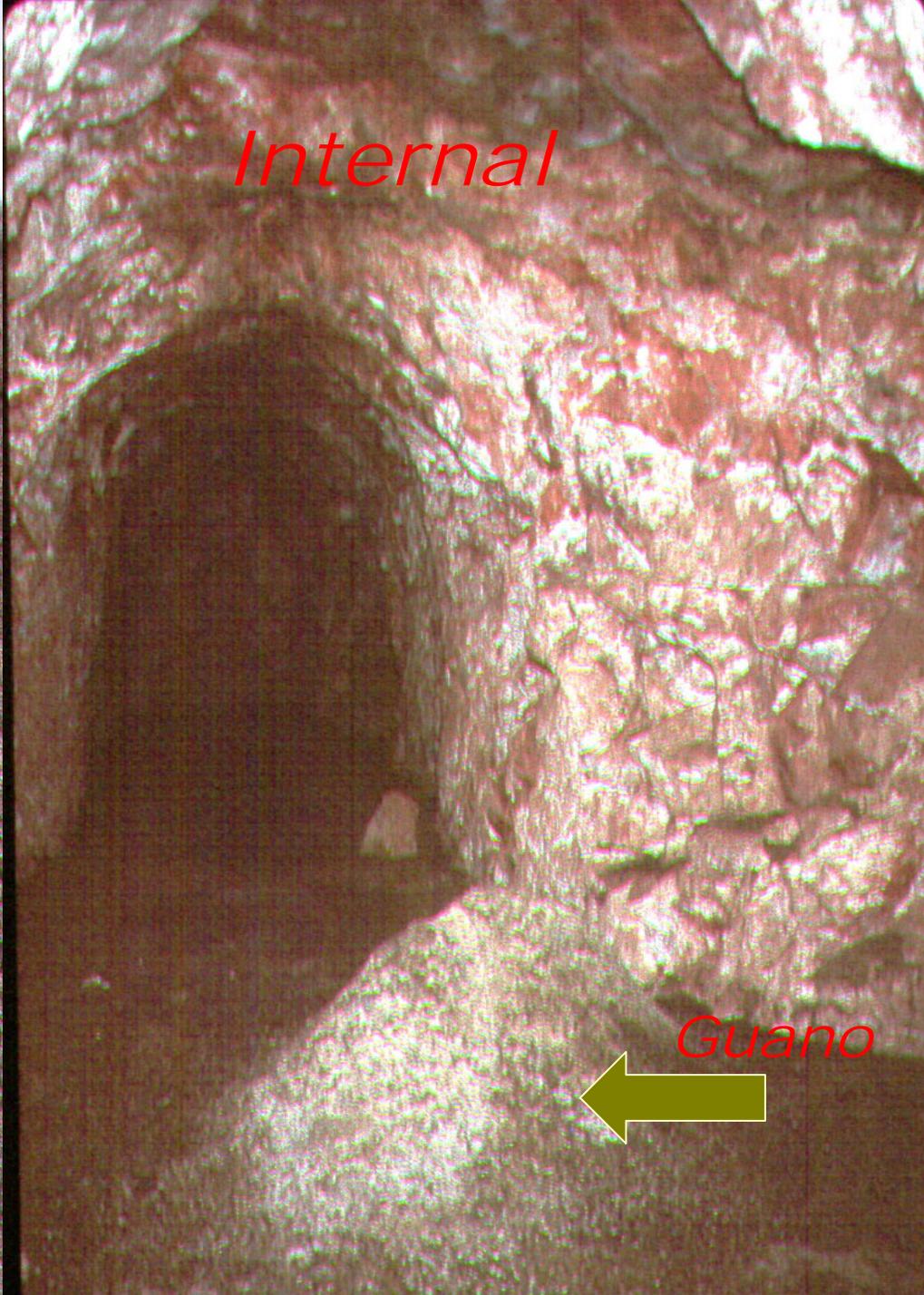
Pre-survey of Abandoned Mines



External



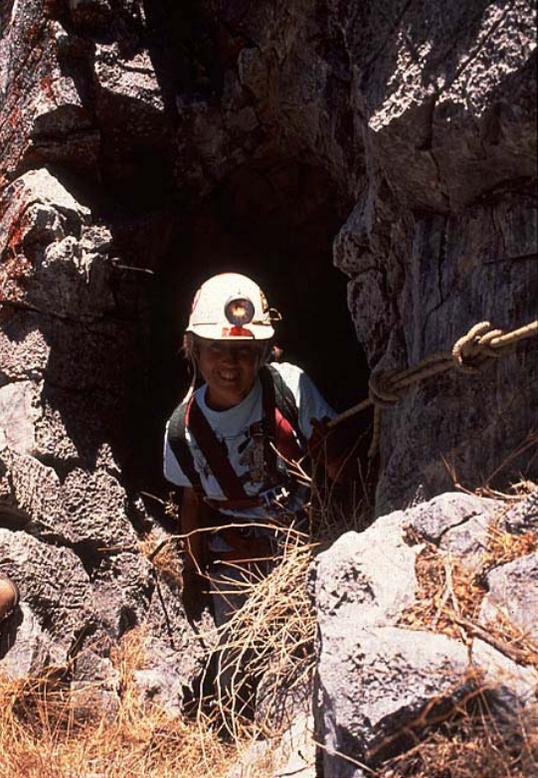
Internal



Guano



Internal Mine Surveys



Internal Surveys Deep Shafts



*Determination of connections
and multiple openings*





Pissicles



Moth Wings



Guano on Plastic

Hibernation Survey



External Surveys



Complex mines



Unsafe portal



Inaccessible openings

External survey techniques

- Night vision equipment
- Infrared video cameras
- Thermal imaging camera
- Acoustic monitoring
- Mist netting & harp traps
- Event recorders

Goals

Methods

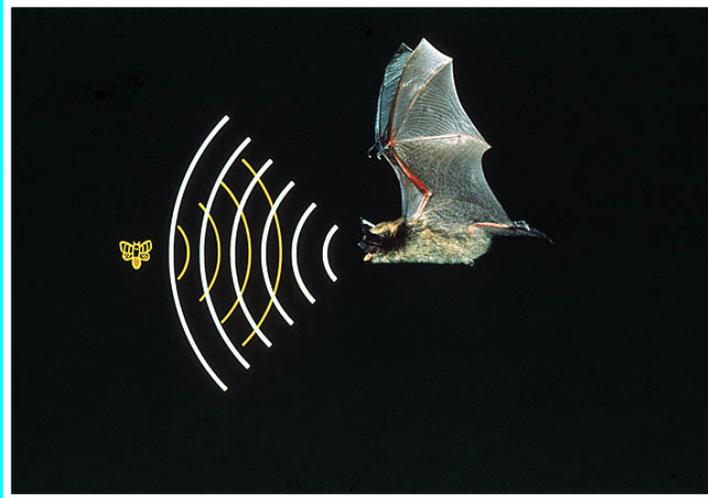
- **Species**
- **Sex and/or reproductive condition**
- **Numbers**

- **Capture or *Acoustic**
- **Capture**
- **Out flight count with Night Vision or IR Camera**

