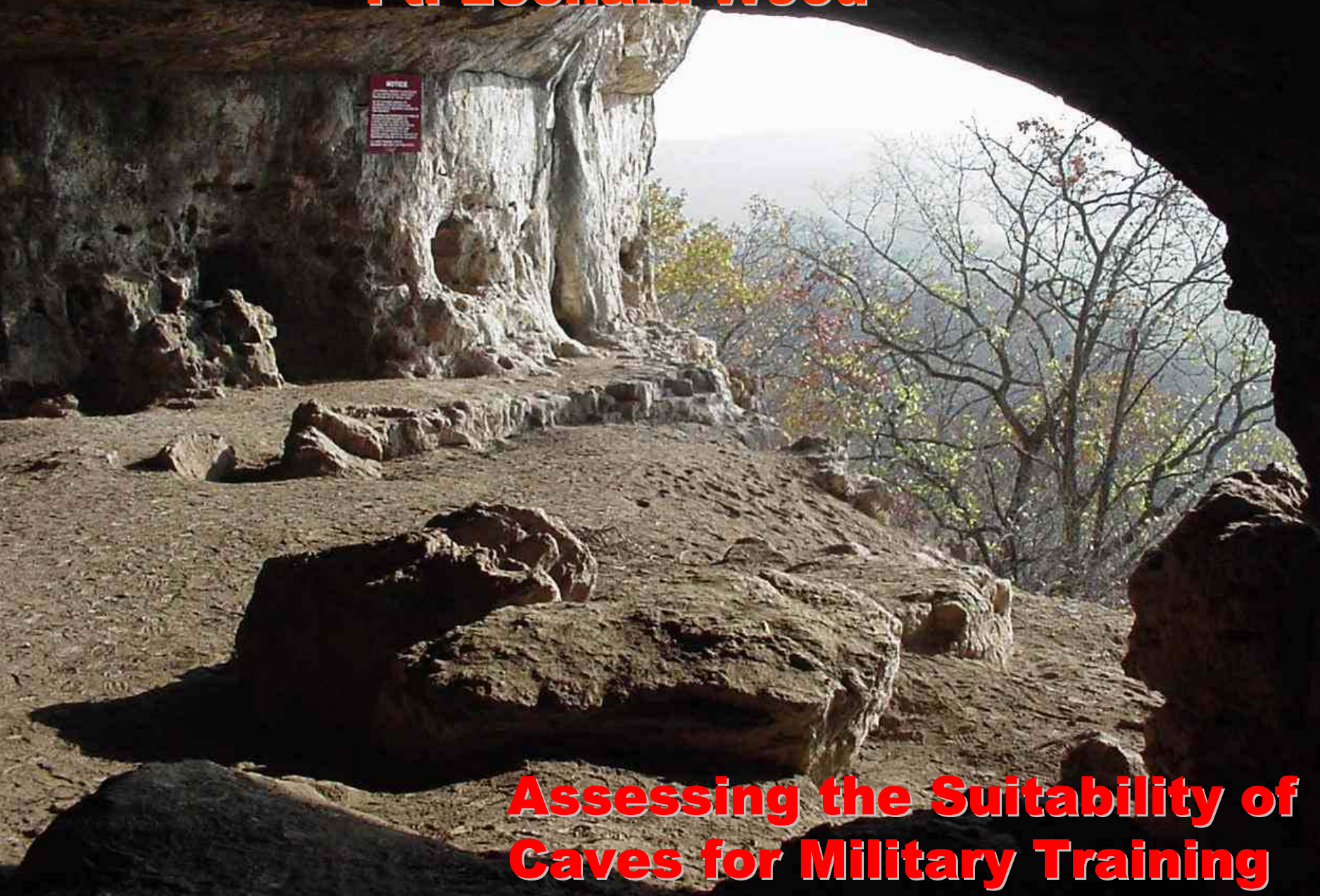


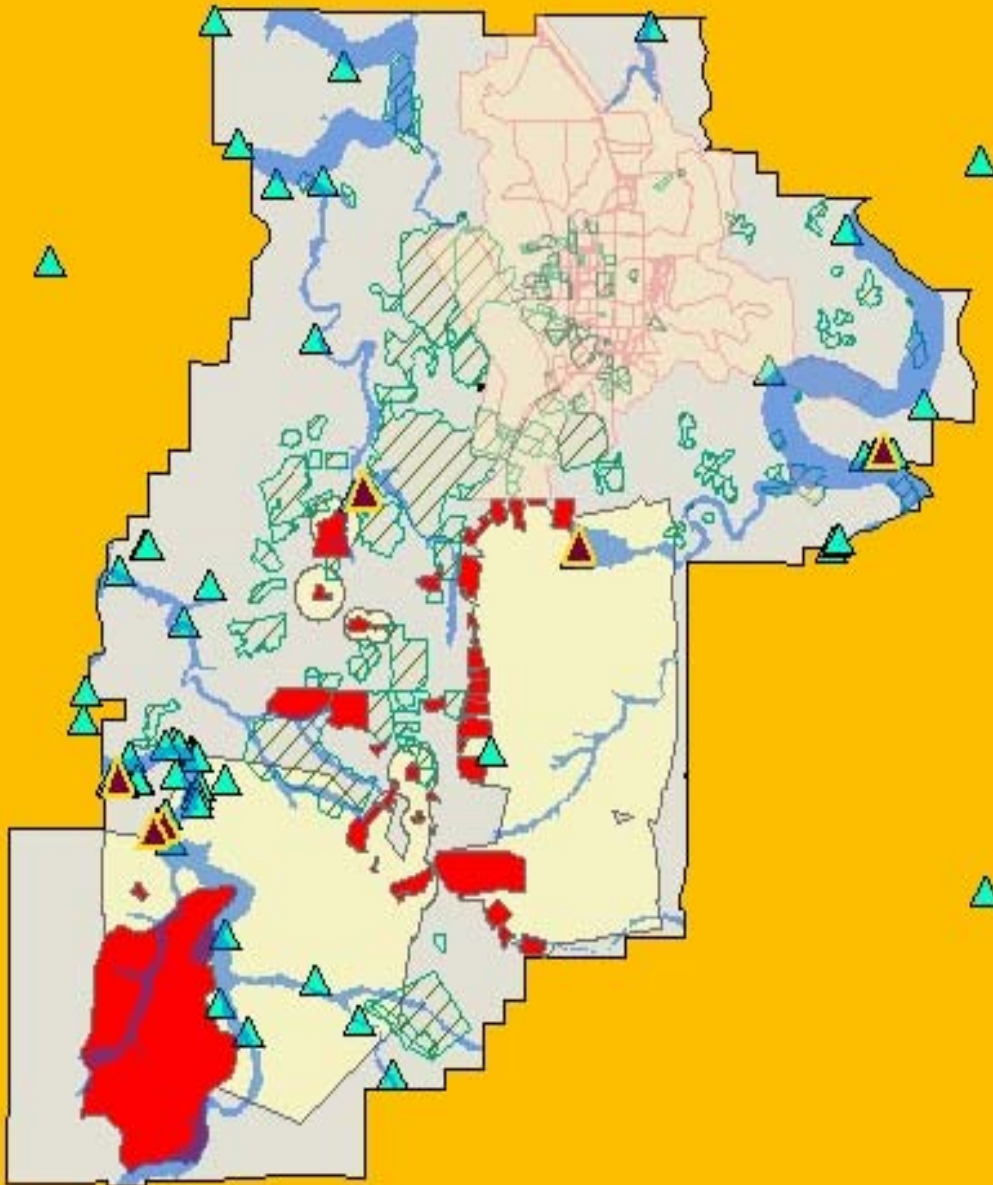
Cultural & Biological Survey of Caves at Ft. Leonard Wood



