The effects of human hunting on northern fur seal (*Callorhinus ursinus*) migration and breeding distributions in the late Holocene

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Abstract

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Northern fur seals (*Callorhinus ursinus*) have figured prominently in archaeological and contemporary biological studies on the west coast of North America. Previous research indicates that major changes in fur seal biogeography have occurred within the past 100-300 years. This dissertation evaluates what role human hunting has had in causing these changes. Determining the extent, the timing, and the cause (or causes) of the changes in fur seal biogeography is directly relevant to a wide variety of archaeological and zoological studies that involve fur seal distributions during the late Holocene.

To do this, I develop variables with which to measure the age composition of fur seals being exploited, with particular emphasis on identifying the breeding distribution of fur seals. Analysis of archaeological fur seal skeletal material clearly indicates that the breeding distribution of fur seals was much more widespread than historically documented, with previously-unidentified rookeries in Alaska, and on or near the Washington coast. This breeding distribution appears to have been stable until the early historic period.

Because population-level effects of harvest pressure may have pre-dated changes in fur seal biogeography, I also measure individual growth rates of fur seals, which scale inversely with population density. Male fur seals from the Ozette assemblage tended to be

smaller in any given age class than animals collected during the 20th century from the Pribilof Islands population. Although it cannot be determined if this size difference reflects a population level consistently at carrying capacity, or latitudinal differences in body size, the pattern is consistent throughout the Ozette sequence, indicating that prehistoric hunting did not significantly affect fur seal population levels over the time period examined.

The data examined here suggest that prehistoric exploitation of fur seals was sustainable, and that all of the biogeographic changes documented for fur seals were caused by the commercial fur trade. More generally, the research presented here adds a unique viewpoint to a long-standing debate regarding the propensity of humans to over-exploit their resource bases. The temporal sequences of fur seal exploitation presented here clearly indicate that over-exploitation is not a universal characteristic of subsistence economies.

Table of Contents

Page

List of Figures iii

List of Tables ix

Chapter 1: Introduction to the problem 1
- Background to the problem 3
- Previous research 6
- Natural history of northern fur seals 6
- Culture history of fur seal exploitation 11
- Demographic profiles 17
- Growth rates 19
- Summary 20

Chapter 2: Modeling bone growth in northern fur seals (*Callorhinus ursinus*) 27
- The use of mortality profiles in archaeofaunal studies 27
- The use of mortality profiles in archaeological analyses of fur seal hunting 29
- Characterizing general bone growth 32
- Characterizing bone growth in northern fur seals 34
  - Evaluating systematic bias in reference samples 36
- Measurements of northern fur seal elements 38
  - The mandible 42
  - The humerus 43
  - The calcaneus 47
- Discussion and conclusions 48

Chapter 3: Evidence of density-dependent growth in northern fur seals (*Callorhinus ursinus*) based on measurements of archived skeletal specimens 76
- Previous studies 77
- Materials and methods 80
- Results 84
- Discussion 86
  - Implications for age estimates of unknown samples using growth curves 87
- Conclusions 90

Chapter 4: Archaeological assemblages included in this study 105
- Distribution and context of sites 110
  - Umnak Island, Alaska, sites 110
  - Kodiak Island, Alaska, sites 113
  - Olympic Peninsula, Washington, sites 115

Page
Chapter 5: Application of bone growth models to archaeological assemblages 129
Skeletal measurements utilized 130
Quantification methodology 132
Demographic profiles 134
Umnak Island, Alaska, sites 135
Kodiak Island, Alaska, sites 136
Olympic Peninsula, Washington, sites 137
Ozette, Washington 138
Interpreting the demographic profiles 139
Documenting temporal trends in demographic profiles 145
Temporal trends in the archaeological sequences 147
Interpreting trends in demographic profiles 153

Chapter 6: Application of growth rate models to archaeological assemblages 215
Removal and preparation of teeth 216
Reading the sectioned teeth 219
Comparison of growth curves 221
Overall patterns 222
Temporal patterns at Ozette 223
Accuracy of age estimates 224
Overall patterns 225
Temporal patterns at Ozette 226
Discussion 227
Implications for age estimates and demographic profiles 229
Conclusions 232