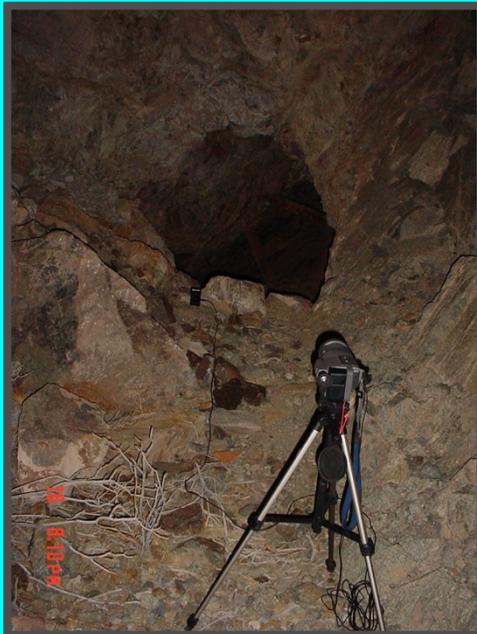
* for some species

Passive Monitoring of Bats

Bats Echolocate



Listen to Calls with a Bat Detector



Record Images with Calls





**Thermal
Imaging
Camera
with
Pettersson
D240x
Time Expansion
Bat Detector
at Mine Portal**

Night vision goggles for upper
Stonehouse Mine outflight



Moon Phase Effect

January 2003

Mine

Macrotus Exit Count

Moon

No

3 C



1515

2491

Queen

26

144

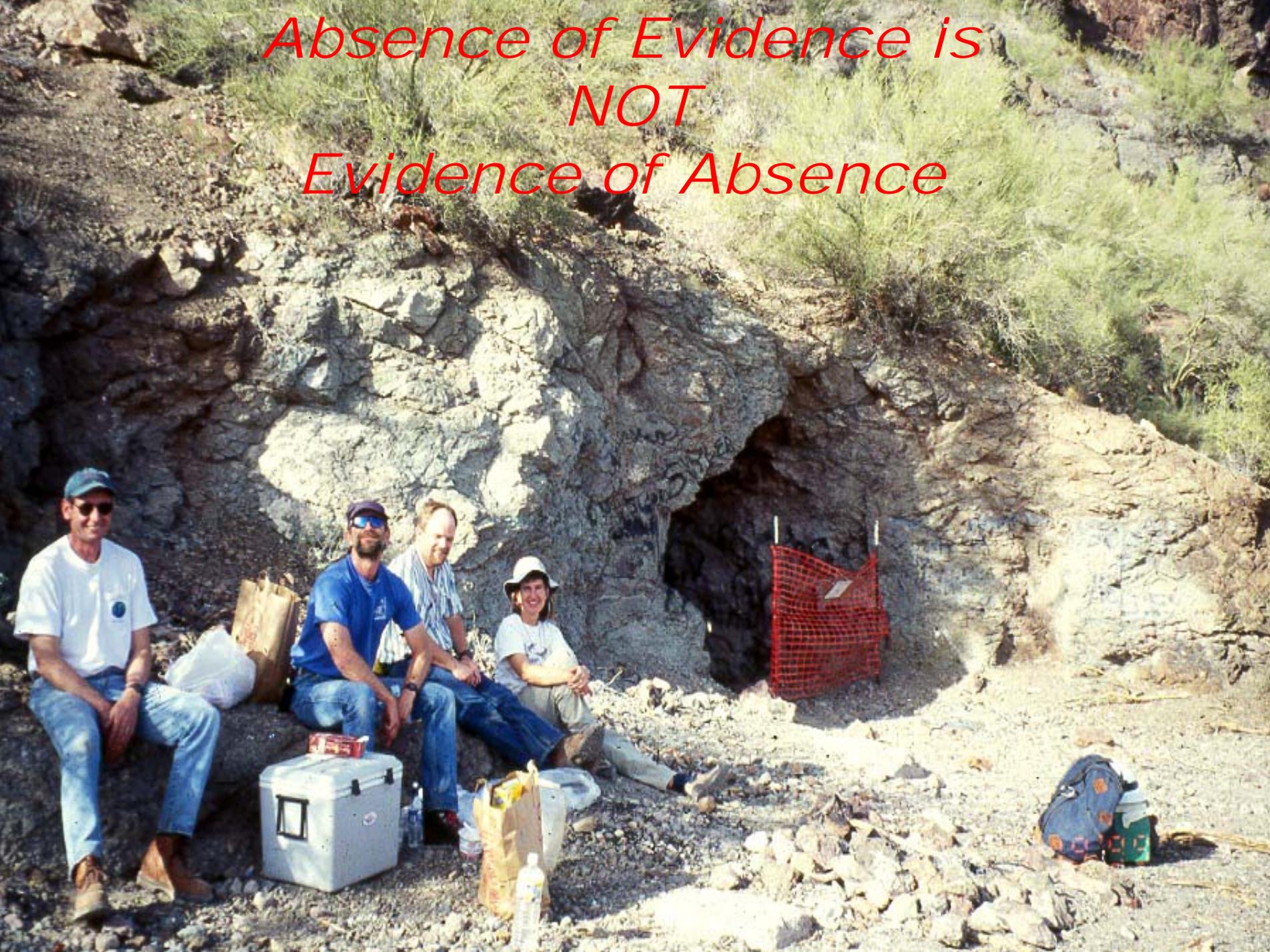
American Boy

12

172



*Absence of Evidence is
NOT
Evidence of Absence*



Management Issues of Bats and Mines on a Landscape Level



15 7:36 PM



