TAPHONOMY OF VERTEBRATES IN A TEMPERATE FOREST SETTING: A TIME-TRANSGRESSIVE SEQUENCE.

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“Dry decay” of bones is commonly evaluated using the Behrensmeyer scale (Behrensmeyer, 1978). This scale was developed in Amboseli National Park in Africa, a semi-arid subtropical setting.

This project is a part of a larger study evaluating the differences in decay rates and timing between the original setting of the Behrensmeyer scale and mid-latitude temperature environments in the United States.

Criminal Justice conducts studies of “wet decay” and insect activity every summer.

This study used the carcasses from the CJ studies to observe the effects of “dry decay”.


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An enclosure on the prairie/forest border contained the remains of study carcasses from the prior four years.

This provided a time-transgressive sequence of bone decay.

The four carcasses were located and marked. All bones in the enclosure were collected. The surface 5 cm of the soil was examined to find partially-buried bones.

Bones were washed, sorted and identified in the laboratory.

Broken bones and separated epiphyses were noted and reconstructed with water-soluble glue.


WARD'S FORENSICS
USA


X-1


X-4

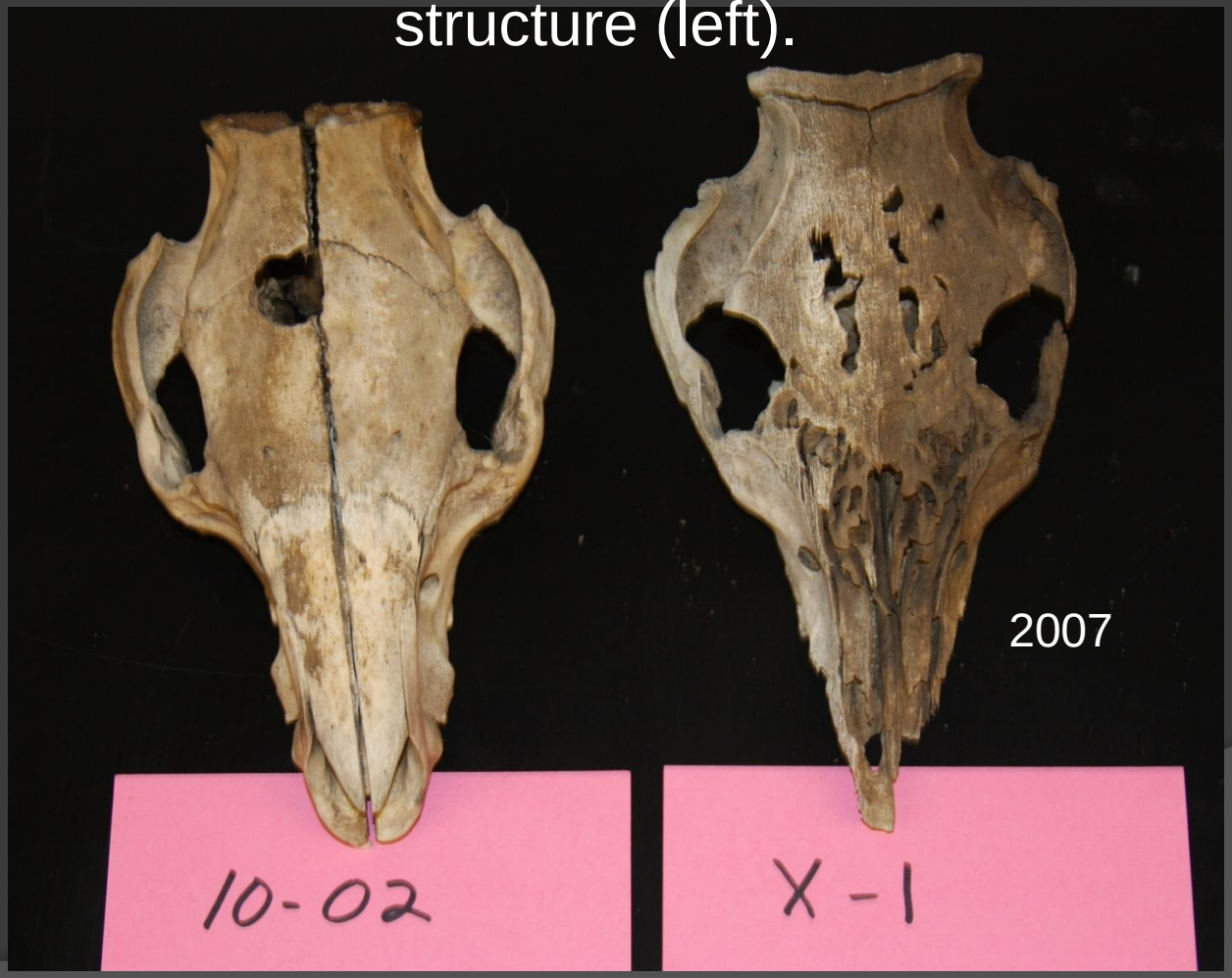
Bone decay was classified using the Behrensmeyer scale.

