



**2003 AFCEE Technology Transfer Workshop**

San Antonio, Texas

*Promoting Readiness through Environmental Stewardship*

# **Large Range Clearance Issues and Answers**

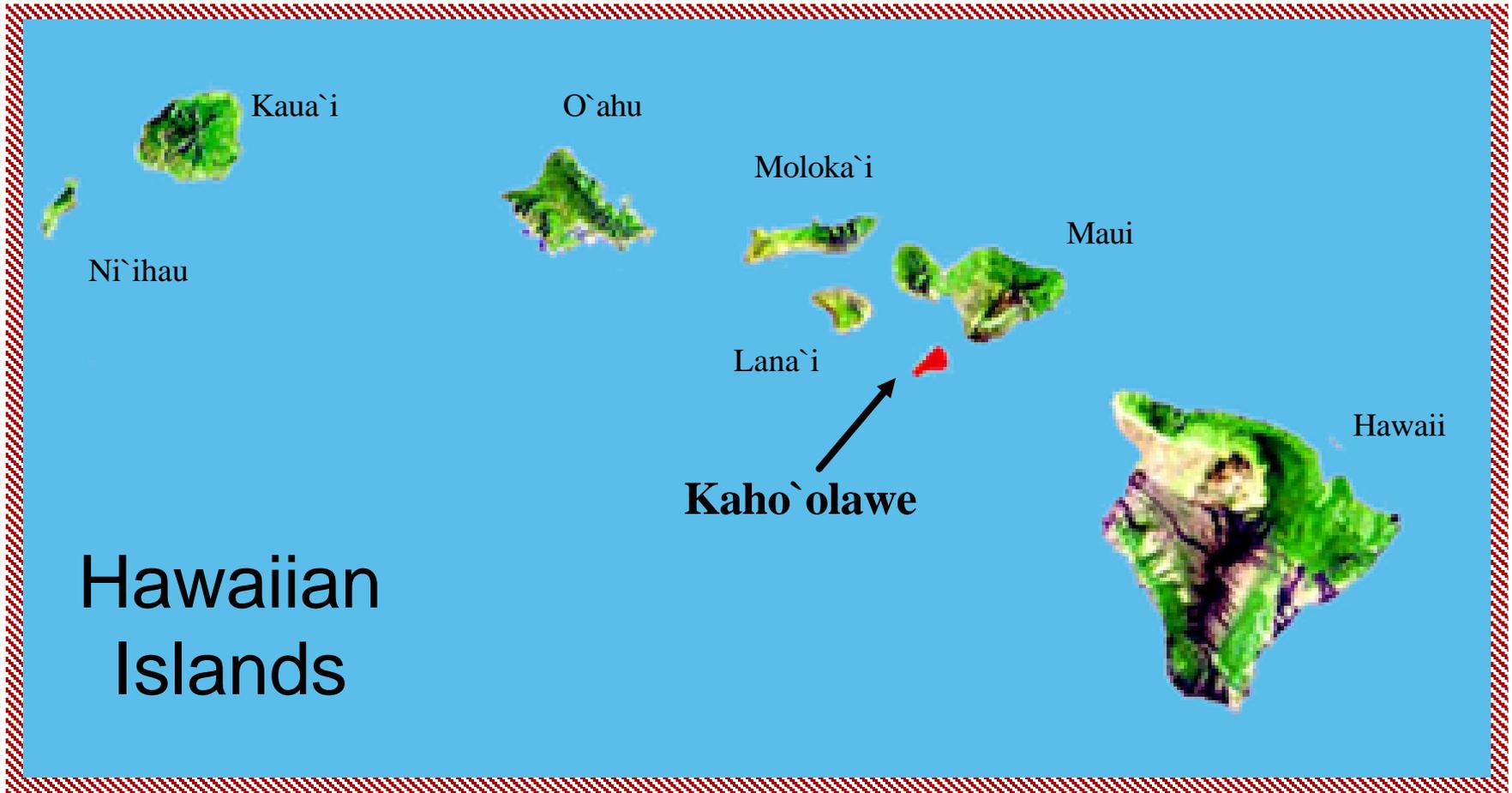
## **The Kaho'olawe Experience**

**Tom McCabe  
Parsons  
26 February 2003**





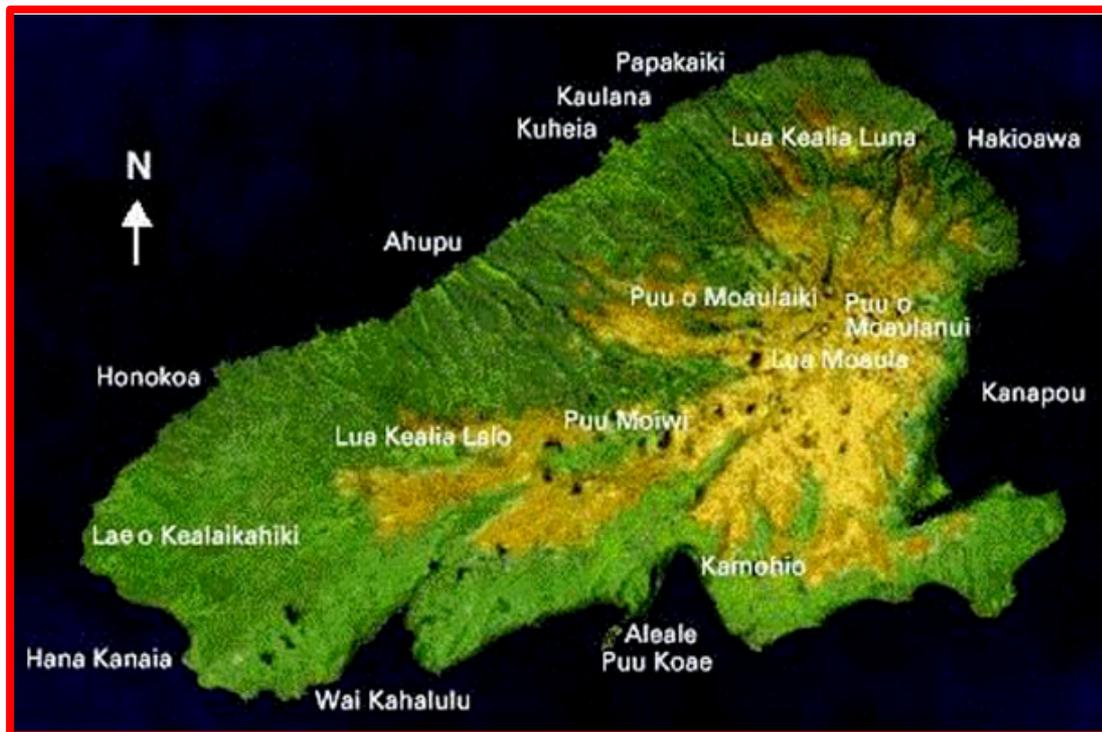
# ***Project Location***





# *Kaho'olawe Project*

- 29,000 acre island  
6 miles from Maui
- 11 miles long,  
7 miles wide
- Active weapons  
range, 1941 - 1990
- Significant HP and  
natural resources





# *Project History*

- **1993: Consent decree issued – start of 10 year cleanup effort**
- **1995: Model UXO Clearance Project**
- **1997: Current project awarded**
- **November 2003: End of clearance activities**
- **Projected cost at completion = \$300 M**





# ***Current Project Status***

- **Over 70% surface cleared of UXO**
- **95% assessed for NR, HP, and Env data**
- **\$14 million infrastructure construction completed**
- **6 million pounds of scrap removed from range**
- **2 million pounds treated and shipped off-island**
- **374 people working on clearance activities**
- **Approximately 500 acres cleared per month**



- **Technical**
  - **UXO Clearance Approach**
  - **Geophysical Detection**
  - **Data Management**
  - **Scrap Disposal**
  - **Other (Logistics, etc.)**
  
- **Non-technical**
  - **Worker Morale**
  - **Political Aspects**





# ***UXO Clearance Approach***

- **Depends on project size**
- **Large ® Mass Production**
  - **Specialized Teams**
  - **Specialty-focused**
  - **Production “Pipeline”**
- **Small ® Project Specific**
  - **Multi-function Teams**
  - **Grid-focused**





# ***UXO Staffing Issues***

- **Project duration issues**
- **Limited EOD - badge personnel available**
- **Alternatives**
  - **Approved UXO training**
  - **Foreign nationals**
  - **Non-UXO laborers**
- **Keys to success:**
  - **Training**
  - **Supervision**
  - **Ratio of EOD / laborers**





# ***Geophysical Detection***

- **Detector Technology**
  - **Geology-dependent**
  - **Magnetometers**
  - **Electromagnetic induction**
  - **Other**
- **Detection Approach**
  - **Terrain and other factors**
  - **Data collection**
  - **Field discrimination**