Management Issues

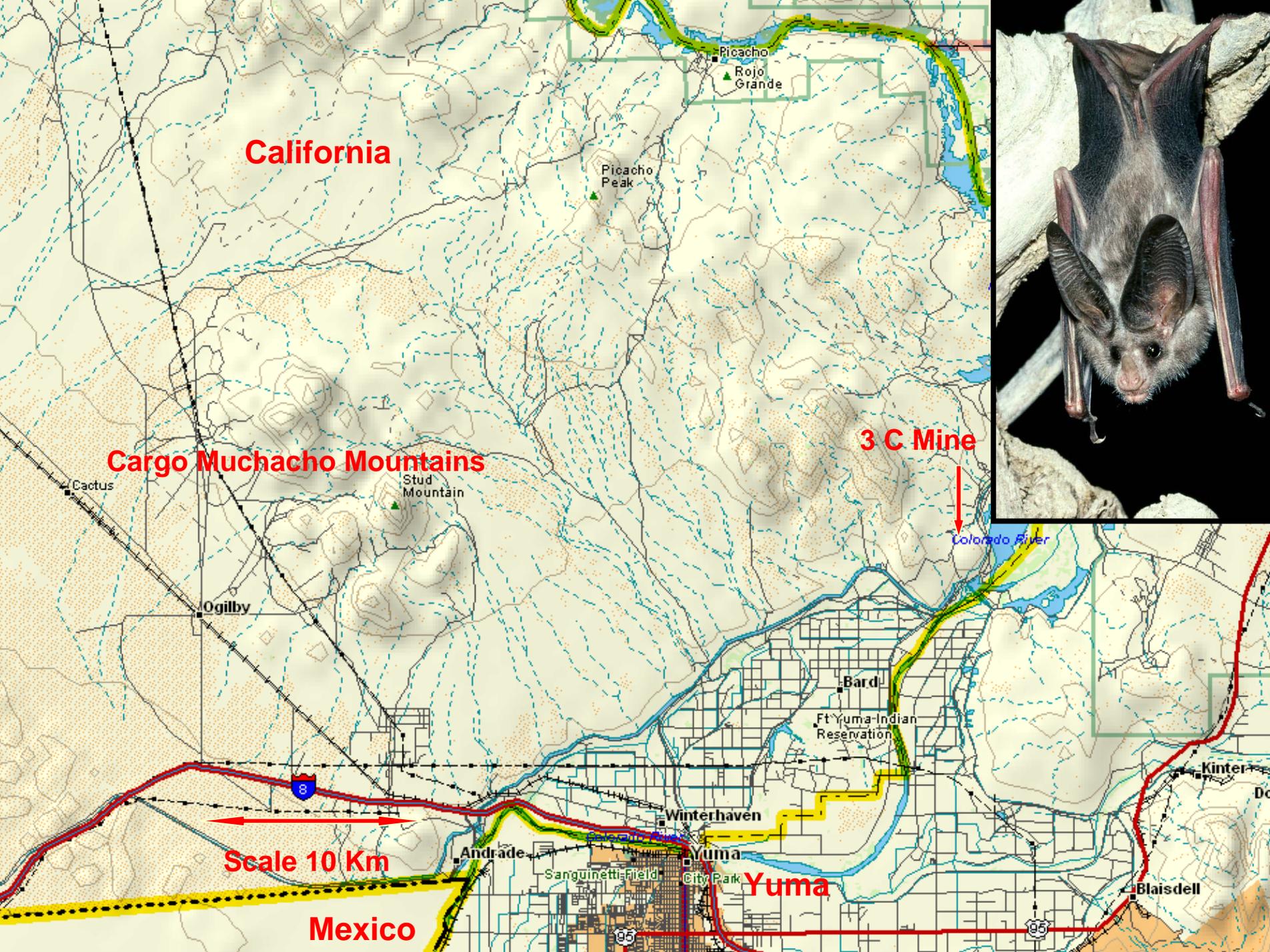
- Bats are mobile and may use multiple mine roosts between seasons and years
- Bats may commute over 40 km between roosting and foraging habitats
- Site specific surveys are necessary to determine bat use
- Mines are being closed for hazard abatement and renewed mining
- All mines within a landscape unit should be evaluated to preserve the best roosts for the most bat species



Known *Macrotus* Roosts



Banded Macrotus released



California

Cargo Muchacho Mountains

3 C Mine

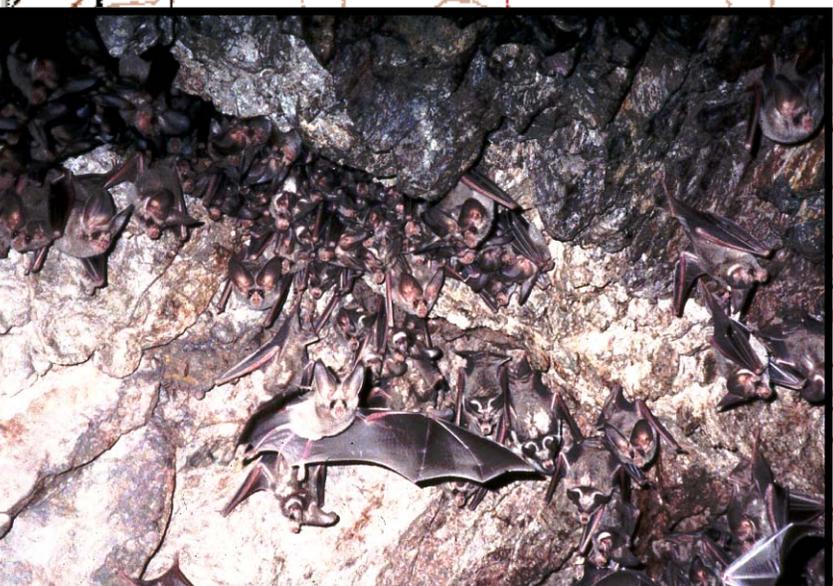
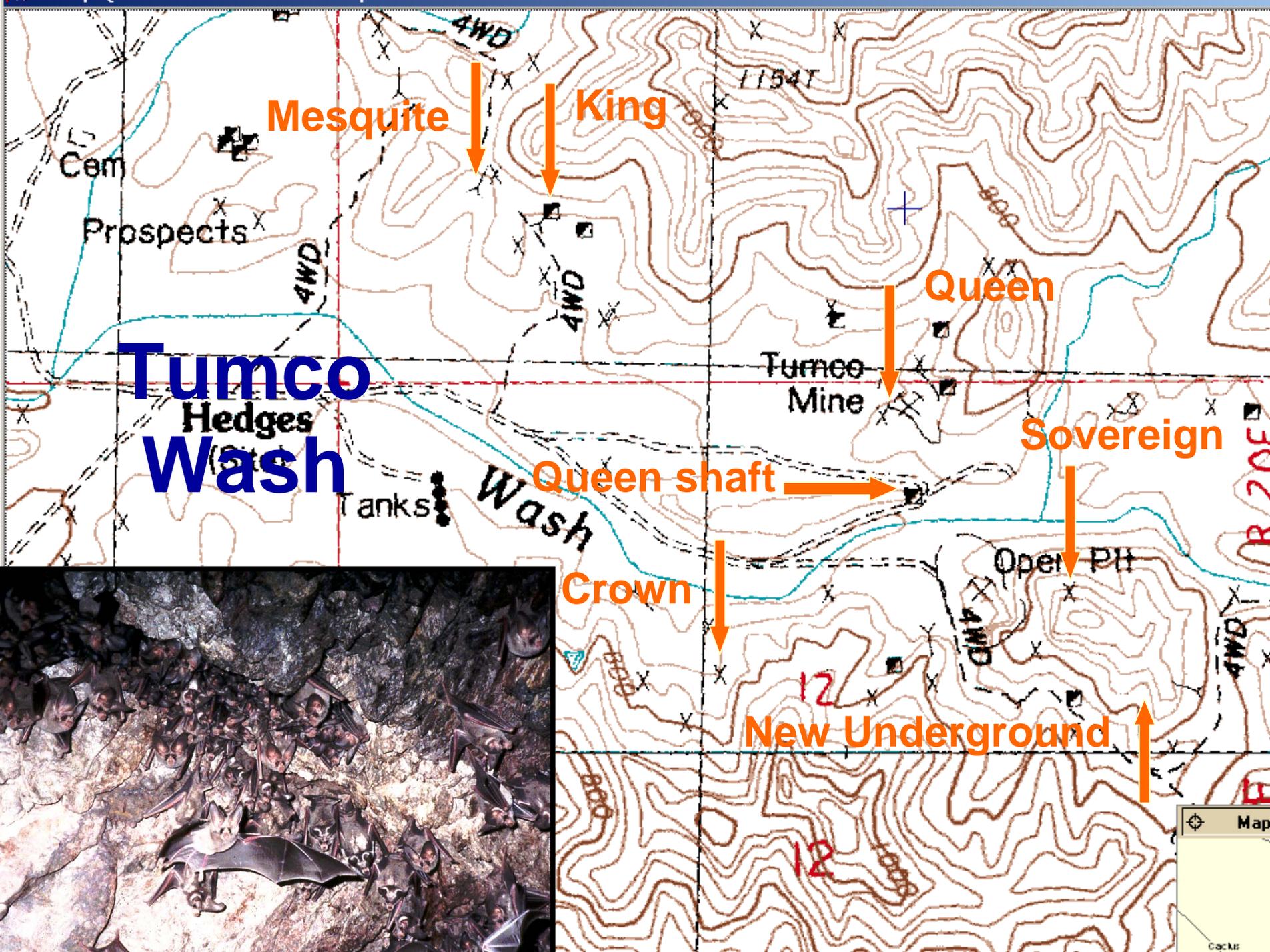
Colorado River

