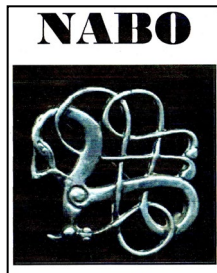


NABONE 9th Edition



NABONE ZOOARCHAEOLOGICAL DATABASE **9th Edition**

RECORDING SYSTEM CODES North Atlantic Biocultural Organization Zooarchaeology Working Group 9th Edition, 20 May 2008

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 | <i>Equus</i> (domestic) | horse |
| BOS | <i>Bos taurus</i> (dom.) | cattle |
| SUS | <i>Sus scrofa</i> (dom.) | pig |
| OVCA | caprine (dom.) | sheep/goat (indeterminate) |
| OVI | <i>Ovis aries</i> (dom.) | sheep |
| CRA | <i>Capra hircus</i> (dom.) | goat |
| CAN | <i>Canis familiaris</i> (dom.) | dog |
| FEL | <i>Felis catus</i> (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 | <i>Pagophilus groenlandicus</i> | harp seal |
| PV | <i>Phoca vitulina</i> | harbor/common seal |
| PH | <i>Phoca hispida</i> | ringed seal |
| EB | <i>Erignathus barbatus</i> | bearded seal |
| CC | <i>Cystophora cristata</i> | hooded seal |
| HG | <i>Halichoerus grypus</i> | grey seal |
| WAL | <i>Odobenus rosmarus</i> | 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 | <i>Rangifer tarandus</i> | caribou/reindeer |
| CER | <i>Cervus elaphus</i> | red deer/elk |
| DAM | <i>Dama dama</i> | fallow deer |
| CLS | <i>Capreolus capreolus</i> | roe deer |
| DSP | Cervid species | indeterminate deer species |

| | | |
|------|-----------------------|---------------------------|
| LUP | <i>Canis lupus</i> | grey wolf |
| FOX | <i>Vulpes vulpes</i> | red fox |
| AFX | <i>Vulpes lagopus</i> | arctic fox |
| FXSP | Fox species | indeterminate fox species |

| | | |
|------|------------------------|----------------------------|
| NAN | <i>Ursus maritimus</i> | polar bear |
| URS | <i>Ursus arctos</i> | brown bear |
| URSP | Bear species | indeterminate bear species |

| | | |
|------|------------------------------|-----------------------------|
| SOAR | <i>Sorex araneus</i> | Eurasian shrew |
| ASL | <i>Apodemus sylvaticus</i> | long-tailed field mouse |
| MUS | <i>Mus musculus</i> | house mouse |
| MSP | Mouse species | indeterminate mouse species |
| NORV | <i>Rattus norvegicus</i> | brown rat |
| RAT | <i>Rattus rattus</i> | black rat |
| RTSP | Rat species | indeterminate rat species |
| LEP | <i>Lepus europaeus</i> | European hare |
| ORC | <i>Oryctolagus cuniculus</i> | 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 | <i>Fratercula arctica</i> | Atlantic puffin |
| MANX | <i>Puffinus puffinus</i> | manx shearwater |
| ALA | <i>Alle alle</i> | little auk/dovekie |

| | | |
|------|----------------------------------|----------------------------|
| PLA | <i>Pluvialis apricaria</i> | Eurasian golden plover |
| HER | <i>Larus argentatus</i> | herring gull |
| LAC | <i>Larus canus</i> | common gull/mew gull |
| LAS | Larus species | indeterminate gull species |
| ALT | <i>Alca torda</i> | razorbill |
| FUL | <i>Fulmarus glacialis</i> | northern fulmar |
| CEP | <i>Cephus grylle</i> | black guillemot |
| URA | <i>Uria aalge</i> | guillemot/common murre |
| URIA | Uria species | guillemot/murre species |
| SUB | <i>Morus bassanus</i> | northern gannet |
| SOM | <i>Somateria mollissima</i> | common eider |
| PHC | <i>Phalacrocorax carbo</i> | great cormorant |
| PHA | <i>Phalacrocorax aristotelis</i> | European shag |
| PHSP | Phalacrocorax species | cormorant/shag species |
| GAL | <i>Gallus gallus</i> | chicken |
| LAM | <i>Lagopus muta</i> | rock ptarmigan |
| NUA | <i>Numenius arquata</i> | Eurasian curlew |
| ANSP | Anser species | goose |
| RAV | <i>Corvus corax</i> | common raven |
| AVSP | Bird species | indeterminate bird species |

FISH

NB: When in doubt use full scientific name.

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

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

| | | |
|-------|---------------------------|----------------------------------|
| PAT | <i>Patella vulgata</i> | common limpet |
| MED | <i>Mytilus edulis</i> | common/blue mussel |
| CLM | <i>Mya</i> species | indeterminate clam species |
| LIT | <i>Littorina littorea</i> | common periwinkle |
| LSP | <i>Littorina</i> species | indeterminate periwinkle species |
| BUC | <i>Buccinum undatum</i> | common/waved whelk |
| WLKSP | <i>Buccinum</i> species | indeterminate whelk species |
| MOLSP | Mollusca | indeterminate mollusk species |

BONE ELEMENTS

MAMMAL & BIRD

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

| | | | |
|-----|---------------------------|-----|------------------------|
| CEV | Cervical vertebra | TIF | Tibia & fibula (seals) |
| TRV | Thoracic vertebra | LML | Lateral malleolus |
| LMV | Lumbar vertebra | FIB | Fibula |
| CDV | Caudal vertebra | | |
| VER | Vertebral fragment | MTT | Metatarsal |
| SAC | Sacrum | 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 | Quadrates |
| DPX | Distal phalanx (wing) | SCL | Scapholunar |
| UNG | Unguis (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 | Pterotic | 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 | Posttemporal |
| DEN | Dentary | SPC | Supracleithrum |
| ANG | Angular | CLE | Cleithrum |
| RET | Retroangular | PCM | Postcleithrum |
| SUO | Supraopercle | QUA | Quadrate |
| PRO | Preopercle | MCC | Mesocoracoid |
| SUM | Supramaxilla | RAD | Radials |
| OPE | Opercle | BAM | Basipterygium |
| SBO | Subopercle | IS | Interhaemal spine |
| INT | Interopercle | PV | Precaudal vertebra |
| BR | Branchiostegal ray | PEN | Penultimate vertebra |
| PAL | Palatine | UV | Ultimate vertebra |
| ECT | Ectopterygoid | HRP | Hypural |
| EPU | Epural | ENS | Expanded neural spine |
| EHS | Expanded haemal spine | BAS | Basioccipital |
| CBP | Caudal bone plate | 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 extosis, 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 dp₄, P₄, M₁, M₂, and M₃ 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 (M₁ in wear, M₃ 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

M₃ (length & breadth)
Length of cheektooth row (M₃ – P₄)
Length of molar row (M₃ – M₁)

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!

