Recovery and Identification

Dr. Franklin E Damann

DPAA Laboratory

Recovery and Identification

1. • Field Operations

2. • Laboratory Operations

3. • Identification Process (Case Study)

4. • Special Projects Update

* There are images of human remains in this briefing

Recovery and Identification

1. • Field Operations

2. • Laboratory Operations

3. • Identification Process

4. • Special Projects Update

Field Operations

Archaeological Recoveries

- Conducted all over the world
- Informed by internal research and external partners
- A multidisciplinary team led by a Scientific Recovery Expert

Disinterment of Unknowns

- National Memorial Cemetery of the Pacific
- American Battlefield Monuments Commission cemeteries across globe

Archaeological recoveries are the controlled recovery of data

- Archaeology is a destructive process

- DPAA archaeologists are experts at understanding:

  – Spatial relationships between items of evidence

  – Spatial relationships between items of evidence and their environmental setting

  – Site transformation

  – The relevance of different sediments and burial features

- This knowledge is essential for overcoming numerous challenges presented by varied field conditions
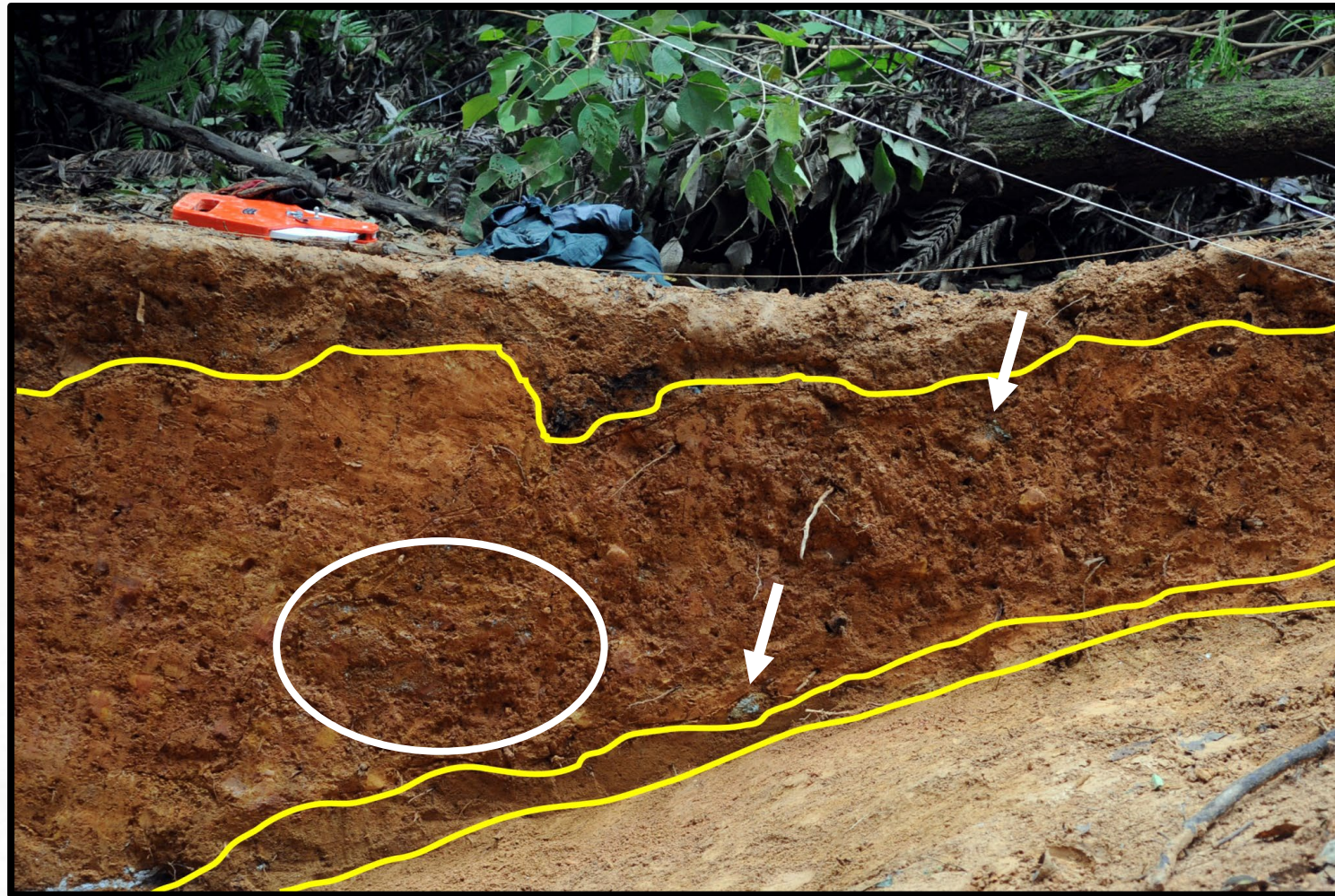
Archaeologists 'read' sediments to understand site transformation

Archaeologists 'read' sediments to understand site transformation

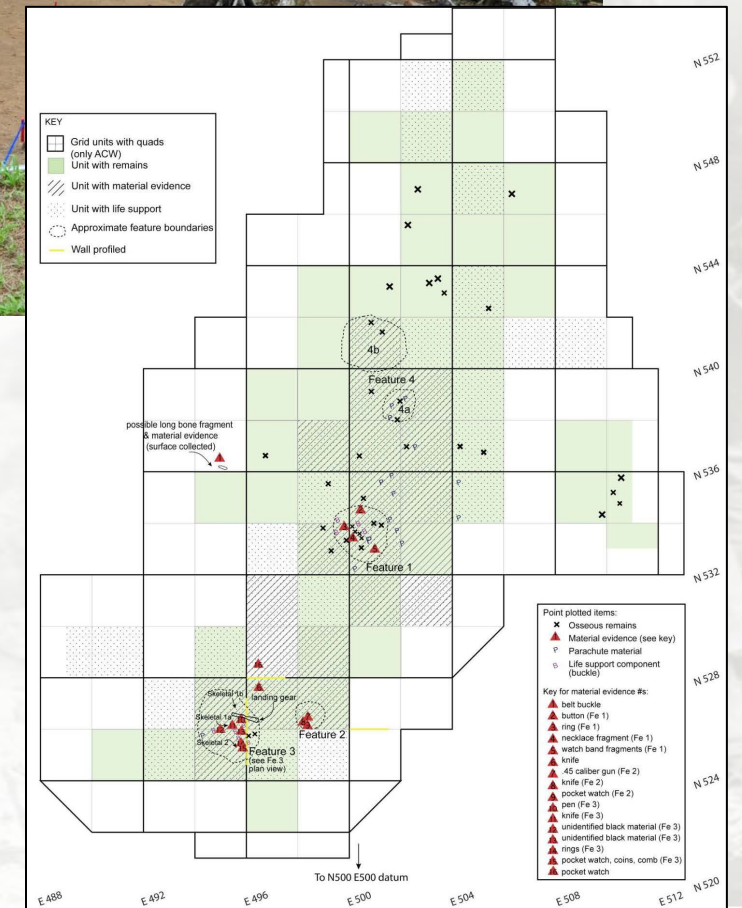# Archaeologists recognize soil changes and features that indicate a burial