Scale 10 Km

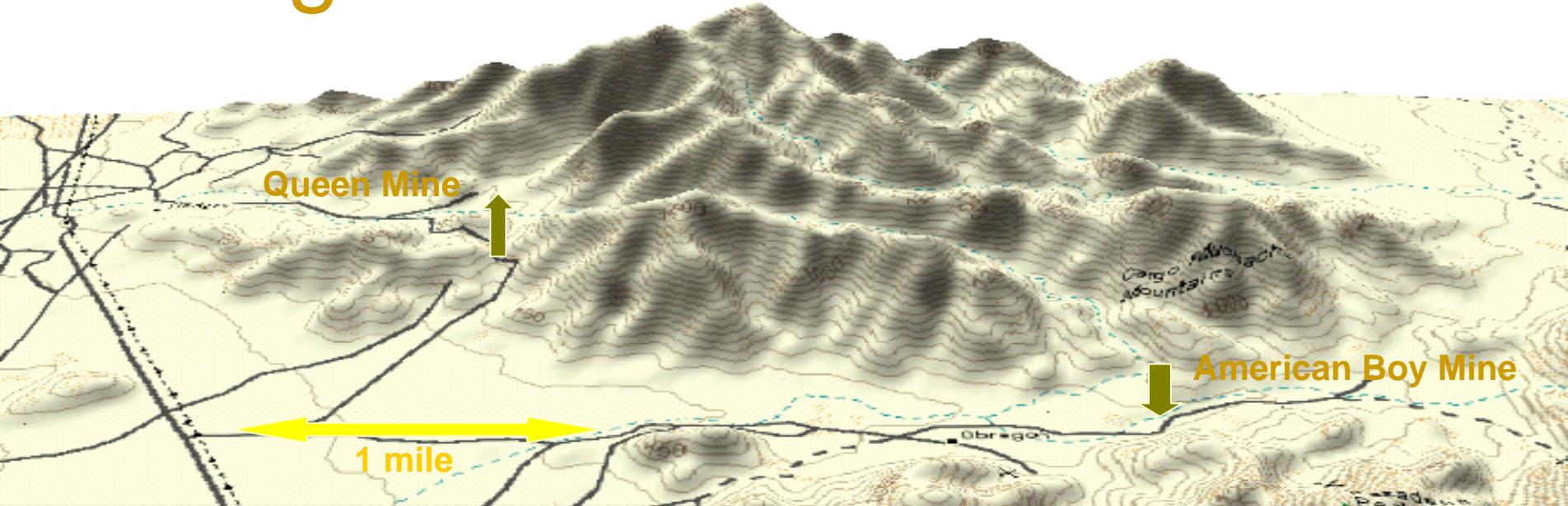
Mexico

Yuma



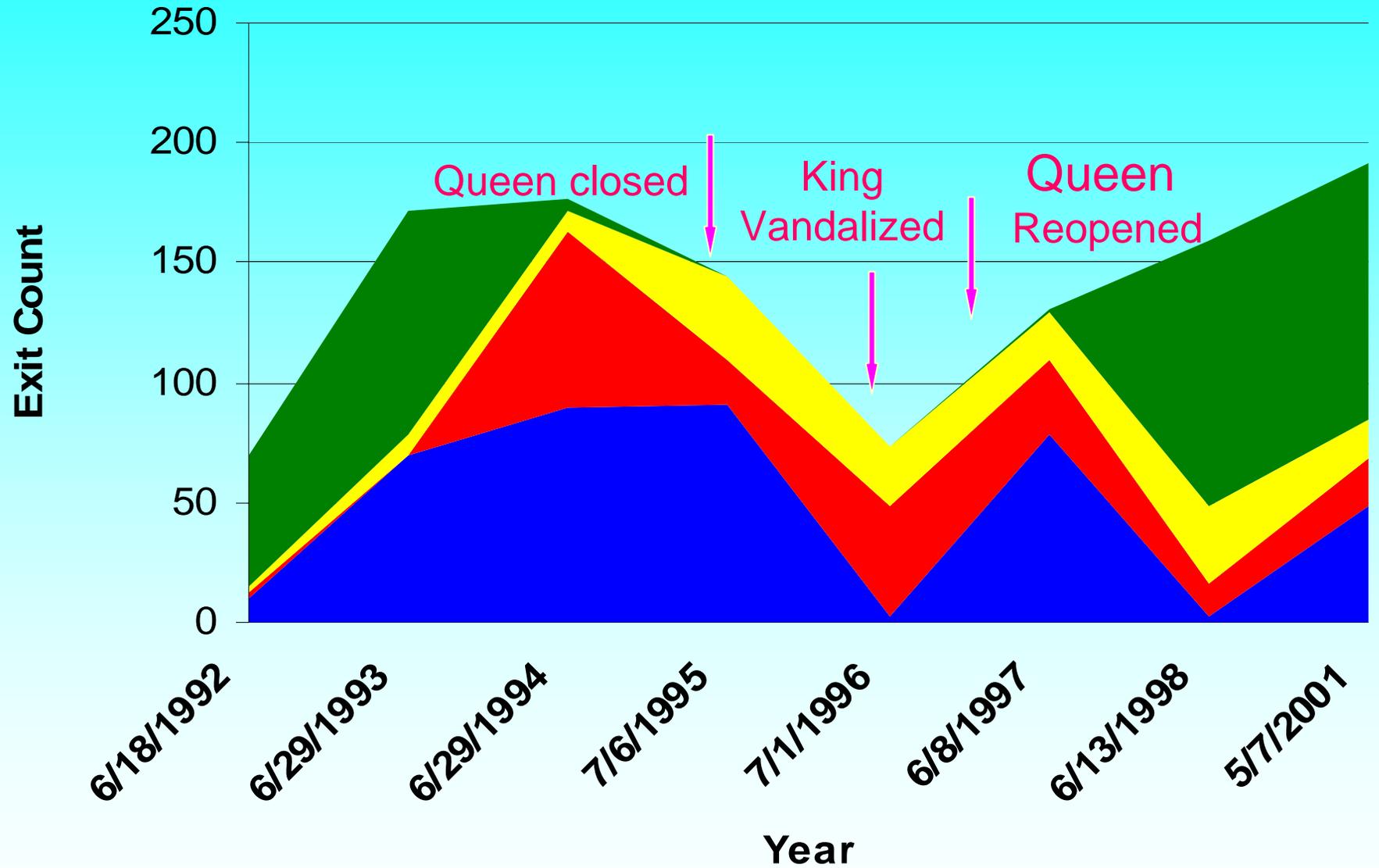


Cargo Muchacho Mines



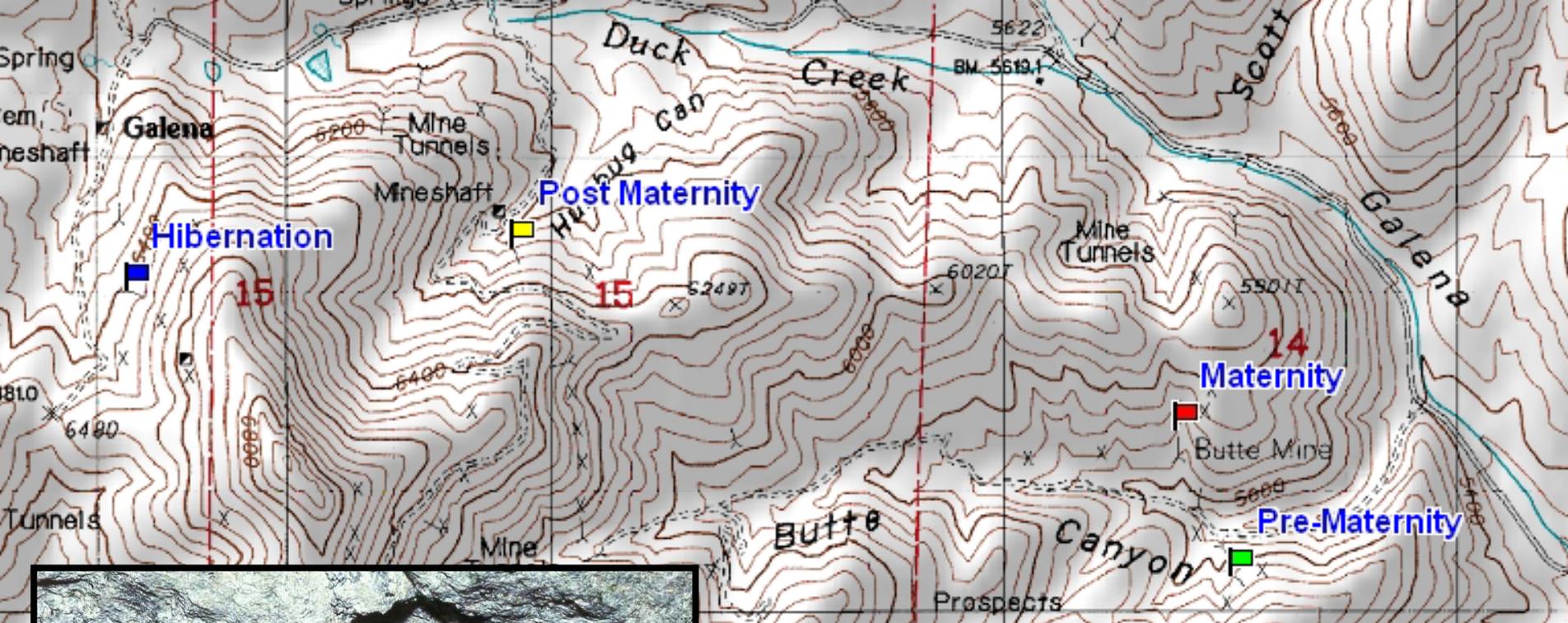
