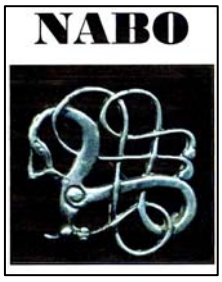

NABONE
ZOOARCHAEOLOGICAL DATABASE
9th Edition

RECORDING SYSTEM CODES
North Atlantic Biocultural Organization
Zooarchaeology Working Group
9th Edition, 20 May 2008 (Updated 1 Feb. 2010)

Objectives

This recording manual is the 9th working version of the NABO Zooarchaeology Working Group Data Records Project, authorized by the January 1997 working group meeting in New York City. The basic structure follows James Rackham's database (Microsoft Access) with some changes and clarifications for North Atlantic applications. The Hunter Bioarchaeology lab was charged with adapting the Rackham system to the realities of modern work in the North Atlantic, and to balance recorded detail with the need for rapid and consistent processing of the large bone collections now becoming common in our research area. A particular concern was the need to promote long term data comparability and to provide both a long term data archive and a set of analytic tools immediately addressing current joint research objectives. The NABONE system consists of this coding manual, a developed Microsoft Access database with useful queries and reports, and an Excel spreadsheet set providing analytic output similar to the old Hunter College QBONE system. This package is available for download on the NABO website (http://www.nabohome.org) and has been used in the analysis of over 65 archaeofauna.

Lab Testing

The Data Records project has used a series of large (ca. 150k TNF) archaeofauna from excavations of the 9th— 19th century sites in Iceland, Faroes, Shetland, Labrador, Norway, Eastern US, and the UK. Following the Working Group recommendations, we have done extensive testing of the present codes and recording system with the help of zooarchaeologists at different levels of training and experience to attempt to improve clarity and promote consistent use by different workers. We have also used this system as a teaching tool in introductory courses. While we feel that the eight versions since January 1997 have improved the utility of the system, there is certainly room for improvement – please help us by pointing out errors and areas for improvement!

Development and testing 1997 — 2008 by Tom McGovern, Sophia Perdikaris, Jim Woollett, Colin Amundsen, Yekaterina Krivogorskaya, George Hambrecht, Ramona Harrison, Seth Brewington, Konrad Smiarowski and Megan Hicks.

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SPECIES CODES

*Note that codes are not provided for all possible species in the N Atlantic region (a large task), but only as a short hand reference for the most commonly appearing taxa. For species not included, simply enter the full scientific name (**not** your own special code please) following current nomenclature. If you find yourself doing this a great deal, please contact us (*nabo@voicenet.com*) and we will provide an official addition to these species codes on the NABO website. It is often a good idea to use the search & replace function in Access to replace codes for less common taxa with the full scientific name after you have completed data entry to make sure of correct interpretation by later users (e.g. OVI is pretty transparent, but PV is more mysterious). Thanks!*

Code	Scientific Taxon	English Common Name
MAMMALS		
EQU	*Equus* (domestic)	horse
BOS	*Bos taurus* (dom.)	cattle
SUS	*Sus scrofa* (dom.)	pig
OVCA	caprine (dom.)	sheep/goat (indeterminate)
OVI	*Ovis aries* (dom.)	sheep
CRA	*Capra hircus* (dom.)	goat
CAN	*Canis familiaris* (dom.)	dog
FEL	*Felis catus* (dom.)	cat
LTM	Large Terrestrial Mammal	cow/horse/large-deer sized
MTM	Medium Terrestrial Mammal	caprine/pig/small-deer sized
STM	Small Terrestrial Mammal	dog/fox/hare sized
VSTM	Very Small Terrestrial Mammal	mouse/vole sized
UNIM	Indeterminate Mammal	unidentifiable MAMMAL fragment
UMM	Indeterminate Marine Mammal	unidentifiable MARINE mammal fragment
UNI	Indeterminate	completely unidentifiable bone fragment
PG	*Pagophilus groenlandicus*	harp seal
PV	*Phoca vitulina*	harbor/common seal
PH	*Phoca hispida*	ringed seal
EB	*Erignathus barbatus*	bearded seal
CC	*Cystophora cristata*	hooded seal
HG	*Halichoerus grypus*	grey seal
WAL	*Odobenus rosmarus*	walrus
LP	Large Phocid	bearded/grey/hooded-seal sized
SP	Small Phocid	harp/harbor/ringed-seal sized
PSP	Phocid species	indeterminate seal species
LCET	Large Cetacean	great whale (baleen or sperm)
SCET	Small Cetacean	porpoise/beluga/narwhal sized

CESP	Cetacean species	indeterminate whale species

NB: For cetacea identified to species, please enter the full scientific name.

