

**HOUSEHOLD ORGANIZATION AND SOCIAL INEQUALITY AT BANDURRIA, A
LATE PRECERAMIC VILLAGE IN HUAURA, PERU**

by

Alejandro Jose Chu Barrera

B.A., Universidad Nacional Mayor de San Marcos, Lima, 1999

M.A., University of Pittsburgh, 2005

Submitted to the Graduate Faculty of
Arts and Sciences in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

University of Pittsburgh

2011

UNIVERSITY OF PITTSBURGH
FACULTY OF ARTS AND SCIENCES

This dissertation was presented

by

Alejandro Jose Chu Barrera

It was defended on

April 26th, 2011

and approved by

Dr. Mark B. Abbott

Dr. Marc P. Bermann

Dr. Robert D. Drennan

Dr. James B. Richardson, III
Dissertation Advisor

Copyright © by Alejandro Jose Chu Barrera

2011

HOUSEHOLD ORGANIZATION AND SOCIAL INEQUALITY AT BANDURRIA, A LATE PRECERAMIC VILLAGE IN HUAURA, PERU

Alejandro Jose Chu Barrera, PhD

University of Pittsburgh, 2011

The Late Preceramic period (3500 – 1800 BC) of coastal Peru witnessed the earliest examples of monumental architecture for the Americas. The presence of monumental architecture has been interpreted as the product of complex societies at the chiefdom or state level. But prior research has focused in this ceremonial monumental architecture. In contrast, research at the site of Bandurria proposed a bottom-up approach focusing on the people who built and used this architecture, with the household as the basic social unit.

Excavations at Bandurria explored the residential occupation of the site, and revealed a sector of monumental architecture unreported by previous researchers.

In the domestic sector, evidence of two types of domestic structures: a quadrangular stone structure associated with a small ceremonial platform and smaller oval hut made of perishable materials. Oval houses were occupied by 2 or so people; the proximity of some oval structures suggests that a household unit consisted of at least two of such structures. The quadrangular structure held a larger floor, and was related to ritual activities such as unbaked clay figurines. Estimates of household size indicate 5 inhabitants for the quadrangular structure. From the analysis of the two types of domestic structures the households at Bandurria were composed of the nuclear families.

Chronologically, both structures were occupied at the same time. The artifact assemblages from the domestic sector exhibit little variety and low density. All the excavation

units share similar artifact types in low proportions. One significant difference is the presence of figurines depicting human figures found in the quadrangular stone structure, another difference is a different access to marine resources.

In the monumental sector, excavations were centered in one of the mounds (mound 1) uncovering evidence of architecture made entirely of round cobble stones and mud mortar. Chronologically the construction of mound 1 is later than the domestic occupation was in use when the site was abandon *circa* 3400 BP.

The results from Bandurria challenge the models that characterize the Late Preceramic society as a complex chiefdom or state. Alternative models have are proposed to fit the domestic data within a larger explanatory framework.

TABLE OF CONTENTS

TABLE OF CONTENTS	VI
LIST OF TABLES	X
LIST OF FIGURES	XIII
PREFACE.....	XXIV
1.0 INTRODUCTION.....	1
1.1 TERMS AND STUDIES FOR THE COASTAL LPP	6
1.2 CHRONOLOGY.....	10
1.3 THE NORTH CENTRAL REGION	14
1.4 THE PALEOCLIMATE BACKGROUND.....	17
1.4.1 Archaeology and Paleoclimate on the Peruvian Coast.....	17
1.4.2 Mid Holocene Climatic Change from Natural Proxies Records	19
1.4.3 Maritime Foundations of Andean Civilization	24
1.5 SOCIAL ORGANIZATION MODELS FOR THE LPP	25
1.5.1 Chiefdoms:	26
1.5.2 Pristine State:	28
1.5.3 The “Crucible Model”	30
1.5.4 Discussion	31
2.0 HOUSEHOLDS DYNAMICS AND SOCIAL COMPLEXITY	33

2.1	SETTLEMENT TYPES, HOUSEHOLDS AND ITS SOCIAL CORRELATIONS.....	33
2.1.1	Emergence of the Village from a Social Evolutionary perspective	33
2.1.2	Communal versus Nuclear villages	35
2.1.3	Households and Social Complexity	36
2.2	HOUSEHOLD STUDIES FOR THE ANDEAN PRECERAMIC	37
2.2.1	Early Preceramic Period (<i>ca.</i> 10000 – 6000 BC).....	38
2.2.2	Middle Preceramic Period (6000 – 3500 BC).....	39
2.2.3	Late Preceramic Period (3500 – 1800 BC)	41
2.3	HOUSEHOLDS AND POPULATION	45
2.4	RESEARCH QUESTIONS.....	50
3.0	RESEARCH AT BANDURRIA	52
3.1	ENVIRONMENTAL SETTING	54
3.2	PARAISO-PLAYA CHICA WETLANDS	56
3.3	PREVIOUS RESEARCH AT BANDURRIA	59
3.3.1	The Paraiso – Playa Chica Complex.....	61
3.4	ARCHAEOLOGICAL SECTORS OF BANDURRIA	64
3.5	EXCAVATION DESIGN AND HISTORY.....	68
3.6	FIELD METHODOLOGY	69
4.0	EXCAVATION RESULTS	71
4.1	EXCAVATIONS IN DOMESTIC SECTOR 1	71
4.1.1	Criteria for defining domestic occupations	71
4.1.2	Area estimations of domestic structures.....	73

4.1.3	Radiocarbon dating	74
4.1.4	Artifacts Recovered from Excavations	75
4.2	UNIT 9	79
4.3	UNIT 6A	88
4.4	UNIT 6B.....	131
4.5	UNIT 8	155
4.6	CHRONOLOGICAL CORRELATIONS	185
4.7	HUMAN BURIALS	193
4.8	HOUSEHOLD COMPARISONS AND POPULATION ESTIMATES	199
4.8.1	Habitational Units.....	199
4.8.2	Activity Areas.....	210
4.8.3	Summary	212
4.9	EXCAVATIONS IN THE MONUMENTAL SECTOR 2	215
4.9.1	Mound 1.....	215
4.9.2	Early Monumental Architectural Traditions in the Central Andes	229
5.0	SUBSISTENCE REMAINS ANALYSIS	234
5.1	INTRODUCTION	234
5.2	FAUNAL REMAINS.....	237
5.2.1	Fish.....	238
5.2.2	Marine Invertebrates	250
5.2.3	Other	264
5.3	BOTANICAL REMAINS	267
5.3.1	Methodology.....	267

5.3.2	Results.....	268
5.4	CORRELATION BETWEEN HOUSEHOLD SUBSISTENCE ASSEMBLAGES	277
6.0	CONCLUSIONS AND PERSPECTIVES	284
6.1	SITE DEVELOPMENT	284
6.2	DEFINING THE HOUSEHOLD AT BANDURRIA AND TRACKING HOUSEHOLD CHANGE.....	287
6.2.1	Habitation Units.....	287
6.2.2	Activities Areas	289
6.2.3	Burial Data	291
6.2.4	Evidence of the Emergence of social differentiation	292
6.3	IMPLICATIONS OF BANDURRIA HOUSEHOLDS ON THE LATE PRECERAMIC PERIOD ARCHAEOLOGY.....	295
6.4	DIRECTIONS FOR FUTURE RESEARCH.....	297
APPENDIX A: PROFILES.....		299
APPENDIX B: DESCRIPTION OF STRATIGRAPHIC UNITS EXCAVATED		312
APPENDIX C: ARTIFACT DISTRIBUTION		474
APPENDIX D: SKELETAL MATERIAL		482
APPENDIX E: SUBSISTENCE ANALYSIS DATA.....		496
BIBLIOGRAPHY		542

LIST OF TABLES

Table 1. Comparison between different chronological periodifications for the Preceramic	13
Table 2. Paleoclimatic data from the archaeological record obtained from Peruvian coastal sites (data from Sandweiss <i>et al.</i> 2007 and Sandweiss 2003).	20
Table 3. Household data from Preceramic sites of the Central and North Central Coast of Peru	49
Table 4. Radiocarbon dates for Bandurria obtained by Rosa Fung	60
Table 5. Sites identified in the Paraiso-Playa Chica area.	62
Table 6. Radiocarbon obtained dates for Paraiso I obtained by Cardenas.....	63
Table 7. Summary of Unit 9 Stratigraphic Units and Occupation Phases	86
Table 8. Artifact distribution by Stratigraphic Units at Unit 9.	87
Table 9. Summary of Unit 6A Stratigraphic Units and Occupation Phases	112
Table 10. Artifact distribution Unit 6A: Total counts and frequencies by occupational phases.	124
Table 11. Artifact distribution Unit 6A without quartz crystals.	125
Table 12. Summary of Unit 6B Stratigraphic Units and Occupation Phases	140
Table 13. Artifact distribution Unit 6B: Total counts and frequencies by occupational phases.	149
Table 14. Artifact distribution Unit 6B without quartz crystals.	150

Table 15. Summary of Unit 8: stratigraphic units and occupation Phases	171
Table 16. Artifact distribution Unit 8: total counts and frequencies by occupational phases. ..	179
Table 17. Artifact distribution Unit 8 without quartz crystals.	180
Table 18. Radiocarbon dates from the Domestic Sector.....	188
Table 19. Age and Sex of Individuals excavated from the Domestic Sector.	198
Table 20. Population estimates from domestic structures from the Domestic Sector.	204
Table 21. Total NSPI and MNI of identified fish with their ranks.	242
Table 22. Habitats of identified fish	244
Table 23. Diversity Indexes (Simpson's diversity index) of Occupational Phases. In <i>italics</i> Phases with clear domestic occupation.....	245
Table 24. NSPI and MNI of fish by occupational Phase.	246
Table 25. MNI and % of selected species related to domestic occupations.	249
Table 26. Taxonomic list of identified marine invertebrates from the analyzed sample.....	253
Table 27. Total NSPI and MNI of identified marine invertebrates with their ranks.	255
Table 28. Habitats of the marine invertebrate identified.	257
Table 29. Diversity Indexes (Simpon's diversity index) of Occupational Phases. In <i>italics</i> Phases with clear domestic occupation.....	259
Table 30. NSPI and MNI of Marine Invertebrate by occupational Phase.	260
Table 31. NSPI and % of species compared among domestic occupations.....	263
Table 32. Total NSPI and MNI of identified marine invertebrates with their ranks.	265
Table 33. NSPI and MNI of Birds and Mammals	266
Table 34. NSPI and MNI of Birds and Mammals	271
Table 35. NSPI of floral remains by occupational Phase	272

Table 36. Diversity Indexes (Simpson's diversity index) of Occupational Phases. In <i>italics</i> Phases with clear domestic occupation.....	273
Table 37. NSPI and % of plant assemblages related to domestic occupations.....	276
Table 38. Selected variables and values for each identified house.....	279
Table 39. Comparisons of Corporate modes compared with the Bandurria data. (Based on Fienman 2000: Table 3.2).....	296
Table 40. Artifact distribution from Unit 6A. Total Counts.....	475
Table 41. Artifact distribution from Unit 6B. Total Counts.....	477
Table 42. Artifact distribution from Unit 8. Total Counts.....	480
Table 43. Fish NSPI and MNI from Unit 6A. Controlled Sample.	497
Table 44. Fish NSPI and MNI from Unit 6B. Controlled Sample.....	504
Table 45. Fish NSPI and MNI from Unit 8. Controlled Sample.	509
Table 46. Fish NSPI and MNI from Unit 9. Controlled Sample.	517
Table 47. Plants NSPI from Unit 6A. Controlled Sample.....	519
Table 48. Plants NSPI from Unit 6B. Controlled Sample.	526
Table 49. Plants NSPI from Unit 8. Controlled Sample.....	531
Table 50. Plants NSPI from Unit 9. Controlled Sample.....	540

LIST OF FIGURES

Figure 1. Central Andes with Middle Preceramic and LPP sites mentioned in text.....	5
Figure 2. North Central Region with main LPP sites.	15
Figure 3. LPP sites in altitudinal profile across the North Central Region.....	16
Figure 4. Comparison of habitational units from coastal Preceramic sites.....	44
Figure 5. Location of Bandurria.....	53
Figure 6. Microhabitats from the Paraiso-Playa Chica wetlands.....	58
Figure 7. Williams sketch of the “village with temple” of Bandurria. (Redrawn with modifications from Williams 1980: Fig. 1.7)	59
Figure 8. Sites located in the Paraiso-Playa Chica complex. (Redrawn with modifications from Cardenas 1977)	63
Figure 9. Topographic plan of Bandurria with its two sectors: the Domestic (Sector 1) southwards and the Monumental (Sector 2) northwards.	65
Figure 10. Modern adobes houses built over the Domestic Sector	66
Figure 11. Mounds from Sector 2 as seen from the Domestic Sector. At the right, modern house.	67
Figure 12. North oriented 5 x 5 m excavation unit with numbered sub-units.	70
Figure 13. North oriented 2 x 2 m test pit with numbered sub-units.	70

Figure 14. Location of excavation Units in Bandurria's Domestic Sector.	78
Figure 15. Unit 9 surface before excavations.	79
Figure 16. First (S.U.9.29) and second (S.U. 9.31) floors found at Unit 9.....	80
Figure 17. The third floor (S.U. 9.36) found below floors 9.29 and 9.31.....	81
Figure 18. General view of Unit 9 after excavation, the floor 9.36 can be seen with its circular pattern of postholes. In the inferior left corner the base of the occupation can be seen.	84
Figure 19. South profile of Unit 9. Three occupations are indicated.....	84
Figure 20. Floor 9.36 with postholes defining a circular structures and associated pits.	85
Figure 21. Bar graph of artifact distribution in Unit 9 by occupational Phase.	87
Figure 22. Unit 6A before excavations, at the right side of the picture (arrow) the stone alignment.	89
Figure 23. Platform wall 6.20 under excavation. A modern intrusion (arrow) destroyed part of the exterior face.....	90
Figure 24. First evidence of south wall 6.21 at the south edge of Unit 6A as the the superficial layer is removed.....	90
Figure 25. South wall 6.21 by the end of the excavations.	91
Figure 26. Third stone wall (S.U. 6.130) located in the western edge of the unit by the end of the excavations.....	91
Figure 27. Fouth stone wall (S.U. 6.03) located wthin Unit 6A and 6B at the end of the excavations.....	92
Figure 28. Quadrangular structure (6A-I) and stone platform at the end of the excavations.	93
Figure 29. General plan of Unit 6 with stone platform and quadrangular structure 6A-I.	94
Figure 30. Offerings and hearths located over stone platform.....	96

Figure 31. Remains of basket with thermo fractured stones.....	97
Figure 32. First human offering of a headless body	99
Figure 33. Second human offering: a head completely crushed by modern occupation.	99
Figure 34. Spondylus beads recovered from the remains of a necklace found at the head.	100
Figure 35. Mud plastered hearths found on top of the stone platform. A. First excavated hearth. B. Second hearth found beside the first hearth in the stone platform.	100
Figure 36. <i>Junco</i> bag (<i>proto shicra</i>) within the platform construction fill.	101
Figure 37. Unit 6C at the end of excavation. The red arrow points to the two hearths and the yellow arrow points to the <i>proto shicra</i> within the exposed construction fill.	102
Figure 38. Exposed surface of midden S.U. 6.98 with postholes	105
Figure 39. Floor 6.115 within the quadrangular structure. At the center hearth (red arrow) and towards the northern section of the structure there are 5 postholes.	105
Figure 40. Floor 6.131 within the quadrangular structure. Red arrow shows the location of the human burial.	106
Figure 41. Subadult burial related with floor 6.131.....	106
Figure 42. Floor 6.178 with associated features. Earlier features have been filled with clean clear sand.	108
Figure 43. End of excavations at Unit 6A exposed a compact midden S.U. 6.229. To the upper left: western wall 6.130 and a probable access.	109
Figure 44. Phase I: Final recorded S.U. at the end of excavation.....	113
Figure 45. End of Phase I: Floor 6.178 and associated postholes.....	114
Figure 46. Occupational Phase IIa, floors 6.157 and 6.165	115
Figure 47. Beginning of Phase IIb: Floor 6.131 and associated features.	116

Figure 48. Floor 6.115 of occupational Phase IIb with associated features	117
Figure 49. Midden 6.98 of Phase IIb with evidence of postholes on its surface.	118
Figure 50. Floor 6.79 from occupational Phase IIb with associated features.	119
Figure 51. Phase III: Upper levels of Unit 6A with identified primary features.	120
Figure 52. Unit 6A West Profile with platform wall 6.20 and associated floors.....	121
Figure 53. Unmodified quartz crystal from Phase IIb	124
Figure 54. Percentages of artifact distribution by occupational Phases.....	125
Figure 55. Percentages of artifact distribution by occupational Phases without the quartz crystals	126
Figure 56. Stone weight from Unit 6A with reed fiber.....	126
Figure 57. Bone tablet with incised lines.....	127
Figure 58. Polished bone needle with incised line.....	127
Figure 59. Bone bird tube with cut marks it is upper portion.	128
Figure 60. Broken <i>Choromytilus chorus</i> fishhook from Phase IIa.	128
Figure 61. Pieces of unbaked clay human figurines from Unit 6A: A. Almost complete figurines. B. Broken figurines torsos. C. Broken right arm and hand of figurine.....	129
Figure 62. Unbaked clay disc with two central perforations has been identified as a construction plummet.	130
Figure 63. Upper levels of Unit 6B. To the left is the continuation of platform stone wall defined in Unit 6B.....	133
Figure 64. Remains of midden 6.51 where the platform stone wall was built. Upper right corner show the platform corner. No mud floors were found as in Unit 6A.	133
Figure 65. Excavation area reduced to 2 x 3 m.....	134

Figure 66. Stratified secondary middens: S.U. 6.70, 6.72, 6.75, 6.76, 6.77, 6.78 and 6.80	134
Figure 67. Floor 6.87 with postholes defined an oval structure.....	135
Figure 68. Sandy layers located under clay floor succession.	136
Figure 69. Subadult burial 6.139 within the sterile sand layer 6.138.	137
Figure 70. Funerary artifacts of burial 6.139	137
Figure 71. Unit 6B at the end of excavation ~4.0 meters of cultural remains.	138
Figure 72. Oval structure from floor 6.87. Occupation Phase II	141
Figure 73. Occupational Phase II. Floor 6.79.	142
Figure 74. Floor 6.79 of Phase II and lower middens from Phase IIIa.....	143
Figure 75. End of occupational Phase IIa. Midden 6.51.....	144
Figure 76. Lower levels of Phase IIIb and upper levels of Phase IIIa.	145
Figure 77. Middens from occupational Phase IIIb.....	146
Figure 78. Surface of Unit 6B before excavation.	147
Figure 79. Percentages of artifact distributions by occupational Phases in Unit 6B.	149
Figure 80. Percentages of artifact distributions by occupational Phases without the quartz crystals in Unit 6B.....	150
Figure 81. Clear and milky quartz crystals recovered from excavation in Unit 6B.	151
Figure 82. Beads recovered from excavation in Unit 6B.....	151
Figure 83. Obsidian flake recovered from Unit 6B.	152
Figure 84. Bifacial lithic tool recovered from Unit 6B.....	152
Figure 85. One of the stone weights recovered from Unit 6B.	153
Figure 86. Broken bird bone flute recovered from Unit 6B.	153
Figure 87. Unbaked clay figurine recovered from Unit 6B.	154

Figure 88. Torch recovered from Unit 6B.	154
Figure 89. Unit 8 as a 2 x 2 m test pit before excavations modern trampling (vehicle tracks and human footprints) can be seen in its surroundings.....	156
Figure 90. Unit 8: First evidence of floor 8.32 found during excavations.....	157
Figure 91. Unit 8: Remains of the domestic structure 8-III associated to floor 8.32.....	158
Figure 92. Unit 8: Excavation of reed mat (S.U. 8.66) over floor S.U 8.57.....	159
Figure 93. Unit 8: Detail of mat in association with post holes.....	159
Figure 94. Unit 8A: Oval structure with hearth (8.155) in floor 8.64.....	161
Figure 95. Unit 8B: Unit 8B: Remains of the first oval structure associated with floor 8.36. White balloon marks a hearth; yellow balloons mark post holes with the remains of posts inside.	162
Figure 96. Units 8A and 8B: Floor 8.57 with the remains of a circular structure, the blue balloons marks the post holes.....	163
Figure 97. Unit 86: Second circular structure on floor 8.64 and associated to a hearth (8.173). 163	
Figure 98. Aerial view of Unit 8A and 8B with floor 8.64 exposed and the two domestic structures associated with hearths 8.155 and 8.173 (red arrows).	165
Figure 99. Unit 8C: Remains of floor 8.32, where no domestic structures found.	166
Figure 100. Unit 8D: Remnants of floor 8.57 at the center of the excavation unit.....	167
Figure 101. Unit 8: Structures 8-I and 8-II on floor 8.36.	172
Figure 102. Unit 8: Remnants of floor 8.127.....	173
Figure 103. Unit 8: Structure 8-III on floor 8.32	174
Figure 104. Unit 8: Structures 8-IV and 8-V on floor 8.57	175
Figure 105. Unit 8: Structures 8-VI and 8-VII on floor 8.64.....	176
Figure 106. Unit 8: superposition of structures 8-I, 8-III, 8-IV and 8-VI.....	177