Differences in soil color

Outline of burial clearly marked

- Soil changes are not always so evident
  - Require close inspection with an experienced eye

Spatial control via grid systems to maintain provenience

Excavation tools and techniques must be adapted to each specific site

Field Operations

- National Memorial Cemetery of the Pacific (NMCP), HI

- American Battlefield Monuments Commission (ABMC) cemeteries worldwide

- Disinterments involve:

  - Analysis of primary source documentation

  - Acquisition of comparative antemortem data
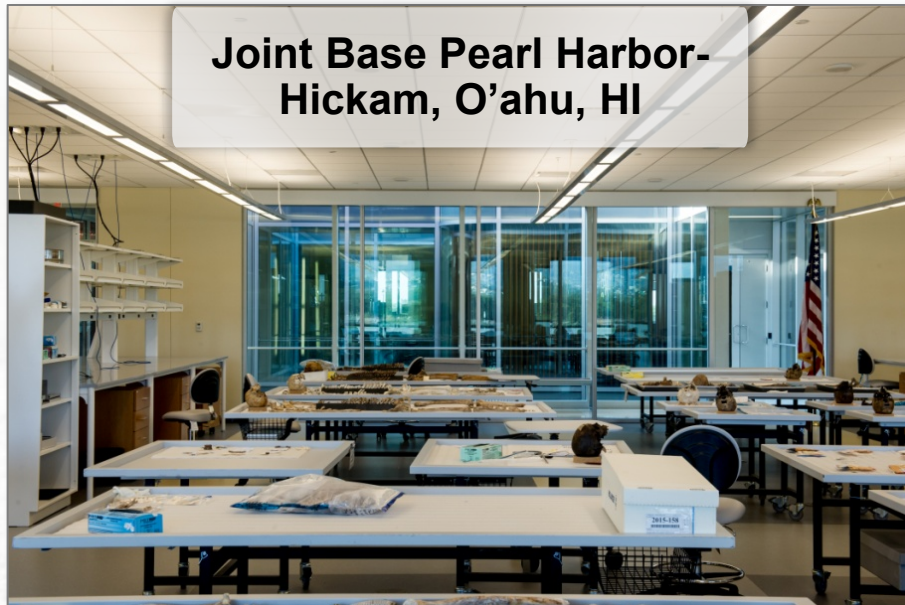
Recovery and Identification

1. • Field Operations

2. • Laboratory Operations

3. • Identification Process

4. • Special Projects Update

Recovered evidence is accessioned into the DPAA Laboratory
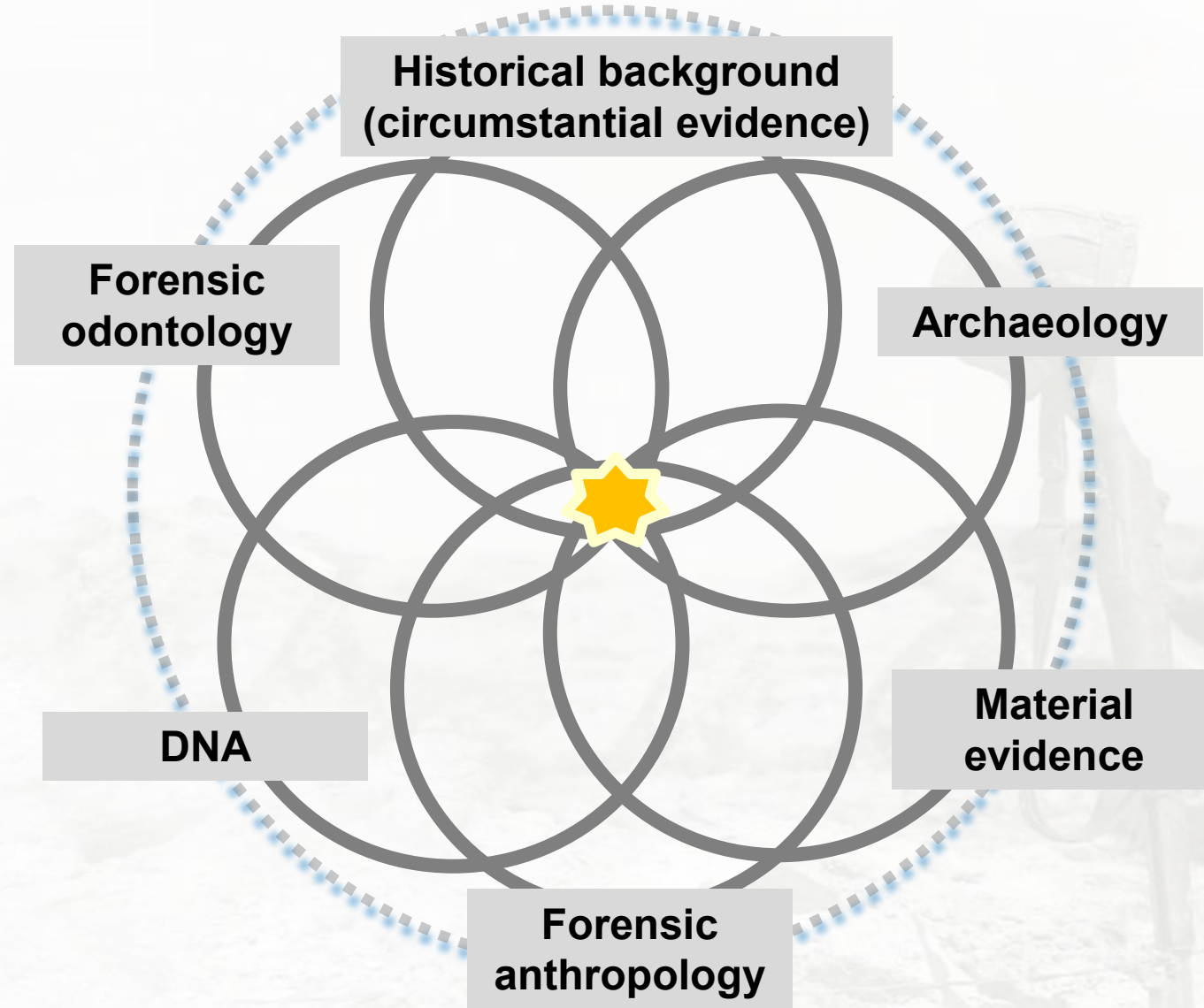
- Accredited by the American Society of Crime Laboratory Directors, Laboratory Accreditation Board ASCLD-LAB, also known as ANAB