Stage 0, no bone decay, soft tissue present (left).

Stage 4, some missing surface bone which exposes underlying structures (right).

The Behrensmeyer scale was slightly modified to accommodate differences within the individual stages. Stage 2 (chipping) was subdivided into 2a (chips attached, below) and 2b (chips missing).

Stage 5 was subdivided into 5a (all outer cortical bones missing, some pieces missing) and 5b (bones broken into shards). In 5a, the bones is still relatively intact, although the vast majority surface bone is missing, exposing deep structure (left).



Stage 5 was subdivided into 5a (all outer cortical bones missing, some pieces missing) and 5b (bones broken into shards). In 5b, the bone is in fragments and is difficult to reconstruct (below).

Results

Bone	Side	2007	2008	2009	2010
Skull	--	5a	5b	2a	3
Mandible	Left	5a	4	3	3
	Right	5a	4	3	3
Scapula	Left	4	5a	2b	3
	Right	4	5a	2b	3
Humerus	Left	2b	2b	2a	1
	Right	4	2b	2a	1
Radius	Left	3	2a	xx	1
	Right	3	2a	xx	2a
Ulna	Left	4	xx	xx	1
	Right	2b	1	xx	2a
Pelvic Wing	Left	2a	2b	2b	1
	Right	2a	xx	2a	1
Femur	Left	2b	2b	2b	1
	Right	2b	xx	2b	1
Tibia	Left	2a	2a	2b	1
	Right	2a	1	2b	2a
Fibula	Left	2a	xx	1	1
	Right	2a	xx	1	1

Decay occurs fastest in the upper body, most strongly affecting the skull, mandible and scapula.

2008

2007

The Behrensmeyer scale can be applied to temperate settings. Some refinement could accommodate differences within the decay stages.

Is the bone decay stage a valuable marker of length of exposure or time since death?

For individual skeletal elements, no.

It may be useful when multiple bone elements are averaged together to achieve a single score.

The substage values were transformed to numeric values (a =.0, b = .5)

Bone	Side	2007	2008	2009	2010
Skull	--	5	5.5	2	3
Mandible	Left	5	4	3	3
	Right	5	4	3	3
Scapula	Left	4	5	2.5	3
	Right	4	5	2.5	3
Humerus	Left	2.5	2.5	2	1
	Right	4	2.5	2	1
Radius	Left	3	2	xx	1
	Right	3	2	xx	2
Ulna	Left	4	xx	xx	2
	Right	2.5	1	xx	2
Pelvic Wing	Left	2	2.5	2.5	1
	Right	2	xx	2	1
Femur	Left	2.5	2.5	2.5	1
	Right	2.5	xx	2.5	1
Tibia	Left	2	2	2.5	1
	Right	2	1	2.5	2
Fibula	Left	2	xx	1	1
	Right	2	xx	1	1
Average		3.105	2.964	2.233	1.737

The current project involves following the decay of bones on a weekly basis. We hope to build a larger database which would provide more robust results using average decay rates.

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- Any questions?