Figure 107. Unmodified quartz crystals from Unit 8.....	178
Figure 108. Percentages of artifacts by occupational Phases in Unit 8.	179
Figure 109. Percentages of artifacts by occupational Phases without the quartz crystals in Unit 8.	180
Figure 110. Beads recovered from Unit 8.....	182
Figure 111. Stone weight tied with <i>junco</i> cord.	182
Figure 112. Sea mammal bone tablet with central incisions and polished edges.	183
Figure 113. Bird bone tablets. Some of them have central light incisions.	183
Figure 114. Shell fishhooks, left: complete fishhook; right: broken fishhook.	184
Figure 115. Wood stick with incised lines.....	184
Figure 116. Comparison among the profiles of excavation units in the Domestic Sector using seal level as vertical datum.	186
Figure 117. Bullet graph of radiocarbon dates obtained from the Domestic Sector. Each bullet graph has its S.U. number. PS: <i>protoshicra</i>	189
Figure 118. Human burial location in the Domestic Sector.....	194
Figure 119. Disturbed burial by the 1973 flood. (Photo Domingo Torero).....	195
Figure 120. Common body position found in human burials.	196
Figure 121. <i>Junco</i> mat and ropes covers the body.....	196
Figure 122. Human burial covered by big cobbles.....	197
Figure 123. Houses floor plans from the Domestic Sector.....	201
Figure 124. Simplified floor plans of structure 6A-I with identified features within the different occupations.	203

Figure 125. Perishable quadrangular structures from a modern urban shanty town of Lima. Roofs and walls are made of reed mats. Notice the low stone wall in the nearest hut and the stone platforms in the others.	204
Figure 126. Bullet graph of habitational units identified at Unit 8.	206
Figure 127. Oval structures plans with main features from floors excavated at Unit 8	207
Figure 128. Oval structures plans with main features from Units 6B and 9.	209
Figure 129. Fragments of a gourd container tied with a reed rope.	211
Figure 130. Fragments of a gourd container.	211
Figure 131. Fireburned stones (cobbles) used in cooking activities.	211
Figure 132. Bullet graph comparing all domestic structures excavated.	214
Figure 133. General view of Mound 1 before excavations.	217
Figure 134. Excavation of the upper levels of Trench 1, at the northern side of Mound 1.	217
Figure 135. Plan of Mound 1 exvacations units and Trench 1	218
Figure 136. Straigraphy and plan map of Trench 1	220
Figure 137. Mound 1 and circular plazar discovered in Trench 1.	225
Figure 138. Mound 1 and circular plaza after expansion of the excavations to the east and west units.	225
Figure 139. Stone platforms and main stairway of Mound 1 north front and stone walls from the Circular Plaza.	226
Figure 140. Offering 1: basket found found next the west corner of the south access of the circular plaza.	227
Figure 141. Bone artifacts and pieces of a cotton net found inside the basket.	227
Figure 142. Offering 2: Bottle gourds found next to the plaza wall.	228

Figure 143. Comparison of radiocarbon dates from Domestic and Monumental sectors.	229
Figure 144. Stylized reconstruction of a Mito chamber with main architectural features. (Redrawn from Quilter 1992: Fig. 12).....	230
Figure 145. Stylized reconstruction of vestibule (V) and atrium (A).	232
Figure 146. Distribution of faunal remains from the excavations at the Domestic Sector	237
Figure 147. Dr. Philippe Bearez (at the center) and other crew members processing modern fish	239
Figure 148. Diagnostic head bones used for taxon identification: (dn) dentary, (ar) articular, (pop) preopercular, (op) opercular, (hm) hyomandibular, (qd) quadrate, (la) lachrymal, (pl) palatine, (pmx) premaxilla, (mx) maxilla, (cl) cleithrum, (scl) supracleithrum, (ptp) post temporal,	240
Figure 149. Geographical distribution of anchovy (<i>Engraulis ringens</i>) and sardine (<i>Sardinops sagax</i>). Redrawn with modification from Bearez and Miranda 2000: Fig. 3	242
Figure 150. Histograms of the fish assemblages from phases associated to domestic occupations.	248
Figure 151. Two of the most important mollusk species identified in shell assemblages are the clam <i>Mesodesma donacium</i> and the mussel <i>Choromytilus chorus</i>	251
Figure 152. Third most common mollusk identified in shell assemblage is the clam <i>Mulinia edulis</i>	252
Figure 153. Histograms of the mollusks assemblages from phases associated to domestic occupations.	262
Figure 154. Histograms of the plant assemblages from phases associated to domestic occupations.	275

Figure 155. Sketch of site grow from C14 dates.	286
Figure 156. Necklace of red stone beads and bird motif. (Photo Domingo Torero).	292
Figure 157. North Profile Stratigraphy as recorded.....	301
Figure 158. Stratigraphic Matrix of the North Profile indicating occupation phases identified.	302
Figure 159. Center Profile Stratigraphy as recorded	305
Figure 160. Stratigraphic Matrix of the Central Profile indicating occupation phases.	308
Figure 161. South Profile Stratigraphy as recorded.....	310
Figure 162. Arthritic changes with eburnation on the left distal femur lateral condyle. Image A inferior view. Image B is posterior view.	483
Figure 163. Inferior view of cranium of Burial 14 showing left maxillary third molar peg in occlusion. (Left one lost post-mortem).....	486
Figure 164. Burial 19 in situ covered large rocks in unit 5A. Photo taken facing north.	487
Figure 165. Hand-twined cotton fibers found between rocks placed over burial Contexto Funerario 39.....	488
Figure 166. Images of cranium from Burial 26, brachycephalic female with possible cranial modification. A. Anterior view of CF 35 on right compare with another individual from Bandurria. B. Left lateral view of same crania, CF35 on right. C. Posterior view of CF35 showing optical bones at lambda and wormian bones in lambdoidal suture. D. Superior view of CF35 showing offset sagittal suture to the left.	492
Figure 167. Superior view of mandible from Burial 26 showing endentulism, alveolar resorption, tooth wear and large genial spines.	492

Figure 168. Vertebrae from Contexto Funerio 35 showing compression fractures, osteophytic activity and Schmorl's nodes. Top Row: Thoracic vertebrae 10-12 from left to right. Bottom Row: Lumbar vertebrae 1-5 from left to right.	493
Figure 169. Healed fracture in the left 10 th rib from Burial 26.....	493

PREFACE

Twelve years ago, a young archaeology undergraduate, influenced by professor Dr. Ruth Shady, decided to change his research interest from the Late Intermediate Period of Central Coast Peru and to focus on the little known site of Caral at the Supe Valley. The student did not know that this decision would begin an intellectual journey to study Peruvian North Central Coast Late Preceramic. Later as a graduate student, his research would focus on the archaeological site of Bandurria, located 10 km south of the nearby city of Huacho, 150 km north of Lima.

Recently a series of researchers have worked in this region, among them Dr. Ruth Shady famous for her studies at Caral where extensive excavations at this monumental site have uncovered the remains of a complex, little known society that flourished around the 3rd millennia B.C.

Is in this context, that the young archaeologist began Graduate studies at the Department of Anthropology of the University of Pittsburgh, thanks to a Heinz Fellowship in Latin American Archaeology. Here at Pitt, he received the theoretical and methodological tools that complemented the previous knowledge obtained at the Universidad Nacional Mayor de San Marcos. Finally, he proposed as a dissertation topic to study these early societies of the North Central Coast of Peru and chose the Late Preceramic site of Bandurria as dissertation topic.

Bandurria was discovered more than 35 years ago, and although it is mentioned in the archaeological literature by several researchers (e.g. Feldman 1985, 1992, Kornbacher 1999, Lavallee 2000, Quilter 1991, Williams 1980a) very little was known about it and like most Peruvian archaeological heritage was in an accelerating process of destruction by modern human occupation.

This dissertation is one step toward the understanding of this coastal settlement and our general knowledge of the beginnings of social complexity in the region. In a more personal sense it is a landmark in my professional formation, a rite of passage, to new and exciting research opportunities and personal gratification.

But this could not be done without the wisdom and help of those who have guide me in this intellectual enterprise. From my early days as a naive undergraduate, I want to thank Dr. Ruth Shady for encouraging me to study early coastal Preceramic societies. At Pitt, I received valuable advice and knowledge from Dr. Marc Bermann, Dr. Robert Drennan, and Dr. Olivier de Montmollin, archaeologists and professors of the Department of Anthropology. Both Drs. Bermann and Drennan were also members of my Dissertation Committee. From the Geology and Planetary Science Department I also want to thank Dr. Mark A. Abbott, also a member of my Dissertation Committee, for sharing with me his paleoclimate data and for funding initial radiocarbon dates from Bandurria. Others radiocarbon dates from the site were possible with the invaluable help of Dr. Gregory Hodgins of the University of Arizona and Dr. Daniel H. Sandweiss of the University of Maine. Dr. Sandweiss and Dr. Michael E. Moseley from the University of Florida, visited me during my fieldwork on several occasions, contributing their friendship and knowledge of maritime adaptations to my research. Special thanks to my advisor Dr. James B. Richardson, III for sharing with me his knowledge and enthusiasm about the

Andean Preceramic period and climate change. All these years I have known him, he has not been only an academic advisor but a mentor and a friend as well.

Research at Bandurria was initially funded by the National Science Foundation with a Doctoral Dissertation Improvement Grant (#0531805) from which this dissertation is produced. Later research was funded by the local and regional governments. The NSF funds served as seed money that created an awareness and interest among local authorities in their local archaeological heritage which led them to support a long term research and restoration project at Bandurria. I am very grateful to my first field crew that worked under the NSF Grant: Alfonso Ponciano, Joana Vivar, Mauro Ordoñez, Luis Angel Flores, Diana Aleman, Marlene Mejia, Karla Alarcon and Francisco Vallejo. Later, excavations at Unit 8 were complemented by archaeologists Martin Rodriguez, Alvaro Cubas and Joana Vivar. I want to highlight the outstanding participation of archaeologist Alfonso Ponciano in the Bandurria Project, his dedication toward the excavation of the Unit 6, through four years (2005-2008), his loyalty and appreciation of our research goals deserve recognition. He also gave an invaluable help with the processing of plans and images from excavation at Unit 6. During the lab and analysis work I received the invaluable help of the lab assistants Karina Garcia (mollusk remains), Jessica Garcia (fish remains) and Laura Montes (botanical remains) who worked under my supervision and in consultation with other colleagues. Inventory and curation of all the recovered materials was superbly done by archaeologist Joana Vivar. Conservator Patricia Landa was in charge of all conservation of the excavated artifacts, her outstanding work allowed the conservation and preservation of some fine artifacts. Both the field and lab crew worked hard and well, without their help this research would not have been possible.

Topographic mapping of the site was possible with the invaluable help of the *Proyecto Especial Arqueológico Caral – Supe* (PEACS) who provided their equipment (total station and differential GPS) and personnel, during the topographic fieldwork and posterior data processing. This mapping was complemented by Benjamin Guerrero who mapped excavations units and structures uncovered by the excavations.

In Huacho, since the beginning of the fieldwork, we received the support of Carlos Bisso Drago and his family, Domingo Torero Fernandez de Cordova and the other members of the *Patronato de Defensa del Patrimonio Cultural del Valle de Huaura*. Later, their help was invaluable in obtaining local funding.

Finally, this dissertation could not be done without the encouragement of my parents who had always supported me and my research. I am deeply indebted to Rosio Gonzales for her unconditional support and infinite patience with me through all these years and recently on the Bandurria project. She “pulled my ears” once in a while in order to keep me in track, for that and more all my love.

1.0 INTRODUCTION

The Peruvian coast is a dry arid strip of land that lies between the Pacific Ocean and the highlands of the Andes. In the last few years, studies (e.g. Shady 1996, Shady *et al.* 2000, Haas *et al.* 2004, Haas and Creamer 2006, Vega-Centeno 2005, 2007) have again focused attention on the Late Preceramic Period (3500 – 1800 B.C) of the Central and North-Central coast. The Late Preceramic Period (LPP) is very important in understanding later developments and it is thought to be the foundations for the origins of Andean “civilization”.

Our research investigated the socio-economic changes during the LPP at the household level. Based on the household study at the archaeological site of Bandurria, we will be able to determine if the development of social complexity that accompanied the rise of the LLP temple centers is also reflected in the households.

Studies of LPP households are almost nonexistence. We lack much of the basic information for domestic activities during the LPP although Middle Preceramic sites, like La Paloma and Nanchoc, have provided useful data on dwellings and activities performed at the household level. Our main goal is to define the characteristics of a coastal village known in the literature as Bandurria originally defined as a village with a small mound (e.g. Fung 1989, Williams 1980). Our research has identified a monumental architecture sector unknown to previous site researchers. This important discovery has changed our previous knowledge of the development of the site raising more questions about the relationship between domestic and

monumental architecture. This monumental sector allowed more funding to research the site with the involvement of local and regional governments. With this budget excavations were extended from the initial field season of 6 months (Aug. 2005 to Jan. 2006) to four more field seasons (2006 to 2009) of almost 10 months each, allowing extensive excavations and exposure of large areas containing domestic remains and monumental architecture.

The first season allowed us to confirm the preceramic nature of Bandurria and its stratigraphic complexity as almost 3 m of cultural occupation was recorded in exposed profiles. It also allowed us to define the first evidence of domestic structures and uncover the first remains of monumental architecture, a pyramidal platform and a sunken circular plaza. The second season was focused on continuing the excavations in the domestic area and uncovering the mound and plaza to define its building techniques and dimensions. The third season continued the excavations of domestic occupation, where we reached the base of human occupation at almost 4 m below the surface. Excavations in the monumental sector uncovered new structures with evidence of large scale feasting. The fourth and fifth season were focused on excavations in the monumental sector continuing with the work began in previous field seasons. A second circular plaza was discovered and excavated. This plaza was also associated with low platform structure.

Due to the five field seasons a great amount of data has been recovered. My dissertation will focus primarily on household archaeology and what it reflects about the complexity of the society that produced the monumental complexes. I will concentrate on the data from 3 excavation units in the domestic sector where the remains of 10 domestic structures were found. These structures, together with 29 burials and significant subsistence data from the domestic occupation will be presented and compared. To a much lesser extent we will discuss the

monumental architecture in order to place the household/subsistence results within the context of what complexity of society built these structures.

Research at Bandurria confirms that the LPP was a very dynamic and crucial period for the emergence of social complexity in the Central Andes. For the first time, there was a clear differentiation of the social space (Fung, 1999: 178) reflected in corporate architecture related to complex social systems, such as chiefdoms (Feldman, 1985; Quilter, 1992), pristine states (Shady, 1999a) or none of the above (Haas and Creamer, 2006). But many of the arguments and inferences for LPP social relations are focused on studies at sites with monumental architecture. There is no clear interpretation of the social mechanisms and social strategies to explain how Andean “civilization” emerged.

The first chapter will focus on general issues; first we will define the chronological time frame used to define the Preceramic Period. Then we will characterize the North Central region where Bandurria is located. A brief account of the history of research of the coastal Late Preceramic Period will be presented, followed by the paleoclimatic conditions of the region. We will finish with reviewing the different models proposed to define the LPP social organization.

In the second chapter we will define the household as an archaeological unit and discuss the available data for the Preceramic period. Finally we will present the research questions that this dissertation will try to answer.

The third chapter will focus in the research done at Bandurria, beginning with a review of previous research, presenting the surrounding environment and archaeological sites, site sectorization, excavation design and field methodology.

The fourth chapter will present the excavation results from the different excavation units at the domestic sector of the site; the occupational phases identified and the domestic structures

defined. Also the burial data will be presented to compare with the domestic remains. Finally the different domestic occupations will be compared to find similarities or differences among them. This chapter will also present a summary of the results of the excavations in the monumental sector of the site.

The fifth chapter will present the results the subsistence analysis recovered from the excavations at the domestic sector. Faunal and botanical remains from each unit and occupational phase will be compared to track changes in subsistence or differential access to resources in each of the domestic occupations identified.

Finally, the sixth chapter will present the conclusions of this dissertation, the relations between household and subsistence through the site's different occupations and the research perspective, a departing point for future research topics at Late Preceramic sites in Peru's north central coast.

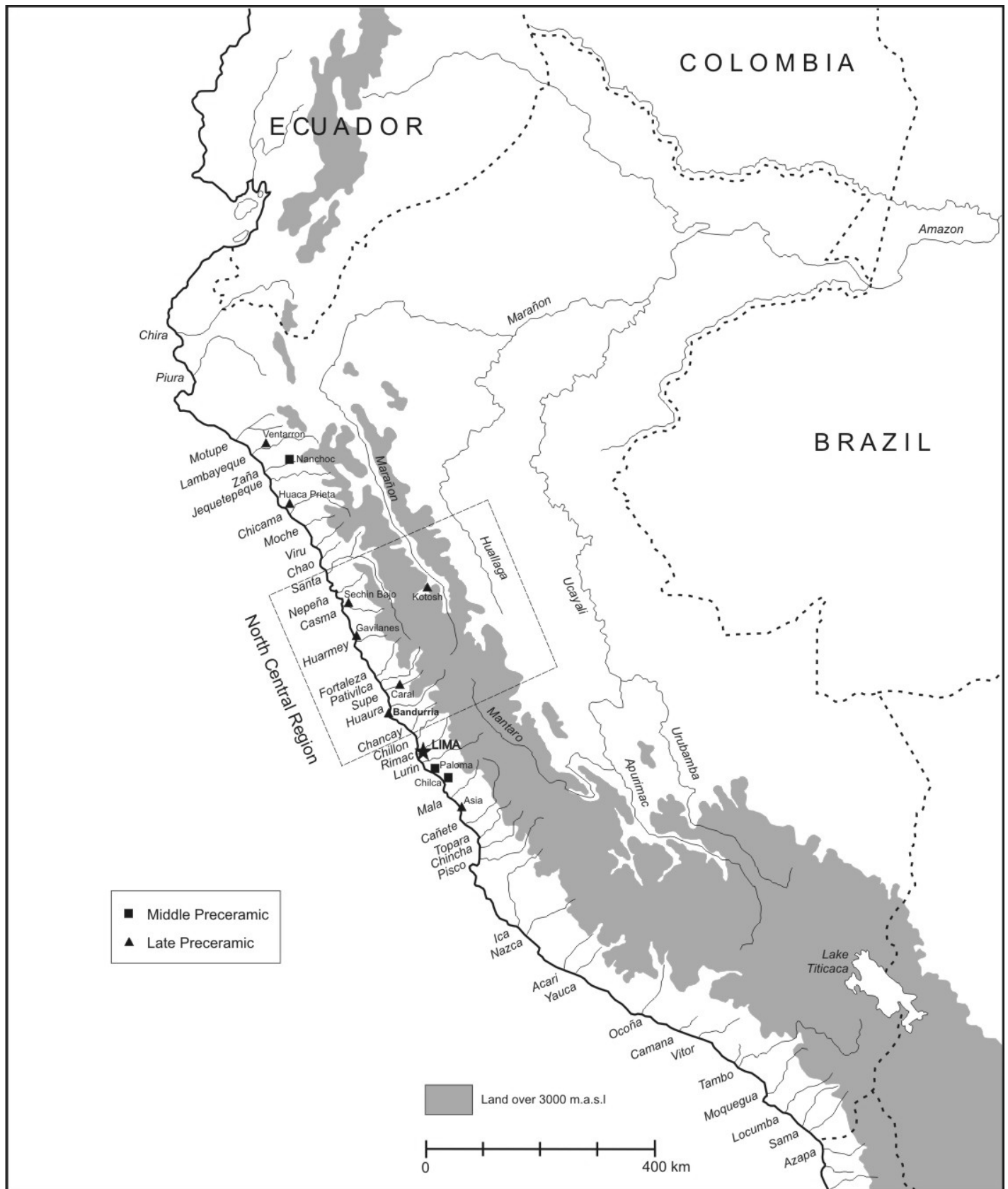


Figure 1. Central Andes with Middle Preceramic and LPP sites mentioned in text.

1.1 TERMS AND STUDIES FOR THE COASTAL LPP

Since the beginnings of scientific archeology at the Andes, archaeologists have identified a very early and primitive, stage in Andean cultural development. German archaeologist Max Uhle (1920) and later Phillip Means (1931) referred to this period as the Archaic Period within a diffusionist framework. Until then, these cultural remains, considered as the earliest cultural manifestation of the region, received very little, if no archaeological attention, which was focused only in later ceramic periods. The Archaic term was first used by anthropologist Franz Boas (1913) and Herbert J. Spinden (1928) referring to the first sedentary horticulturist villages of North and Central America (Willey and Phillips 1957: 23). Later, Peruvian archaeologist Luis Lumbreras (1969: 57) and others reutilized the Archaic term to refer the transition from hunting and gathering to a Neolithic agricultural society.

Although Charles Barrington Brown was the first to recognize and report the existence of Preceramic sites in the Peruvian coast in the early 20th century (1926), it was not until the 1940s that Junius Bird's excavations at the preceramic site of Huaca Prieta (1946-1947) at the mouth of the Chicama valley, marked the beginning of the archaeological research of the coastal preceramic sites in the Central Andes. The Huaca Prieta excavations were part of the Viru Valley Project, the first multidisciplinary research of an entire Andean coastal valley (Ford 1954, Willey 1974). Excavations at Huaca Prieta recovered evidence of a highly sophisticated fishing technology based in the use of cotton nets, as well of twined cotton textiles (Bird *et al.* 1985). Archaeologist Michael E. Moseley (1992: 9) considers Bird research as the first to demonstrate preceramic coastal sedentarism. Bird was one of the first researchers to use the term "preceramic" as referring to cultural remains not associated with ceramics.

During this decade, another important contribution to the archaeological research of the region was the use of aerial photographs to identified coastal sites. This technique allowed Paul Kosok (1948) to locate several monumental sites in the Supe valley, among them Chupacigarro Grande (later known as Caral). Another technological breakthrough, at the end of the decade, was the invention of radiocarbon dating (Libby *et al.* 1949) that measured the disintegration of the C¹⁴ carbon isotope, which allowed the dating (absolute chronology) of organic remains associated with past human occupations.