- Located at two core sites
  - A support site is located at Wright-Patterson AFB, Dayton, OH

Joint Base Pearl Harbor-Hickam, O'ahu, HI

Offutt Air Force Base, Omaha, NE

Multiple lines of evidence are required to make an identification

- Historical background (circumstantial evidence)
- Archaeology
- Material evidence
- Forensic anthropology
- DNA
- Forensic odontology

The identification process begins with proper historical research

WWII – 73,000 unaccounted-for service members
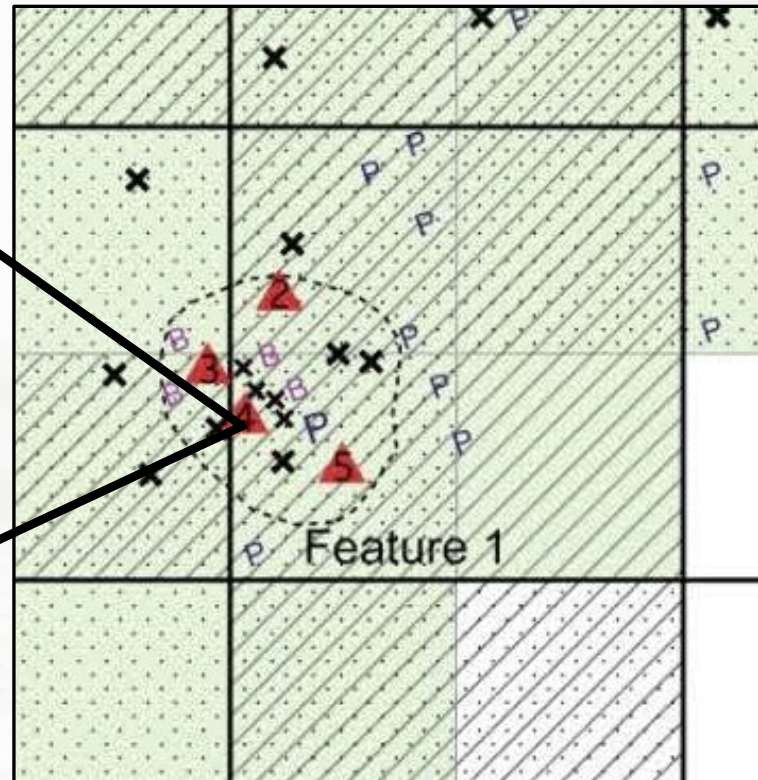
How many P-47 losses within 100K, 10K, 1K?

Archaeologists perform controlled field sciences operations

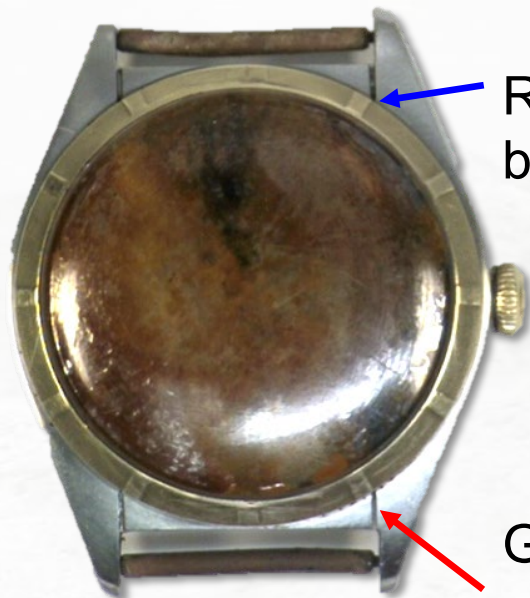Spatial control to determine associations of evidence to each other and the environment

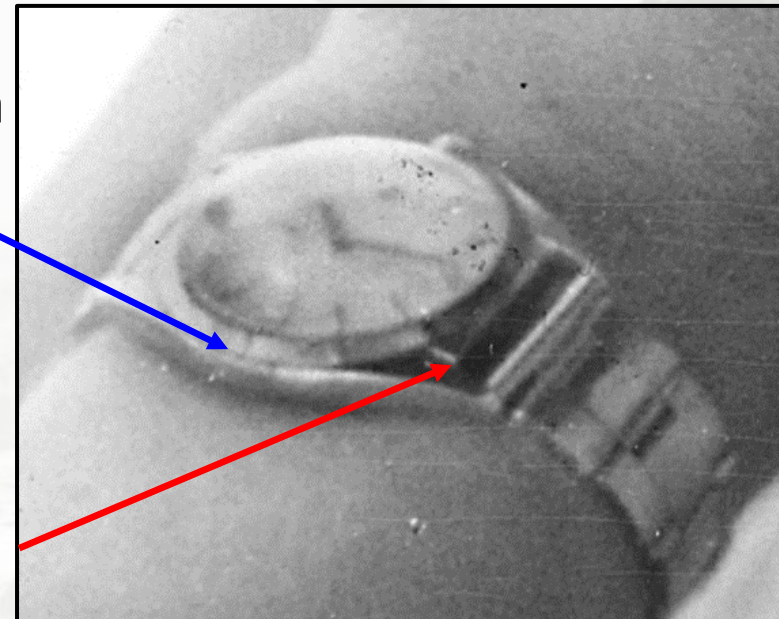# Material evidence helps to identify the loss incident and/or specific individuals

Material Evidence – Personal Effects
items associated with the individual at the incident

Rolex Oyster Datejust

Rectangular relief on bezel (blue arrow)

Grooved areas (red arrow)