Tumco Mines Maternity Exit Counts

■ Queen ■ King ■ Mesquite ■ Crown

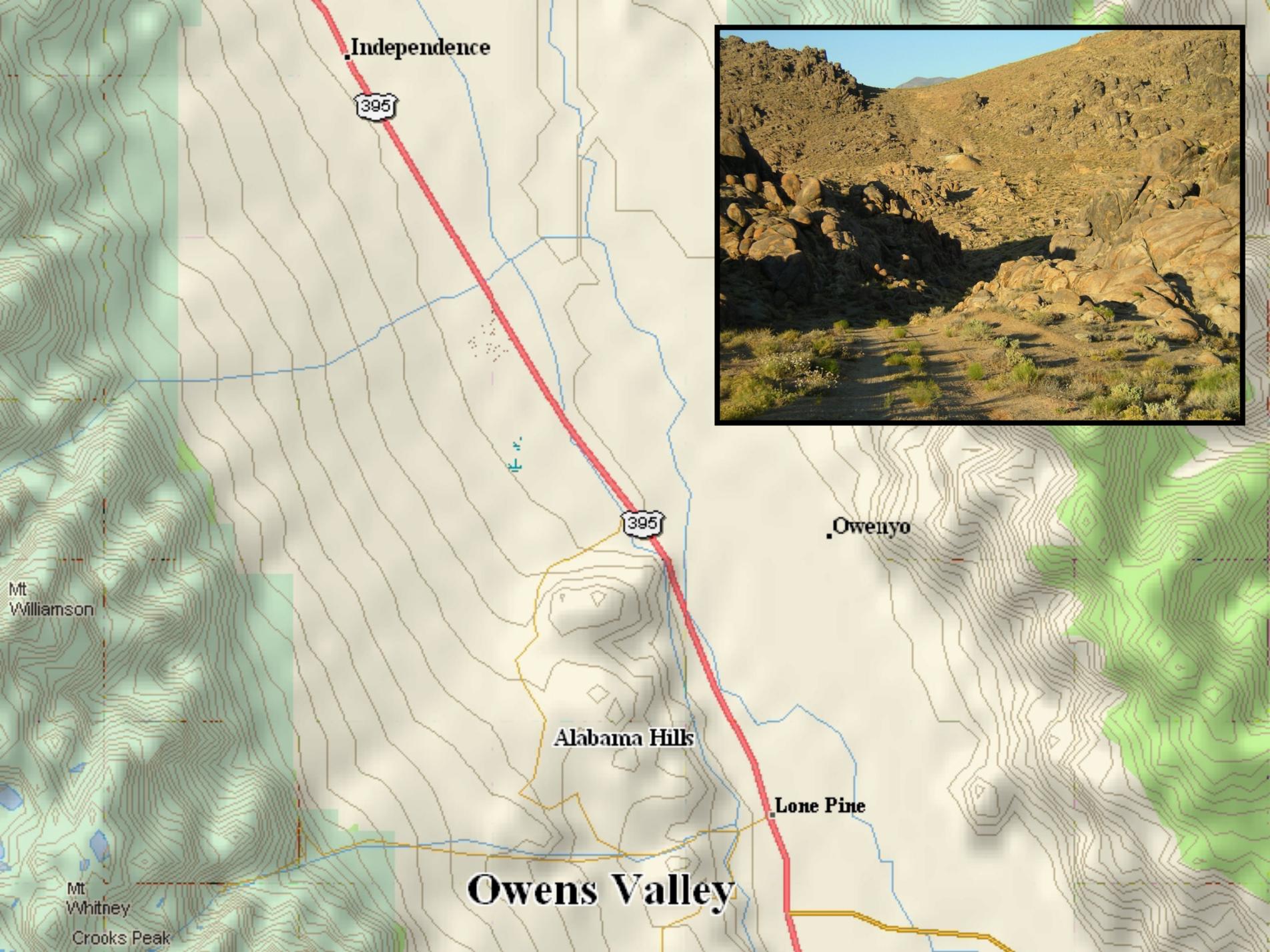




Central Nevada



Battle Mountain Townsend's big-eared bat mine roosts



Independence