During the 1950s French researcher Frederic A. Engel, from the *Centro de Investigaciones de Zonas Aridas* (CIZA), began an ambitious long term study to locate prehispanic sites along the Peruvian coast. His contribution was the identification and location of hundreds of preceramic sites along the coast (Engel 1957a, 1957b, 1958). As part of his study, excavations were done at the LPP sites of Asia (Engel 1963), Rio Seco (Wendt 1964) and El Paraiso (Engel 1966a), where one structure (Unidad 1) was restored. Another of his contributions was to recognize the presence of cotton in some sites, defining what he called (1964) the Cotton Preceramic Period that corresponds to the Late Preceramic.

In the next decade (1960) more studies were focused on the preceramic. Research focused mainly at the Central Coast, specifically the Ancon-Chillon area. Edward P. Lanning and Thomas Patterson surveyed the entire area and developed a cultural chronology. The study of the Ancon-Chillon area would let Lanning to suggest a relationship between climatic change and cultural transformations (Lanning 1963, 1965, 1967). Other researchers, such as the Peruvians Jorge C. Muelle and Rogger Ravines (1973) also excavated in Ancon identifying an important Preceramic occupation. The Ancon-Chillon data allowed for the application of demographic pressure models to explain the development of agriculture and emergence of social complexity in

the area (Cohen 1977, 1978). Parallel to this coastal research the Japanese Archaeological Mission to the Andes throughout the 1960's excavated in the Huallaga basin at the sites of Kotosh, Shillacoto and Wairajirca, uncovering preceramic ceremonial architecture. The ceremonial architecture discovered at Kotosh (Terada 1960, 1963) defines the Mito architecture tradition (Bonnier 1988, 1997, Burger and Salazar Burger, 1989) found at other highland LPP sites.

These previous studies were the database that in the 1970s, was used to formulate a series of theories to explain the emergence of complex societies on the coast. Research showed that some form of social complexity was present by the end of the Preceramic Period. Lanning (1967) already had noticed the importance of marine resources for the inhabitants of the Ancon-Chillon area. Other archaeologists, like Rosa Fung, also had noticed the importance of marine resources in the emergence of the so called "Andean Civilization" (Fung 1972). Later, Moseley (1964, 1969, 1975), who conducted research in the Ancon-Chillon area during the sixties, postulated a hypothesis he called the "Maritime Foundations of Andean Civilization" (MFAC). He proposed that the coastal monumental complexes were constructed within an economy based on marine resources. Immediately after its publication the MFAC was heavily criticized (e.g. Osborn 1977, Quilter and Stocker 1983, Raymond 1981, Wilson 1981) as the rest of world civilizations were known to have emerged, based on an agricultural economy. At this time it was thought inconceivable that high culture could be attained based on fish and shellfish. This was the time that scholars thought that only agricultural intensification could sustain social complexity and that marine resource could only sustain tribal societies.

During the next decade (1980s) more preceramic site were researched increasing the amount of data available. Aspero located at the Supe valley was used by Moseley as the type site

for his MFAC and was excavated by one of his students, Robert Feldman (1980); El Paraiso, located at the Chillón valley, initially studied by Engel, was excavated with a different methodology and objectives by Jeffrey Quilter (1985) and Gavilanes located at the Huarmey valley was excavated by Duccio Bonavia (1982). In the highlands, research was done at the preceramic sites of Huaricoto at the *Callejon de Huaylas* by Richard Burger (1985); La Galgada at the Tablachaca valley by Terence Grieder (1988) and Piruru at the Tantomayo valley by Elizabeth Bonnier (1983). These studies defined two distinctive architectural traditions, one at the coast and the other at highlands (Feldman 1985, Fung 1999). Using the available data, the architect Carlos Williams (1980) developed a typology of the emergence of the coastal preceramic monumental architecture and established a chronological sequence of the early development of monumental architecture on the coast. At the sociopolitical level, the late preceramic was defined as complex hierarchical society at the chiefdom level (Feldman 1980, 1985, 1989).

The next decade (1990s) changed our knowledge of the LPP as excavations at Caral, conducted by Ruth Shady who confirmed the antiquity of the monumental architecture at the site dating to *circa* 3rd millennium B.C. This discovery, supported by a series of radiocarbon dates (Shady *et al.* 2001) allowed her to propose the “Earliest Civilization of the Americas” arguing that the city and the Pristine State emerged at Caral during the LPP (Shady 1997, 1999a, 1999b, 2004).

Following the lead of Shady research at Caral, intensive archaeological survey has been done at other valleys of the North Central coast. Survey at the valleys of Pativilca, Fortaleza and Huaura have identified several sites with monumental architecture of similar and even bigger dimensions than Caral and other LPP sites of the Supe valley (Creamer *et al.* 2007, Haas *et al.*

2004, Haas and Creamer 2006). These surveys have produced radiocarbon dates, some of them related to the Middle Preceramic and beginning of the LPP, that allowed Haas *et al.* to challenge the MFAC and to postulate (Haas and Creamer 2006: 755) a dependency of coastal populations on valley crops (especially cotton) cultivated inland under the administration of these monumental centers. These authors challenged the previous characterization of the LPP and the mechanism and degree of social organization of the North Central coast which they refer to as the *Norte Chico* region.

At the same time, a new series of LPP sites have been discovered elsewhere in the Peruvian coast that support the idea of parallel coastal developments during the LPP. Shicras, located at the Chancay valley, is a site composed by two mounds with radiocarbon dates that place it contemporaneous with Caral and other inland LPP sites (Tosso 2008). Its complex architecture and monumentality resembles the North Central coast sites. Further north, at the Casma valley recent discoveries of monumental architecture dated 5500 B.P. at Sechin Bajo (Vallejos 2008) and LPP painted murals at Huaca Ventarron at the Lambayeque valley (Alva 2008) reflect an emergence of monumental architecture elsewhere in the coast that remains to be further investigated.

1.2 CHRONOLOGY

From the beginnings of research at Preceramic sites several chronological frameworks have been proposed. Frederic Engel (1964) was among the first to propose a simple preceramic chronology for the coastal preceramic based on the presence/absence of cotton. Later (1966) he refined his chronology based in the introduction of domesticated plants in the archaeological

record. Today, two main chronological frameworks are used at the Central Andean region. Referring to the time frame we are discussing (*ca.* 3500 – 1800 B.C.), the terms Archaic and Preceramic periods are used interchangeably. Although considered as synonyms, both refer to different time conceptions:

- The Archaic stage, commonly used by Peruvian archaeologists and recently by some Americans (e.g. Haas *et al.* 2004) belongs to a construct formulated by Luis Lumbreras (1969) based in developmental stages and not on time periods. It had its root in previous attempts to organize Andean prehispanic prehistory (e.g. Strong 1948, Stewart 1948, Bushnell 1956, Mason 1957). Lumbreras defined seven development stages: Lithic, Archaic, Formative, Regional Developments, Wari Empire, Regional States, and Inca Empire. These stages were grouped in three sections based in social-economic criteria (Lumbreras 1969: 27): Gatherers, Village Agriculturalists and Urban Industrialists. Preceramic societies corresponded with the Lithic and Archaic stages of the Gatherers group. Agriculture appeared in the Early Archaic (*ibid*: 60), equivalent to the Middle Preceramic Period. The Middle Archaic was a stage of village horticulturists (*ibid*: 63), corresponding to the Late Preceramic Period. The appearance of pottery and the first ceramic societies belongs to the Late Archaic (*ibid*.: 76) equivalent to the Initial Period.

Later, Shady (1993, 1995) developed her own time periods, using the Archaic terminology and dividing it in three stages: Early Archaic, Middle Archaic and Late Archaic. This nomenclature also has been adopted by recent researchers of the region (e.g. Haas *et al.* 2004, 2007, Vega-Centeno 2005, 2006).

The Preceramic Period belongs to a periodification initially developed by John Rowe (1962) with Edward Lanning's additions to the preceramic periods. Both authors were advocates

of a time period chronology instead of using developmental stages (Rowe 1962: 40, Lanning 1967: 24). The use of periods is based in a chronological framework based in a series of cultural traits found in a specific region, it does not consider evolutionary processes nor stages (e.g. plant and animal domestication, urban revolution, formation of the State, etc.).

We agree with these researchers and consider the use of a period's chronology instead of a stage system. We consider the use of the term Preceramic to refer to the time before the introduction of pottery in the Central Andes (*ca.* 1800 BC). We also consider contradictory that the same authors propose the emergence of civilization (Pristine State and the city) are the advocates using the term Archaic, when all authors agree that it is a stage that characterizes early sedentarism and simple societies.

For this dissertation we propose to divide the Preceramic in three main periods (in Table 1 is compared among other periodifications): Early Preceramic (*ca.* 10000 – 6000 BC), Middle Preceramic (*ca.* 6000 – 3500 BC) and Late Preceramic (3500 – 1800 BC).

Table 1. Comparison between different chronological periodifications for the Preceramic

Engel, 1964	Engel, 1966	Rowe/Lanning 1967	Lumbreras, 1969	Shady, 1995	Chu, 2008
	1300	Initial Period	1200	Early Formative	Initial Period
		1500	Late Archaic		
1800		1800	1800	1800	1800
Cotton Preceramic	Third agricultural stage: cotton w/o ceramics	Period VI	Middle Archaic		
		2500	2500	Late Archaic	Late Preceramic
3000	3000	Period V	Early Archaic	3000	
Preceramic w/o Cotton	Second agricultural Stage: beans and <i>jiquima</i>				3500
	4000	4200	4000		
				Middle Archaic	Middle Preceramic
	First stage: Incipient agriculture	Period IV	Lithic		
		6000		6000	6000
	7000	Period III		Early Archaic	Early Preceramic
		↓	↓	8000	↓

*Dates in years B.C.

1.3 THE NORTH CENTRAL REGION

The Andean region defined by the cordillera of the Andes crosscut western South America. The Central Andes comprises almost all the actual territory of Peru extending to Ecuador and Bolivia. Since the beginnings of archaeological research in Peru it has been customary to divide the Central Andes in three main sections: north, central and south. These transverse sections comprise stretches of coast, highlands and Amazon forest. Within these regions, research defined the North Central Region as an area of interaction between different ecological regions due to the presence of several natural routes that linked the coast, the highlands and the Amazon forest. This allowed for the exchange of people, goods and ideas that prompted the emergence of social complexity (Shady *et al.* 2000: 15, Shady 2005: 8). This region has also been called North Central Area (e.g. Shady *et al.* 2000, Shady 2005) and more recently *Norte Chico* or “Little North” (e.g. Haas *et al.* 2004, 2005, Haas and Creamer 2006: 745) used to refer to the coastal portion of the North Central region, although *Norte Chico* is a modern geopolitical term and is used to refer to its closeness to Lima, Peru’s capital city.

Considering ecological and geomorphologic differences the North Central Region can be divided in three main areas (Figs. 2 and 3):

1. North Central Coast: Refers to the western slope Andean valleys which drain into the Pacific Ocean, from the Chancay valley in the south to the Santa valley at the north. Within this coast zone there are two subareas:

- a. Littoral: Coastal line and the rivers mouths.

- b. Valley: Lower, middle and upper valley zones.

2. North central Highlands: Refers to the interandean valleys (e.g. Callejon de Huaylas, Callejon de Conchucos), the *Puna* region and glaciers.

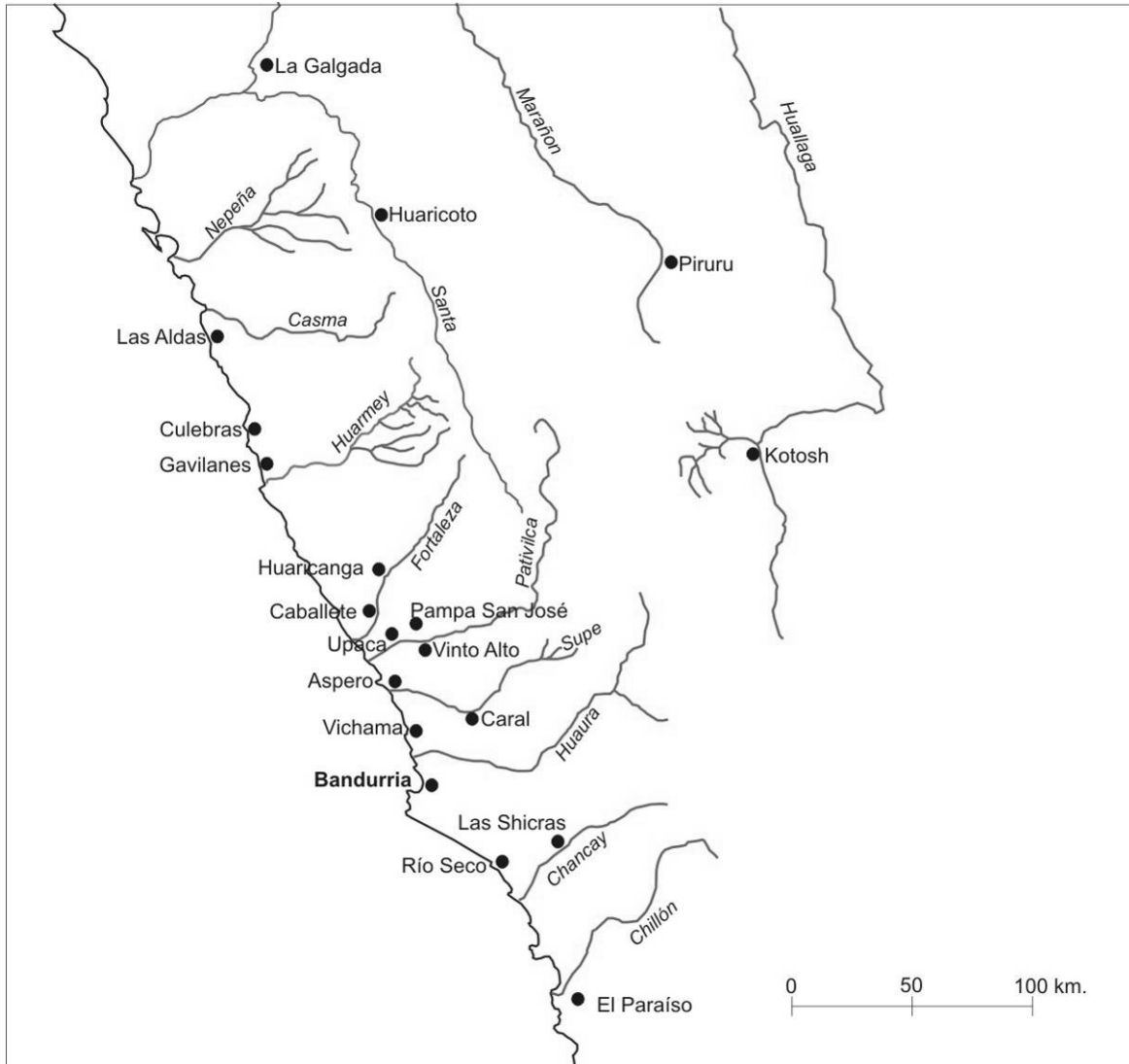


Figure 2. North Central Region with main LPP sites.

3. North Central Forest: Refers to the eastern slope of the Andes, whose piedmont is crossed by rivers that drain into the Amazon. The most significant are the Huallaga and Marañón valleys.

Within these different regions are a series of contemporary sites that share several cultural traits linking them together in an exchange of ideas and cultural traditions.

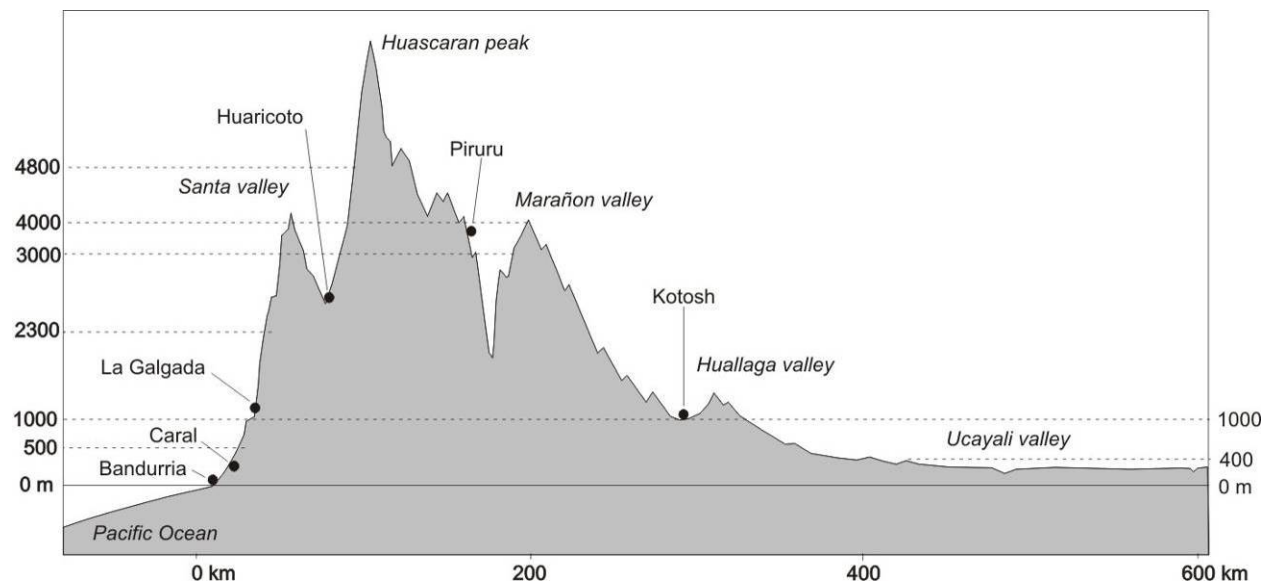


Figure 3. LPP sites in altitudinal profile across the North Central Region

1.4 THE PALEOCLIMATE BACKGROUND

The Mid Holocene (~9,000-3,000 B.P.) saw important changes in world climate and the Peruvian coast was not an exception. During the first part of the Mid Holocene I (~9,000-5,800 B.P.) the shoreline was constantly changing as sea level rose quickly as a product of deglaciation. Sea level stabilization has been argued to be a very important issue in the emergence of social complexity worldwide (Day *et al.* 2007). Before 5,800 B.P. coastlines were submerged at 1 km per century and with an increase of 1-2 m per century, preventing coastal habitats to mature. By the end of the Mid Holocene I the continental shelf regions became inundated creating more shallow water areas and rich coastal environments (*ibid*: 169).

1.4.1 Archaeology and Paleoclimate on the Peruvian Coast

In the Peruvian coast climatic factors have affected human populations since they settled it during the Late Pleistocene to present. Shifts in settlement patterns, construction style, subsistence practices and burial patterns considered as major indicators of cultural change have been affected in different degrees by climatic and environmental changes since the arrival of humans in the Central Andes.

Archaeologists such as Edward Lanning (1963, 1965, and 1967), Michael Moseley (1975, 1978, and 1992), James Richardson (e.g. 1973, 1978, 1981, and 1983) and Daniel Sandweiss (e.g. 1996a, 1996b, 1999 and 2003) are among the first to recognize the importance of climate in the cultural transformations recorded at the Peruvian coast. Based in his research at Ancon, Lanning (1963, 1965) proposed a shift from terrestrial *Lomas* hunting to a maritime fishing and gathering. Lanning was also the first to suggest (Lanning 1963: 369-370) that

changes in the ocean circulation patterns of the Peruvian current increased sea productivity around 5,800 B.P. Although few paleoclimatic records were available at the early 1960s Lanning's hypothesis was a major but little accepted breakthrough (Richardson and Sandweiss 2008: 60). For example Craig and Putsy (1968) referred to Lanning's ideas as "a transparent adventure in environmental determinism".

In 1966 Moseley began research at Ancon at a series of Preceramic sites (1968), he also incorporated climate into his model as El Niño was included into the explanatory framework that evolved into the MFAC hypothesis (1975). However Moseley also considered the importance of industrial crops (e.g cotton) in the manufacture of fishing gear.

In the far north coast, Richardson (1965, 1973) began research in the Talara region in the mid-1960s. The discovery of a series of preceramic settlements containing extinct mangrove shellfish suggested a different environment in the Talara region with wetter conditions and a warmer ocean prior to 5,800 B.P. Richardson also pioneered at the study of beach ridges, investigating the Chira and Colan beach ridges and proposing they were the result of mega-Niños (Richardson 1981, 1983, Richardson and Sandweiss 2008). He also was among the first researchers to suggest the origins of El Niño in the Holocene (Richardson 1981: 141). In his 1981 article Richardson also was the first to propose the presence of early sites submerged in the continental shelf of the Peruvian coast. Soon afterwards, Claude Chauat in 1982 also proposed the presence of underwater Paijan sites as he reconstructed the north coast paleoenvironment (Chauat 2006: 370-371). Until now no underwater archaeological research has been done in Peru's coast, but for example in North America underwater archaeology has located sites of 10,000 to 6,000 years old (Richardson 2006a, 2006b).

Decades later, Sandweiss was sent by Moseley in the early-1980s to check the Santa beach ridges discovering on the paleoshoreline a series of Preceramic settlements containing warm water mollusks (Sandweiss *et al.* 1983). Research at the Ostra Base Camp and Ostra Collecting Station initiated the first major discussion about the onset of El Niño at the Mid Holocene. Later, some kilometers south at the Casma valley, Thomas y Shelia Pozorski found warm water mollusks assembles at the Almejas site (Pozorski and Pozorski 2003), confirming warmer conditions at the Peruvian north coast and El Niño frequency throughout the Holocene.

With the research at the Ostra sites, Rollins, Richardson and Sandweiss proposed (1986) that El Niño was absent during the early Holocene and began to affect human populations only after 5,800 years ago. Additional studies showing the pre 5,800 B.P. climatic conditions came from Andrus's geochemical analysis of fish otoliths (Andrus et al. 2002, 2003) and mollusks (Andrus et al. 2005) confirming a sea surface temperature (SST) of about 3-4°C warmer than today.