Anthropological analysis narrows the list of possible individuals

Biological profile

- Sex
- Age
- Ancestry
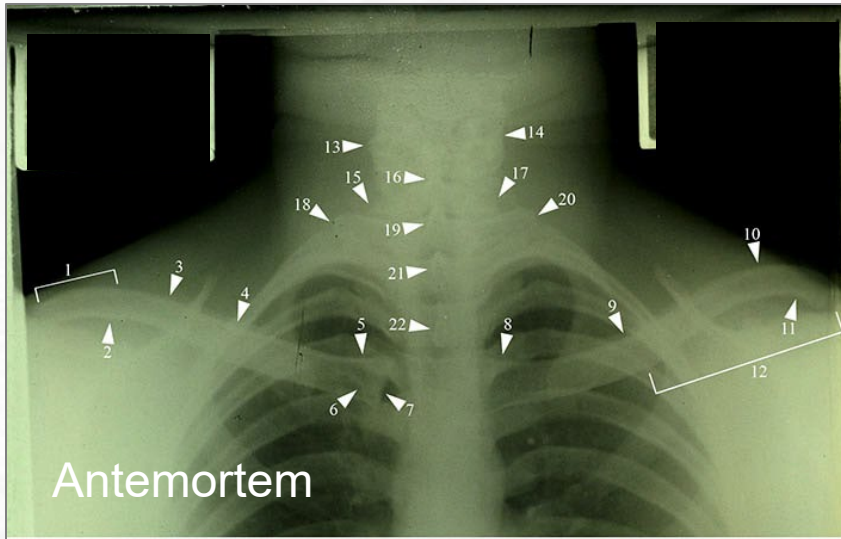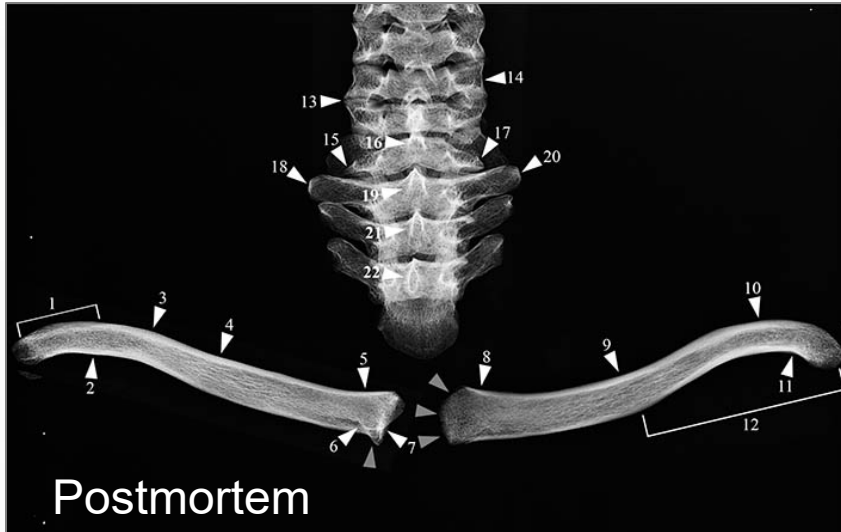- Stature
- Trauma, pathology
- Individual traits

Compare with antemortem data

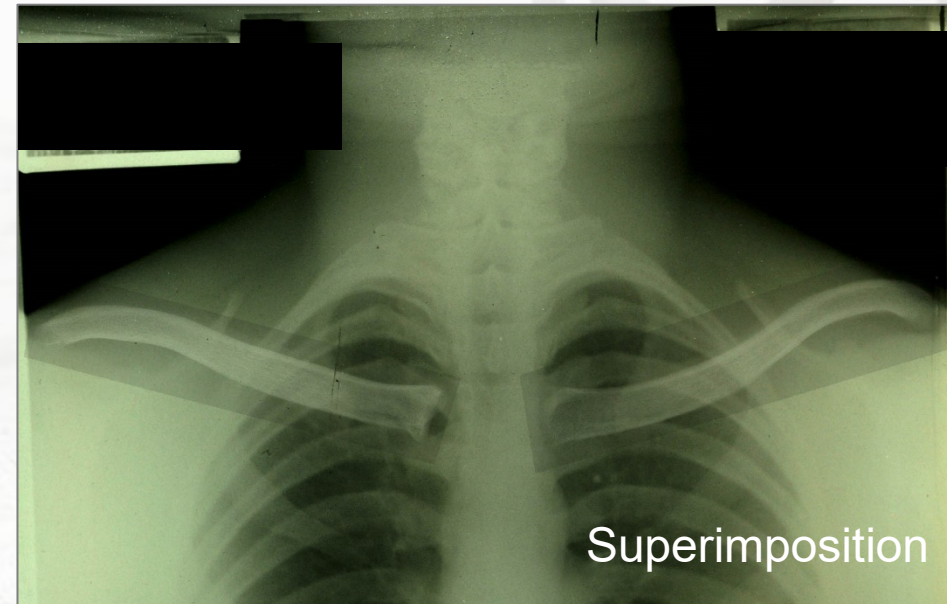(1) Segregate commingled remains

(2) Narrow the search space

Anthropologists compare post-mortem and antemortem chest x-rays

Postmortem

Antemortem

Superimposition

Generate a short list

Find points of concordance

Verify with superimposition

Odontologists compare the dentition to antemortem dental records

| Table 1. Dental comparison table of CIL			
Tooth #	Tooth #	Postmortem	Antemortem
27	R-11	E	V
28	R-12	E	V
29	R-13	E	V
30	R-14	V	V
31	R-15	V	V
32	R-16	V, impacted	V, impacted
KEY: green shade = similar findings, E = missing perimortem/postmortem; V = unrestored.			

#32

#32

Forensic Chemistry –
Stable Isotopes in bones & teeth can reconstruct an individual's history

Stable isotopes are "nature's recorders"

- *Diet*: Carbon, Nitrogen, and Sulfur
- *Geographic origin*: Oxygen, Strontium, and possibly Lead

Useful for exclusion, not direct identification.
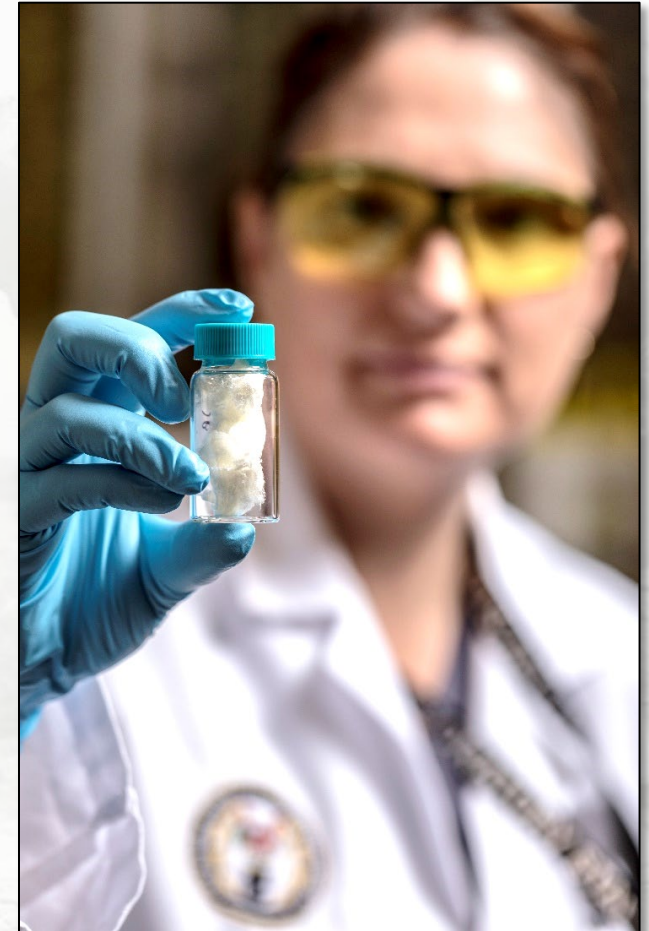
DNA evidence can be used to exclude individuals from a shortlist