RAN	*Rangifer tarandus*	caribou/reindeer
CER	*Cervus elaphus*	red deer/elk
DAM	*Dama dama*	fallow deer
CLS	*Capreolus capreolus*	roe deer
DSP	Cervid species	indeterminate deer species
LUP	*Canis lupus*	grey wolf
FOX	*Vulpes vulpes*	red fox
AFX	*Vulpes lagopus*	arctic fox
FXSP	Fox species	indeterminate fox species
NAN	*Ursus maritimus*	polar bear
URS	*Ursus arctos*	brown bear
URSP	Bear species	indeterminate bear species
SOAR	*Sorex araneus*	Eurasian shrew
ASL	*Apodemus sylvaticus*	long-tailed field mouse
MUS	*Mus musculus*	house mouse
MSP	Mouse species	indeterminate mouse species
NORV	*Rattus norvegicus*	brown rat
RAT	*Rattus rattus*	black rat
RTSP	Rat species	indeterminate rat species
LEP	*Lepus europaeus*	European hare
ORC	*Oryctolagus cuniculus*	European rabbit
LAGO	Lagomorpha	indeterminate hare/rabbit

BIRDS NB: We recommend you do a search & replace in Access to provide the full scientific names after you are done with entry – bird name codes can become confusing rapidly.

FRA	*Fratercula arctica*	Atlantic puffin
MANX	*Puffinus puffinus*	manx shearwater
ALA	*Alle alle*	little auk/dovekie
PLA	*Pluvialis apricaria*	Eurasian golden plover
HER	*Larus argentatus*	herring gull
LAC	*Larus canus*	common gull/mew gull
LAS	Larus species	indeterminate gull species
ALT	*Alca torda*	razorbill

FUL	*Fulmarus glacialis*	northern fulmar
CEP	*Cepphus grylle*	black guillemot
URA	*Uria aalge*	guillemot/common murre
URIA	Uria species	guillemot/murre species
SUB	*Morus bassanus*	northern gannet
SOM	*Somateria mollissima*	common eider
PHC	*Phalacrocorax carbo*	great cormorant
PHA	*Phalacrocorax aristotelis*	European shag
PHSP	Phalacrocorax species	cormorant/shag species
GAL	*Gallus gallus*	chicken
LAM	*Lagopus muta*	rock ptarmigan
NUA	*Numenius arquata*	Eurasian curlew
ANSP	Anser species	goose
RAV	*Corvus corax*	common raven
AVSP	Bird species	indeterminate bird species

FISH NB: When in doubt use full scientific name.

COD	*Gadus morhua*	Atlantic cod
LIN	*Molva molva*	European ling
HAD	*Melanogrammus aeglefinus*	haddock
GAD	Gadidae	cod family
SAL	*Salmo salar*	Atlantic salmon
TRT	*Salmo trutta*	brown trout
CHR	*Salvelinus alpinus*	arctic char
SMD	Salmonidae	salmon family
HAL	*Hippoglossus hippoglossus*	Atlantic halibut
ANA	*Anarhichas lupus*	Atlantic wolf fish
BRO	*Brosme brosme*	cusk/tusk/torsk
POL	*Pollachius virens*	pollock/saithe
PLE	Pleuronectiformes	flatfishes
RAJ	*Raja* genus	skates
FISH	Fish species	indeterminate fish species

MOLLUSCA NB: Please enter full scientific name for all mollusks identified to species level.

PAT	*Patella vulgata*	common limpet
MED	*Mytilus edulis*	common/blue mussel
CLM	*Mya* species	indeterminate clam species
LIT	*Littorina littorea*	common periwinkle
LSP	*Littorina* species	indeterminate periwinkle species
BUC	*Buccinum undatum*	common/waved whelk

WLKSP	*Buccinum* species	indeterminate whelk species
MOLSP	Mollusca	indeterminate mollusk species