As no climatic proxies are available at the coast for direct study of climate change, the archaeological records is the best alternative to track climatic changes through the human occupation of the coast (Table 2). As we will see many of the traditional climatic proxies have results that can be correlated with the observed at the archaeological record from the Terminal Pleistocene, Early Holocene, Mid Holocene and Late Holocene.

1.4.2 Mid Holocene Climatic Change from Natural Proxies Records

Together with the climatic record recovered from archaeological sites, a series of climate studies have been conducted in the Andean region using traditional paleoclimatic proxies (lake, ocean and glacial cores, soils studies, etc.).

Table 2. Paleoclimatic data from the archaeological record obtained from Peruvian coastal sites (data from Sandweiss *et al.* 2007 and Sandweiss 2003).

Site (S Latitude)	Terminal Pleistocene ca. 13000-11000 BP	Early Holocene ca. 11000-9000 BP	Mid Holocene I ca. 9000-5800 BP	Mid Holocene II ca. 5800-3000 BP	References
Siches (4°30')			Warmer SSTs/ seasonal precipitation/ No ENSO	Cool SSTs (modern conditions)	Sandweiss et al. 1996, Andrus et al. 2002
Amotape (4°40')	Warmer SSTs/ less arid	Warmer SSTs/ less arid			Richardson 1978
Quebrada Chorrillos (6°)				Cool SSTs (modern conditions)	Cardenas et al. 1993
Paijan (8°30')	Warmer SSTs/ less arid	Warmer SSTs/ less arid			Chauchat et al. 1992
Salinas de Chao (8°40')				Cool SSTs (modern conditions)	Sandweiss et al. 1996, Andrus et al. 2002
Ostra (8°55')			Warmer SSTs/ seasonal precipitation/ High amplitude seasonal SST cycle/ No ENSO		Sandweiss et al. 1996, Andrus et al. 2002
Huaynuna (9°30')				Cool SSTs (modern conditions)/ Low frequency ENSO	Pozorski and Pozorski 1990
Almejas (9°40')			Warmer SSTs/ No ENSO		Pozorski and Pozorski 1995
Los Gavilanes (10°)				Cool SSTs (modern conditions)/ Low frequency ENSO	Bonavia 1980
Aspero (10°45')				Cool SSTs (modern conditions)/ Low frequency ENSO	Feldman 1980
Bandurria (11°11')				Cool SSTs (modern conditions)/ Low frequency ENSO	
Paloma (12°30')			Cool SSTs (modern conditions) Very arid		Reitz 1988
Quebrada Jaguay (16°30')	Cool SSTs (modern conditions)	Cool SSTs (modern conditions)	Cool SSTs (modern conditions)		Sandweiss et al. 1988
Ring Site (17°40')	Cool SSTs (modern conditions)	Cool SSTs (modern conditions)	Cool SSTs (modern conditions)		Sandweiss et al. 1989
Quebrada Tacahuay (17°48')	Cool SSTs (modern conditions)/ ENSO floods	Cool SSTs (modern conditions)	Cool SSTs (modern conditions) /No ENSO floods	Cool SSTs (modern conditions)/ ENSO floods late	deFrance et al. 2001
Quebrada de los Burros (18°)		Cool SSTs (modern conditions)	Cool SSTs (modern conditions) /No ENSO floods	Cool SSTs (modern conditions)/ ENSO floods late	Lavallee et al. 1999

Quaternary soil development studies by Noller (1993) along the Peruvian coast showed a major disjunction at 12°S. Southern latitudes presented an absence of significant soil development and the indicators of a long term hyperaridity (soluble minerals and salts). North of 12° S latitude Noller (1993: 204) found greater soil development and the absence of significant evidence of periodic rainfall events. The soil record found by Noller has been correlated with the seasonal SST structure of Andrus et al. (2002) as reflecting seasonal precipitation along the coast north of 12°C (Sandweiss et al. 2007: 35) confirming the Mid Holocene climatic scenario.

The soil record also is consistent with *lomas* distribution along the coast when patterns of endemism and plant distribution are studied. Rundel and Dillon (1998) had identified differences between northern and southern *lomas* flora with a boundary at 12°S. The southern portion presents a high degree of endemism in each *lomas* studied reflecting long-term hyperaridity. The northern section shows greater similarities between the now isolated *lomas* suggesting that in some moment in the past the *lomas* were continuous along the north coast as product of wetter conditions. As Sandweiss *et al.* (2007) hypothesized the *lomas* endemism also fits the Mid Holocene climatic scenario of seasonal rainfall.

Lake cores have been used from decades as proxies for climatic reconstruction and in the Andes they also have tracked the El Niño history. Although all lake coring comes from the Andean highlands some relevant data for the coast can be inferred. Using layers containing clastic sediments washed into the lakes during storms measured using gray-scale and color light reflectance they match the historic record of El Niño events. Rodbell *et al.* (1999) found at Laguna Pallcacocha, Ecuador that after *ca.* 5000 B.P. clastic deposition have 2-8.5 year periodicities consistent with the modern El Niño occurrence. Similar climatic data have been

obtained from Galapagos Islands (Reidinger *et al.* 2002) where the record show an increase of frequency and intensity of El Niño around 3100 B.P.

Lake cores from Lake Titicaca also have allowed climatic reconstruction for the last 25,000 years (Baker *et al.* 2001). Lake cores show maximum aridity related with the lower levels of the lake between the early and middle Holocene (8000-5000 B.P.) and reaching it lowest level between 6000-5000 B.P. after which the lake rose near to modern lake levels. Knowing that during modern El Niño the Titicaca basin suffers droughts, El Niño frequency can be correlated, as Sandweiss *et al.* (2007) observed that the lower lake levels is coincidental with the infrequent El Niño during the early and mid Holocene.

Cores from Laguna Aculeo in Central Chile (Jenny *et al.* 2002) show a record of an arid Early to Mid Holocene period (ca. 9500 – 7000 B.P.) followed by humid conditions after 5700 B.P. reaching modern conditions around 3000 B.P. For Sandweiss *et al.* (2007: 36) Laguna Aculeo chronology matches almost perfectly the archaeological record from Peru's North Coast as no or weak El Niño events occurred at the Early and Mid Holocene with an increase in El Niño frequency up to modern times by the Late Holocene.

Ocean cores near the coast of Peru and Chile produced high resolution records to reconstruct the El Niño history for the last 20,000 years. Core 106KL from the coast off Lima recorded the El Niño events (Rein *et al.* 2005) that affected the Peruvian Central Coast. A strong correlation between the archeological data and the core records was found for the core shows a maximum El Niño activity during the Early Holocene, followed by weak El Niño activity during the Mid Holocene with a significant increase after around 3000 B.P. (*ibid*: 37). Again as with lake cores, Sandweiss *et al.* (2007: 37) argued that the ocean core records fit the archaeologically based paleoclimatic reconstruction of El Niño.

During the Early and Mid Holocene, as the El Niño frequency shifted, sea level rose to its modern level *circa* 5800 B.P as confirmed by sea level curves using coral reefs, seismic reflection and cores from the continental shelf (e.g. Clark *et al.* 1978, Dillon and Oldale 1978 and Fairbanks 1989). The Early and Mid Holocene paleocoastline moved rapidly at a rate of 1 kilometer per century and a depth increase of 1-2 meters per century (Day *et al.* 2007: 169). During this inundation process many shallow water areas were created than in conjunction with an overall increase of global temperature enhanced aquatic productivity. As Day *et al.* (2007) mentioned the coastal margin productivity (CMP) increased significantly as more shallow water habitats were created by the rising sea level. From less than 300 g dry weight per square meter per year, the CMP increased between 1000 and 2000 g dry weight per square meter per year. In the case of the Peruvian coast this increase of shallow water habitats together with shift of sea currents may have caused a boost of sea productivity.

The paleoclimatic scenario proposed by Richardson and Sandweiss (Richardson and Sandweiss 2008, Sandweiss *et al.* 2007) based on archaeological data from coastal sites together with the paleoclimatic proxies presented above, argues for a northward emplacement of the Peruvian cold current from 12° south latitude to its current position of 5° south latitude as an explanation of the El Niño onset at 5800 B.P. (Richardson and Sandweiss 2008: 67). This paleoclimatic scenario can be linked to the coastal Preceramic cultural changes during the Holocene as proposed by Sandweiss *et al.* (2007: 42):

- Before *ca.* 9000 B.P. El Niño was present with unknown frequency. Fisher-hunter-gatherer populations lived along the coast in small settlements.

- Between *ca.* 9000 – 5800 B.P. El Niño was absent or with very low frequency. The fisher-hunter-gatherer lifestyles continued with the addition of some domesticated plants. Some settlements may have become permanent large villages.
- Between *ca.* 5800 – 3000 B.P. El Niño was present but at lower frequency than today. This period correlates with the LPP and is the onset of monumental architecture on the coast. Pyramid building will extend from the LPP to the Initial period.
- After *ca.* 3000 B.P. El Niño attained modern frequency. Shortly after this second climatic shift, the construction of monumental architecture end on the coast for several centuries.

1.4.3 Maritime Foundations of Andean Civilization

On the Central Andean coast El Niño reoccures after a hiatus of 3,000 years (Sandweiss *et al.*, 2001; Richardson and Sandweiss 2008) into an infrequent climatic phenomenon with a reoccurrence rate of 50 to 100 years. This produced a dramatic change in the marine and terrestrial environments (Richardson and Sandweiss 2008). As modern sea level and shorelines were established, the coastal environment attained its present arid climate. The cold sea current brought with it increased marine resources such as schools of anchovies (Andrus *et al.*, 2002). The increased marine resources provided the economic base for the rise of complex polities on the north central coast of Peru during Mid Holocene II (5,800 – 3,000 B.P.) or LPP.

At a global perspective Day's *et al.* (2007) comparative study showed that complex (urban) societies emerged 1,100 years after sea level stabilization allowing coastal resources to become fully established. In general, the emergence of the first villages with a ranked social stratification occurred near estuarines and lower flood plains in tropical to temperate latitudes

(*ibid*: 175). After sea level stabilization, a typical trajectory led from coastal villages to more complex societies further from the shore. Available data from radiocarbon dates seems to support Day *et al.* hypothesis as the earliest dates around 4,600 B.P. from LPP coastal sites (e.g. Aspero and Bandurria) marked the beginning of monumental architecture at the north central coast. Larger inland sites located at the mid valleys of the Supe, Pativilca and Fortaleza rivers, present later radiocarbon dates (e.g. Caral).

As radiocarbon dates show it is very probable that the initial sedentary settlements first appeared on the shore near estuarine or wetland habitats. This is the case of several LPP located beside river mouths or wetlands such as Bandurria, Aspero, Culebras and Río Seco. It is evident that the presence of various habitats, with abundant faunal and floral resources was the main factor preceramic populations settling there. Fishing and shellfish gathering was the basis of subsistence in combination with a significant number of industrial (e.g cotton and gourds) and food crops essential to the emergence of cultural complexity in the LPP (Andrus *et al.* 2002; Richardson and Sandweiss 2008). It is only later in time as population grew and the demand for cultivated plants (food and industrial plants) increased that the inland valley sites appeared towards the end of the Late Preceramic.

1.5 SOCIAL ORGANIZATION MODELS FOR THE LPP

Several models of social organization had been proposed for the LPP, but there is still very little discussion about the mechanisms responsible to explain increasing social complexity. From excavations at two sites located in the Supe valley, Feldman has argued for the chiefdom model after his excavations at Aspero and Shady from her research in Caral proposed the model of a

Pristine State. From survey of North Central coast valleys Haas and Creamer 2006 proposed that neither a chiefdom or a Pristine State was a viable explanation, proposing a “crucible” model of social organization. We will review critically each of these proposals.

1.5.1 Chiefdoms:

Robert Feldman (1980, 1985) used the chiefdom model based on his research in Aspero. Aspero is located in the lower Supe valley near to a shoreline of mixed sand and rocky beaches. The site is situated along a series of low hills called *Lomas del Puerto* and has an area of 13 ha, with extensive midden deposits, artificial terracing, masonry structures and corporate-labor platform mounds. Six artificial platform mounds are identified at Aspero, ranging between 2 to 4 meters in height.

Feldman attempts to explain the social organization of Aspero based solely upon the excavations of several temple mounds. He states that the construction of these mounds indicates a corporate labor force consisting of households, either from within a single community, or from several communities (Feldman, 1985: 82). He infers that an authoritative group (elites?) coordinated and directed the construction activities. This elite group had special functions and privileges, thus he called Aspero society a coastal chiefdom (*ibid*: 83). Feldman uses the chiefdom definition defined by Service (1962) and contrasts it with Shalin’s (1958) Polynesian study. He identifies several features that he used as chiefdom’s traits:

1. The size of the constructions, mounds of about 30 x 50 meters and heights ranging between 2 to 4 meters and rooms over 10 m² and architecture details with 1 m thick walls, 2.5 m high that are not habitation dwellings.

2. The use of *shicra* or bagged fill, also found in El Paraiso, in LPP sites of the Supe valley (including Caral), other LPP mounds from the North Central coast, is considered by Feldman as construction techniques not found in the building of domestic structures.
3. The presence of architectural decoration: niches, friezes and wall paint. He associates these features with ceremonial structures and corporate constructions.
4. The lack of domestic refuse within the mounds, in the floor and in the construction fill.
5. The presence of prestige goods (beads and *Spondylus* shell), considered as luxury trade items, in limited amounts.

Feldman defines Aspero as “group oriented”, later known as a corporate chiefdom. But he lacked a diachronic perspective of the evolution of the site as a whole, limiting his research to the construction phases of the mounds he excavated. For Feldman (1980, 1985, 1987) the presence of monumental architecture is clearly an indicator of chiefdom level society. No other evidence of social complexity was found other than in the mounds he excavated. Two rich burials in one of the mounds was an adult and an infant with prestige items that he feels reflect some kind of hereditary status. Although there is a residential sector composed of domestic terracing (Moseley, 1975: 91) these were not investigated. His focus was only on the monumental architecture with no excavation of domestic refuse or dwellings. Thus he lacks the evidence to explore the strategies used by elites to involve corporate labor through feasting or gifts of exotic goods and bases his interpretation of a chiefdom level of socio-political complexity only on the three Aspero mounds he investigated.

Recently, Feldman's chiefdom model has been criticized (Haas and Creamer 2006) since no LPP site stands as a center or capital of a chiefly authority. Haas and Creamer argue that the chiefdom concept itself implies some kind of centralized polity (*ibid*: 750) and their research has been unable to locate the social, political or religious center of the North Central coast LPP chiefdom. Other chiefdom traits not present in the North Central coast is evidence of warfare, a ubiquitous trait in chiefdom societies (*ibid*: 751). For them the absence of warfare and a non centralized settlement pattern argues in favor of a non chiefdom polity.

1.5.2 Pristine State:

From her research at the Caral site in the Supe Valley since 1996, Shady (1999a, 1999b) argues that the State appeared during the LPP. She argues that at the beginning of the LPP a common identity developed among small coastal groups, creating some kind of social bond (Shady, 1999a: 3) sharing similar cultural traits and a defined territory. According to Shady, an embryonic elite class emerged from the supralocal development of productive forces (e.i. surplus) and an intensification of exchange activities. These "proto" elites imposed their authority over "similar" groups joined by cultural similarities. Finally, when these supralocal elite achieved control over the communities, the state is born (Shady, 1999a: 3). Caral is the capital city of this Pristine State with public and administrative areas and a residential neighborhood. This assumption was formulated to fulfill the classic definition of civilization. The other 13 monumental complexes in the valley are a hierarchical settlement system with 4 different levels based upon size, from the "capital" Caral with more than 50 ha, through a hierarchy of 4 site classes, varying from 40 to 4 ha. Using the direct historical approach based on 17th documents she argued that during the LPP of the Supe State, the earliest evidence of the

ayllus and *pachacas* (kin based) are present, sharing the idea of *lo Andino*. Although she suggests that religion is the main factor used by the elite to emerge as rulers in the Supe Pristine State, but no specific developmental strategies are discussed.

The pristine State used religion as a cohesion and expropriation tool. Based on material culture and architecture, the Pristine state had three levels of social hierarchy: the elites had secular and religious functions, directing the construction of monumental architecture, performing religious activities, administrating production and controlling the long distance exchange. Many of the proposed social reconstruction are conjectural and based in simplistic inferences of the artefacts and architecture found: monumental architecture reflects the presence of architects, engineers and masons; the discovery of bones musical instruments reflects the presence of music specialists, the presence of all these “specialists” must be related with the division of this society into social classes and therefore the presence of a hierarchical organization as somebody must “direct” all this activities. The middle range theory used to link the empirical data with social organization model is an attempt to correlate ethnohistoric (16th century AD) sources about social organization (*ayllus* and *pachaca*) to the fragmented (3rd millennium BC) archaeological record. The household is briefly mentioned and the daily life of the commoners or even elites not well documented, even though she did excavate, what she considers an elite domestic sector of the site, which remains poorly reported. There have been other claims that LPP and even Initial Period monumental sites had a state level of complexity (Silva Santisteban 1997, Pozorski and Pozorski 1994), but as with Caral there is not a convincing argument or data support for this conclusion.

The Pristine State model has been questioned very strongly by a recently publication by Haas and Creamer (2006). They argued that the Caral Pristine State discussion is not even placed

within the existing literature on the evolution of the state in Peru or elsewhere (Haas and Creamer 2006: 752). For them Shady's state definition could include a wide range of complex societies around the world that are not necessarily State level polities. They also argued that there is the lack of empirical data to address Caral statehood and regional hegemony or the exercise of coercive power.

1.5.3 The “Crucible Model”

As an alternative to the two previous models for the LPP social organization, Haas and Creamer (2006) have proposed a third model or hypothesis. Although they do not label the kind of polity that flourished in their *Norte Chico* region, their “Crucible” hypothesis is based in: “the development of early cultural complexity focused in the *Norte Chico* and not widespread on the Peruvian coast” and “that from the very start of the cultural transformation at the beginning of the third millennium, the center of power in the *Norte Chico* are to be found at the inland sites” (Haas and Creamer 2006: 753). From this departing point they develop an alternative scenario where they stress that regional settlement patterns are the only way to get a clear picture of this emerging social complexity. For them, climatic change at the beginning of the 3rd millennium BC limited resources for local hunter gatherers and favored the inland valley residents that began a simple irrigation system agriculture, establishing a new economic regime and becoming power-holders at a regional scale (*ibid.*: 755). Through cotton cultivation and other foodstuffs, these agriculturalists created a dependency on coastal fishing communities seeking cotton as the prime material of their fishing nets and clothing. The presence of numerous sites with monumental architecture reflected a competition among these valley centers for participants (*ibid.*) and not a

centralized polity. They make the point that the scale of the inland mounds of the *Norte Chico* valleys are much greater than Aspero and other coastal centers.

The explanation of this difference in the scale of the ceremonial architecture is based on their inland valley control of the production of cotton and they state that “While the hypothesis [MFAC] was interesting in the 1970s, it is no longer viable” (*ibid.*: 769). Their two main tenets are also questionable as we have seen recent discoveries of LPP monumental architecture elsewhere in the coast (e.g. Sechin Bajo and Huaca Ventarron) that create doubt that early cultural complexity only occurred in their *Norte Chico* area. Finally and most importantly they argue that the Norte Chico region is unlike chiefly societies elsewhere due to the density of inland sites, the greater size of their monumental architecture and the lack of evidence for secondary or tertiary centers.

In critiquing earlier models, Vega-Centeno (2006: 39) argues that only the scale of the monuments has been used as a measurement to determine the degree of centralization and hierarchy within these societies. As an alternative he is beginning to apply concepts such as heterarchy (Vega-Centeno 2005a: 357, 2005b: 117) and peer polity interaction (Vega-Centeno 2005a: 355) as proposed by Colin Renfrew (1986).

1.5.4 Discussion

Feldman concluded from his research at Aspero that a chiefdom level of complexity existed at this coastal site. Since Feldman’s early attempt at reconstructing the social-political organization of a Late Preceramic site, archaeologists have begun to realize that a chiefly model does not fit the evidence from coastal and valley sites. Although there were monumental centers, the populations were living in egalitarian villages. Without monumental architecture, these

centers would reflect mainly an egalitarian life style. So either these sites were built by egalitarian societies with non-hierarchical ways of organizing regional-scale projects (kin groups) or this represented a unique Andean kind of complex society, in which the centralization and leadership structure did not extend to social inequality at the household level.

In the 1990s with the research at Caral, this idea of egalitarian populations building monumental architecture centers was overthrown. Caral has been presented as the reflecting a kind of social inequality you would expect to see in complex chiefly societies (of the kind that build monumental architecture). So after Caral, the Late Preceramic began to look more like a conventional chiefly population. Caral fits the chiefdom model and seems likely that if other LPP sites like Huaca Prieta and Aspero were re-excavated, these sites too would look like Caral in having an associated occupation with social inequality, it is not likely that Caral was unique.

Finally in the 2000s, with Haas *et al.* research at the *Norte Chico* thing changed again. The size and density of the site located in the valleys of Fortaleza and Pativilca does not fit the regional model of chiefdoms, so maybe the LPP does display a uniquely Andean kind of society after all.

2.0 HOUSEHOLDS DYNAMICS AND SOCIAL COMPLEXITY

2.1 SETTLEMENT TYPES, HOUSEHOLDS AND ITS SOCIAL CORRELATIONS

The emergence of sedentary life is usually linked to the beginning of social complexity in human societies. As villages appeared independently in different parts of the world by the end of the Pleistocene it marked the beginning of social differentiation (Flannery 1972: 23). Now it is well known that the emergence of the village did not require of agriculture, nor permanent sedentary lifestyles. For the Andes, the available data supports these assumptions.