395

395

Owensyo

Alabama Hills

Lone Pine

Owens Valley

Mt. Williamson

Mt. Whitney

Crooks Peak

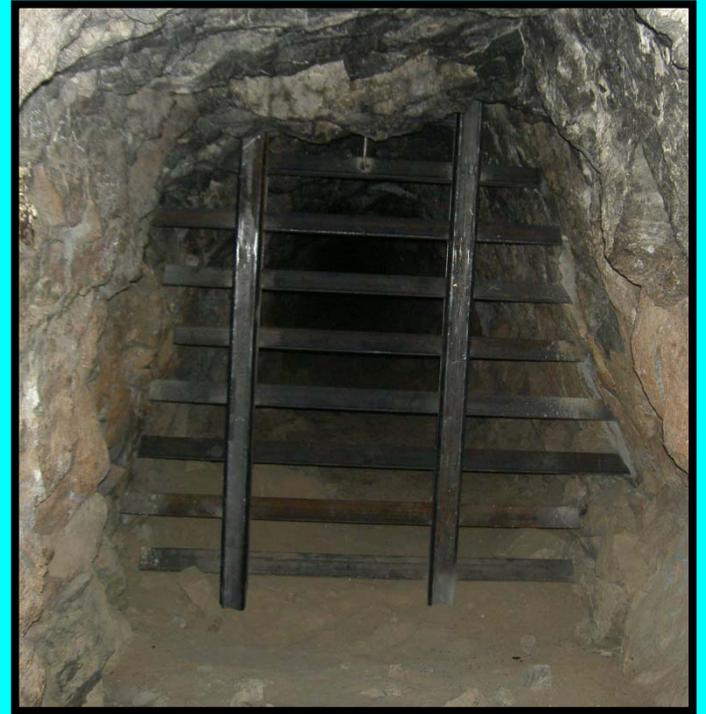
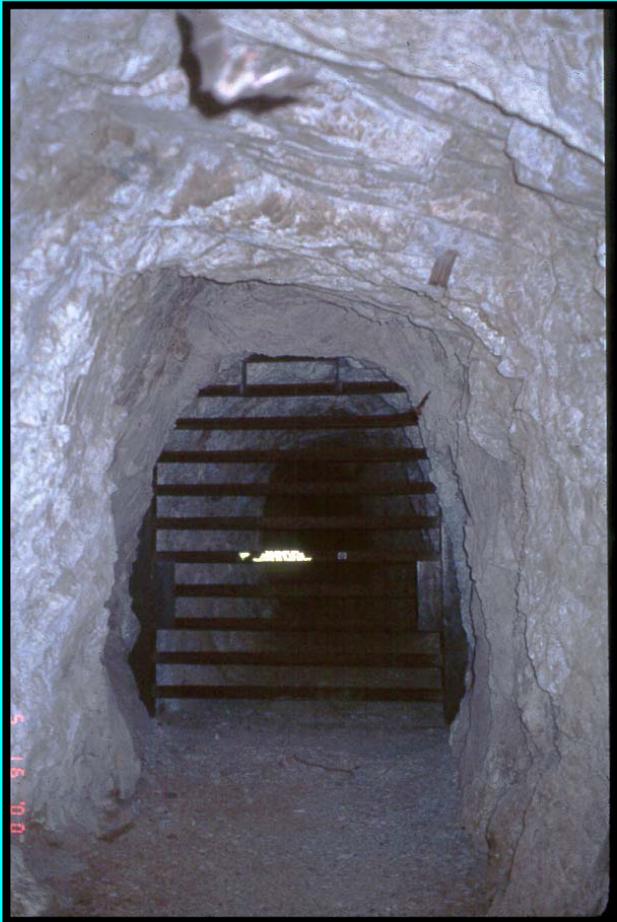