# Geophysical Staffing

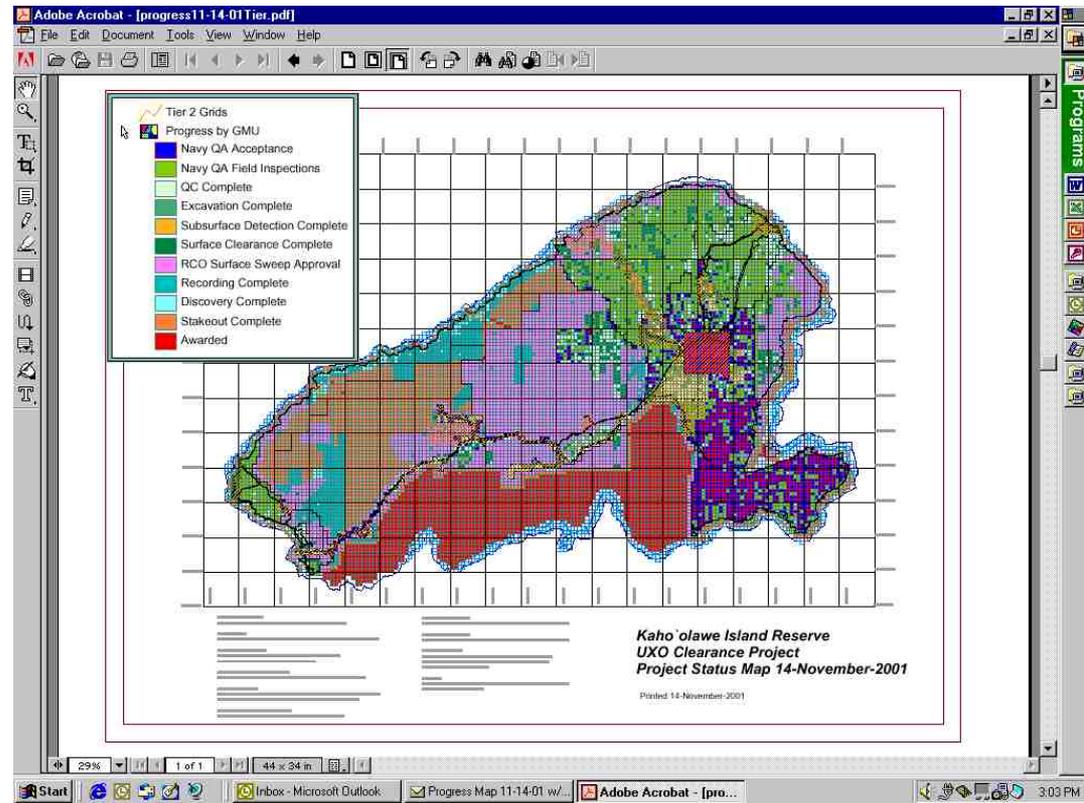
- Limited pool of experienced geophysicists
- Alternative: Mix of professional and hourly workers
- Keys to success:
  - Training
  - Certification
  - Quality Control





# Data Management

- Most significant deliverable
- Requirements:
  - Database foundation
  - GIS interface
  - User interface
- Kaho'olawe solution:
  - Oracle Spatial
  - GeoMedia GIS
  - Web-page user interface