2.1.1 Emergence of the Village from a Social Evolutionary perspective

In an attempt to relate different types of early settlements with the societies who built them and lived there, Flannery (1972, 2002) in an influential study compared in two regions (Near East and Mesomerica) the emergence of two early settlements: the circular hut compound and the village of rectangular houses. The transition of these settlements from small circular or oval structures to rectangular structures in Mesoamerica and the Near East reflected a transition from a communal pattern, probably more egalitarian, to a household pattern, the base for a hierarchical society (Flannery 1972). In a recent publication (2002), Flannery includes data from elsewhere, but not from the Andean region, and adds a third stage featuring the extended family house. The village can be considered the architectural manifestation of the social and political

organization of the society who lived there (Flannery 1972: 47), floor areas in the house shapes reflect a different household organization. In general (as Flannery 1972: 29 mentions they are exceptions) smaller houses tend to be circular and correlate with nomadic and semi--nomadic societies, usually egalitarian; while larger houses are rectangular or quadrangular and related to fully sedentary and usually hierarchical societies. Later Flannery (2002: 421) clarified that the geometric shape of the house is not the crucial variable; instead the main difference is between societies where small huts were occupied by individuals with shared storage and societies with larger houses occupied by nuclear families with private storage.

The circular hut compounds were usually designed for 1 or 2 persons with a floor area ~ 10 m² (Flannery 1972: 30-31). These houses were not occupied by a family. The quadrangular houses can accommodate a family of 3 or 4 members with a floor area between 25-35 m². The shift to quadrangular houses reflects the emergence of the nuclear family as the social unit. It is during this stage that differences between the sizes of storage facilities can be interpreted as differences in production, surplus or wealth accumulation among the households. Another important characteristic of quadrangular houses is that it is easier to add or subtract rooms (Flannery 1972: 28, Malpass and Stothert 1992: 149). Thus, expanding households can be easily accommodated as part of the residential dwelling by adding rooms.

Recently, Flannery (2002) has added a third stage in the evolution of villages, the emergence of the extended household. Economic factors are argued to be the obvious reasons why extended households emerged (Flannery 2002: 424). An extended household allowed for a larger labor force, more economic activities and a division of labor beyond the nuclear family. These extended households are linked to the emergence of chiefly societies. Flannery illustrates the transition from circular to quadrangular dwellings in Near Eastern sites such as Beidhal,

Jordan (~6500 B.C.) and Tell Mureybit, Syria (~7500 B.C.). The transition from nuclear to extended families can be seen in the site of Hassuna, Iraq (*ibid.*: 425). Here nuclear family houses of 25 m² areas, accomodating 3 or 4 persons, located around open courts, shift to a more formalized planned house plan with a larger area of more than 140 m² with an estimate of housing between 15-20 persons. Flannery did not find any sites for Mesoamerica that present both transitions.

2.1.2 Communal versus Nuclear villages

Flannery's initial research has been the departure point and a theoretical underpin for later research (e.g. Adler 1993, Hegmon 1991, Redman 1983, Rose 2001, Wills 1991 among others) including this dissertation. For example, Rose (2001: 12) based on Flannery's village types defined the Communal-Hut Compound pattern as a settlement characteristic of communities in which the entire hamlet forms a corporate group. As Hegmon (1991) describes these communities practice a generalized reciprocity and sharing. The storage facilities in this type of society are communal owned and are located in a central area within the settlement or in common areas not associated to individuals dwellings (Flannery 1972).

The village of circular houses with exterior storage as observed by Wills (1991) appears to be the initial transition to sedentism and village life. This type of early settlement is composed by individual household units containing a single nuclear family. Rose (2001: 13) defined them as Nuclear household villages, representing a household mode of economic organization (Flannery 1972: 38). Usually this type of village has a larger population than the communally organized village (*ibid.*: 38). Storage facilities in household villages are not communal and each

individual household is associated with its own storage facilities and a surrounded private patio used as a private workspace.

The replacement of one type of settlement type by another as Flannery (2002: 431) mentions are too varied for a single model to explain, but within the factors involved in this transition are: shifts in risk acceptance between the group and the nuclear family, increases or decreases in dependence on agriculture, privatization of storage and possibly even shifts between polygamous and monogamous marriage. The growth of houses designed to hold extended families also can be explained by various causes among them: are the need for larger households to take many tasks related with a farming/herding economy, greater labor needed because of intensive irrigation farming, response to disperse field system that result from communal land clearance and the increased size of elite households who seek to support and direct the work of craft specialists.

2.1.3 Households and Social Complexity

Approaches to households often have been used to examine social organization (e.g. Hendon 1991, Hirth 1993, Costin and Earle 1989, Stark and Miller 1993, Tourtellot 1988). Domestic remains and structures have been analyzed to search for social status and wealth. Differences among households can be inferred as some degree of social inequality among them and indirectly social hierarchy. As mentioned before we will expect to find evidence of social differentiation among nuclear household and extended households villages than in hut compound settlements.

From a domestic perspective three main variables have been traditionally used when analyzing social inequality and wealth (Smith 1987): residential architecture, burials and

household artifacts, but as Smith (1987: 326) states “relating material culture with household wealth is not a simple affair”. He sees a weak relation between household possessions and wealth suggesting that among the archaeological indicators probably residential architecture reflects wealth more directly and consistently (*ibid*: 327).

From a different perspective Hirth (1993) looks for social rank among households as a measure of social complexity. Social rank can be traced in households several ways being the most common archaeological indicators (Hirth 1993: 122): household size, architectural design and the tool assemblages related to each household. For his research at Xochicalco (1993) he used floor plans, decoration and the quality of the architecture and distribution of tool assemblages as indicators of household rank and concludes that “the identification of household rank is a difficult and complicated task” (*ibid*: 140). Hirth’s research is a cautionary tale that the artifact and architectural data can produce different patterns and therefore, reflect different aspects of wealth and rank.

Reviewing the available published research, it is interesting to note that for the Central Andes there are few research projects that focus on household archaeology. For the LPP, most research has been focused in public/ceremonial architecture. In addition research on ceramic period sedentary agrarian societies rarely focuses upon the emergence of wealth and social inequality among the households.

2.2 HOUSEHOLD STUDIES FOR THE ANDEAN PRECERAMIC

In depth research on LPP household organization is limited. Very few researches have dealt with early residential organization at the Central Andes (e.g. Aldenderfer 1993 and Malpass and

Stothert 1992). It is also surprising that from the organizational models presented at the previous chapter, none of them uses domestic/residential data. All are based only in monumental architecture studies. For the Central Andes Malpass and Stothert (1992) synthesis organized the dispersed data and tracked household changes from the Early Preceramic Period through the LPP. They noticed that “many excavators have described preceramic houses but have not included the associated features and refuse” (1992: 137).

2.2.1 Early Preceramic Period (*ca.* 10000 – 6000 BC)

By the end of the Pleistocene, the first peoples arrived in the Central Andean region and began their adaptation to new environments. These hunter and gatherers were organized in bands composed of small family units. This was an egalitarian society where gender and age difference predominated. Excavations at the terminal Pleistocene site of Quebrada Jaguay (10,500 to 10,800) B.P. on the coast, revealed the remains of a semi- subterranean circular house related to the later occupation of the site around 8000 B.P. (Sandweiss *et al.* 1998). The structure had been constructed with circular postholes and has a diameter about five meters with an internal hearth (Sandweiss *et al.* 1998: 1832, Sandweiss *et al.* 1999: 63).

In the Paracas region, Engel (1966b: 31) reported the presence of a village (14A-VI-96) composed of circular huts of 5 – 6 m in diameter arranged around a large central house (Malpass and Stothert 1992: 143). Engel dates this village to 6880 BC.

Further north at the Tres Ventanas cave, located at headwaters of the Chilca *quebrada*, Engel found in Cave 1 an Early Preceramic circular hut measuring 1.5 m in diameter (Engel 1970: 56). At the nearby cave of Quipche, Engel also reported another circular hut with a

diameter of 1.5 m, related with the lowest occupational levels of the cave with a radiocarbon date of 7990 BC (Engel 1984: 16).

Research at the northern valleys of Zaña and Jequetepeque (Dillehay *et al.* 2003) located a series of residential sites that have been excavated and dated to late Paijan (*ca.* 10,000 to 8,300 BP). These structures of 8.41, 5.15, 2.97 and 1.54 square meters (Dillehay *et al.* 2003: Fig. 4, Fig. 5) are composed of stone lined architecture in a circular/oval shape. This type of permanent dwellings has been defined by Dillehay *et al.* as evidence of proto-households, as defined by Boguchi (1999: 151-152) and represent the transition from the foraging Early Paijan groups of great mobility to co-residential proto-households in Late Paijan (Dillehay *et al.* 2003: 8) of decreased mobility related with the beginnings of plant domestication. No evidence of this early occupation has been reported for the North Central coast.

2.2.2 Middle Preceramic Period (6000 – 3500 BC)

This period is related to plant and animal domestication in the Central Andes and the beginning of a sedentary village lifestyle. During the Middle Preceramic, villages began to appear in the landscape. The village lifestyle is the base for the later social inequality. It is very probable the first villages had inhabitants who were bound by kinship relationships. There is little evidence of this period on the central and north central coast. Paloma village in Chilca, has been one of the few Middle Preceramic settlements studied in some detail at the Central coast (Benfer 1984, 1986, 1990, Quilter 1989) where a total of 81 circular houses were found divided in two occupation phases. The first occupation, dated before 5050 BC belongs to circular structures (Fig. 4) with a mean floor area of 10.9 m², built over the sterile surface taking advantage of natural depressions (Engel, 1980: 19). The structures of this early occupation have

been occupied short periods of time. The second occupation, dated between 5050 – 3520 BC contains more formalized circular and oval dwellings with a mean floor area of 10.8 m², the houses floors were located 25 cm below the surface and surrounded by post holes. Analysis in the burials at the site by Jeffrey Quilter (1981, 1989) allowed him to define a funerary pattern with burials under the structure's floor composed of a male adult at the center of the hut and surrounded by females and children. This pattern, Quilter (1989) suggests represents the nuclear family as the basic social unit at Paloma. The estimate of individuals from the dwellings areas of a mean of 5 people for each structure appears to support this statement.

Research by Thomas Dillehay on the western slope of the Andes at the upper Zaña valley in the Nanchoc area have located a cemetery and residential sites related to an incipient horticulture and lime production (Dillehay *et al.* 1989: 733). For the earliest phase Las Pircas (6500 – 5000 BC) had an elliptical hut floor with a post hole pattern measuring 2 x 2.3 m (Dillehay *et al.* 1999: 114). At other Las Pircas phase sites ancient garden furrows were identified. The houses related to this occupation appear to be elliptical structures with foundations of adobe and stone (Dillehay *et al.* 1989: 749). Dillehay *et al.* (1999: 115) suggests that the evidence of household rituals expressed in exotic items such as quartz crystals, stingray spines, colorful marine shells, fossils, beads and amulets of exotic stones. Using ethnographic evidence from modern day tropical forest groups it is interpreted that the exotic goods may have been among the earliest non food resources to be procured and managed by the local population within a “garden magic” household ritual thus reflecting intensification of exploratory plant manipulation.

In the next phase, Tierra Blanca (4000 – 3000 BC), a change in the dwelling shape was observed. A typical Tierra Blanca phase residential site contains semi- rectangular houses with

rounded corners and rock dividing walls with small hearths inside slightly larger than the previous phase (Dillehay *et al.* 1999: 117). A series of other changes have been detected between these two phases: the presence of earth mounds belonging to the Tierra Blanca phase, the significant decrease in the number and quality of the exotic good, crude and poorly worked lithic artifacts compared with Las Pircas, a less systematic treatment of the dead and a significant increase in the amount on lime processing, reflecting a more formal and standardized system of production (*ibid*: 118).

These changes have been interpreted as a shift from household autonomy and possible ritual in the Las Pircas phase to communal activity at earthen mounds during the Tierra Blanca phase. To date these mounds are the oldest found at the Central Andes. Apparently lime production for coca chewing was fundamental for this change and spurred the development of mounds (*ibid*: 122). Dillehay *et al.* does not mention the emergence of hierarchies or elites during the Tierra Blanca phase and only suggests the development of small but specialized corporate bodies as distinct entities (*ibid*: 122)

In contrast to the central and north central highlands, Middle Preceramic occupation have been located at caves and rock shelters, with no clear evidence of village lifestyles like in Paloma or Nanchoc. For the north central coast no settlements of this period have been identified yet.

2.2.3 Late Preceramic Period (3500 – 1800 BC)

This period began an important transformation in the social and economic organization of the Central Andes related with the emergence of complex society and monumental architecture on the coast. At the household level the evidence of a changing social structure from the Middle to

the Late Preceramic Period has been based on Flannery's 1972 (also Flannery 2002) article on the origins of the village.

The archaeological evidence from the Peruvian coast appears to support Flannery's model. The general trend observed is a shift of circular dwellings to quadrangular ones from Early and Middle Preceramic sites to LPP sites. By ethnographic analogy and because of the small structure areas ($\sim 10 \text{ m}^2$) it is concluded that most activities were conducted outside the dwellings, in areas probably shared with others (Malpass and Stothert 1992: 147). LPP sites such as Culebras (Engel 1957a, Lanning 1967) and Los Chinos (Proulx 1973) have quadrangular domestic architecture and sites such as Río Seco (Engel 1957a, 1957b, Wendt 1964), Asia (Engel 1963), and Caral (Shady 1997) which have multi-room compounds with quadrangular structures with much bigger areas ($\sim 150 \text{ m}^2$).

From the evidence of increasing floor areas through the Preceramic Period, Malpass and Stothert (1992:149) suggest that the late LPP dwellings could have also housed extended families, arriving independently at Flannery's inclusion of a third stage in the evolution of the village (Flannery 2002:424).

Other LPP sites such as Asia (Engel 1963), Río Seco (Wendt 1964), and Culebras (Lanning, 1967) are clear examples of multi-room compounds with quadrangular dwellings, but the published data is insufficient to define domestic activities, a major goal of our proposed research. Although it is interesting that Engel (1963: 19) reported an earlier phase of circular structures opposed to the later rectangular dwelling at Asia occupational sequence. Willey and Corbett's (1954: 21-34) excavations at Aspero in the Supe Valley, uncovered a multi-room structure (*ibid*: Map V) that has striking similarities to LPP houses at Asia and Río Seco. More recently, Shady (1997) excavated quadrangular multi-room compounds adjacent to mounds at

Caral, which she interprets as elite households. In this case, very little material culture was found inside the structures and there is no association of the houses with middens or other domestic refuse. The similarities between some of the excavated compounds at Caral and the ones presented by Flannery (2002) are striking, for they may represent extended elite households. Although, the domestic function of the compounds at Caral is assigned only by their non-monumentality and vicinity to the temple mounds. Although LPP household research is limited, there is correlation of quadrangular or rectangular houses, reflected in multi-room compounds, with emerging monumental architecture. But the archaeological record still lacks the evidence for this transition from circular to quadrangular house, since all the excavated LPP sites contained multi-room compounds.

Our research at Bandurria was designed to track changes in houses areas and adjacent surface areas to test the different models of social organization proposed for the LPP. However, no site to date presents a continuous occupation through the LPP. Such a site would allow one to trace, not only the above changes in dwelling form, but also changes in social and political complexity associated with the beginning of monumental architecture. Bandurria has been selected among the LPP sites of the North Central coast and as it has been reported (Fung 1988) it present two different LPP occupations. An earlier occupation related to circular structures of perishable materials and postholes and a later one related to quadrangular structures with stone foundations.

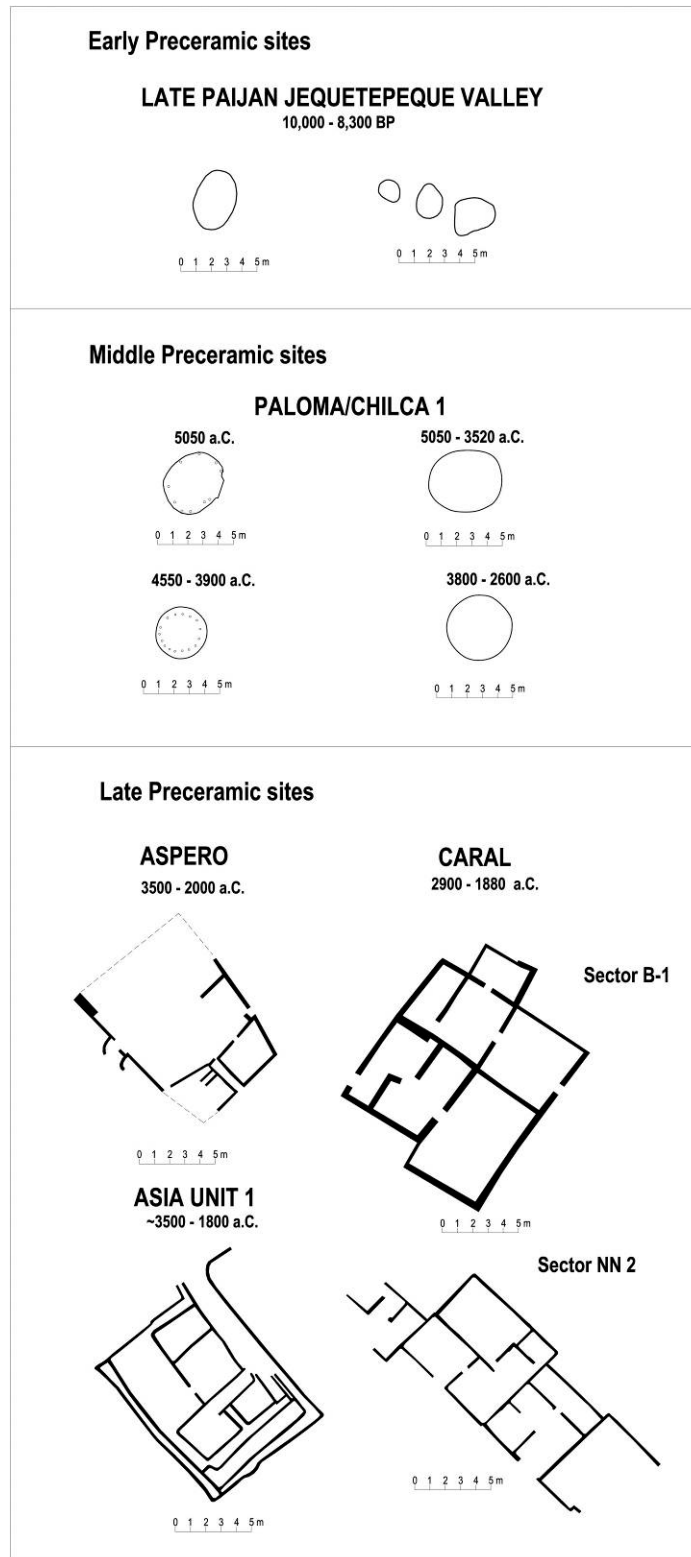


Figure 4. Comparison of habitational units from coastal Preceramic sites.

All the structures are at the same scale and oriented north. A clear increase in floor area can be observed, from circular structures to multi room compounds. (Redrawn with modifications from Engel 1963, 1980, 1988; Dillehay *et al.* 2003; Shady and Leyva 2003 and Willey and Corbett 1954)

2.3 HOUSEHOLDS AND POPULATION

Population size is a key issue when studying a particular site or society. Studies of population estimates from dwelling areas began with the classic Naroll's (1962) cross cultural ethnographic research on 18 societies. Naroll was the first to calculate a formula to estimate population size from dwellings floor areas. His study determined a ratio of 10 m² per person (Naroll 1962: 588).

After Naroll's research many studies continued exploring the relationship between floor area and population size restudying and revising Naroll's original database and calculations. Cook and Heizer (1968) conducted a regional cross-cultural study for the California region using ethnohistoric and archaeological data. They estimated 20 ft² (or 1.86 m²) of roofed area per person up to six persons and thereafter 100 ft² (or 9.29 m²) per person (Cook and Heizer 1968:114). Later LeBlanc (1971) focusing in three different geographical regions, discussed the issue that not all dwelling areas are roofed and some roofed area are not dwelling areas. In his conclusion he cautioned that if a general law of floor area is being derived, it is necessary to collect, not only the floor area, but the amount of roofed area and its various uses (1971: 211).

Casselberry (1974) presents another refinement of Naroll's calculation using cross-cultural ethnographic data and observes the necessity to be more discriminant when applying formulas or ratios to calculate population estimates from floor areas, as formulas for circular dwellings cannot be applied to multiroom or multifamiliar structures (1974: 118). Based on his study of eight societies he concluded that for multifamily dwellings one person occupied 6 m² of floor area (*ibid*: 119). Following the same concerns about Naroll's ratio application, Wiessner (1974, 1979) presents an alternative to Naroll's formula modeled specifically to hunters and gatherer camps. Using ethnographic data from !Kung Bushmen, Wiessner used camp area (that incircles huts and major concentration of debris) instead of dwelling floor area to calculate

population estimates. Her results, using a variation of Narroll's formula gave a range of 5.9 m²/person (corrected later to 4.5 m²/person) for a camp of 10 persons and 10.2 m²/person (corrected later to 11.8 m²/person) for a camp of 25 persons (1979: 808-809).

Kramer's (1979) ethnoarchaeological study of an Iranian village looked at differences of wealth among its inhabitants, concludes that the roofed dwelling area is a good indicator for the number of occupants regardless of household wealth. She concludes that the average roofed dwelling area between the two studied groups (land owners and landless) is 9.9 and 9.6. m² per person respectively.

Later, Brown (1987) also revisited Narroll's study using HRAF data to review Narroll's calculations. After a heavy severe of Narroll's methodology and an exhaustive review of the data he concluded (1987:35) that regression analysis does not provide a clear basis for worldwide population estimation and recommends the mean of 6 m²/person.