**Assessing the Suitability of
Caves for Military Training**

Report Documentation Page				Form Approved OMB No. 0704-0188	
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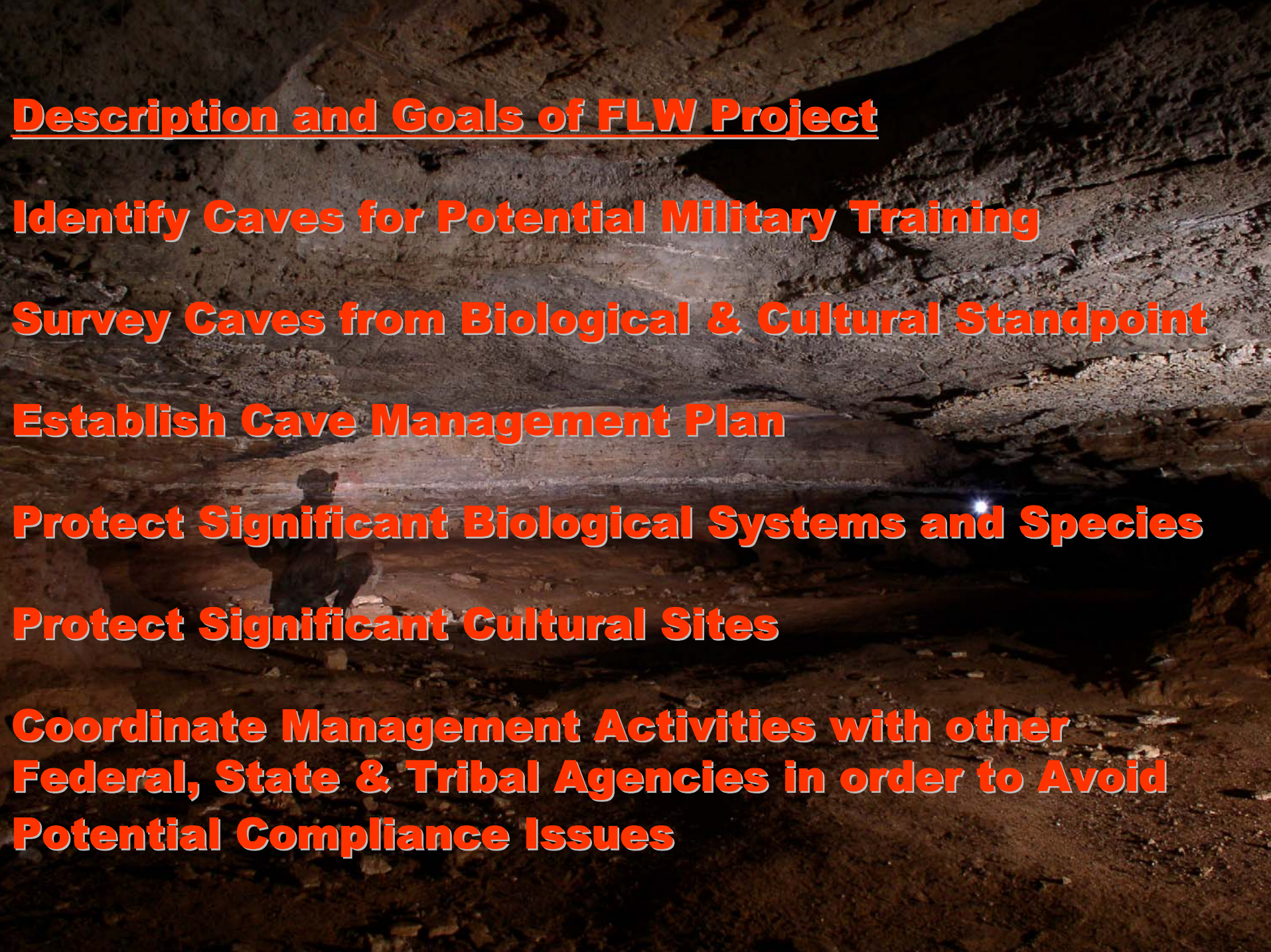
MANSCEN & Fort Leonard Wood
61,410 Acres