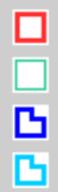


Legend | Map Queries | Progress Maps

### Map Features

#### Grid Features:

- 1000m Grid
- GMUs
- Work Areas
- Block Assess



#### Investigation Features:

- Anomalies
- EV Points
- HP Areas
- NR Points
- UX Points



#### Contours:

- 10m Contours
- 1m Contours

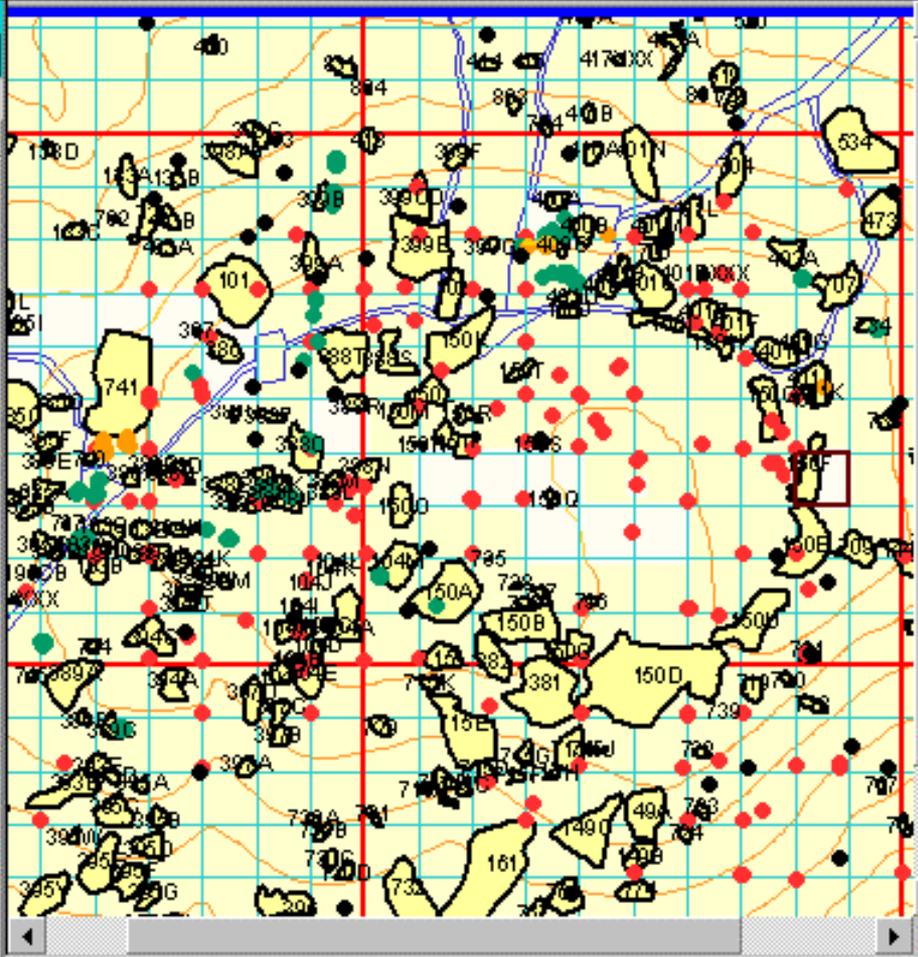


#### Aerial Photos:

- 1992 Aerials
- 1986 Aerials



Submit



**Summary for Work Area Lua** Total # of GMUs: **205**  
**Makika**

Total # Completed GMUs		Total Weight Removed (lbs)	
Stakeout	205	Brass	904
Discovery	205	Ahminium	1505.8
Recording	205	Other Met. Demil.	7628.5
Area Prep	170	Other Met. No Demil.	16288
Surface Clearance	169	Target Remnants	
Subsurface Detection	132	Non UXO Remnants	11229
Excavation	148	Subsurface	28657.36
		All Materials	66212.66

### Vicinity Map

### Map Navigation

### Map Navigation Tips:

- Use the first Magnify button to define a zoom box in a map.
- The second Magnify button will allow you to zoom back from your current map view.
- The Hand button will allow you to pan the map view in any direction.
- Use the R button to refresh the map after a map pan or clicking a checkbox on the Legend.

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# ***Scrap Disposal***

- **Range scrap - a hot topic**
- **Recent incidents**
- **Preferred method: chain of custody to final destruction**
- **Kaho'olawe approach**
  - **Redundant visual inspection**
  - **On-island 5X treatment**
  - **Complete demil before shipping off-island**





# *Remote Site Issues*

- Personnel Transport
- Supplies / Equipment
  - Chain Saws (232)
  - Brush Cutters (204)
  - Radios (256)
  - Metal Detectors (275)
  - Vehicles (125)
  - GPS Units (112)
  - Diesel (110,000 gal/yr)
  - Water (486,000 bottles/yr)





# ***Approach: Logistics Emphasis***

- **Dedicated logistics staff:**
  - 5 procurement
  - 6 support base in Maui
  - 3 on island
- **Helicopter contracts**
- **Barge contract**
- **Innovations to improve efficiency at each step**





# *Clearance Exceptions*

- **Scope of Work = entire island**
- **Numerous ravines and shorelines**
- **Limited time and funding**
- **Problem: resulting uncleared areas**





# *Approach: Risk Management*

- Identify high risk areas
- Identify future high use areas
- Prioritize clearance
- Define exception area boundaries
- Establish institutional controls





# Worker Morale

- Duration of Project
- Difficult working conditions
- Resulting problems:
  - Low attendance
  - Injury / illness
  - Low productivity





# *Approach: Incentives*

- **Safety**

- Exercise program
- Boot program
- Regular stand-downs
- Safety rewards

- **Productivity**

- Attendance rewards
- Production awards
- Quality improvement awards





# *Stakeholder Agendas*

- Stakeholders have priorities that are different than that of the client
- Project is a highly visible, political undertaking





# *Approach: Partnership*

- Regular meetings to discuss issues, problems, and concerns
- Cooperation on working levels





# ***Conclusion***



*Promoting Readiness through Environmental Stewardship*