Chapter 7: Discussion and Conclusions 258
Anticipated effects of climatic stressors 260
Evaluating the role of climatic stressors 262
Conclusions 265

References Cited 270

Appendix A: Reference collections utilized for measurements 301

Appendix B: Definitions of skeletal measurements 305
Illustrations of elements and measurements 306
Descriptions of measurements 314

Appendix C: Measurements of modern reference skeletons 317

Appendix D: Von Bertalanffy parameter estimates for all portions of all elements 383

Appendix E: Summary of specific elements and measurements used for each site 388

List of Figures

Figure **Page**

1.1 Locations of selected archaeological sites with fur seal material........................23

1.2 Principal migration routes of fur seals in the Bering Sea and eastern North Pacific Ocean 24

1.3 Temporal trends in counts of fur seals, by age class, on Kitovi Rookery, St. Paul Island, Pribilof Islands, Alaska 25

1.4 Population trend of fur seals based on counts of adult males and pups in the Pribilof Islands, Alaska 25

2.1a Theoretical standing stock of an unharvested population that is doubling in size every year..50

2.1b Decreases in mean length and weight with increasing mortality due to harvest pressure 50

2.2 Age composition of male fur seals maintaining territories on the breeding grounds, St. Paul, Alaska 51

2.3a Generalized bone growth..52

2.3b Generalized long bone growth, showing a step function in length with the fusion of each epiphysis...52

2.4a Age distribution of female reference mandibles measured for this study...........53

2.4b Age distribution of male reference mandibles measured for this study...............53

2.5a Age distribution of female reference skeletons measured for this study.............54

2.5b Age distribution of male reference skeletons measured for this study................54

2.6 Growth of male and female humeri, as measured by total length.......................55

2.7 Humerus measurements used for this study...56

2.8 Mandible measurements used for this study...57

2.9 Growth of the mandible in fur seals, as measured by mandibular short length (MSL), and characterized by von Bertalanffy growth curves..............................58

2.10 Growth of the mandible in fur seals, as measured by length of the alveoli of the posterior three post-canine teeth (post-3)...59

Figure		Page

2.11 Growth of the mandible in fur seals, as measured by the minimum height of the ramus (mindep) 60

2.12 Growth of the mandible in fur seals, as measured by width of the ramus at mindep (width at mindep) 61

2.13 Growth of the mandible in fur seals, as measured by condyle width 62

2.14 Growth of the mandible in fur seals, as measured by condyle thickness 63

2.15 Growth of male humeri, as measured by total length 64

2.16 Growth of female humeri, as measured by total length 65

2.17 Growth of male humeri, as measured by distal width 66

2.18 Growth of female humeri, as measured by distal width 67

2.19 Calcaneus measurements used for this study 68

2.20 Growth of male and female calcanei, as measured by calcaneus length 69

2.21 Generalized long bone growth in pinnipeds, showing relationship between sociological maturity and skeletal maturity 70

3.1 Trends in fur seal population, Pribilof Islands, Alaska, during the 20th century 92

3.2a Histogram showing the distribution of collection years for specimens from popmin 93

3.2b Histogram showing the distribution of collection years for specimens from popmax 93

3.3a Scatter plot of length-at-age data for male fur seals collected between 1911-1920 (popmin), with corresponding von Bertalanffy growth curve 94

3.3b Scatter plot of length-at-age data for male fur seals collected between 1940-1955 (popmax), with corresponding von Bertalanffy growth curve 94

3.4 Scatter plot of length-at-age data and corresponding von Bertalanffy growth curves for male fur seals collected during popmin and popmax 95