MANSCEN & FLW MISSIONS
Basic Combat Training
Engineer School & Training
Military Police School & Training
Chemical School & Training
ITRO Heavy Equipment Course

63 Caves (Known) ▲
40 CENR's/ENR's
16 NAGPRA Sites

2 Endangered Species
6 Caves Sites ▲
2 Gray Bat (Maternity)
4 Indiana Bat (Hibernacula)

A person wearing a helmet and gear is crouching in a dark, rocky cave, illuminated by a flashlight. The cave walls are rugged and textured.

Description and Goals of FLW Project

Identify Caves for Potential Military Training

Survey Caves from Biological & Cultural Standpoint

Establish Cave Management Plan

Protect Significant Biological Systems and Species

Protect Significant Cultural Sites

**Coordinate Management Activities with other
Federal, State & Tribal Agencies in order to Avoid
Potential Compliance Issues**

PROVIDE SPECIFIC APPROVED MILITARY CAVE SCENARIO TRAINING SITES

PARTICIPATING FLW UNITS

**EN ANCOC's
Sapper Leader Course
Robotics
DARPA**

CAVE TRAINING SCENARIOS

**Cave Clearing Battle Drill
Search & Destroy
Frontal Assault
Avenues of Approach**

Lead DoD in Cave Training

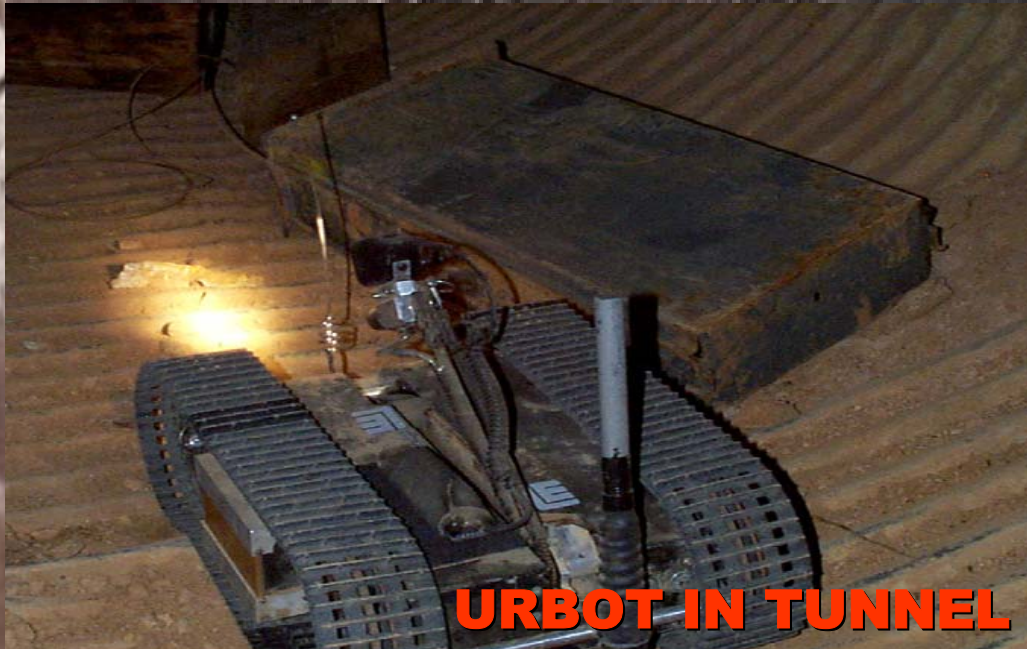
FLW UNITS IN ACTION