- Family reference samples are essential

Recovery and Identification

1. • Field Operations

2. • Laboratory Operations

3. • Identification Process

4. • Special Projects Update

Identification Walk Through

Multiple lines of evidence are used together

- This case was relatively straightforward
- But this is exception, not the norm

This example is a Korean War case

~ **7600** MIA from the Korean War

7,600

Historical Research

In late 1950, over a span of two days, two Companies of the 25th ID engaged along a front in northern North Korea

Chinese Communist Forces infiltrated Allied lines and overran the U.S. positions

63 U.S. soldiers are listed MIA from that engagement

7,600   **63**

Archaeological Recovery

A US recovery team excavated a purported burial site in North Korea

The burial site was in an active agricultural field
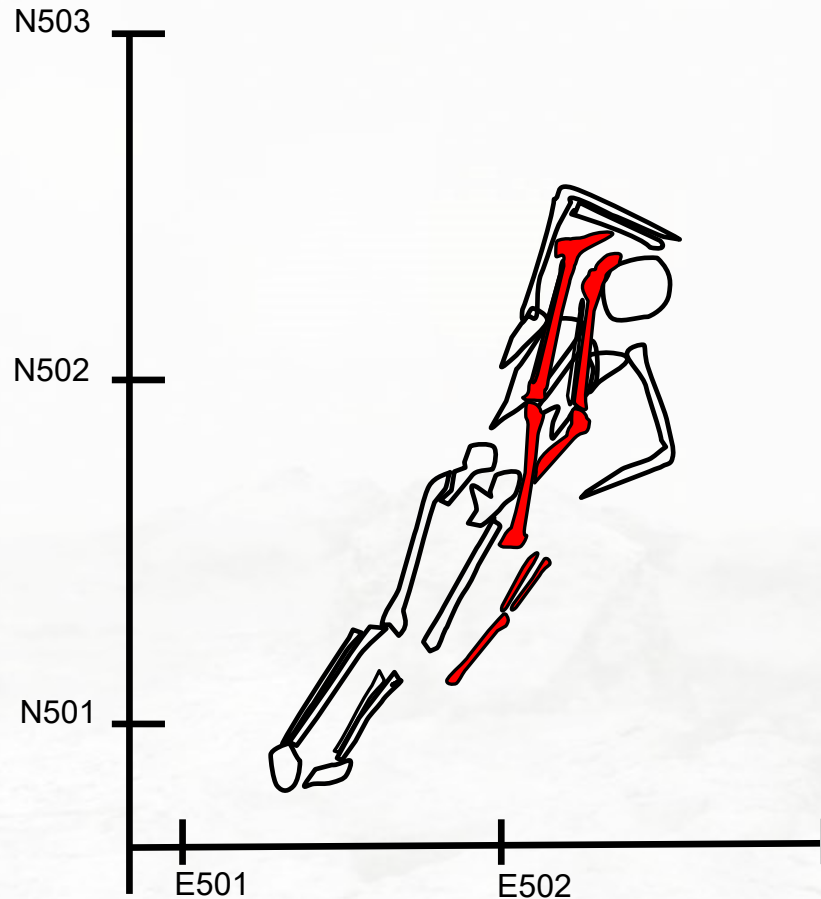
The remains of two individuals were recovered

7,600 > **63** >

Archaeological Recovery

One set of remains was laying on top of the other

Individual on the bottom was laying face-down, arms not neatly laying to the side

This suggests that these individuals were not buried by friendly forces

7,600   **63**

Historical Research PLUS Archaeological DATA

63 Individuals are listed as missing from that area, from that specific battle

42 Individuals were listed as KIA, found and buried by UN Forces

Leaving…

21 Individuals listed as MIA whom might have been found and buried by North Korean or Chinese soldiers
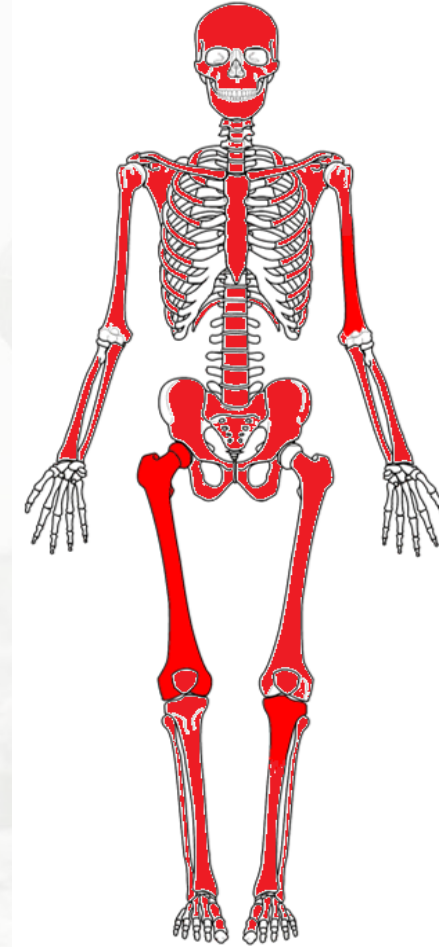
7,600   **63**   **21**

Anthropological Analysis

Biological profile

- Sex: Male

- Ancestry: African descent

- Age: 17-19 years old

- Stature: 68.5" tall

- Additional observations on skeleton

How many of the 21 people fit this profile?