BONE ELEMENTS

MAMMAL & BIRD

HCO	Horn core fragment
ANT	Antler fragment
ANTS	Antler, shed pedicle
S+*A*	Skull & attached antler
S+H	Skull & attached horn core
SKL	Skull fragment
FRN	Frontal
PAR	Parietal
TEM	Temporal
PET	Petrous (bulla)
ZYG	Zygomatic
OCC	Occipital
NAS	Nasal
ROS	Rostrum
PMX	Premaxilla
MAX	Maxilla
MAN	Mandible
IN	Incisor
PM	Premolar
MO	Molar
CN	Canine
PC	Post canine (seals)
TTH	Tooth fragment
HYD	Hyoid
ATL	Atlas
AXI	Axis
CEV	Cervical vertebra
TRV	Thoracic vertebra
LMV	Lumbar vertebra
CDV	Caudal vertebra
VER	Vertebral fragment
SAC	Sacrum
STE	Sternum
RIB	Rib
CC	Costal cartilage
SCP	Scapula
HUM	Humerus
RAD	Radius
RUL	Radius & ulna
ULN	Ulna
CAR	Carpal
TAR	Tarsal
AST	Astragalus
CAL	Calcaneus
TRC	Naviculocuboid
CTA	Carpal/tarsal fragment
MTC	Metacarpal
MC1	Metacarpal 1
MC2	Metacarpal 2
MC3	Metacarpal 3
MC4	Metacarpal 4
MC5	Metacarpal 5
PHA	Phalanx fragment
PH1	Phalanx 1
PH2	Phalanx 2
PH3	Phalanx 3
SES	Sesamoid
FEM	Femur
TIB	Tibia
TIF	Tibia & fibula (seals)
LML	Lateral malleolus
FIB	Fibula
MTT	Metatarsal
MT1	Metatarsal 1
MT2	Metatarsal 2

PAT	Patella	MT3	Metatarsal 3
PES	Articulated foot	MT4	Metatarsal 4
INN	Innominate	MT5	Metatarsal 5
LBF	Long bone fragment	MTP	Metapodial fragment
UNI	Unidentified bone element	BAC	Baculum

ADDITIONAL BIRD

SYN	Synsacrum	RNG	Tracheal ring
TBT	Tibiotarsus	FUR	Furcula
CMT	Carpometacarpus	COR	Coracoid
TMT	Tarsometatarsus	LSA	Lumbosacral
PPX	Proximal phalanx (wing)	QUA	Quadrate
DPX	Distal phalanx (wing)	SCL	Scapholunar
UNG	Ungus (talon)	CUN	Cuneiform

MOLLUSCA

UMB	Umbo (univalves, e.g. limpet centers)	VLV	Valve

FISH

ETH	Ethmoid	SUP	Supraoccipital
PRF	Prefrontal	EXO	Exoccipital
VOM	Vomer	MTR	Mesopterygoid
MES	Mesethmoid	MET	Metapterygoid
ALI	Alisphenoid	HYO	Hyomandibular
PARA	Parasphenoid	SYM	Symplectic
PAR	Parietal	INH	Interhyal
SPH	Sphenotic	EPH	Epihyal
PTE	Pterrotic	CER	Ceratohyal
EPI	Epiotic	HYH	Hypohyal
OPI	Opisthotic	BAH	Basihyal
PRT	Prootic	PP	Pharyngeal plate
OTO	Otolith	EPB	Epibranchial
IB	Investing bones	CEB	Ceratobranchial
NAS	Nasal	HYP	Hypobranchial
FRN	Frontal	BAB	Basibranchial
STP	Supratemporal	BP	Basibranchial plate
SPB	Supraorbital	URO	Urohyal
LAC	Lachrymal	PHA	Pharyngobranchial
SUB	Suborbital	POS	Postemporal
DEN	Dentary	SPC	Supracleithrum

ANG	Angular
RET	Retroangular
SUO	Supraopercle
PRO	Preopercle
SUM	Supramaxilla
OPE	Opercle
SBO	Subopercle
INT	Interopercle
BR	Branchiostegal ray
PAL	Palatine
ECT	Ectopterygoid
EPU	Epural
EHS	Expanded haemal spine
CBP	Caudal bone plate
CLE	Cleithrum
PCM	Postcleithrum
QUA	Quadrate
MCC	Mesocoracoid
RAD	Radials
BAM	Basipterygium
IS	Interhaemal spine
PV	Precaudal vertebra
PEN	Penultimate vertebra
UV	Ultimate vertebra
HRP	Hypural
ENS	Expanded neural spine
BAS	Basioccipital
URN	Uroneural

TAPHONOMY

END

PRO	Proximal
DIS	Distal
S	Shaft
MED	Medial (on the center line of the body)
LAT	Lateral (off the center line of the body)
ANT	Anterior
POS	Posterior
UP	Upper tooth
LW	Lower tooth
P+E	Proximal shaft & detached epiphysis
D+E	Distal shaft & detached epiphysis
PE	Proximal epiphysis (detached)
DE	Distal epiphysis (detached)
V+E	Vertebra & detached epiphysis
E	Detached vertebral epiphysis
W-S	Fish vertebra with intact centrum but lacking all spines
ACE	Acetabulum of the innominate
W	Whole bone
F	Fragment (unidentified)

FRAGMENT SIZE NB: Only substantial bone fragments should be counted, so as to prevent an artificially inflated bone count resulting from taphonomic factors (i.e. exfoliation) rather than human activity (i.e. butchery). While there is a size category "1" (fragments smaller than 1 cm), fragments 1 – 5 mm in size should not be counted unless they can clearly be assigned to individual skeletal elements. Bone rinds should not be counted either, as they have most likely flaked off of bones already counted.