3.5 Climatic events likely to affect prey availability for fur seals in the eastern North Pacific 96

Figure		Page
3.6	Relationship between VB growth curves for popmin, popmax, and the full sample	97
3.7a	Relationship between true age and age estimated from mandibular short length (MSL) for popmin, using the VB growth curve for the full reference sample	98
3.7b	Distribution of errors in age estimation for popmin	98
3.8a	Relationship between true age and age estimated from mandibilar short length (MSL) for popmax, using the VB growth curve for the full reference sample	99
3.8b	Distribution of errors in age estimation for popmax	99
3.9a	Distribution of errors in age estimation for popmin, animals younger than 3.0 years	100
3.9b	Distribution of errors in age estimation for popmax, animals younger than 3.0 years	100
4.1	Map of eastern North Pacific and adjacent coastline, indicating locations of place names discussed in text	119
4.2	History of northern fur seal exploitation on and around the Pribilof Islands, Alaska, 1786-1885	120
4.3	Decline in fur seal harvest on and around the Farallon Islands, California, 1808-1833	121
4.4	Umnak Island, Alaska, showing the approximate locations of the Oglodax' and Chaluka archaeological sites	122
4.5	Kodiak and Sitkalidak Islands, Alaska, showing the approximate locations of the Three Saints Bay, Rolling Bay, and Kiavak archaeological sites	123
4.6	Olympic Peninsula, Washington, showing the approximate locations of the Neah Bay, Tatoosh, Sooes, and Ozette archaeological sites	124
5.1	Correlation between distal width and proximal width in the humerus of northern fur seals	156
5.2	Age distribution of northern fur seals from Oglodax', all stratigraphic levels combined	157
5.3	Age distribution of young-of-the-year northern fur seals from Oglodax', all stratigraphic levels combined	158

Figure **Page**

5.4 Age distribution of northern fur seals from Chaluka, all stratigraphic levels combined 159

5.5 Age distribution of young-of-the-year northern fur seals from Chaluka, all stratigraphic levels combined 160

5.6 Age distribution of northern fur seals from Three Saints Bay, all stratigraphic levels combined 161

5.7 Age distribution of northern fur seals from Rolling Bay and Kiavak, all stratigraphic levels combined 162

5.8 Age distribution of young-of-the-year northern fur seals from Three Saints Bay, all stratigraphic levels combined 163

5.9 Age distribution of young-of-the-year northern fur seals from Rolling Bay and Kiavak, all stratigraphic levels combined 164

5.10 Age distribution of northern fur seals from Neah Bay, all stratigraphic levels combined 165

5.11 Age distribution of northern fur seals from Tatoosh, all stratigraphic levels combined 166

5.12 Age distribution of northern fur seals from Sooes, all stratigraphic levels combined 167

5.13 Age distribution of young-of-the-year northern fur seals from Neah Bay, all stratigraphic levels combined 168

5.14 Age distribution of young-of-the-year northern fur seals from Tatoosh, all stratigraphic levels combined 169

5.15 Age distribution of young-of-the-year northern fur seals from Sooes, all stratigraphic levels combined 170

5.16 Age distribution of northern fur seals from Ozette, all stratigraphic levels combined 171

5.17 Age distribution of young-of-the-year northern fur seals from Ozette, all stratigraphic levels combined 172

5.18 Age distribution of stranded young-of-the-year northern fur seals, California coast (1981-2000) 173

Figure		Page

5.19 Age distribution of stranded young-of-the-year, selected California counties (1981-2000) 174

5.20 Surface water flow, southern California Bight, Autumn 1992 176

5.21 Age distribution of young-of-the-year northern fur seals, Seal Rock, Oregon 177

5.22 Age distribution of young-of-the-year northern fur seals, Umpqua/Eden, Oregon 177

5.23 Surface water flow, Washington coastal waters, July 1964 vs. November 1964 178

5.24 Surface water flow, Washington coastal waters, April 1964 179

5.25 Age distribution of northern fur seals from Oglodax', by stratum 180

5.26 Age distribution of northern fur seals from Chaluka, by stratum 183

5.27a Trends in averages ages of northern fur seals from Oglodax' 184

5.27b Trends in median age of northern fur seals from Oglodax' for young-of-the-year 184

5.28a Trends in median ages of northern fur seals from Chaluka 185

5.28b Trends in median ages of northern fur seals from Chaluka for young-of-the-year 185

5.29 Age distribution of young-of-the-year northern fur seals from Oglodax' 186

5.30 Age distribution of young-of-the-year northern fur seals from Chaluka 189

5.31 Age distribution of northern fur seals from Tatoosh 190

5.32 Age distribution of young-of-the-year northern fur seals from Tatoosh 191

5.33 Age distribution of northern fur seals from Ozette 192

5.34a Trends in median ages of northern fur seals from Ozette 195

5.34b Trends in median ages of northern fur seals from Ozette for young-of-the-year 195