Combining house shape changes and floor areas for the Peruvian Preceramic sequence, the evidence presented show that there is a clear relationship between shape and size of the habitational unit during the Preceramic Period in the central and north central coast. We believed these changes can be regarded as changes in household organization. Table 3 summaries the shapes, areas and number of persons calculated for each dwelling of the discussed sites.

To calculate the number of person per structure we decided to use two ratios: Cook and Heizer's (1968) calculations of 1.86 m² per person up to six persons and thereafter 9.29 m² per person and Brown's mean of 6 m² per person. Table 3 presents preceramic habitational units size and population estimation using both ratios. We have considered the roofed area in our calculations; in the case of small circular dwellings it is clear that all the roofed space was used for habitation. In the case of larger multiroom dwellings our assumption is that the habitational

area overlaps the roofed area. The application of both ratios produced significant differences (about 1:5 ratio) in circular structures population estimates using Brown's and Cook and Heizer's ratio respectively. As structure areas increased (e.g bigger multiroom structures) and we use the Cook and Heizer's 10 m² per person, the difference between both ratios is reduced. As none of the floor studies we have reviewed presents an specific model for small circular structures (e.g. Wiessner uses not only the hut but all the surrounding midden) we think the best approximation to estimate the population of small circular structures is Cook and Heizer estimate of 2m² of roofed floor per person.

From the Early Preceramic apparently two types of dwellings can be defined: small circular or irregular structures like the ones found in Tres Ventanas and the Late Paijan site PV-21-431 in the Jequetepeque valley occupied by only one or two individuals, and bigger circular and oval structures like the one found in site PV-21-470 at Quebrada Jaguay where between four to seven persons could inhabit these structures. For the first smaller dwellings is clear that a household must occupy more than one structure; bigger dwellings have areas that could house a nuclear family but no other evidence confirms if the Early Preceramic households were composed of nuclear families.

During the Middle Preceramic, structures continued to be circular or oval, but increased in area. From the floor areas and estimated population from Middle Preceramic Paloma and Chilca villages, the household was composed of nuclear families. The burial pattern related with floor areas seems to support this claim. It appears that for the Middle Preceramic period, the nuclear family was already the basic social unit.

The archaeological record still lacks the evidence for the transition from circular to quadrangular house, since all the excavated LPP sites contained multi-room compounds. The

areas and population estimates for LPP sites (i.e. Aspero, Río Seco and Caral) are significantly bigger from the small Middle Preceramic structures. Following Flannery's (2002) model they reflect extended families. Data from Los Chinos and Culebras is very vague as it is only mentioned briefly by Lanning (1967) and Proulx (1973). Neither provided measurements or plans.

The building materials of these structures are different: circular structures are built of perishable materials as cane, wood, etc. while orthogonal dwellings are built of stone or mud. We believe that perishable materials of sites like Paloma or Chilca are not related with the nature of the residence (temporal or permanent), but with the available labor force invested in house construction. It is no casual factor of the transition in the domestic structures from circular to quadrangular coincides with an increase in the marine resources availability. A mixed economy of marine and terrestrial resources with emphasis on maritime, but supported with cotton agriculture, must have allowed a surplus that permitted more investment in house construction that triggered a series of social processes that ended with the emergence of monumental architecture in the region.

Table 3. Household data from Preceramic sites of the Central and North Central Coast of Peru

Site	Date (BC) ⁺	Shape of structure	Area (m ²)	Pop. Estimate Cook and Heizer (1968)	Pop. Estimate Brown (1987)
PV-21-470	8000 – 6000	Oval	8.4	4.2	1.4
PV-21-431	8000 – 6000	Circular	5.2	2.6	0.9
Tres Ventanas	7000 – 6000	Circular	1.8	0.8	0.3
Jaguay	7000-6000	Circular	19.0	7.0	3.2
Las Pircas	6500 – 5000	Oval	3.6	1.8	0.6
Paloma Unit I 1st occupation	before 5050	Circular	10.8	5.4	1.8
Paloma Unit I 2nd occupation	5050 – 3525	Circular Oval	10.9	5.5	1.8
Chilca I Pueblo A	4550 – 3900	Circular	6.2	3.1	1.0
Tierras Blancas	4000 – 3000	Semi-rectangular	?	?	?
Chilca I Pueblo B	3800 – 2600	Circular	9.2	4.6	1.5
Los Chinos	LPP	Quadrangular	?	?	?
Culebras	LPP	Quadrangular	?	?	?
Bandurria 1st occupation	4000 – 3700	Circular?	?	?	?
Bandurria 2nd occupation	2550 – 1850?	Orthogonal?	?	?	?
Asia 1st occupation	?	Circular?	?	?	?
Asia 2nd occupation	LPP	Orthogonal	93.6	9.4	15.6
Aspero	4100 – 2000	Orthogonal	80.1 (aprox.)	8.0	13.4
Rio Seco	2550 – 1850	Orthogonal	?	?	
Caral Sector NN-2	2900 – 1880	Orthogonal	71.1	7.1	11.85
Caral Sector B-1	2900 – 1880	Orthogonal	124	12.4	20.7

⁺ Date range available for site occupation, there are no direct dates from houses.

2.4 RESEARCH QUESTIONS

The focus of this dissertation is to research the changing social complexity in the region, using a bottom-up approach. As mentioned previously, research in the North Central coast was focused on monumental architecture (e.g. Feldman in Aspero and Shady in Caral) and regional surveys (Haas *et al.* in Fortaleza, Pativilca and Huaura valleys). Therefore, I will focus on the household organization for the LPP, attempting to answer three main questions:

1. How many individuals lived in a household and how was the household organized? In depth studies of LPP households are almost nonexistent. From Middle Preceramic sites (Engel, 1977, 1980, Quilter, 1989) we know that settlements contained circular dwellings surrounded by dense shell middens and a subsistence pattern based primarily upon marine resources. Burials were located under the house floors (e.g. Paloma). No specialized activity areas were observed in these settlements, nor were social hierarchies inferred. Bandurria's two successive occupations allow us to trace household change not only from a synchronic but also from a diachronic perspective. From the house floors, I hope to determine the number of individuals per structure (e.g. Narroll, 1962, Cook and Heizer 1968, Brown 1987) and from the shape and size of dwellings, infer household composition (nuclear vs. extended family). We will record the house and the areas around the house, to define the probable number of individuals who comprised the social unit within each household. Other key elements will be the number of hearths, storage features, activities areas, and burials located within and around the structures. Previous research at other preceramic sites, as at Paloma, Chilca I, Río Seco, and Asia, has shown that house floors are usually well preserved allowing for the reconstruction of house shapes and sizes. It is clear from the funerary bundles and baskets recovered from Fung's research that preservation is excellent at Bandurria.

2. *What domestic and non-domestic activities were carried out by the household?* We expect to find that a major proportion of the activities will be related to marine resource procurement. The presence of exotic items in some households may reflect emergent social differentiation in the form of prestige and/or wealth. We will evaluate the nature, amount, and provenance of these exotic goods to define their social significance within the society. The domestic architecture will be correlated with surrounding areas as Killion (1992) and Hayden and Cannon (1983) have previously done. We will reconstruct domestic activities by plotting artifact assemblages, the presence/absence of hearths, grinding stones, and storage pits. When gathering the data from each household unit, I will expose groups of households rather than only studying individual households. In this way, I can reduce large error ranges related to individual variation (Hayden and Cannon 1982).

3. *What types of interactions existed between households?* Where marine fauna are the main subsistence resource, El Niño or red tides are periodical environmental phenomena in the Peruvian coast that can drastically affect marine production. These early villagers must have developed social mechanisms to deal with resources shortfalls. Spatial location of houses and storage facilities will allow me to define the relationships between households. As Wiessner (1982) and more recently Flannery (2002) have pointed out, risk of subsistence shortfalls and privatization of storage can be related in the way risk is mitigated by the group or family. The spatial location of the storage facilities related to the household units will allow us to interpret how groups of households related to each other.

3.0 RESEARCH AT BANDURRIA

Bandurria is located in a section of the North Central coast with a complex relief of isolated hills and traces of the Coastal mountain chain. The coastal line here is irregular with long sandy beaches, cliffs and rocky beaches. The main geographical features in the area are the Sanu hills (282 m.a.s.l.) raising in the middle of the desert coast, 5 km SW of Bandurria, the salt beds of the *Salinas de Huacho*, 8 km SW of Bandurria, and the Salinas bay where the site is located. The Salinas Bay (Fig. 3) is composed by two well defined sectors, as previously noted by Cardenas (1977-78: 111):

1. Playa Chica sector comprises the north side of the bay, from Malpaso point in the north to Quilca point in the south. Playa Chica is a long sandy beach surrounded in many parts by an alluvial terrace, several meters above sea level. It is in this terrace that the archaeological sites are located. In this sector is the *Pampa de las Bandurrias* (where the archaeological site of Bandurria is located), the *Pampa Playa Chica* and *Quebrada de Cochinos* where a fresh water stream runs from the Santa Rosa Irrigation located up valley.
2. The Paraiso sector includes the south side of the bay and extends from Quilca point to Salinas point far south of the bay. It contains various rocky and sandy beaches located at the piedmont of the Sanu hill.

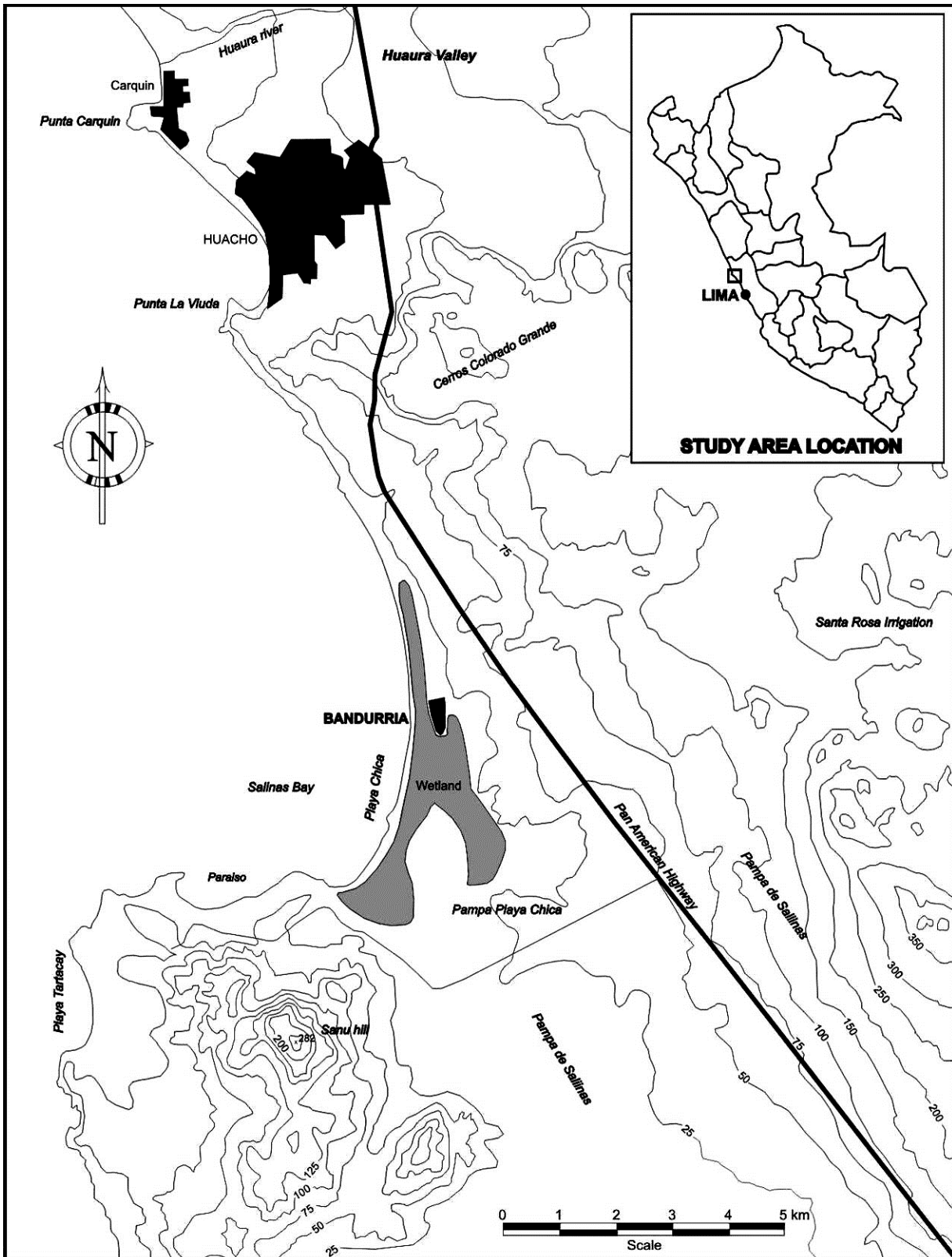


Figure 5. Location of Bandurria.

Politically, Bandurria is located 150 km north of the city of Lima, in the district of Huacho, province of Huaura. Geographically it is between the UTM coordinates: 8 762 625 N, 217 829 E in its north edge, and 8 761 758 N, 217 663 E in its south edge. The site itself is located on a alluvial terrace from 20 m.a.s.l. decreasing in altitude, from North to South, down to 10 m.a.s.l. The site is accessed by a dirt road at kilometer 141 of the North Pan-American Highway.

3.1 ENVIRONMENTAL SETTING

The coastal settlement of Bandurria is located in an ecological zone denominated by *Chala* as defined by Peruvian geographer Pulgar Vidal (1987). The *Chala* or littoral region of this section of the Peruvian coast is a coastal stretch up to 40 km wide ranging within an altitude of 0-500 m.a.s.l. Another ecological classification, based mainly on rainfall and temperature as defined by Holdridge (1967) and used by ONERN (1975) has designated this section of the coast as Sub Tropical Desert. This ecological formation extends through Huacho littoral and is composed of coastal plains and the lower Huaura valley. The topographic relief is flat to slightly undulating that varies to abrupt in the Sanu hills in the south and Colorado hills in the north of Bandurria. Soils are of variable texture between fine and light, with salt concentrations and with a small proportion of organic matter. Sand and small dune formations predominate.

This arid desert area presents a climate defined by the Peruvian or Humboldt cold water current, the Pacific anticyclone and the Andes mountains. The upwelling in this current produces one of the most productive oceans in the world. This is only disrupted by the occurrence of the El Niño (ENSO) event. Every year in December the warm equatorial Niño current moves south

into the Peruvian current raising sea temperatures, but every 3-7 years this intrusion of warm water goes further south down to Trujillo and lasts several months to over a year. But about every 20 to 40 years a severe El Niño takes the warm waters further south (Maash 2008: 42). This causes cold water marine species to migrate farther south or die. The effect of this warm water on the coastal climate is reflected in torrential rains in the normally arid desert; the higher amount of moisture in the air produces an increase of coastal *Lomas* vegetation and an extended summer season.

In normal years, the Peruvian coast presents two marked seasons defined mainly by solar irradiation: a summer period between December and May with temperatures ranging from 25° to 29° C and a winter period that extends May to December with temperatures ranging from 14° to 16°C, with a mean annual temperature of 18.6°C. During the winter season high atmospheric humidity remains very high, around 100%, creating a cold sensation. The annual precipitation ranges between 0 and 50 mm, with an exceptional 250 mm in some *Lomas* areas. Strong daily winds blowing inland NNE off the sea. Winds are particularly strong during the summer afternoons.

The vegetation observed in this ecological coastal landscape has been defined as marine littoral vegetation (Pulgar-Vidal, 1980: 38). This type of vegetation is very near to the sea, which means it is tolerant of high salt concentrations. Among the few plant species that can live in saline soils are the halophytic plants, where we find the saltgrass or *grama salada* (*Distichlis spicata* and *Distichlis thalassica*) Gramineae plants that cover extensive areas along the entire coast. Salt weeds are found near coastal lagoons (*albuferas*), arid zones with presence of underground water, and infiltration areas near rivers.

3.2 PARAISO-PLAYA CHICA WETLANDS

In the Salinas Bay area, beside Bandurria, is the Paraiso-Playa Chica coastal wetlands. This wetland is product of the Santa Rosa irrigation also responsible of the destruction of a sector of the archaeological site. It has a length of 8 km and a variable width between 100 m and 2 km. It has an area of 440 ha divided in two lagoons (North and South) with a maximum depth of 1.5 m. The archaeological site of Bandurria is located in the south side of the North Lagoon. Near the sea shore the lagoons depth is related with tides and with strong high tides salt water enters part of the South lagoon creating zones with marine sediments.

Research at the Paraiso-Playa Chica wetlands (Tello *et al.* 2006, Cano *et al.* 1998) has identified 11 terrestrial plant species and 8 aquatic plant species. Birds are the most representative animal taxa in this ecosystem with 125 bird species identified to date. The wetland is an important bird habitat, as birds use it for breeding, nesting, and rearing young. The *Paraiso-Playa Chica* wetland is the only one undisturbed by human occupation in Peru's central coast. To migratory birds, the wetland is an important transit zone in their long migratory trip from the northern hemisphere. Biological research at the wetland (Tello *et al.* 2006: 3 and Cruz *et al.* 2007: 141) has defined 9 microhabitats (Fig. 6):

1. Sand beach: long sandy beach with small dunes runs parallel to the sea line. Known as Playa Chica this sand beach is 12 km long.
2. Rock beach: small rocky areas located on the south edge of Salinas Bay.
3. Silt beach: a narrow flat winding strip located the east edge of the south lagoon influenced by the lagoon water level fluctuations.
4. *Gramadal*: Sandy plain covered by salt grass, mainly *Distichlis spicata*, occupies the north central and north areas of the wetland.

5. *Totalal*: Dense accumulations of various reed species (*totoral*) mainly *Typha sp.* and *Schoenoplectus californicus* (always green vegetation) in the central and south areas of the wetland. In the edges of these accumulations are salt crusts with an association of salt grass-*Salicornia sp.*
6. Sedge formation: a waterlogged strip in the center and east edge of the wetland, with presence of salt grass (mainly *Distichlis spicata*), *Schoenoplectus americanus* (*junco*) and *Scirpus maritimus* (*junco*).
7. Shrub formation: Located around the irrigation channels that feed the wetland is a dry area with the presence of *Phragmites communis* (*carrizo*) and *Pennisetum purpureum* (*carricillo*); used in the manufacture of mats. The tree *Acacia sp.* (*huarango*) related to dry environments and typical of the Peruvian desert is also present in this microhabitat.
8. North Lagoon: It has an area of 54 ha and an elongated shape has a maximum depth of 1.5 m of brackish water with an alkaline pH 9.31.
9. South Lagoon: It has an area of 195 ha and contains more salts than the North lagoon as it has a narrow connection to the sea. Maximum depth of 0.5 m and a pH of 9.39.

Paleoenvironmental reconstruction of the area confirms the presence of a wetland during Late Preceramic times. The combination of marine and wetland resources were probably the main reason why Bandurria emerged as a settlement. Before 1973 the area was an arid desert plain with no vegetation called *Pampa de las Bandurrias* in reference to the bird Bandurria also known as the Andean Ibis or the black faced ibis (*Theristicus branickii*) that inhabited the area. This bird is a threatened species in Peru because of modern urban occupation of the coast that have destroyed their habitats and its unregulated hunt.

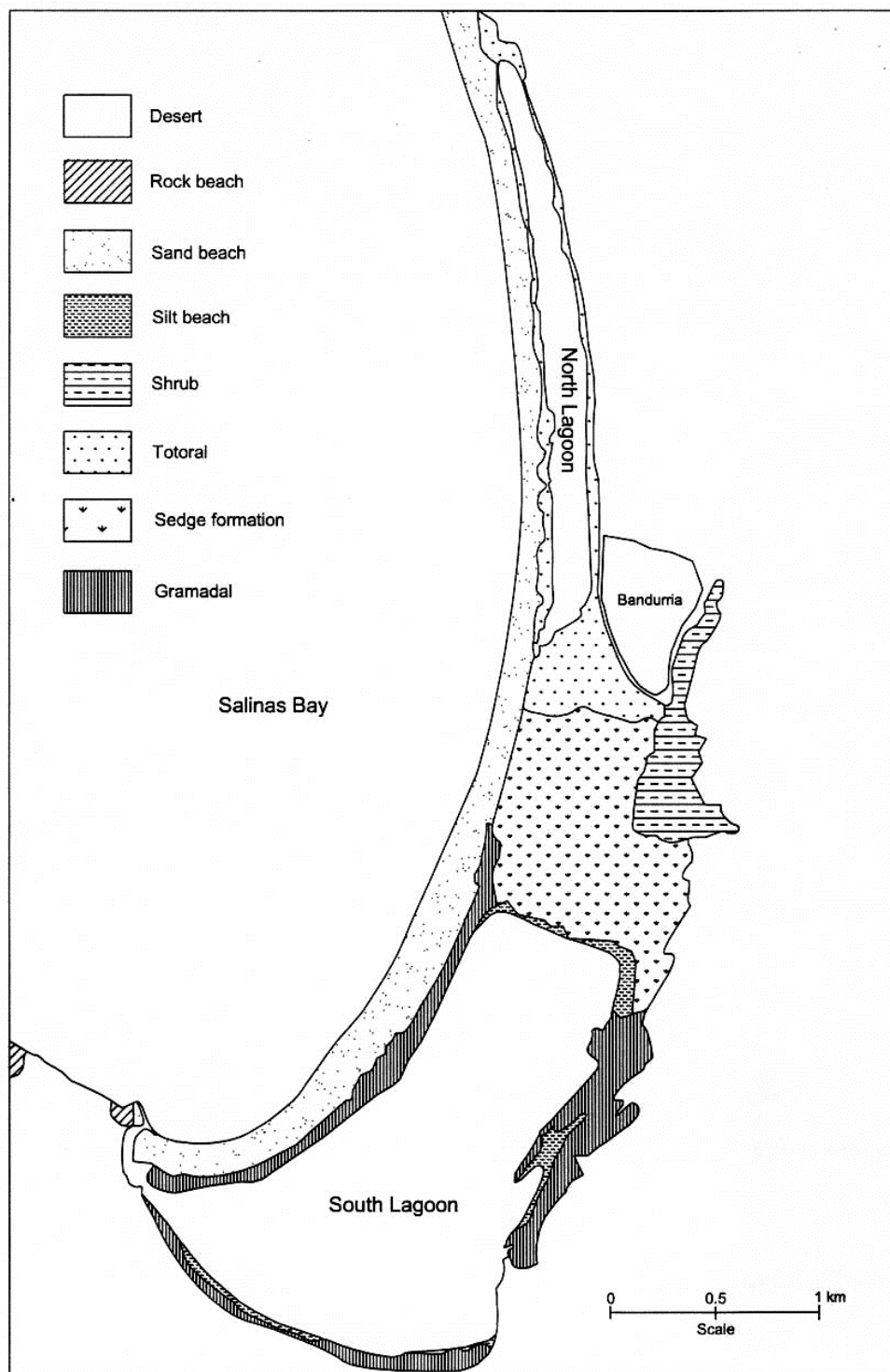


Figure 6. Microhabitats from the Paraiso-Playa Chica wetlands.