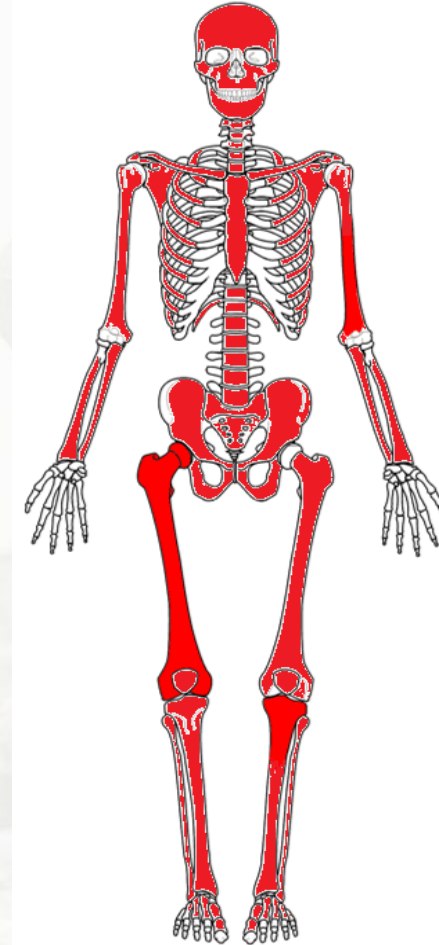**7,600** > **63** > **21** > >

Anthropological Analysis

Biological profile

- Sex: Male

- Ancestry: African descent

- Age: 17-19 years old

- Stature: 68.5" tall

- Additional observations on skeleton
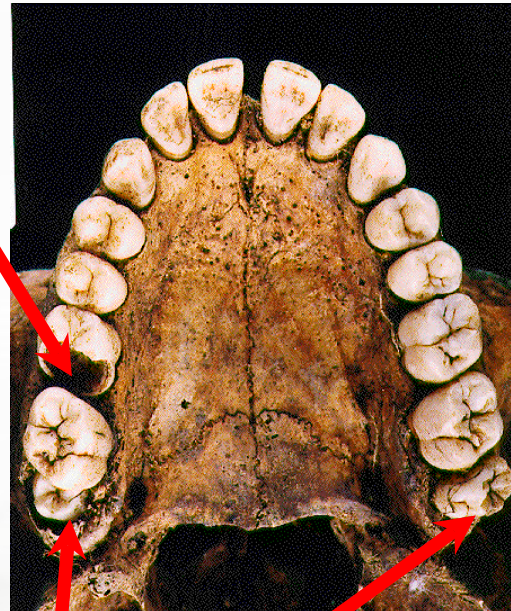
How many of the 21 people fit this profile?

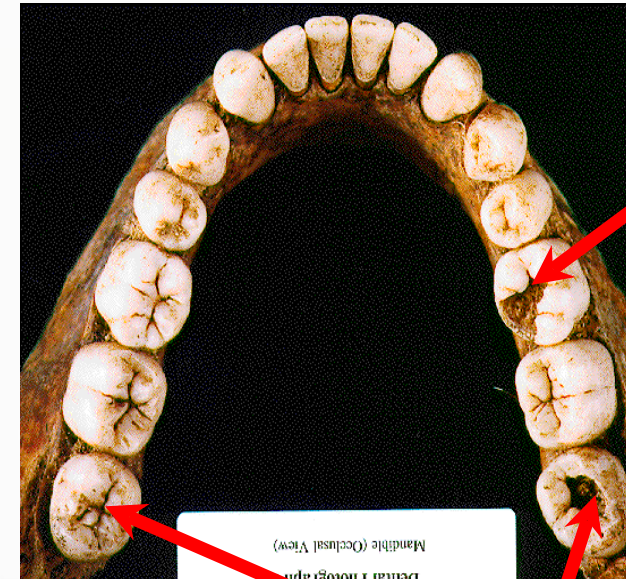**7,600** > **63** > **21** > **6**

Dental Analysis

Maxilla (upper jaw)

Mandible (lower jaw)

Large Cavity (right side, first molar)

Large Cavity (right side, first molar)

Unerupted third molars

Erupted Third Molars

How many of the 6 people have antemortem dental charts that fit this dental profile?

7,600 | **63** | **21** | **6**

Dental Comparison

Cavities on first molars, right side, top and bottom (yellow)

"Missing" upper third molars (red)

Present lower third molars (blue)

| 7,600 | 63 | 21 | 6 | 1 |

Individuating Traits

A "diastema" was observed.
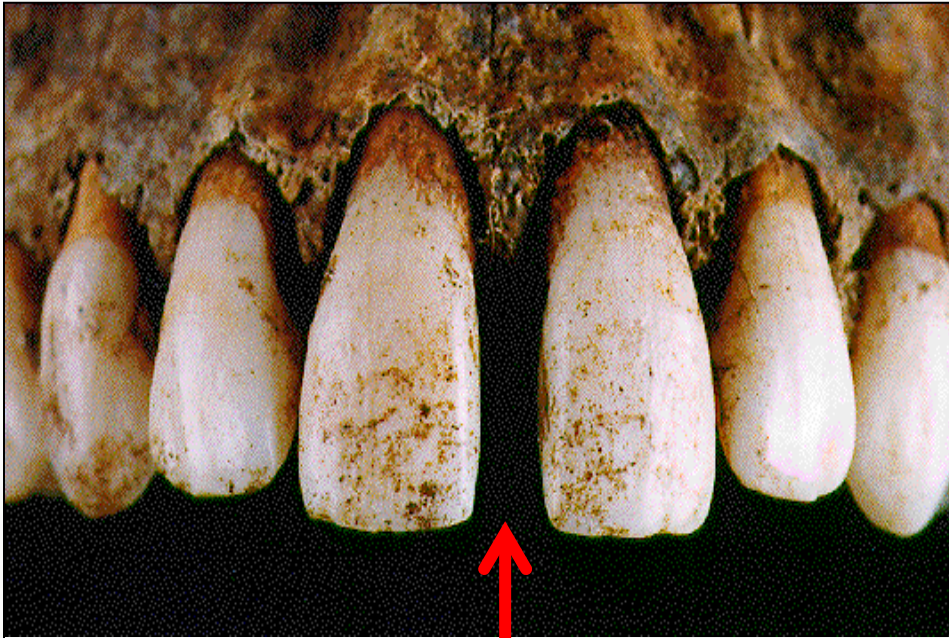
Conclusions

Identification

1. Begins with controlled recovery from the historical and archaeological record

2. Achieved through multiple lines of evidence

3. Only possible when Antemortem / Comparative (FRS) data are available

Recovery and Identification

1. • Field Operations

2. • Laboratory Operations

3. • Identification Process

4. • Special Projects Update

Special projects have been set up to focus on specific battles or locations

| Project	Conflict	Approximate number of U.S. unaccounted for
Korean War (K208, JRO, Disinterments)	Korean War	~7,600 unaccounted for
Cabanatuan Prison Camp	WWII	950 unaccounted for
USS *Oklahoma*, Pearl Harbor	WWII	388 unaccounted for
Battle of Tarawa	WWII	514–539 unaccounted for
USS *West Virginia* & USS *California,* Pearl Harbor	WWII	25 unaccounted for 20 unaccounted for
Battle of Buna–Gona, Papua New Guinea	WWII	107 unaccounted for
Solomon Islands	WWII	TBD – awaiting results of historical research
Ploesti	WWII	~85 unaccounted for

