

Search/Recovery of Skeletal Remains from Outdoor Settings

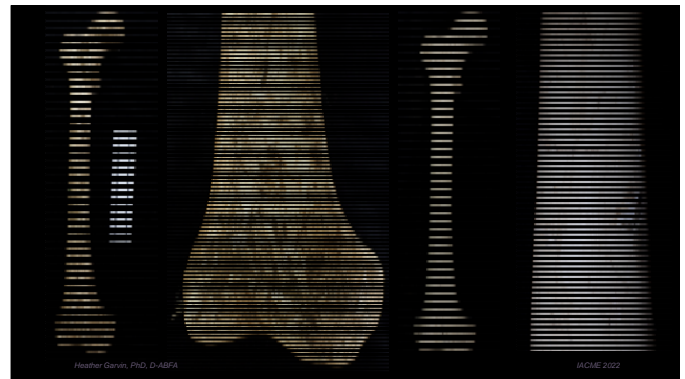


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A Bone is Found

Question 1:
Is it actually bone?

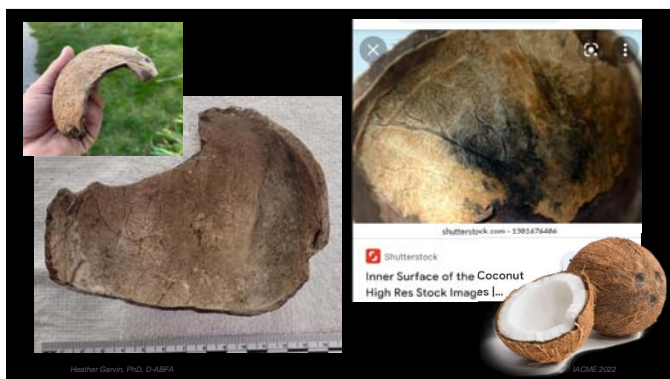
Plastic Decoration
Model
Rock
Stick
Shell
Other



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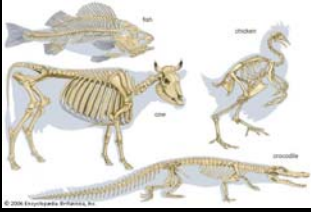


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Question 2: Is it human?



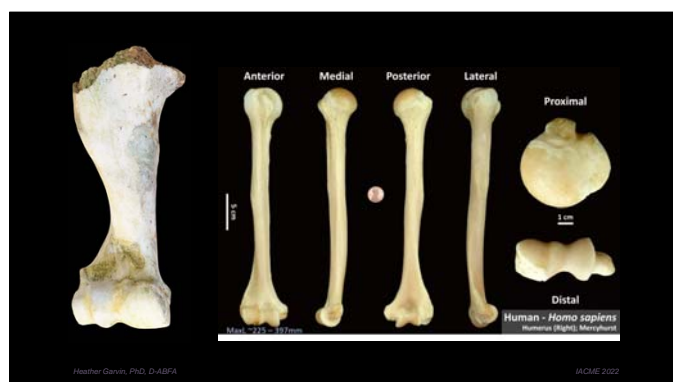
Size Function
Development Morphology

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OsteoID Web Resources

www.boneidentification.com

About OsteoID Using OsteoID Additional Resources Frequently Asked Questions **SEARCH ALL BONES**

What does the bone you are identifying most look like?



Humerus Femur Radius

Works for "long bones".
Search by bone or Search All.
Humans & 27 Faunal Species.

Garvin et al. (2022). Forensic approaches to species identification of skeletal remains: metrics, statistics, and OsteoID. *Ecology*.


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Differentiating Human vs Non

Size + Development



Epiphyses = ends of bones
Ridges on epiphyseal fusion surface
Smooth outer joint surface
Fused line indicating epiphyses not fully fused = more adult specimen
Ridges & furrows indicating unfused epiphyses
Saw cut indicative of sawing

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Search by Common Name
Common Name:

Search by Scientific Name
Genus: Species:

Length (mm)
Number:

Proximal Width (mm)
Number:

Distal Width (mm)
Number:

Search by animal, bone type, & SIZE!
Filters results...
Can enlarge images

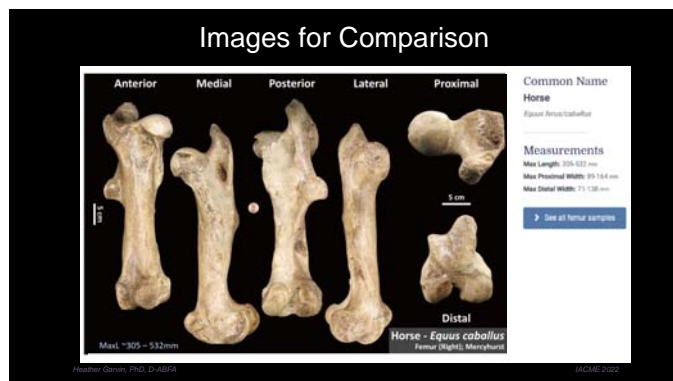
Bone Type
☐ Definite (28)
☐ Radius (22)
☐ Femur (26)
☐ Fibula (14)
☐ Humerus (27)
☐ Metacarpal (13)
☐ Metatarsal (13)
☐ Radius, Radius (9)
☐ Radio Ulna (19)
☐ Scapula (26)
☐ TibioFibula (28)
☐ Ulna (26)

Human Femur
Genus: *Homo*
Species: *sapiens*
Common Name: Human
Length: 344 - 350mm
Proximal Width: 71 - 103mm
Distal Width: 58 - 86mm

Brown Bear Femur
Genus: *Ursus*
Species: *arctos*
Common Name: Brown Bear
Length: 267 - 313mm
Proximal Width: 75 - 126mm
Distal Width: 51 - 112mm

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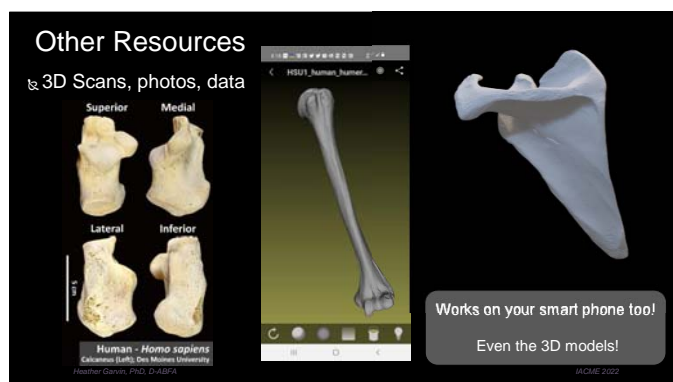
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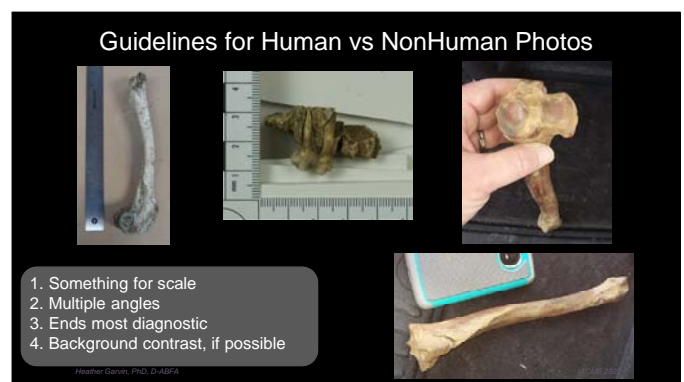
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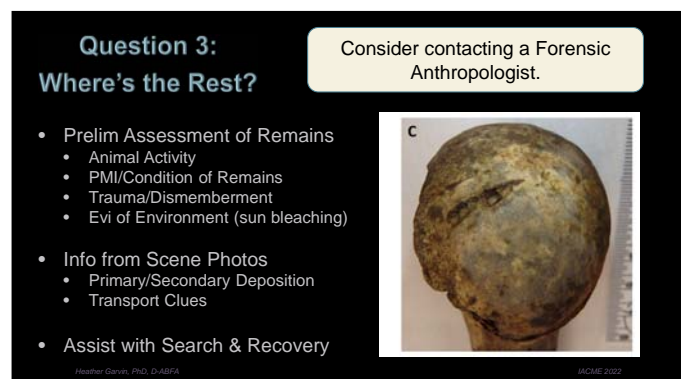
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Terrestrial Search for Remains – Broad Area

- Plan out search areas
 - Aerial maps/photographs
 - Geography of the area (e.g., slopes)
 - Most likely areas (investigation/FA)
 - Let all searchers see condition of element