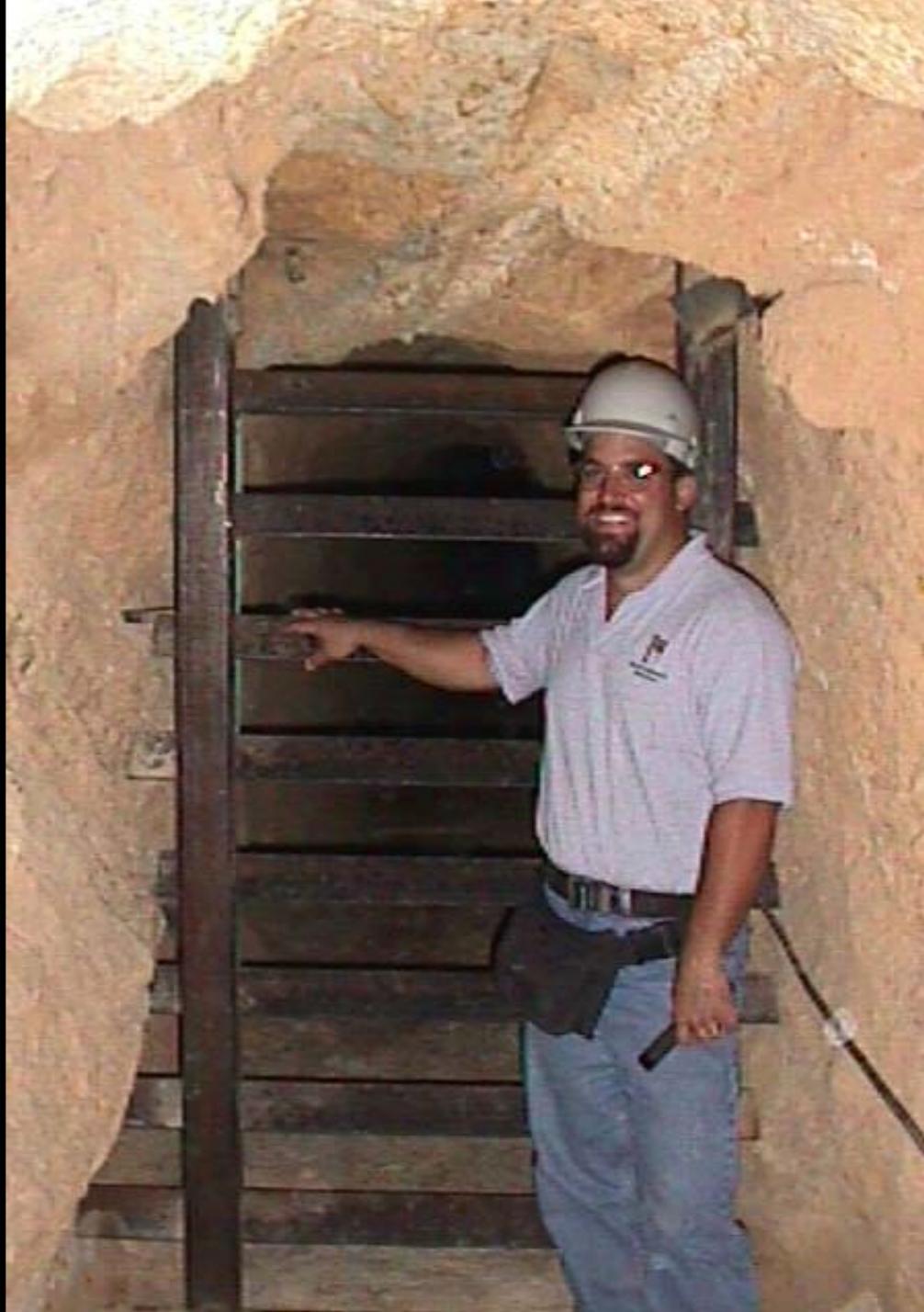


Sunrise Relief mine, Phoenix, Arizona

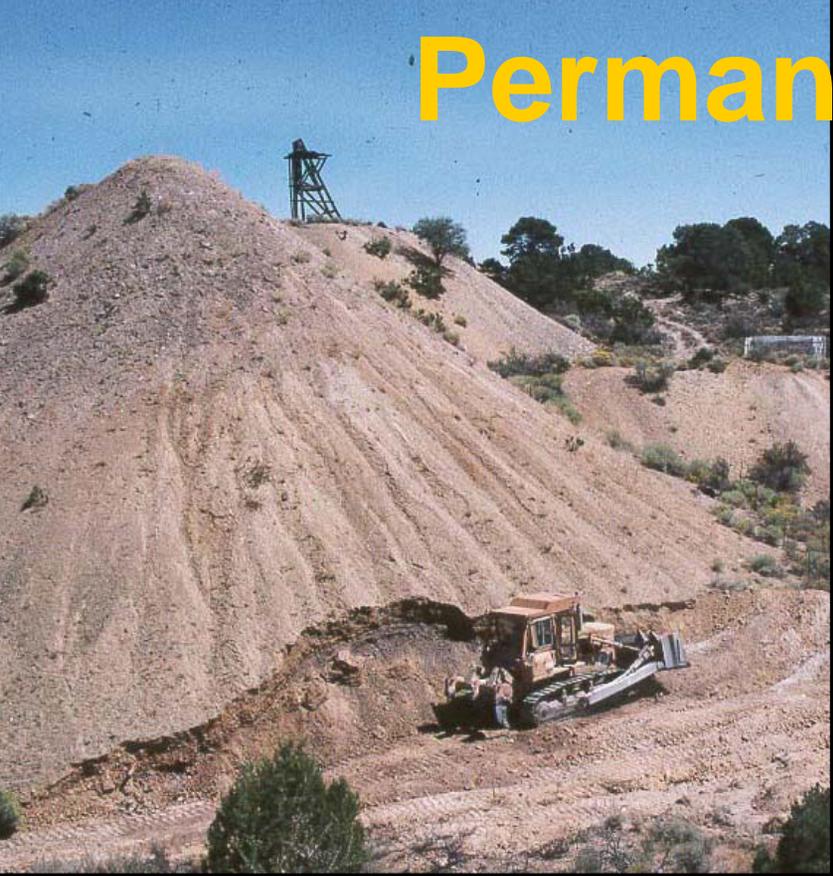
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Gated Mines





Permanent Closure





Foam Closure



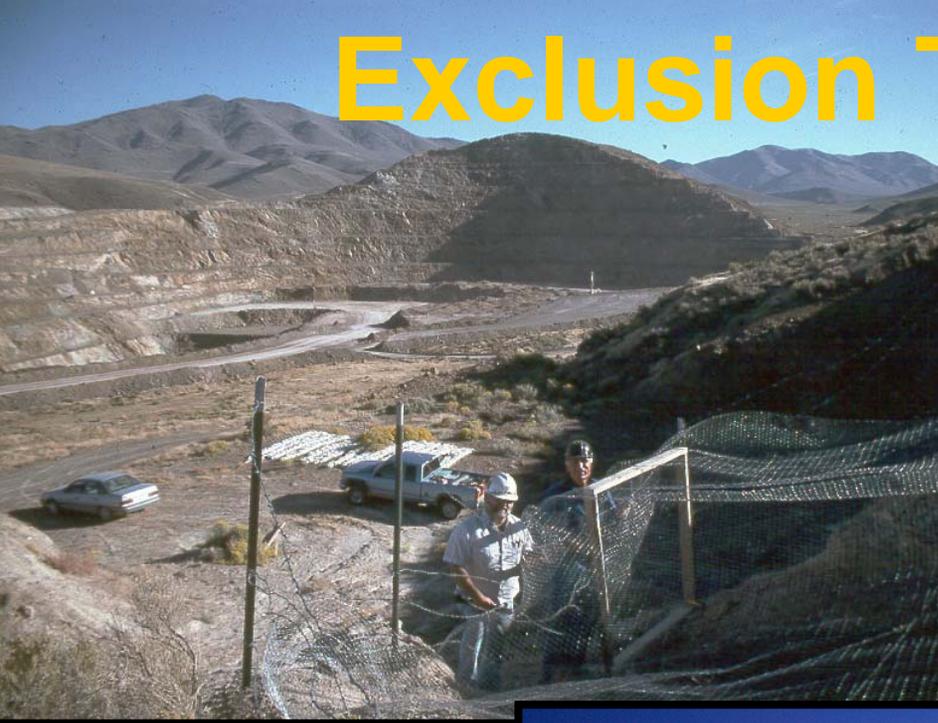
EXCLUSION CONSIDERATIONS

- No exclusion is necessary for mines where ALL of the mine can be seen from the surface (no drifts, domes, deep rock crevices).
- Mines that require exclusion are those where all of the mine is not visible from the surface, and especially if previous internal or external surveys have demonstrated bat or other wildlife use.
- For horizontal workings in the range of desert tortoise, mine should be entered to check for tortoises prior to closure.
- Late summer and early fall are the best times for exclusions and hard closures (mid-August through October) as they offer the fewest wildlife impacts.