TBD = to be determined

Our special projects are complicated by extensive commingling

- In an ideal world, one burial, one casket, or one accession would contain or consist of **one** individual
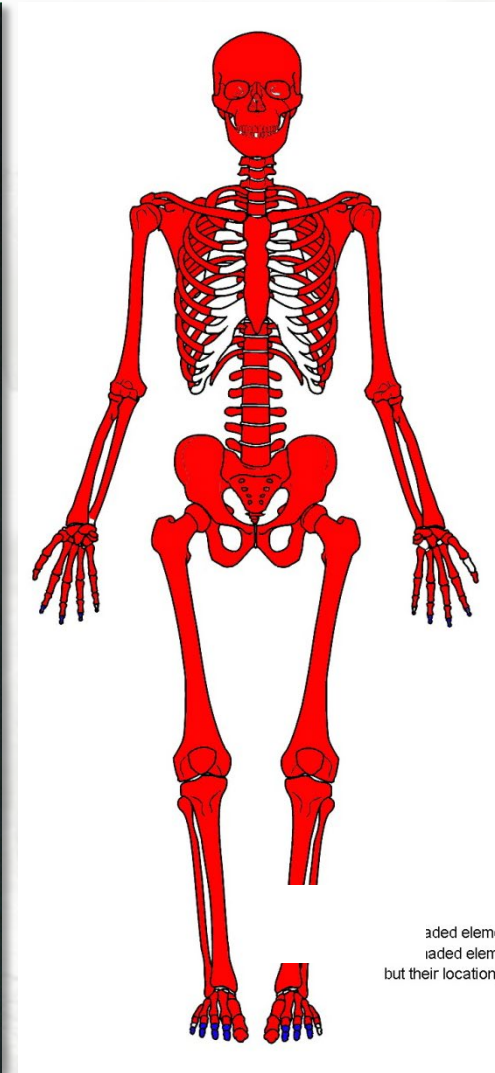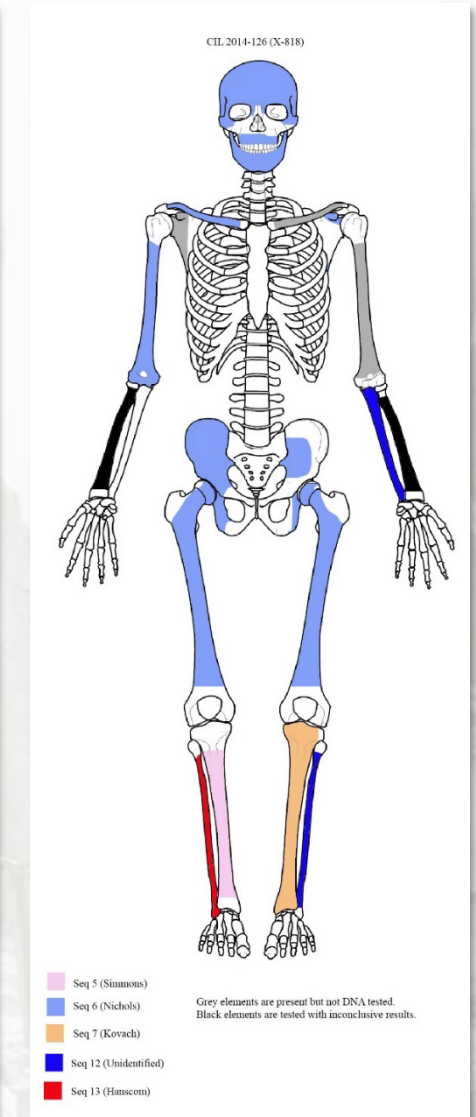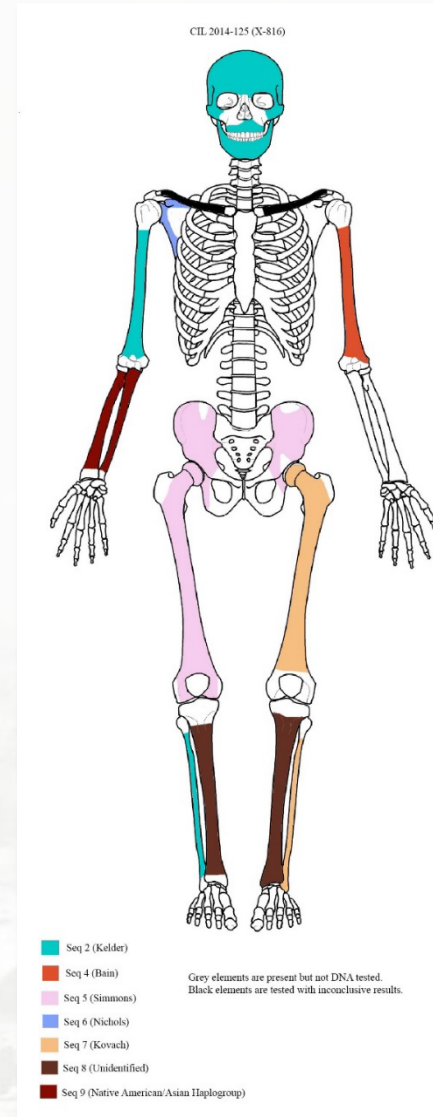
Commingling Issues

Cabanatuan Prison Camp, Philippines

- Mass grave system used in the camp cemetery

- Common Grave (CG) 717

  – Originally associated with 14 individuals

  – 13 accessions into DPAA Laboratory

  – A single accession typically contains 2–8 different DNA sequences

CIL 2014-125 (X-816)

Seq 2 (Kelder)
Seq 4 (Bain)
Seq 5 (Simmons)
Seq 6 (Nichols)
Seq 7 (Kovach)
Seq 8 (Unidentified)
Seq 9 (Native American/Asian Haplogroup)

Grey elements are present but not DNA tested.
Black elements are tested with inconclusive results.

CIL 2014-126 (X-818)

Seq 5 (Simmons)
Seq 6 (Nichols)
Seq 7 (Kovach)
Seq 12 (Unidentified)
Seq 13 (Hanscom)

Grey elements are present but not DNA tested.
Black elements are tested with inconclusive results.