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Terrestrial Search for Remains – Broad Area

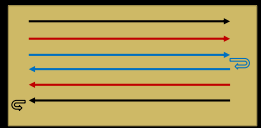

- Line Search
 - Stay in a LINE
 - Flag anything that could be of interest
 - Recommend 2 colors, one bone and one "other"
 - Move vegetation, leaf litter
 - Dense vegetation = closer individuals
 - Obstacles – resume directly on other side



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Terrestrial Search for Remains – Broad Area

- FA can follow & assess flags
 - Or pictures sent for evaluation
 - Remove non-human elements/flags
- Can mark edges of corridors with fluorescent tape, etc
 - Or if going back and forth, rotate around the edge person
 - GPS/Total Station points of search area

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Immediate Scene / Main Concentration

- 🔍 Photo-document prior to search
- 🔍 Work outward → inward, hands-and-knees
- Remove loose vegetation
 - 🔍 Bucket and then dump in one or two designated locations away from scene
 - 🔍 Screen if necessary
- 🔍 If necessary can clip other vegetation
- 🔍 Flag anything – try to keep *in situ*



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Brush Pile



Each case
presents
unique
challenges



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Documented
wood slats

Then removed

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Leave Remains *in situ*

Photo-document again
after

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Scene Documentation

- ☞ Photographs
- ☞ Total Station
- ☞ GPS
- ☞ Drone
- ☞ 3D Scene Surface Scans
- ☞ Sketches
- ☞ Distance Measurements
- ☞ Hand-Drawn Measured

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Drone & 3D Scene Scans

- ☞ Have mapping capabilities
- ☞ Captures entire scene
- ☞ Can be impeded by tree cover, etc.
- ☞ Post processing time?
- ☞ Final map production?
- ☞ Individuals out of scene during capture

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Surface Scatter Recovery

- ☞ Photograph immediate flagged scene
- ☞ Photograph dispersed elements
 - ☞ With views showing relative to main scene
- ☞ Can decide on numbering system
 - ☞ Each element, each concentration
 - ☞ Placards or write directly on flags
 - ☞ Keep running list/key
 - ☞ Photograph each "#"

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Hand-Drawn Map

- ☞ Baseline
- ☞ Archaeology Grids (1x1m)
- ☞ "Pop-Up Grids"
 - ☞ Take X & Y measurements
 - ☞ Tape measurer, plumbob
 - ☞ Sketch onto graph paper
 - ☞ Can be time-consuming

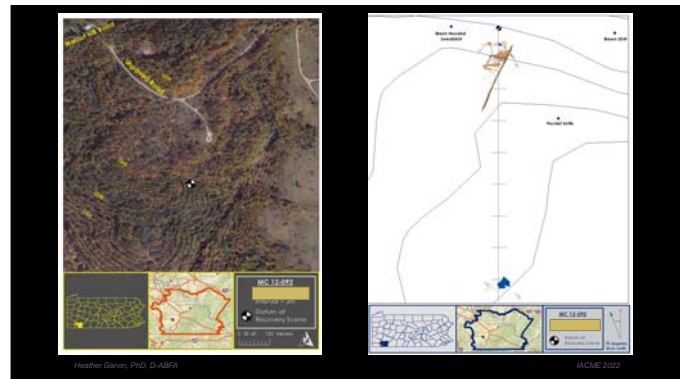
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"Pop-Up Grid"

Can be easier to read than the tape measurers for approximate distances.

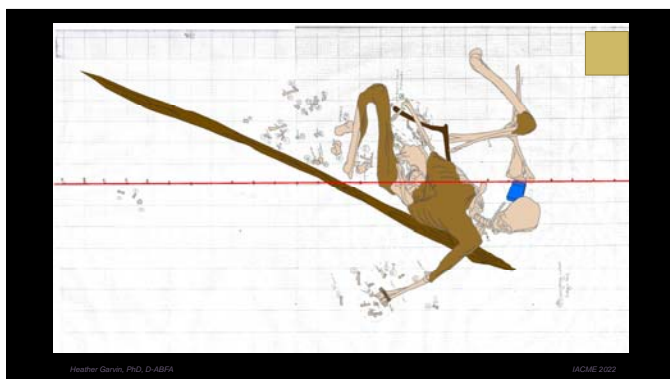
Can assist hand-drawn maps.