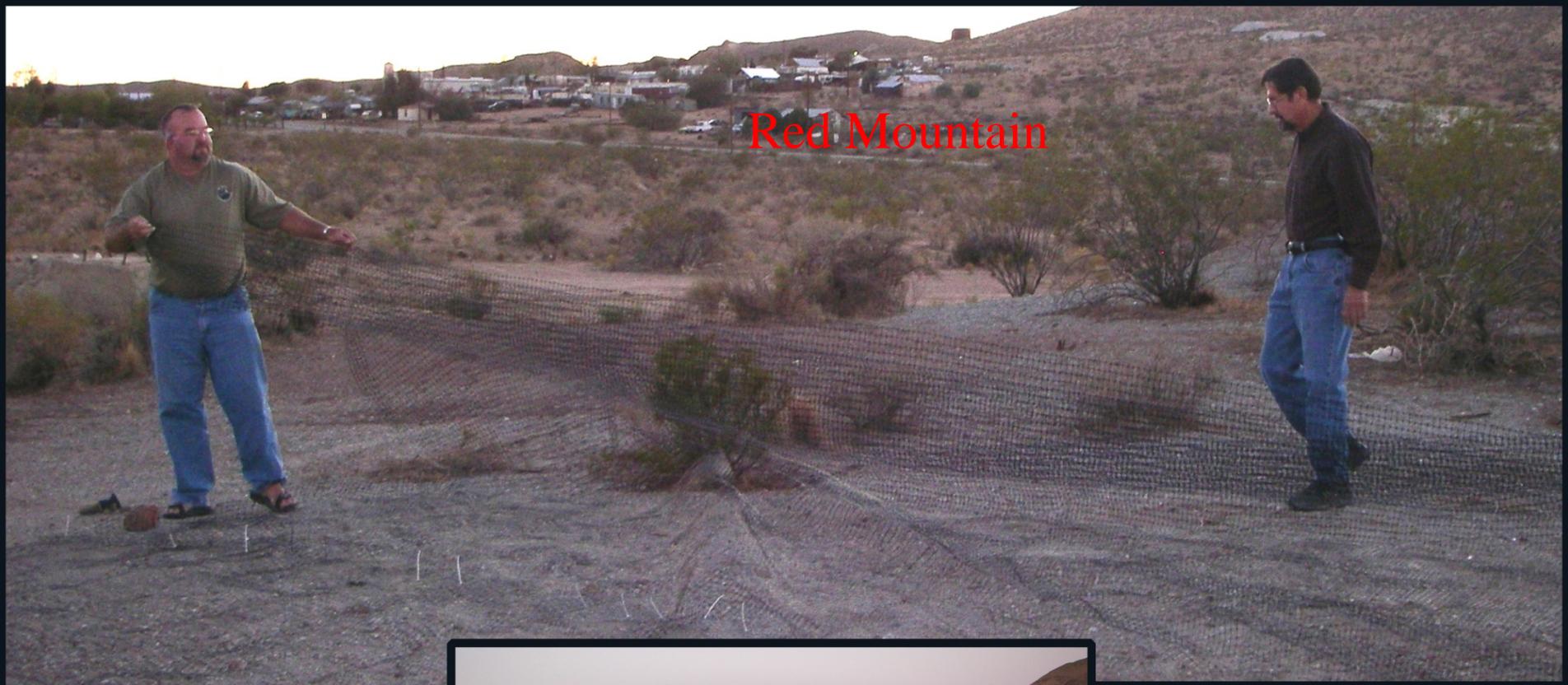
EXCLUSION PROTOCOL

- Use chicken wire or heavy duty bird netting with one inch openings. Cut material allowing at least 18 inches extra around perimeter, and 6 inches for each piece that needs to be pieced and overlapped. Cable ties are used for joining pieces. For large vertical shaft openings, strong wire may need to be strung across the mine in several directions to support closure material.
- Anchor closure material on two sides of mine opening with large nails or spikes. Leave at least a third of the portal open or a 3x3 foot exit space.
- Quietly observe with night vision for 90 minutes after sunset (as per external survey protocol) for emerging wildlife. If no animals emerge, cover the mine totally and anchor with nails, leaving a small “awning” that when viewed or acoustically scanned from most angles appears as a barrier, but that would be detectible as a small “window” when perceived by an animal trapped in the mine. Short wooden garden stakes are useful for creating the awning when no bushes or rock features are available.

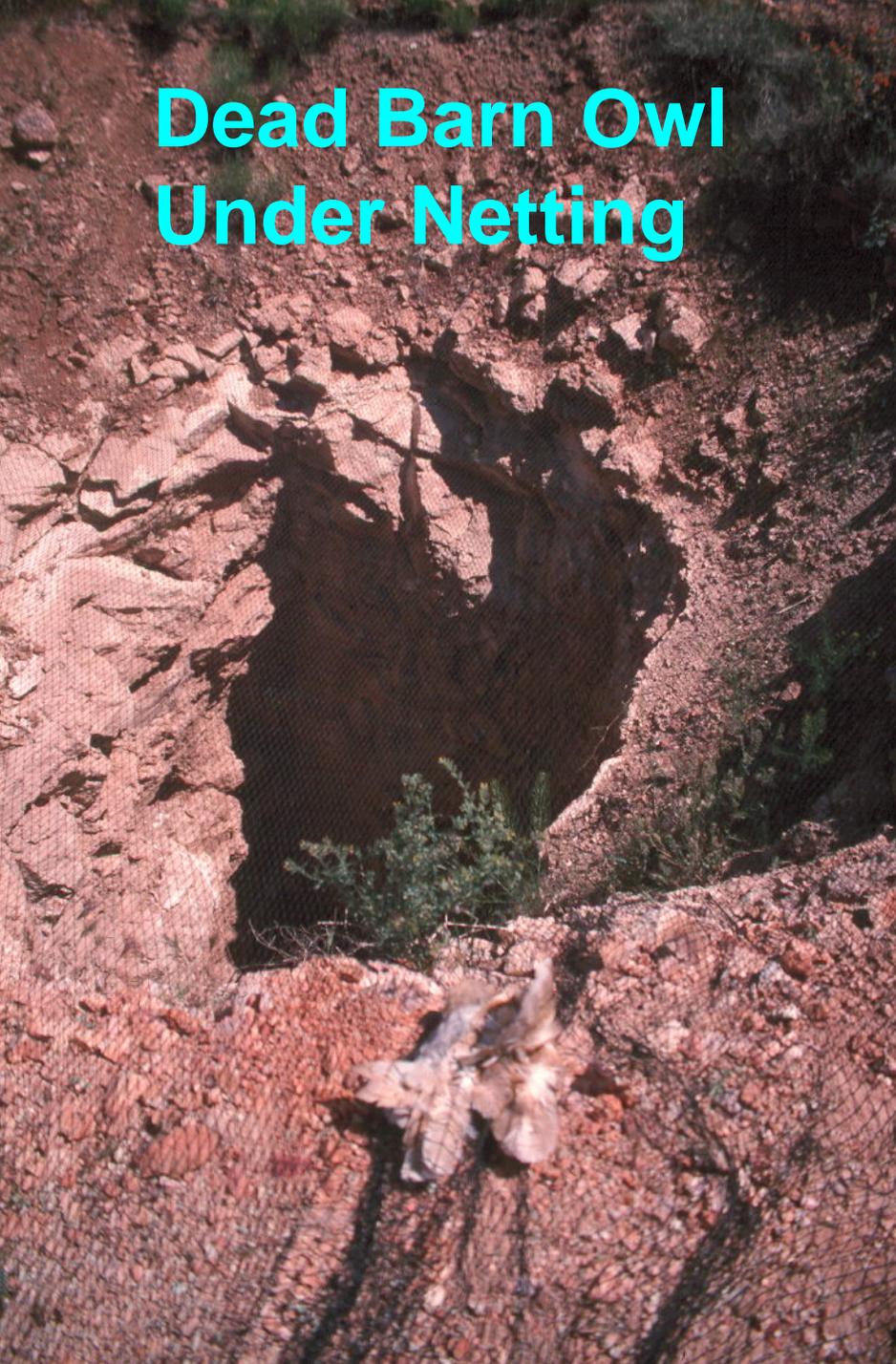
Exclusion Techniques



Red Mountain



Dead Barn Owl Under Netting



Conclusion



Mountain range level surveys are necessary to protect the best bat roosts in mines

Bat sunset