**SAPPER LEADER
COURSE TRAINING**



EN ANCOC's AA BRIEF



URBOT IN TUNNEL

BIOLOGICAL RESOURCE CAVE SURVEY

SURVEY RESULTS

- Invertebrate, Vertebrate and Vascular Plant surveys on 58 Caves Sites
- Multiple State & County Micro (Invertebrates) Fauna Records
- Multiple County Flora Records
- Over 100 (Invertebrate, Vertebrate) Taxa Recorded on Survey
- 220 Species of Vascular Plants Recorded - 50 Taxa Pending
- 9 Plant Community Associations Found in Proximity to Caves
- Four Cave Sites Considered Biologically Significant



FEDERAL ENDANGERED SPECIES SURVEY RESULTS

- **58 Cave Surveys Completed**
- **No New Endangered Species Found**
- **1 Potential Gray Bat Site Found**



EFFECTS ON FLW TRAINING/MISSON

- **None (Potential Site in Close Proximity to Existing Gray Bat Cave)**

STATE LISTED SPECIES SURVEY RESULTS

- **No New State Species of Concern Found**
- **1 New Site Found (Grotto salamander)**
- **1 New Site Found (Missouri Cave Amphipod)**



ISSUES

- **Invertebrate ID process longer than expected**
- **Numerous Cave Invertebrate taxa could easily be undescribed to science or have the potential to be new species (not uncommon in cave surveys)**