Figure **Page**

5.35 Age distribution of young-of-the-year northern fur seals from Ozette 196

6.1 Loss of mass of teeth due to sectioning 235

6.2 Upper right canine of male northern fur seal..236

6.3 Lower right canine of male northern fur seal..236

6.4 Etched section of MCRC 40220, showing distinct ridges in each of the four growth layer groups (GLGs)...237

6.5 Etched section of MCRC 54832, showing complex pattern of (GLGs) 237

6.6 Comparison of mandible growth curves for male fur seals based on reference mandibles and mandibles from Ozette..238

6.7 Temporal trends in VB growth curve parameter *a* with 95% confidence interval for parameter estimate 239

6.8 Temporal trends in VB growth curve parameter *b* with 95% confidence interval for parameter estimate 239

6.9 Temporal trends in VB growth curve parameter y_1 (mandible size at age zero), with 95% confidence interval for paramter estimate 240

6.10 Temporal trends in VB growth curve parameter y_2 (mandible size at age eight), with 95% confidence interval for paramter estimate 240

6.11 Hypothetical age estimates plotted as interval-censored data on the x-axis and continuous data on the y-axis...241

6.12 Comparison of independent age estimates for male mandibles from Ozette.....241

6.13 Temporal trends in regression coefficient describing the relationship between age estimation based on tooth sections and age estimation based on calibration of mandible length..242

6.14 Comparison of growth curves for reference mandibles (solid line) and mandibles from Ozette (dashed line), focusing on the first three years of growth 243

6.15 Relationship between age estimates based on MSL using the Ozette VB growth curve and age estimates based on tooth annuli, for male mandibles = 50.00 mm 244

Figure		**Page**

6.16 Comparison of estimated age distributions for male mandibles = 50.00 mm from Ozette, Units I-III 245

6.17 Comparison of estimated age distributions for male mandibles = 50.00 mm from Ozette, Unit IV 246

6.18 Comparison of estimated age distributions for male mandibles = 50.00 mm from Ozette, House 2 and Unit VtV 247

6.19 Comparison of estimated age distributions for male mandibles = 50.00 mm from Ozette, House 3 and Unit VtVI 248

6.20 Comparison of estimated age distributions for male mandibles = 50.00 mm from Ozette, House 5 and Unit VtVII 249

6.21 Comparison of estimated age distributions for male mandibles = 50.00 mm from Ozette, House 1 and VXM 250

6.22 Comparison of estimated age distributions for male mandibles = 50.00 mm from Ozette, Units VI and VII 251

6.23 Comparison of trends in median ages of male mandibles = 50.00 mm from Ozette based on full reference VB growth curve and Ozette VB growth curve 252

7.1 Fur seal population trends and history of climatic stressors in the North Pacific/Bering Sea in the 20th century 268

7.2 Approximate relationship between climatic events (Little Ice Age and Medieval Warm Period) and major stratigraphic units analyzed in Chapters 5 and 6 269

B.1 Pelvis measurements used for this study 306

B.2 Femur measurements used for this study 307

B.3 Tibia measurements used for this study 308

B.4 Fibula measurements used for this study 309

B.5 Astragalus measurements used for this study 310

B.6 Measurements taken on the first metatarsal and first phalanx of the first digit of the foot 310

B.7 Scapula measurements used for this study 311

B.8 Radius measurements used for this study 311

Figure		Page
B.9	Ulna measurements used for this study	312
B.10	Measurements taken on the first metacarpal and first phalanx of the first digit of the hand	312
B.11	Baculum measurements used for this study	313

List of Tables

Table **Page**

1.1 Selected archaeological sites in western North America with fur seal material.. 26

2.1 Sample sizes of reference specimens used in this study, by element and by sex 71

2.2 Definitions of measurements of the mandible, humerus, and calcaneus used for this study 72

2.3 Von Bertalanffy parameter estimates describing growth of the mandible, humerus, and calcaneus 73

2.4 Geographic distribution of reference specimens used to characterize growth patterns of fur seals 75

3.1 Datasets and time periods which have been the focus of previous attempts to document density-dependent responses in northern fur seals 101

3.2 Parameter estimates and summary statistics for von Bertalanffy growth curves for popmin and popmax........ 102

3.3 Predicted strength and direction of errors in age-estimation from reference curves 103

3.4 Regression statistics, by cohort, describing the relationship between true age and age estimation based on calibration of mandible length........ 104