Or used alone with photographs.

Goal: Some type of metric documentation

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Collection of Remains

- ⌘ Leave flags/numbers
- ⌘ Ensure documented
- ⌘ Isolated elements = paper bags
 - ⌘ Keep evidence number
- ⌘ Large concentration = body bag
- ⌘ Avoid sealed plastic (mold)
 - ⌘ Or only for transport & open and air out upon receipt



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Final Scene Processing

- ⌘ Preliminary inventory
- ⌘ Photo-Document with remains removed
- ⌘ Metal detectors?
- ⌘ Trowel underlying soil
- ⌘ Sift/Screen removed soil



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Clandestine Burial

Commonly:

- ⌘ Not right next to a tree
- ⌘ Not too far from vehicular / other access
- ⌘ Dug shallow
 - ⌘ Can be disturbed by animals.



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Other Types of Outdoor Scenes

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Excavating a Burial

- ⌘ Use trowel
 - ⌘ Best to trowel from inside (e.g., at bisection) towards outer edge, and top down
 - ⌘ May be able to discern feature wall (more compact, not mottled)
 - ⌘ Tool marks could possibly be recovered



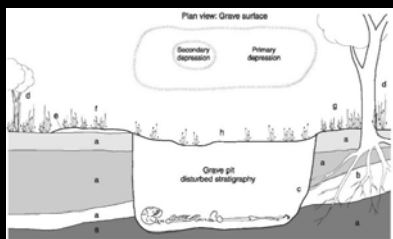
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Clandestine Burial

- ⌘ Locating a burial:
 - ⌘ New vegetation
 - ⌘ Lack of vegetation
 - ⌘ Raised mound/disturbance
 - ⌘ Depression
 - ⌘ Mottled soil
 - ⌘ Less compact soil (probe)
 - ⌘ Back fill pile



<https://what-when-how.com/forensic-science/location-and-recovery-of-forensic-remains/>

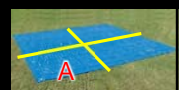
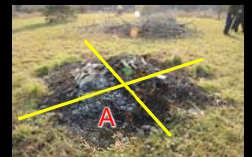
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Recovery of Burned Remains

- ⌘ Photos!
- ⌘ Can use quadrants
 - ⌘ Excavate Top down
 - ⌘ Sift (likely by hand) on tarp
 - ⌘ labeled with quadrant
 - ⌘ Keep remains labeled with quadrant
 - ⌘ Can also record approximate depth
- ⌘ Keep anything that *might* be bone



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River Environments

- ↳ Sink → Float → Sink
 - ⌘ Timing depends on temp, environment, person, clothing, snags
- ↳ Can travel long distances
 - ⌘ Case Ex: Mississippi River Bridge → pelvis/femur = 30 miles (1 year after)
- ↳ 280 Ft from water's edge, on levee
- ↳ Evidence of carnivore activity
- ↳ Sun bleaching
- ↳ Adipocere & polishing = River transport

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Transporting Burned Remains

- ↳ Photos!
- ↳ Burned head/hands still intact
 - ⌘ Saranwrap / Cling Wrap
- ↳ Wrapping in Aluminum Foil
 - ⌘ Larger, fragile, elements
- ↳ Cardboard boxes

Q12 Jv | Fkubndqybg MEV 5348
<https://www.fbi.gov/2013/11/14/4498888/735x385x47>

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Materials for Terrestrial Search/Recovery

↳ Camera	↳ Tape Measurers
↳ Buckets	↳ Mapping Equipment <ul style="list-style-type: none"> ⌘ However you decide (grids, string, pins/stakes, graph paper, backing, plumb bob, total station, GPS, scanner, drone, etc).
↳ Garbage Bags	↳ Metal Detector
↳ Gloves (Nitrile & Work/Gardening)	↳ Body Bag/Evi Bags
↳ Flags (2 colors)	↳ Permanent Markers
↳ Fluorescent Tape	↳ Duct Tape
↳ Tarps	↳ Boots / Waders
↳ Trowel	↳ Tents / Lights
↳ Dustpan & Lg Paint Brush	
↳ Screen (depends)	
↳ Clippers	

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Questions?

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www.theabfa.org
www.boneidentification.com
www.forensicanthroexpert.com

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