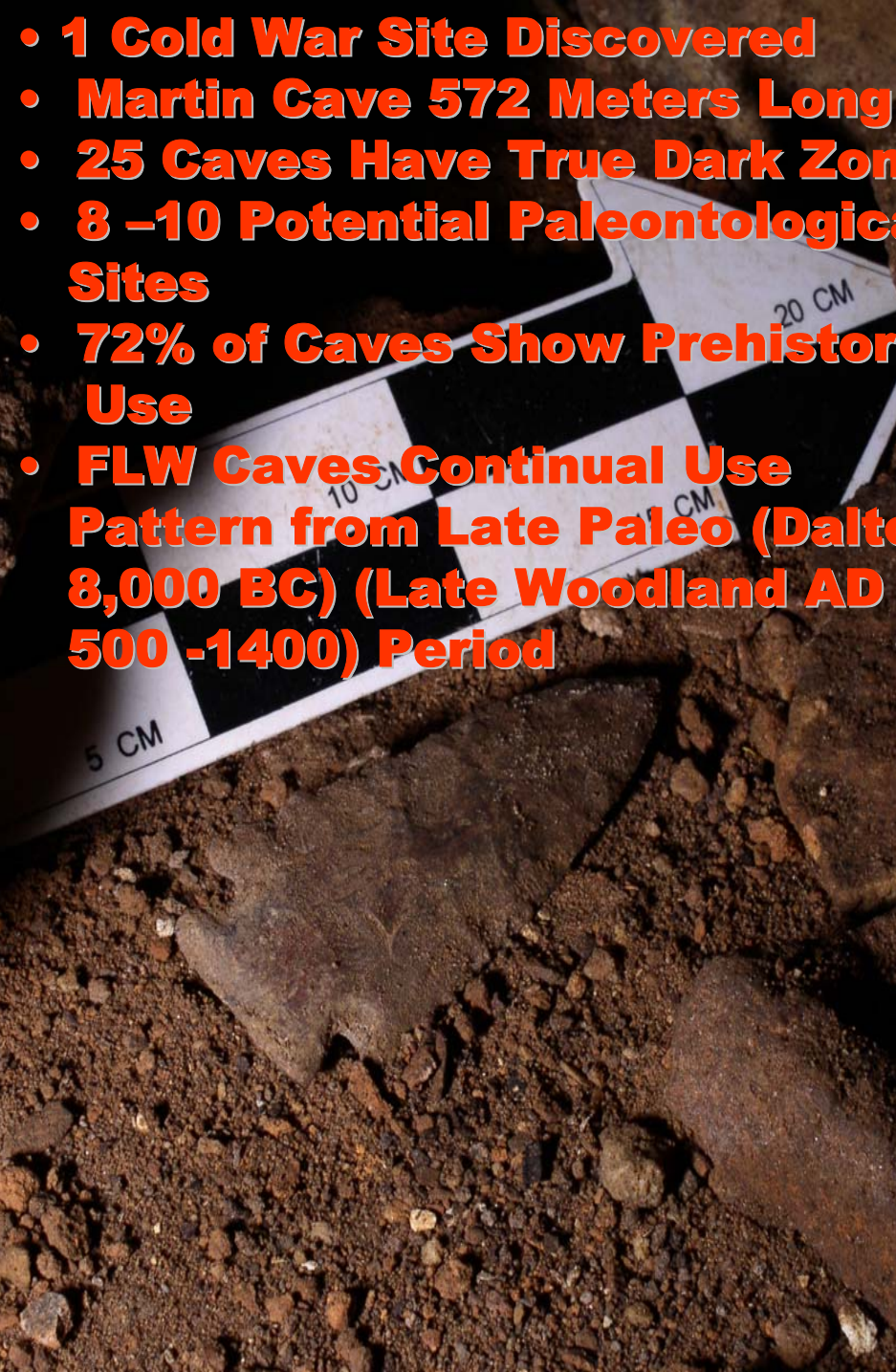
CULTURAL RESOURCE CAVE SURVEY

SURVEY RESULTS

- **54 Caves Surveyed & Mapped**
- **7 Potential CENR Sites**
- **4 Potential NAGPRA Sites**
- **2 Sites (Kerr & Martin) Mitigated With Additional DPW CRP Funds**
- **All Caves Sites Recorded in GIS Database (ArcMap) with Hot-linked Photos of Cultural, Biological & Map Information**
- **Established Positive Contact with 5 Tribal Groups**



- **1 Cold War Site Discovered**
- **Martin Cave 572 Meters Long**
- **25 Caves Have True Dark Zone**
- **8 -10 Potential Paleontological Sites**
- **72% of Caves Show Prehistoric Use**
- **FLW Caves Continual Use Pattern from Late Paleo (Dalton 8,000 BC) (Late Woodland AD 500 -1400) Period**







← B.CO.