3.3 PREVIOUS RESEARCH AT BANDURRIA

The first references of the presence of Preceramic sites in the area are mentioned by Engel (1958: 11) who refers to a series of shell middens located in the coastline between Huacho and the Salinas bay. It is very probable Engel visited Bandurria among the other shell middens, but it was since 1973 that attention has been focused in Bandurria as a flood from the Irrigation Santa Rosa, up valley, destroyed the eastern edge of the site, uncovering dense cultural deposits (Fung, 1988, 1991, 1999, 2004). The first persons to notice the destruction of the site was Domingo Torero and his son, amateurs archaeologists, who immediately conducted an archaeological salvage project with the help of local people. As the destruction continued the archaeologist Rosa Fung was called to the site, continuing with the salvage. Later in 1977, Fung returned to Bandurria and recorded a section of the exposed profile and excavated a structure with stones foundations (Fung, 2004: 327) belonging to the latest occupation. In the 1970s, the site was also superficially surveyed as part of a large survey project within the Huaura valley (Cardenas, 1977, 1977-78). Later, Williams (1980: 382) used Bandurria as the type site for “village with a temple” in his typology of early architecture in the Andes (Fig. 7).

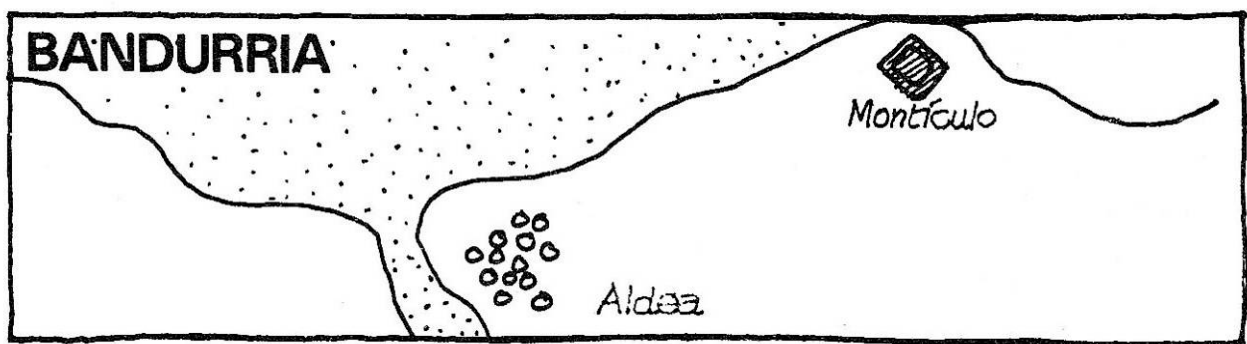


Figure 7. Williams sketch of the “village with temple” of Bandurria. (Redrawn with modifications from Williams 1980: Fig. 1.7)

From her research Fung identified two successive occupations (1988, 1991, 1999, 2004) and obtained the first radiocarbon dates for the site (Table 3). For the earliest occupation we have radiocarbon dates ranging from 5,200 cal B.P. (belonging to the base of the first occupation) to 4,900 cal. B.P. (Fung 1988, 2004). Fung (1988, 2004) research showed that the first occupation contained funerary bundles belonging to a dolichocephalic population. The funerary bundles were composed of wrapped twined textiles. Fung (2004: 327) associates this burial population with the first occupation and correlates it with a probable domestic structure she found in the canal stratigraphic profile. She also states that the majority of the artifacts recovered, including an unbaked clay figurine, come from this first occupation. This figurine (Fung, 1988: fig.3.2; 1991: fig.123) does not resemble those found at Aspero (Feldman, 1980: Fig 40-41) or Caral (Shady, 2004).

Table 4. Radiocarbon dates for Bandurria obtained by Rosa Fung

Provenience	Code	Date uncal BP	Cal. BC	(Mean)
Base 1st occupation	V-3279	4530±80	3550 – 2900 Cal. a. C.	(3225)
Layer 4	V-3277	4480±70	3360 – 3000 Cal. a. C.	(3180)
Mat burial	I-7448	4420±140	3550 – 2650 Cal. a. C.	(3100)
Layer 3	V-3278	4300±90	3350 – 2600 Cal. a. C.	(2975)
Layer 14, Level 1	PUCP-73	3700±70	2290 – 1880 Cal. a. C.	(2085)
Unknown	Ny-246	4530±80	3550 – 2900 Cal. a. C.	(3225)
Unknown	Ny-244	4480±70	3360 – 3000 Cal. a. C.	(3180)
Unknown	Ny-245	4320±90	3350 – 2600 Cal. a. C.	(2975)

Source: Fung 1988: Table 1, complemented with Ziolkowski et al. 1985

The second or later village burials at Bandurria represent a brachycephalic population who buried their infants in baskets and did not use funerary bundles. This burial pattern is similar to that at other LPP sites such as Asia and Río Seco (Engel 1963; Wendt, 1964) which are dated 4,200 to 4,000 cal. B.P. and are associated with quadrangular multi-room compounds. In

association with these burials, several structures of quarried stone were found. Fung (2004: 327-328) describes these structures as:

A residential unit made from a single row of quarried stones. It was related to a relatively shallow cultural level. The similarities among the quarried stones and its stratigraphic location will link the brachycephalic cemetery with the last preceramic occupation at the site. (*Translation is ours*).

From this statement we can infer that the stone structures found by Fung could be quadrangular or rectangular multi-room dwellings similar to the ones previously excavated in Asia or Río Seco. Fung mentions that this last occupation is almost identical with that at Río Seco, dating to 4,200 to 4,000 cal. B.P. and although there are no ^{14}C dates for the last occupation at Bandurria, it should date to the same time period.

After Fung's research, in the mid 1980s the Domestic sector of the site was occupied by 23 families that exploited the nearby wetland resources. Since then, the site has been seriously affected by the modern occupation losing its original configuration.

3.3.1 The Paraiso – Playa Chica Complex

From Fung's research at Bandurria and the regional survey by Mercedes Cardenas done in the 1970s, we can identify an important human occupation in the Paraiso - Playa Chica area from the Preceramic period until the Spaniards' arrival in the 16th century. This continuous occupation of this portion of the coast is called the Paraiso-Playa Chica complex. This complex was related with the cultural processes of the Huaura valley and the North central region. Within the project: *Obtencion de una cronologia del uso de los recursos marinos en el antiguo Peru*, Cardenas surveyed various coastal valleys, including the Huaura valley and its adjacent coast line. In the

Paraiso – Playa Chica area, numerous sites were located (Cardenas 1977, 1977-78) and recently confirmed with a 2004 survey (Nelson and Ruiz 2004).

Table 5. Sites identified in the Paraiso-Playa Chica area.

Site	Site Code	Period	Site Type
Sanu 1	216	Preceramic	Shell midden, platforms
Sanu 2	217	Middle Horizon/ Late Intermediate	Shell midden
Sanu 3	218	Probably Preceramic	Shell midden
Sanu 4	219	Undetermined	Structures
Paraiso 1	221	Preceramic / Initial Period	Shell midden, structures
Paraiso 2	208	Initial Period	Shell midden
Paraiso 3	222	Initial Period I	Shell midden
Paraiso 4	223	Probably Preceramic	Shell midden
Choque Ispana	224	Late Intermediate/ Late Horizon/ Colonial	Structures
Cocoy	232	Preceramic?/ Late Intermediate	Shell middens
Bandurria	220	Preceramic	Structures

Source: Cardenas 1977, 1977-78

The abundance of marine resource and favorable wetter climate allowed the settlement of the area since early times. Many of the shell middens appear to have superposed occupations, probably beginning from the Preceramic. Cardenas (1977-78: 119) already proposed different environment conditions that allowed human to establish there since the Preceramic period to early Colonial times. The proximity to the *salinas* or salt flats is another important resource that would explain the early occupation of the area. For the Preceramic period a series of shell middens have been located that reflect an early maritime adaptation. The small site of Paraiso 1, excavated by Cardenas presents an occupation that begins in the Middle Preceramic, the Late Preceramic and the Initial period (Table 4).

Towards the end of the Preceramic, Bandurria became the largest settlement of the area and the only one with evidence of LPP monumental architecture. At the beginning of the Initial Period, Bandurria would be abandoned, but Paraiso 1 would continue to be occupied by a smaller population with early ceramics.

Table 6. Radiocarbon obtained dates for Paraiso I obtained by Cardenas

Site/ Provenience	Code	Date uncal BP	Cal. BC 95% prob. (mean)
Paraiso 1 / Cateo 1: 0,2-0,4 m depth	PUCP-99	2230±50	391 – 173 Cal. BC (282)
Paraiso 1 / Pozo B: 0,0-0,2 m depth	PUCP-72	3230±80	1682 – 1382 Cal. BC (1537)
Paraiso 1 / Pozo B: 2,4-2,8 m depth	PUCP-71	3890±130	2695 – 1971 Cal. BC (2333)
Paraiso 1 / Pozo A: 1,4-1,6 m depth	PUCP-50	4880±60	3787 – 3616 Cal. BC (3701)
Paraiso 1 / Pozo A: 2,6-2,9 m depth	PUCP-51	5690±70	4709 – 4438 Cal. BC (4573)

Source: Cardenas 1977, 1977-78

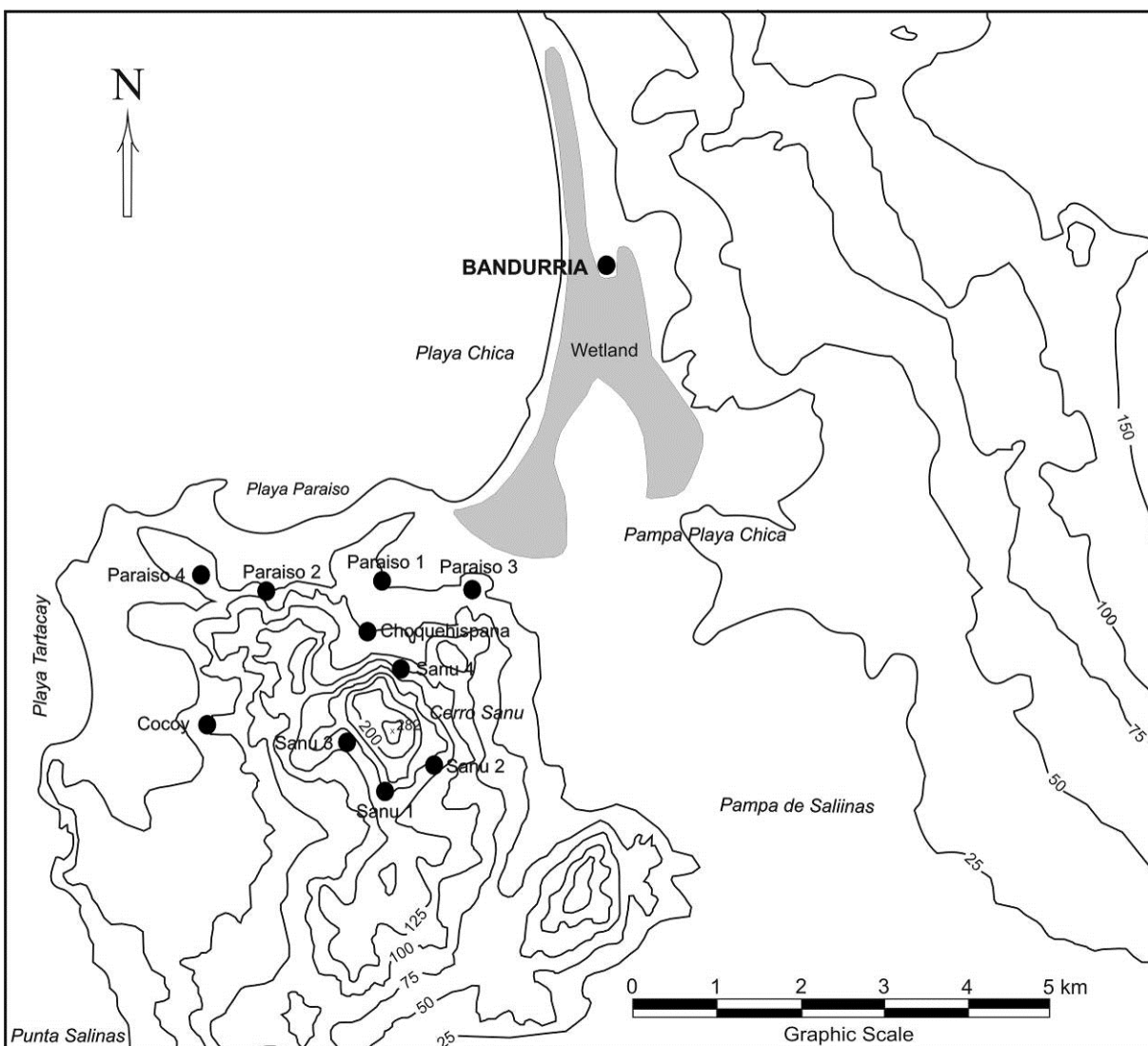


Figure 8. Sites located in the Paraiso-Playa Chica complex. (Redrawn with modifications from Cardenas 1977)

3.4 ARCHAEOLOGICAL SECTORS OF BANDURRIA

Bandurria was divided in two sectors based on the surface archaeological remains (Fig. 9). Sector 1 or Domestic Sector has an area of approximately 11 hectares and is located on the south side of the site. Its surface contains abundant remains of domestic activities reflected in food remains (mainly fragmented shell and fish bones) and dense concentration of ash and charcoal, which gives a dark gray tone to this sector of the site. This sector was affected by the 1973 flood destroying about 11.3 hectares of the domestic occupation and we believe also the core of the settlement with the earliest occupation, the flood left an exposed 5 meter high cut of cultural remains. At the SW edge of the sector a small mound 3 meter high is located. This small mound is depicted in the 1970s site descriptions (see Fig. 7) as a small ceremonial structure (Temple) that defined Bandurria as a Preceramic “village with temple” settlement. Since 1985 this sector is occupied by 23 families that extract the nearby *junco* and *totorá*, they have built huts and adobe houses and disturbed the entire site surface with their activities (Fig. 10). During the design of the research this sector was divided in two areas (Area I and Area II) in reference of the small mound and stone alignments, but when fieldwork began a detailed surface inspection was done and it was decided to consider all the areas as one sector. Following previous research at the site, during the planning stage of the research, we did not consider the monumental sector as it has not been discovered.

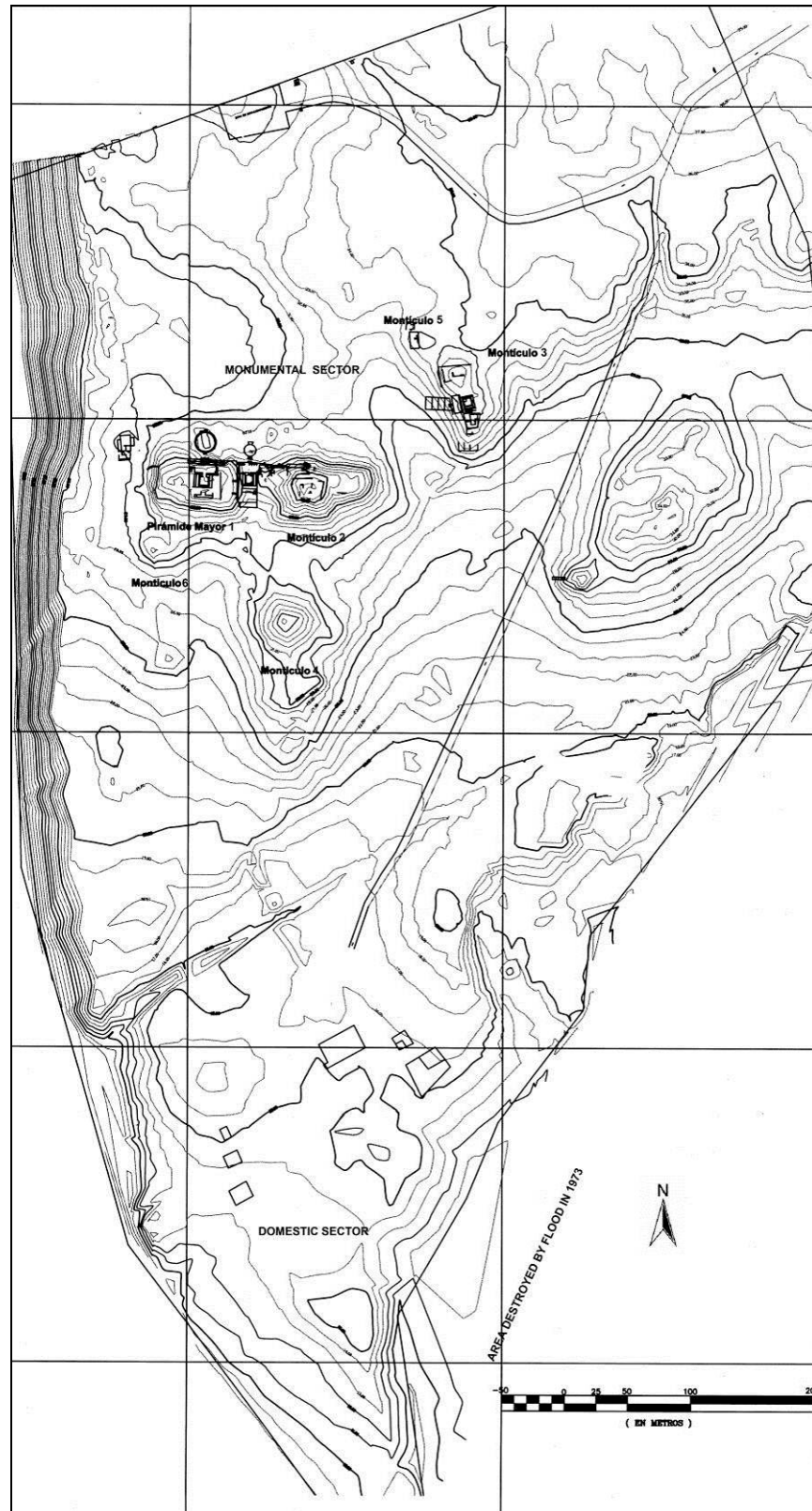


Figure 9. Topographic plan of Bandurria with its two sectors: the Domestic (Sector 1) southwards and the Monumental (Sector 2) northwards.



Figure 10. Modern adobes houses built over the Domestic Sector

Sector 2 or Monumental Sector has an area of 20 hectares and is located on the north side of Bandurria. At first sight Sector 2 appears to be a low natural hill formation of sand and stones (Fig. 11), but an intensive survey of the area and the shape of the elevations revealed their artificial nature. The four main mounds have heights from 8 to 12 meters. The sides of the main mounds have a regular shape defining the shape of subsurface structures, their slopes alternates with ruptures and projections of possible platforms and terraced fronts. The main mounds have a north south orientation. Six small mounds 1 to 3 meters high have been located adjacent to the main mounds. They have irregular shapes and orientations, but have the same regular artificial relief. In order to systematize the sector, the main mounds received numbers 1 to 4 and the small mounds 5 to 10 (Fig. 9).

In general, few cultural remains are observed at the surface of this sector, only scattered patches of modern trash and some shell concentrations. Surrounding the mounds a few midden areas had been located, they are usually in flat open areas; in some cases these middens are associated with small stone alignments. The main contents of these middens are ash charcoal,

burnt stone and shell. To confirm the artificial nature of these mounds an excavation was done in one on the main mounds as we will detail in the followings pages.

It interesting to remark that previous researchers of the site (e.g. Fung, Cardenas, Williams) did not recognize the man made nature of the surroundings elevations. Finally, after the Late Preceramic Period Bandurria was not occupied again; only a small seasonal occupation of the Late Intermediate Period has been located in top Mound 1. All the domestic Sector occupation belongs only to the LPP and is on the very surface of the site. That is why the last occupation phase has been destroyed by modern occupation.



Figure 11. Mounds from Sector 2 as seen from the Domestic Sector. At the right, modern house.

3.5 EXCAVATION DESIGN AND HISTORY

Initially the research was focused in excavation of several units at the domestic sector of the site, but after survey of surrounding elevations to determine if they were artificial mounds, one excavation unit was placed at the monumental sector.

