

PANEL 3: BLIGHT REMOVAL, REMEDIATION
& ECONOMICS

Geophysical Classification for Munitions Response: A Better Way

Lenny Siegel, Center for Public Environmental Oversight



California State University
MONTEREY BAY
Extraordinary Opportunity



Challenge of Munitions Response

- Intense public use of lands formerly used for military training
- Sensitive ecosystems with slow “grow-back”
- Exposure may have catastrophic consequences.

DANGER

PELIGRO



EXPLOSIVES AREA



KEEP OUT BY ORDER OF THE COMMANDER

AREA DE EXPLOSIVOS

MANTENGASE AFUERA POR ORDEN
DEL COMANDANTE

NOTICE

TRESPASSERS WILL BE PROSECUTED
INTRUSOS SERAN PROCESADOS

Under Title 18, USC, Section 1382

Goals of Munitions Response

- Goal should be to prevent exposure while minimizing disruption and destruction.
- Clearance must consider new uses, “trespassing,” munitions migration, and erosion of overlying soil.
- Maximize subsurface clearance.

Historic Approach

- Clear land.
- Detect metal.
- Dig everything.
- Remove metal and remove or blow suspected ordnance.
- Often hundreds of holes per acre.

Problems

- Costly
- Time-Consuming
- Area Closures
- Destruction of Landscape
- Risky, Labor-Intensive Digging

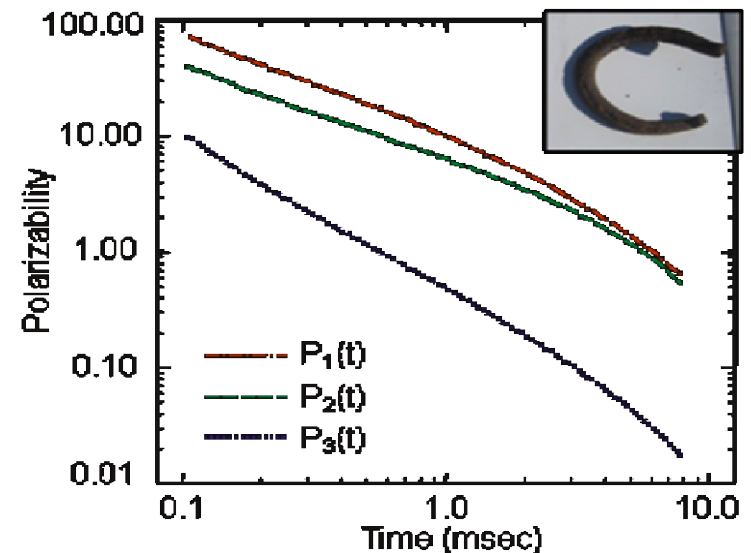
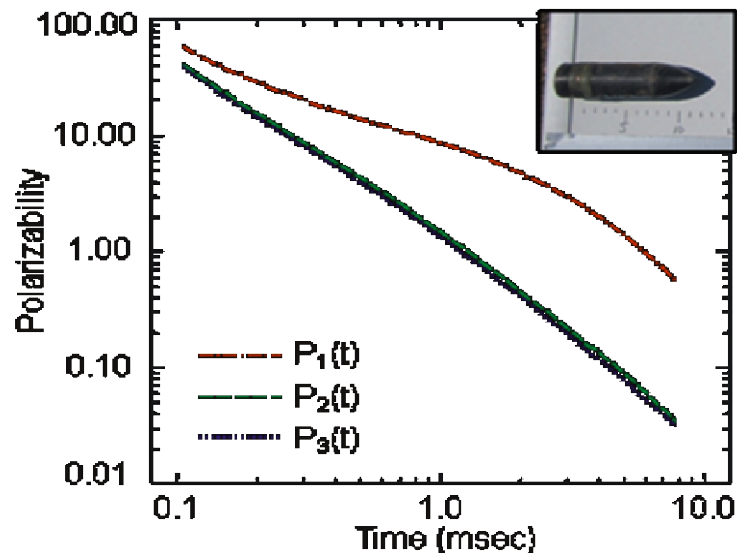
Geophysical Classification

- Sometimes clear land.
- Identify and map metal.
- Re-survey spots with metal.
- Create dig list of suspected ordnance or uncertain objects.
- Remove or blow ordnance.
- Leave other metal in ground