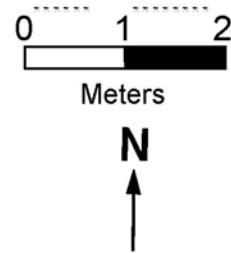
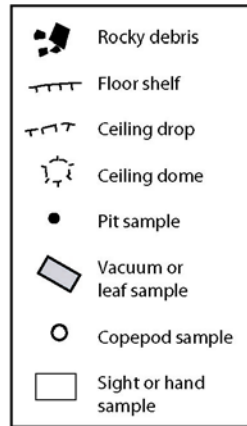
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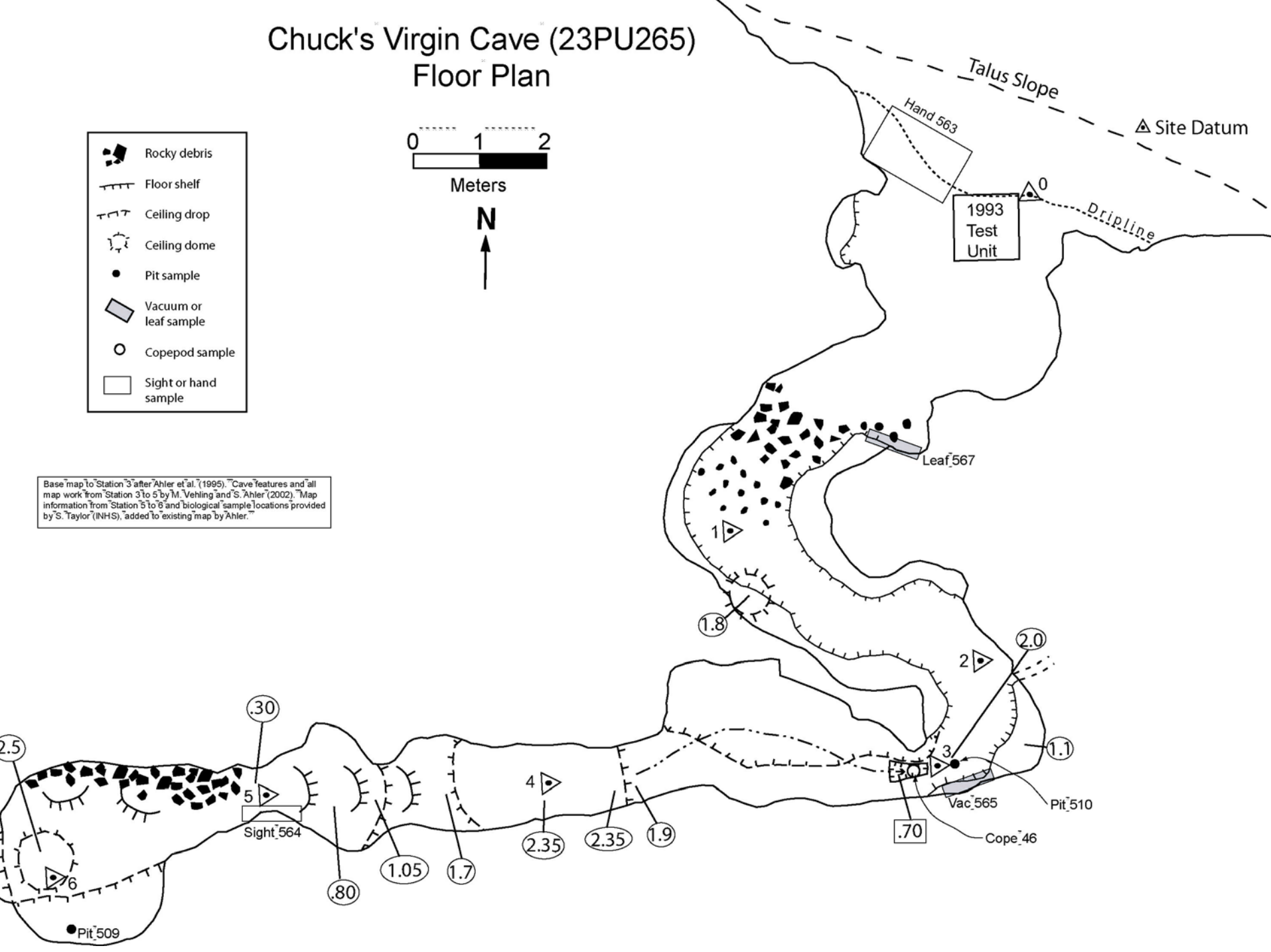
LI

USA

Chuck's Virgin Cave (23PU265) Floor Plan



Base map to Station 3 after Ahler et al. (1995). Cave features and all map work from Station 3 to 5 by M. Vehling and S. Ahler (2002). Map information from Station 5 to 6 and biological sample locations provided by S. Taylor (INHS), added to existing map by Ahler.