A single burial casket can contain the remains of numerous individuals
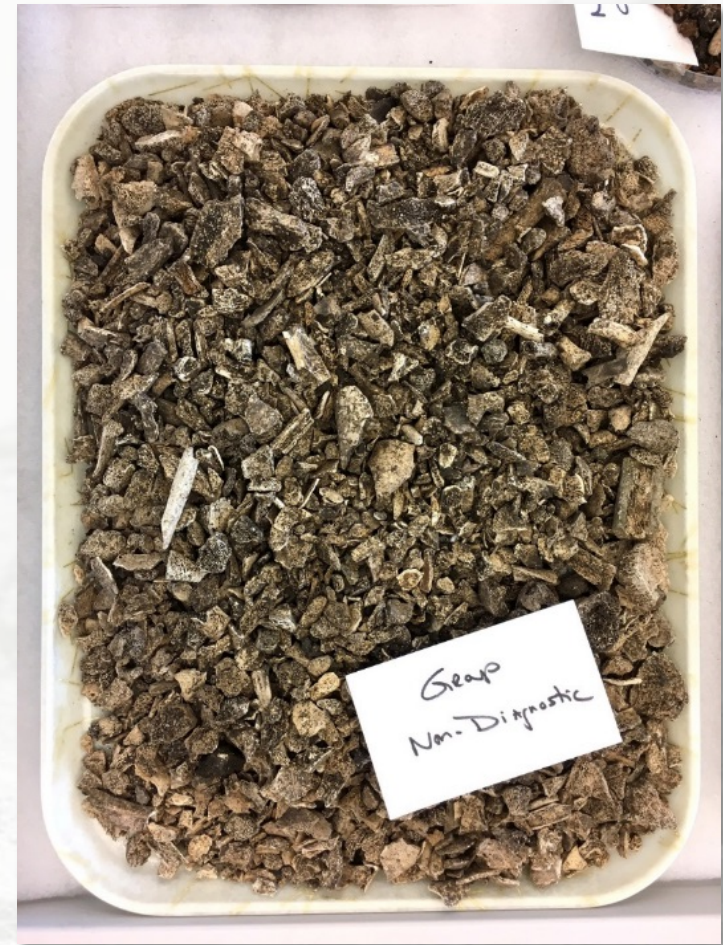
USS *Oklahoma*

- Burial at NMCP, 1949–50

  – 62 caskets of commingled remains in 46 graves

  – Average of 8–9 bundles in each casket

  – Average rate of commingling per bundle is 80%

- First casket disinterred from NMCP in 2003

  – 94 different DNA sequences

■	1
■	2
■	3
■	4
■	5
■	6
■	7
■	8
■	9
■	Present

Mito Sequences
2003-116 G-06 X-230B
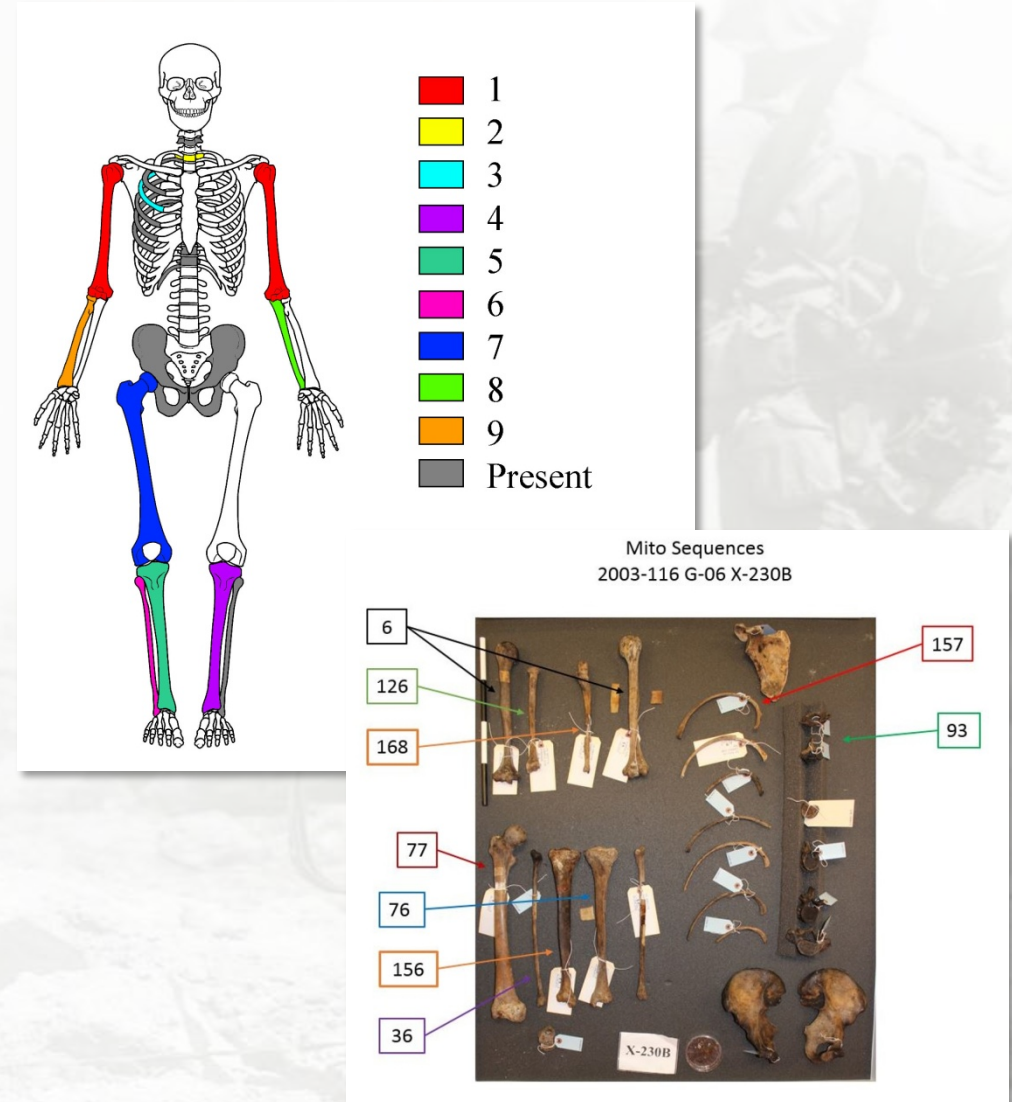
Our special projects are complicated further by extensive fragmentation

Identifications result from exhaustive scientific and agency-wide efforts

Success results from:

1. Controlled recovery of data from the historical and archaeological record

2. Using multiple lines of evidence

3. Comparison of Antemortem to Postmortem data (including FRS)

"Fulfilling our nation's promise"

In 2020, DPAA accounted for 120 individuals