Three-D Sensor



Identify Suspected Ordnance



Red-Yellow-Green

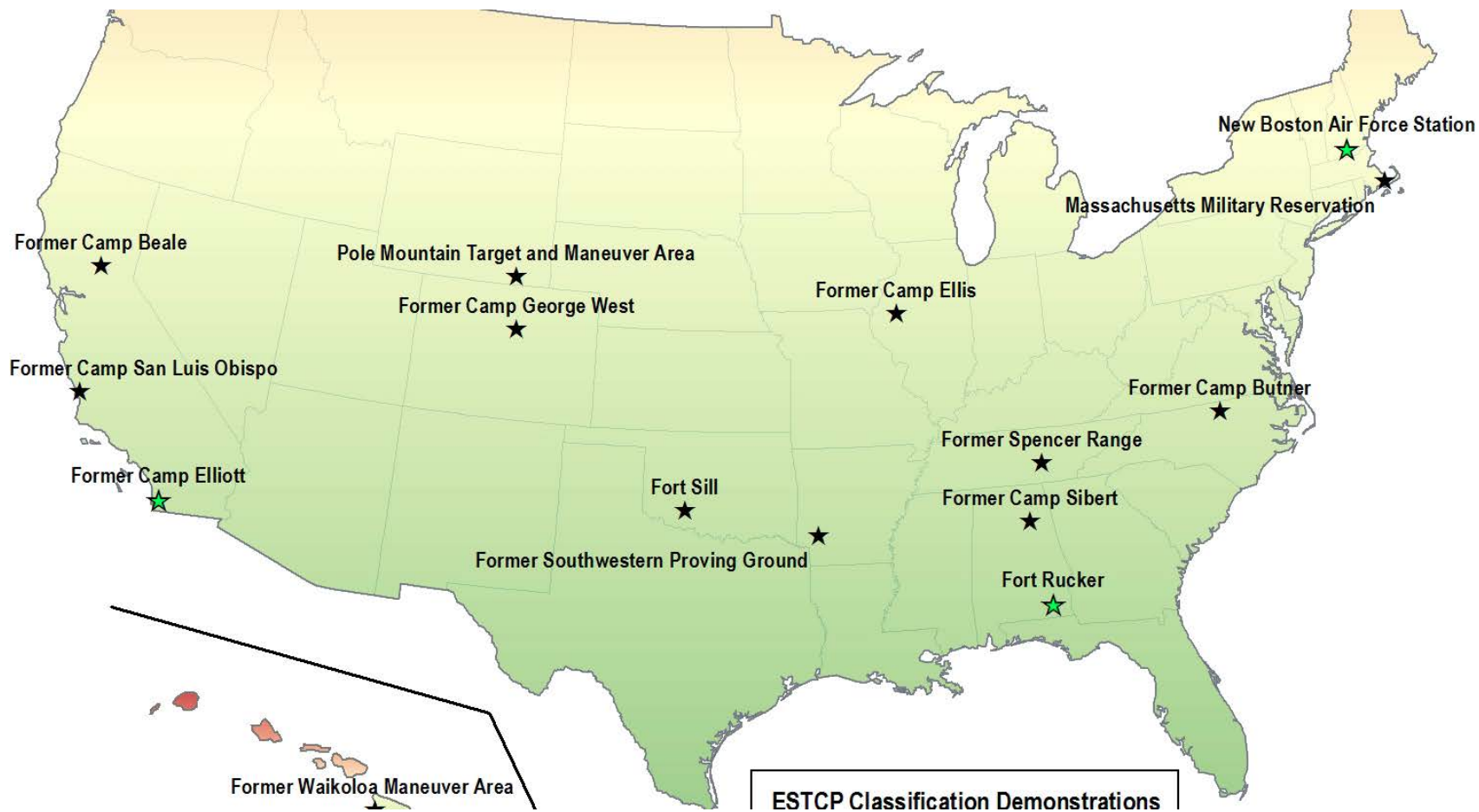
| Anomaly ID | Dig on First Pass | Type | Comment |
|------------|-------------------|--------|---------------------------------------|
| 2498 | Y | | Unable to extract reliable parameters |
| 247 | Y | 105 mm | |
| 1114 | Y | 4.2 in | High likelihood TOI |
| 69 | Y | 155 mm | |
| 811 | Y | 81 mm | |
| 313 | N | | Unable to classify |
| 883 | N | | |
| ... | N | | |
| ... | N | | |
| ... | N | | High likelihood not TOI |
| ... | N | | |
| ... | N | | |
| ... | N | | |
| ... | N | | |
| ... | N | | |

First
Pass
Threshold

| Anomaly ID | Dig | Type |
|------------|-----|--------|
| 2498 | Y | |
| 247 | Y | 105 mm |
| 1114 | Y | 4.2 in |
| 69 | Y | 155 mm |
| 811 | Y | 81 mm |
| 313 | Y | 105 mm |
| 883 | N | |
| ... | N | |
| ... | N | |
| ... | N | |
| ... | N | |
| ... | N | |
| ... | N | |
| ... | N | |
| ... | N | |
| ... | N | |

Final
Threshold

Demonstration Sites





Limitations

- Terrain and vegetation
- Fragile Equipment
- Too much metal
- Qualifications of classifiers

Acceptance?

- Regulator
- Community
- Industry
- Army/Army Corps

E-mail me or give me your card if you want to join CPEO' s free *Brownfields Internet Forum* and/or *Military Environmental Forum* newsgroup.

Lenny Siegel

Center for Public Environmental Oversight
c/o PSC, 278-A Hope Street
Mountain View, CA 94041
Voice & Fax: 650/961-8918

lsiegel@cpeo.org — <http://www.cpeo.org>