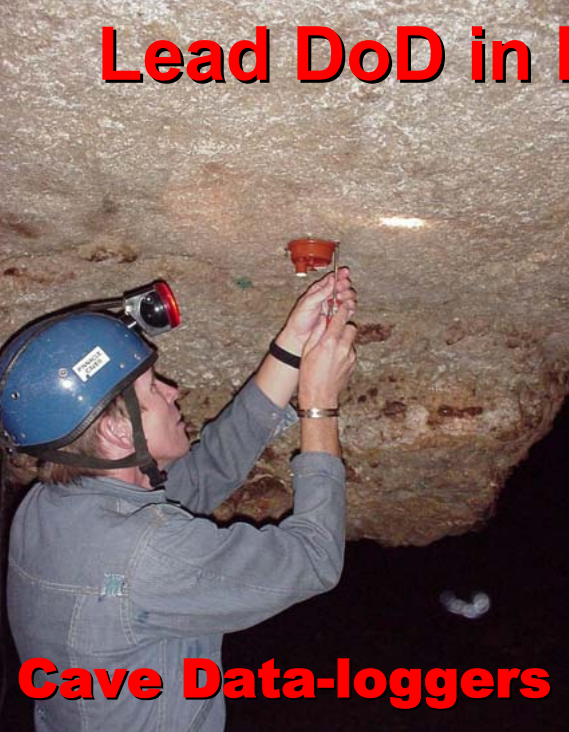








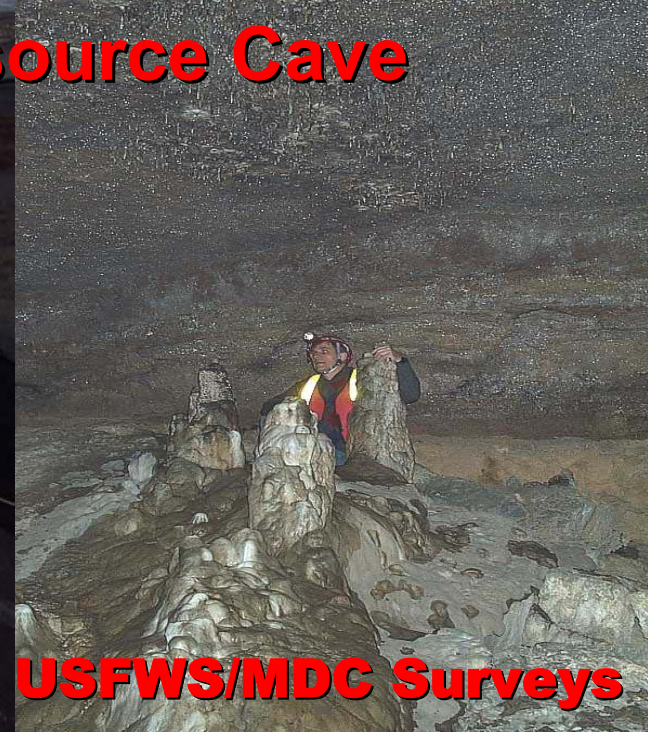
Lead DoD in Natural/Cultural Resource Cave Management



Cave Data-loggers



Cave Mapping



USFWS/MDC Surveys



DPW Cave Monitoring & Protection



FLW NAGPRA ISSUES & FUTURE

Continue Cave Gating at NAGPRA Sites

On-Going Consultation with Tribal Leaders Including Cultural Affiliation and Repatriation of Human Remains

Visitation by Tribal Leaders to FLW to Review CRMP Activities & Goals





Legacy & FLW Training/Natural/Cultural Resource Cave Management Future Goals

**Approved Training Cave Sites
Cave Gates at NAGPRA Sites
Harden Cave Surfaces**

**Cave Management Plan
Cave Data-loggers
Continue Monitoring**

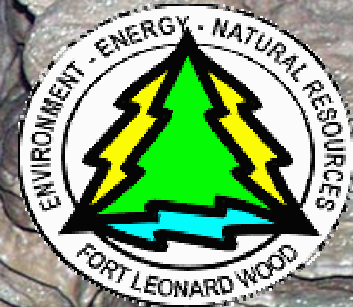
**Develop Protocols for Other DoD Installations
Work With USFWS, MDC & Tribal Organizations**

PROJECT COORINATORS

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Dr. Richard Edging
Dr. Michael Hargrave

CEMML/FLW DPW
CEMML/FLW DPW
USACERL/ERDC

MANSCEN & Fort Leonard Wood,
Missouri



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Dr. Steve Taylor Biological Survey INHS

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