4.1 Number of fur seals harvested, by year, on and around the Farallon Islands, California, 1808-1833 125

4.2 Number of identified specimens (NISP) and approximate dates for the major stratigraphic units for assemblages analyzed in this report 126

4.3 Absolute dating of strata from each of the sites analyzed in this report 128

5.1 Frequencies of ageable NISP in half-year intervals, and summary statistics of age estimations, Oglodax' 198

5.2 Frequencies of ageable NISP in half-year intervals, and summary statistics of age estimations, Chaluka 200

5.3 Frequencies of ageable NISP of young-of-the-year in one month intervals, and summary statistics of age estimations, Oglodax' 201

Table		Page

5.4 Frequencies of ageable NISP of young-of-the-year in one month intervals, and summary statistics of age estimations, Chaluka 203

5.5 Frequencies of ageable NISP in half-year intervals, and summary statistics of age estimations, Kodiak Island sites 204

5.6 Frequencies of ageable NISP of young-of-the-year in one month intervals, and summary statistics of age estimations, Kodiak Island sites 205

5.7 Frequencies of ageable NISP in half-year intervals, and summary statistics of age estimations, Cape Flattery sites 206

5.8 Frequencies of ageable NISP of young-of-the-year in one month intervals, and summary statistics of age estimations, Cape Flattery sites 208

5.9 Frequencies of ageable NISP in half-year intervals, and summary statistics of age estimations, Ozette 209

5.10 Frequencies of ageable NISP of young-of-the-year in one month intervals, and summary statistics of age estimations, Ozette 211

5.11 Frequencies of northern fur seal strandings along the California coast, by county.. 212

5.12 Contingency tables and chi-square results for Cochran's test of linear trends comparing temporal trends in the frequencies of all young-of-the-year with all animals
= one year.. 213

5.13 Contingency tables and chi-square results for Cochran's test of linear trends comparing temporal trends in the frequencies of pups = four months and all other young-of-the-year = 12 months 214

6.1 Number of identified fur seal specimens and dates for the major stratigraphic units of Ozette 253

6.2 Von Bertalanffy parameter estimates for archaeological and reference samples... 254

6.3 Regression statistics, by stratum, describing the relationship between age estimation based on tooth sections and age estimation based on calibration of mandible length... 256

Table		Page

6.4 Regression statistics describing the relationship between age estimated from tooth annuli and corrected age estimation based on calibration of MSL using the Ozette VB growth curve 257

A.1 Counts of mandibles measured in this study........ 302

A.2 Counts of post-cranial skeletons measured in this study 303

A.3 Key to collection codes 304

B.1 Descriptions of measurements used in this study 314

C.1 Mandible measurement data used in this study 319

C.2 Measurement data for the pelvis used in this study........ 346

C.3 Measurement data for the femur used in this study........ 348

C.4 Measurement data for the tibia used in this study........ 350

C.5 Measurement data for the fibula used in this study 352

C.6 Measurement data for the astragalus and calcaneus used in this study 354

C.7 Measurement data for the first metatarsal used in this study........ 356

C.8 Measurement data for the first phalanx of the first digit of the foot used in this study........ 358

C.9 Measurement data for the scapula used in this study........ 360

C.10 Measurement data for the humerus used in this study........ 362

C.11 Measurement data for the radius used in this study........ 364

C.12 Measurement data for the ulna used in this study........ 366

C.13 Measurement data for the first metacarpal used in this study........ 368

C.14 Measurement data for the first phalanx of the first digit of the hand used in this study........ 370

C.15 Measurement data for the baculum used in this study........ 372

Table		Page
D.1	Von Bertalanffy parameter estimates describing growth of all other skeletal elements analyzed	384
E.1	Mandible measurements used to calculate “ageable NISP” for Chaluka	389
E.2	Elements and measurements used to calculate “ageable NISP” for Oglodax’	390
E.3	Elements and measurements used to calculate “ageable NISP” for Kodiak sites	398
E.4	Elements and measurements used to calculate “ageable NISP” for Cape Flattery sites	402
E.5	Mandible measurements used to calculate “ageable NISP” for Ozette	408

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