1	Below 1 cm maximum dimension
2	From 1 – 2 cm
5	From 2 – 5 cm
10	From 5 – 10 cm
11	Larger than 10 cm maximum dimension

FUSION STATE

F	Fused completely; line obscured
FP	Fused proximally, but not distally (whole bone)
FD	Fused distally, but not proximally (whole bone)
U	Unfused (if loose epiphysis is present, must be glued on)
I	Intermediate; fused, but line clearly visible

BUTCHERY

CH	Chopped (heavy blow)
KN	Knifed (scratches)
SP	Split down saggital plane
TR	Split transversely (across midline)
BP	Biperforated (metapodials only)
POL	Glossy polish (set aside)
SW	Sawn (set aside)
DR	Drilled (set aside)
WO	Other working (set aside)
IM	Impact fracture
BI	Bilateral impact (hammer & anvil)
SV	Svið preparation (split cranium)

BURNING

B	Black burned
W	White-grey burned
S	Scorched (black & dark brown patches on unburned background)

GNAWING

DOG	Dog/canine
ROD	Rodent
OH	Other (use comments section for description)

AGE ESTIMATE

This column is for the analyst's best estimate of age based on overall bone condition, not simply fusion or eruption state. Note that if this column is left blank, it will be assumed that the fragment/element is either from an adult or that no age assessment was possible. Juveniles (unfused) should be recorded in the FUSION column.

"Neonatal" refers to the commonly found elements that are rough-textured, unfused and usually deriving from animals less than 3 – 4 months old. "Fetal" refers to extremely young animals, either really late fetal or 1 – 2 weeks old (medially-unfused metapodials, etc.). Both categories are regularly recovered from North Atlantic sites and may be worth separating. "Old" elements are from animals showing clear marks of age (exhibiting not only fused epiphyses, but also obliterated epiphysial lines, signs of extososis, etc.) and do *not* apply to all adults.

NN	Neonatal (rough texture; unfused)
FT	Feotal (late fetal or just-born; younger than NN)
O	Old

SEX

M	Male
F	Female
C	Castrate

METRICS / TOOTH ROWS

Enter here the working codes for measurable elements and mandibular tooth rows. The columns provided on the record form can be used for either Grant (1982) tooth wear codes (available for dp_4, P_4, M_1, M_2, and M_3 mandibular teeth) or for common bone measurements (we follow von den Driesch [1976]; see lab manual). Each bone element or mandible selected

for measurement/analysis must be assigned its own reference number, usually preceded by the site code (e.g. HST 125). NB: To ensure that the same code is not assigned twice, it is a good idea to keep a running list of all reference numbers.

All mandibles scored for eruption and wear must have a reference number inked onto the bone and should be bagged individually with full context data. Use foam padding if mandibles are in poor condition. Maxillary tooth rows should have tooth eruption states recorded (M_1 in wear, M_3 in wear, etc.). While maxillary tooth rows are not recorded according to the Grant system, you should use the codes LW (light wear ~ Grant a-d), MW (medium wear ~ Grant e-g), HW (heavy wear ~ Grant h and above) in the spaces provided for mandibular molar and premolars. This will provide supplementary rough ageing data where maxilla are frequent and a check on the mandibular patterning.

The preferred order for recording common bone measurements is Bp, SD, GL, Bd. If you have many more measurements you may want to use a separate form (make sure it is stapled to the original sheet). Reference numbers and full context information should be inked onto measured bones so they can be retrieved if necessary. Please ADD columns to the Access database table as needed to accommodate extra metrics. If Von den Driesch standards are not followed please reference or describe with sketch. The following skeletal elements are to be measured:

For **MAMMALS** (all measurements follow Von den Driesch [1976])

Humerus
Radius/Ulna
Femur
Tibia
Astragalus
Calcaneus
Metacarpal
Metatarsal
M_3 (length & breadth)
Length of cheektooth row ($M_3 – P_4$)
Length of molar row ($M_3 – M_1$)

For **FISH** (all measurements follow Wheeler & Jones [1989])

Atlas (gets scanned as well)
Premaxilla
Dentary
Vomer
Cleithrum

COMMENTS

Use this section to record observations specific to the bone or element – non-metric characteristics, pathologies, or any other information that may be helpful. Use more than one line per bone if necessary. For lengthy discussions, use an analysis notebook but be sure to enter all notes in the appropriate part of the Access database under the whole context comments column or on the bone-by-bone comments column.

Users are urged to report problems they may encounter or offer suggestions for improvement. This coding system has been evolving since 1997 with community input. Thanks for your help!