First topographic mapping was done allowing us to locate and georeference the excavations units within the UTM PSAD56 grid. Then we proceeded to clean the exposed profile created by the flood to get an idea of the depth and density of the cultural deposits. We found dense cultural deposits in some cases up to 5 meter high (see Appendix 1 for the detailed description of the profiles). The high density of cultural remains and complexity of the stratigraphy made us rethink the original excavation plan. Originally we planned to excavate of 41, 1x1 meter test pits randomly located within the Domestic Sector to locate a sample of 16 houses, but because of the complexity and density of the cultural deposits we decided to trace only 10 excavation units of 2 x 2 m distributed along the sector in locations we expected to find houses. Of the 10 excavations units, time limitation only allowed the excavation of 7 units (Unit 2, Unit 3, Unit 6, Unit 8, Unit 9, Unit 12 and Unit 13). Of these 7 excavation units, Unit 2, 3, 12 and 13 were almost immediately abandoned as they presented no clear evidence of domestic activities and a complex microstratigraphy. Excavation in Unit 9 continued until the natural (sterile) layer was reached. It remained a 2 x 2 m unit. Reaching the base of the occupation remains of a structure were found but its limited area of 4 m², made us realize the necessity of opening area excavations to expose and define domestic contexts. In some areas test pits, as Unit 9, helped define the occupational sequence of the site. Units 6 and 8 were expanded as they presented evidence of a domestic occupation and a clear occupational sequence.

3.6 FIELD METHODOLOGY

After initial testing, the standard excavation unit measured 5 x 5 m with a 1 x 1 m grid to record the finds and features found during excavations (Fig. 12). Test pits measured 2 x 2 m, also with a 1x1 m grid (Fig. 13). The excavation itself systematically removed different strata using trowels and brushes following the natural contour and shapes of the deposits. Both natural and cultural strata are considered as Stratigraphic Units (S.U.) following the term “Unit of Stratification” defined by Edward Harris (1989). Following Harris’s definition all natural and man made layers and features were considered a unit of stratification and a number was assigned to them. In our research the excavation unit number precedes each S.U. (e.g. S.U. 6.1 will refer to the stratification unit number 1 of the Excavation Unit 6). We decided not to assign S.U. numbers to the interfaces as Harris proposes. Each S.U was recorded by photograph, graphic at 1:10 or 1:20 scale, and writing its description on printed forms. Munsell color charts were used to identify the color of the layers excavated.

After assigning a S.U. number the different elements were excavated, all excavated strata were sieved using two mesh sizes of 6 mm and 2 mm. The recovered material was divided into two samples: the controlled sample is a 12 liter sample taken from the feature center to avoid contamination; the 6 mm fraction of this sample was completely collected and bagged. Later it was separated in the laboratory. The 2 mm fraction was bagged and separated in the lab. The general sample was the rest of the level. From the 6 mm general sample we collected artifacts and significant materials (complete seeds, shell, bones, debitage, etc.). The 2 mm fraction was reviewed in the field very quickly for significant objects (lithic flakes, small seeds, etc.). Both fractions of the general sample were bagged and labeled and sent to the lab for further processing

and analysis. At the end of each day the materials recovered were inventoried and assigned a unique inventory number.

At the lab, inventoried material was then sorted between controlled and general samples. The controlled samples were separated to be analyzed and the general samples stored in boxes. For analysis and comparisons among S.U.s only controlled samples were used. Detailed sample analysis procedures and results will be discussed in Chapter 5.

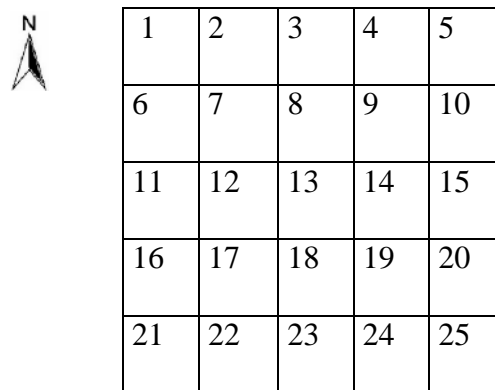


Figure 12. North oriented 5 x 5 m excavation unit with numbered sub-units.

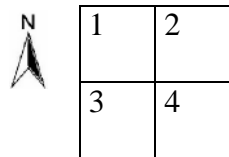


Figure 13. North oriented 2 x 2 m test pit with numbered sub-units.

4.0 EXCAVATION RESULTS

4.1 EXCAVATIONS IN DOMESTIC SECTOR 1

Archaeological excavations in Bandurria began in August 2005 with the excavations of 7 excavation units (Units 2, 3, 6, 8, 9, 12 and 13) but as we mentioned before only Unit 6, Unit 8 and Unit 9 presented clear evidence of domestic occupation. The Unit 9 remained a 2 x 2 m test pit and ended when sterile layers were reached. The excavation of Units 6 and 8 continued to be excavated in successive field seasons. The Unit 6 and 8 were excavated in the 2006 and 2007 field seasons.

4.1.1 Criteria for defining domestic occupations

As reported we recorded three sections of the profile exposed by the 1973 flood at the east side of the domestic sector. From close observation and analysis of the stratigraphy we determined the presence of different depositional and taphonomic processes. We are certain that all the depositional and taphonomic processes are products solely of domestic activities, mainly food preparation and consumption. Surprisingly, not many artifacts were found, the most common were beads, baskets and textile fragments.

We have divided the different depositional processes involved in site formation into two main types: primary and secondary. Primary deposition means that they are the refuse or

byproducts of a domestic activity done *in situ* or very near where it was deposited (e.g. charcoal and ash in a hearth). Secondary deposition is debris produced elsewhere in the site and later dumped in the area where we found them. This is a common practice at Bandurria and in many cases this practice has disturbed the previous occupation of the area used as a dump. In some cases, during the Preceramic occupation of the site, there has been human transit over these middens creating compact and regular surfaces that in some cases resemble a formal floor, made of mud, but they are not associated with the usual features we found within formal floors.

We were able to identify a series of layers that are secondary depositions. They usually are of two types according to the density of refuse in them. The first type is composed of a loose sandy matrix that contains a moderate to dense concentration of organic remains (mainly seafood) and in some cases ash and charcoal. The second type of secondary deposition is composed only by organic material presenting a dark gray to black color when ash and charcoal predominates. In some cases shell is the main component of this midden type and can be labeled as a typical shell midden (Wasekew, 1987; Stein, 1992). These secondary middens are from few centimeters (1 or 2 cm) up to 50 to 70 cm thick.

Within these middens it is common to observe formal floors, the first type of primary deposition we have defined and that we have used as markers to define the different domestic occupations at the sector. There are usually formal yellowish mud floors of regular surfaces with 1 to 3 cm of thickness that contain a series of elements within and over them. The first feature we found in the floors are post holes of different shape and sizes. Some postholes presented *in situ* remains of a wooden post or 2 to 4 stalks of canes (*Phragmites australis*) tied with junco. In some cases we have found that post holes present a circular or elliptic pattern that we have interpreted as the plan of a domestic structure. The contents of postholes have been considered as

primary depositions based on experimental archaeology research (Reynolds 1995). As we mentioned before, post depositional processes have cut or removed these floors resulting in only partial preservation.

Other distinctive features associated with formal floors, considered as primary depositions are hearths. Hearths are usually found with burnt and fire cracked stones, charcoal, ash and carbonized organic remains. Another feature very common at the site are pits generally circular of various sizes (between 30 to 50 cm of diameter) filled with domestic refuse. As we mentioned above it is a common practice at the site to excavate pits and fill them with refuse. We defined these pits as primary depositions when they are related to a formal floor. Another type of primary deposition is scattered refuse found on floor surfaces that is composed mainly of food remains, ash and charcoal. It can be easily differentiated from the secondary refuse. For analysis purposes this refuse is considered within the floor it is over. During excavation particular attention was taken to this scattered refuse for defining the total area (e.i. the area surrounding structures) following Hayden and Cannon (1983: 126) in order to find the features we have defined as primary depositions related to a particular structure.

4.1.2 Area estimations of domestic structures

As mentioned before occupational floors were associated to postholes that in some cases exhibit circular or elliptic patterns. These patterns were considered to be the floor plans of domestic structures built and used with a particular mud floor. From the postholes patterns, the area of these structures was calculated by joining the center of each posthole by a geometric shape (i.e. circle or ellipsoid) that best fitted the available postholes. From the evidence we determined that

structures presented entirely an ellipsoid plan. This allowed us to reconstruct floor areas of structures where later occupations destroyed floors and postholes.

The structures areas were calculated in square meters (m²) and rounded up to 2 decimal places. Only the postholes found in the outer limits of the structures were used for area calculations. The postholes located inside the domestic structures were not used for area calculations.

4.1.3 Radiocarbon dating

A series of samples were taken during excavation for radiocarbon dating. In coastal late Preceramic sites there are almost no chronological markers to establish relative chronologies as with sites containing ceramics. The only way to know the age of a particular context is with radiocarbon dating in order to obtain absolute chronologies. Social dynamics in preceramic times can have depositional processes that created deep middens in few years; usually deep stratified sites that can be perceived as product of several centuries of site formation. In the case of Bandurria, radiocarbon dates have shown us that few decades can create deeply stratified middens.

Since there are no chronological markers for the Late Preceramic period radiocarbon dating was mandatory. Samples were obtained from contexts we identified as primary depositions and from areas that have not been contaminated by later depositional processes. In all the cases botanical remains were preferred, taking small twigs or seeds for dating. Sampling avoided wood or charcoal. All samples were dated using AMS method obtaining narrow time ranges useful for establish occupational sequences. A total of 16 samples from Bandurria have been radiocarbon dated from Bandurria excavations, 10 samples were dated at the NSF-Arizona

AMS Laboratory and six of them at the radiocarbon laboratory of the University of California, Irvine.

Radiocarbon dates in this chapter are in radiocarbon years before present ^{14}C BP. These dates were calibrated into cal. BC/AD using Calib 6.0.1 (Stuiver and Reimer 1993 and updates) run using the IntCal (Reimer *et al.* 2004) calibration data set. The ranges presented of cal. BC/AD years have 95.4% probability. By the end of this chapter dates from the different occupations will be compared and discussed within a chronological sequence for Bandurria.

4.1.4 Artifacts Recovered from Excavations

As excavations began a series of artifacts were recovered among the different occupations identified. We have defined as an artifact any object that has been human modified from its general condition for a particular purpose. In general, the presence of artifacts is very low in all the excavations carried out at the Domestic Sector. Artifacts associated with each occupational phase will be presented as the Excavation Units are discussed in the following pages.

A simple artifact classification was used based in the artifacts raw material (bone, shell, lithic, wood and unbaked clay) with two special categories (beads and other). Beads from various materials (bone, shell and stone) are the more ubiquitous artifacts found at the excavations at the domestic sector, for this reason a separate category was created to group all beads regardless of raw material. The “other” category groups special unique findings that do not fit within the artifacts types defined for each raw material.

Stone artifacts were divided into flakes, bifacial tools, stone weights and quartz crystals. In general, stone artifacts are scarce among the artifacts assemblages. Unmodified quartz crystals were found in regular frequencies among the excavation units. Their function is not clear but

apparently but these crystals were collected for some reason. Quartz is not a local stone. Stone weights are small or medium unmodified stones that were tied with cotton or reed. In some cases these weights were used as fishing nets weight (the ones tied with a cotton string) and we believe the stones tied with reeds were used in houses.

Bone artifacts have been divided into bone tablets, bone tubes, bone needles and bone flutes. Bone tablets are rectangular pieces of bone from 5 to 15 cm long and 1 to 5 cm wide with no apparent use and the more common bone artifact recovered in the excavations. Some of these tablets present incised designs of lines or crosses in one side of them and polished edges. Light bird bones and heavier sea lion bones were employed to manufacture these tablets. Bone tubes are light long bird bones cut at their ends and cleaned in their interior, they are more than 10 cm long and with a diameter of 0.8 cm. Bone needles are hard bones polished into needles and they are a very uncommon artifact. Bone flutes are also very uncommon in the excavations of the domestic sector; they too are modified long bird bones with incised small holes.

Shell artifact are among the least common artifacts; the only shell artifact recovered are blue mussel (*Choromytilus chorus*) fishhooks. These fishhooks were carved from a rectangular shell blank with a central circular hole. Excavations have recovered blanks and finished fishhooks.

Wood artifacts recovered from excavations are what we have called worked sticks. These are small polished wooden sticks of 5 cm long and 1 cm wide similar to the smaller bone tablets. This sticks present polished surfaces and edges and some of them have fine lines incisions. Although other wooden sticks have been recovered from excavations most of them did not have any kind of modifications or use marks and have not been considered as artifacts.

Finally, various human figurines and parts of them, made of unbaked clay were found at excavations of units 6A and 6B. These are the only type of unbaked clay artifacts found at the domestic sector excavations.

Artifact frequencies divided for each occupational phase are presented for each Excavation Unit as the excavation results area presented in the following pages. Appendix C presents detailed tables of artifacts distribution within the stratigraphic units. The possible uses and functions of the recovered artifacts will be discussed by the end of this chapter when excavation data is compared between excavation units.

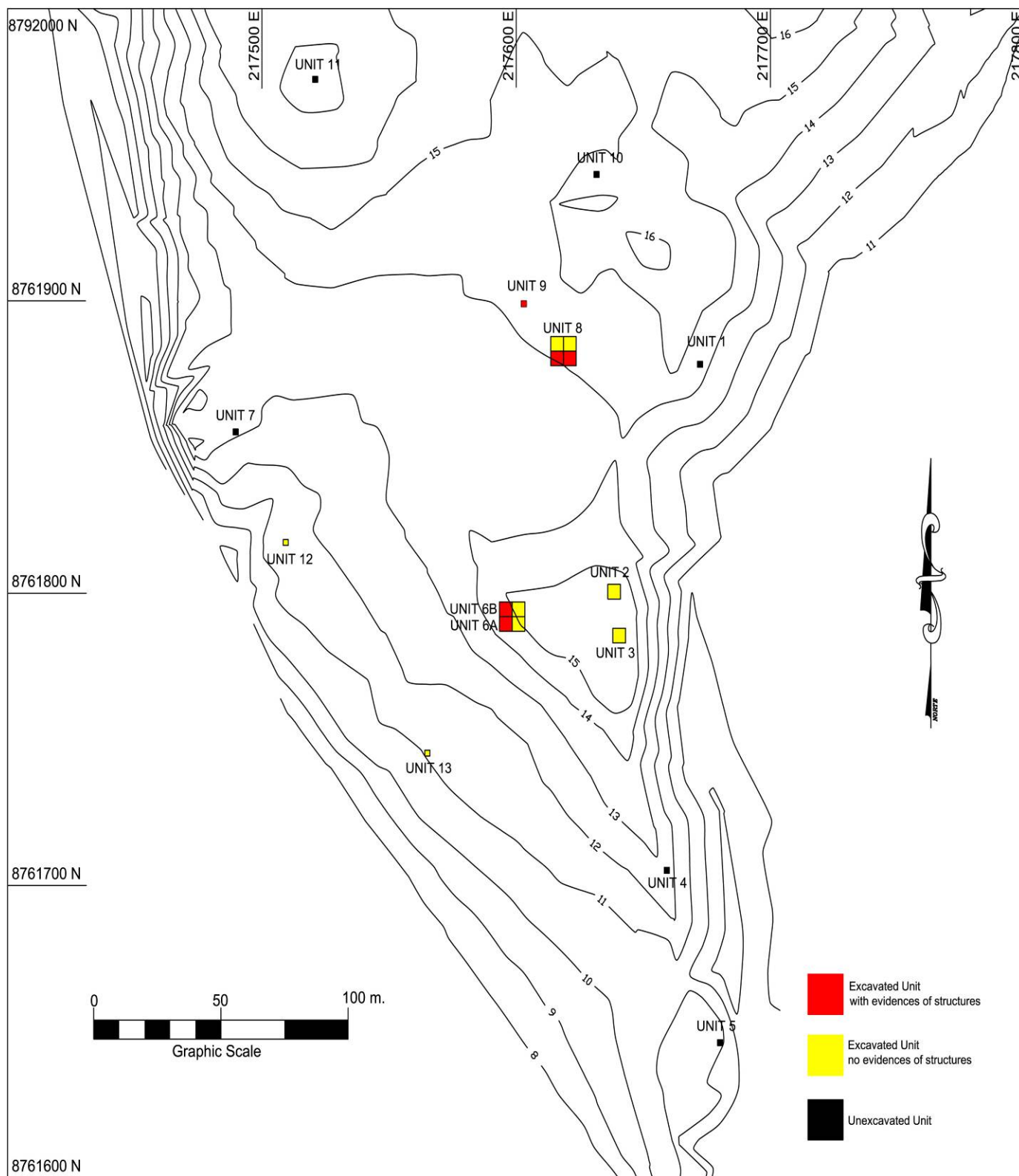


Figure 14. Location of excavation Units in Bandurria's Domestic Sector.

4.2 UNIT 9

This 2 x 2 m unit is located in the central section of the domestic sector in a flat area free of modern houses, with no evidence of stones alignments. Its surface is mainly composed of sand, ash and fragmented shell and presents evidence for heavy transit of people, animals and modern vehicles as the rest of the sector. The objective of this unit was to define the characteristics of the central area, and to trace the superficial remains of shell and ash as evidence of domestic activities. The excavation unit was divided into 1 m² sub-units numbered 1 to 4 in order to improve recording. As excavations advanced only sub-unit 4 was excavated to reach undisturbed layers.



Figure 15. Unit 9 surface before excavations.

Excavation Process:

As excavation began dense midden concentration were found. The upper layers contained sand mixed with ash, charcoal and organic remains (plants, shell, fish bones mainly) and thermofractured stones. In the upper layers no clear indication of occupational floors of domestic

structures were found. Only the upper portions of the midden layers showed compacted surfaces due to the transit of people, this was noted at the surface of S.U's 17, 18, 24, 25 and 26, where no formal floors were found. The layers were apparently midden material produced from somewhere else on the site and deposited in this central area. In this depositional process two clear moments have been distinguished, a later moment with a series of smaller depositions that goes from 0.0 to -70 cm from the surface and an early one where a large hole was dug through previous occupations and filled with a homogenous midden from -70.0 to -130.0 cm from the surface. A plant sample from one of the upper layers late deposition (S.U. 14) was radiocarbon dated to $3,684 \pm 58$ BP (2,210 – 1,880 cal. BC).



Figure 16. First (S.U.9.29) and second (S.U. 9.31) floors found at Unit 9.



Figure 17. The third floor (S.U. 9.36) found below floors 9.29 and 9.31.

The early deposition in Stratigraphic Unit 9.26 extended all the lower part of the excavation unit, it appears to be a large hole that was filled with a homogenous debris composed mainly of burned shell and ash in a sandy matrix. When this hole was dug earlier occupations were destroyed, leaving only a portion of it in the west section of Unit 9. At the same time this midden disturbed by later depositions.

Three floors were found after S.U. 9.26 was removed, the first mud floor (S.U. 9.29), found at -90.0 cm from the surface, was affected by later depositions (S.U's 9.20, 9.22 and 9.27). The floor was composed of clay and grayish brown sand, no cultural materials were found on its surface, or postholes or any indication of structures. This floor extended through the entire excavation unit.

Below the first floor at -102.0 cm from the surface, the second floor (S.U. 9.31) was found; it is also a compact mud floor. It also extended through the entire excavation unit and it is

composed of dark grayish brown clay with small angular stones and fragmented shell on its surface. One small isolated posthole was found.

The third floor was (S.U. 9.36) found at -108.0 cm from the surface, differs of the previous two in its composition as it contained calcium carbonate (CaCO_3) in the mud producing a white surface. It also presented a slight decline to the west. Vegetal remains were found associated with this floor concentrated in the north side of the unit. Seven postholes were identified in this floor and their circular arraignment is a clear indication of a circular structure. Also two pits, one inside and one outside the structure were identified.

Below this floor, a sandy layer with very few cultural remains (S.U. 9.46) reflected the initial human occupation of the area. Within this layer a human burial was found (S.U. 9.47) intruding into the natural sterile soil from -133.0 to -157.0 cm from the surface.

Occupational Sequence:

From excavations at Unit 9 three main occupational phases were identified:

- Phase I: The earliest occupation reflected in the human burial (S.U.9.47) and the sandy layer S.U. 9.46, is the first evidence of human presence in that part of the site, the few cultural remains were probably carried by transit inhabitants. No domestic activities took place at this area during this phase. The scarce cultural remains reflects that the core of the settlement in this time was located somewhere else, probably to the east towards the area destroyed by the flood in 1973 and where profile showed the deepest cultural remains (~ 5 m deep).

- Phase II: The second occupation reflects an expansion of the site to the area of the excavation unit with the domestic occupation divided in three periods each identified by the mud floors found. The first of these floors (S.U. 9.36) clearly present evidence of a circular domestic

structure and differs from the other that contained calcium carbonate in its composition. It is unknown why calcium carbonate was used in this floor. The second and third floors are two successive mud floors (S.U. 8.31 and 8.32) with no evidence of postholes or midden remains directly associated with them.

-Phase III: The third occupation is an extensive midden deposition divided in two periods. The first (IIIa) is the deposition of two secondary middens (S.U. 9.27 and 9.28) over the floor 9.29. The second is (IIIb) the latest in the occupational sequence of this excavation unit and is a single event where a large hole was dug (even cutting part of the IIIa layers) being filled with debris (S.U. 9.26). This created a more or less flat surface. One of the first deposition of this second phase the S.U. 9.14 was radiocarbon dated to $3,684 \pm 58$ BP (2,210 – 1,880 cal. BC) date that fits with the last occupation of Bandurria. During this phase the area was used as a dump for domestic activities conducted elsewhere in the site.



Figure 18. General view of Unit 9 after excavation, the floor 9.36 can be seen with its circular pattern of postholes. In the inferior left corner the base of the occupation can be seen.

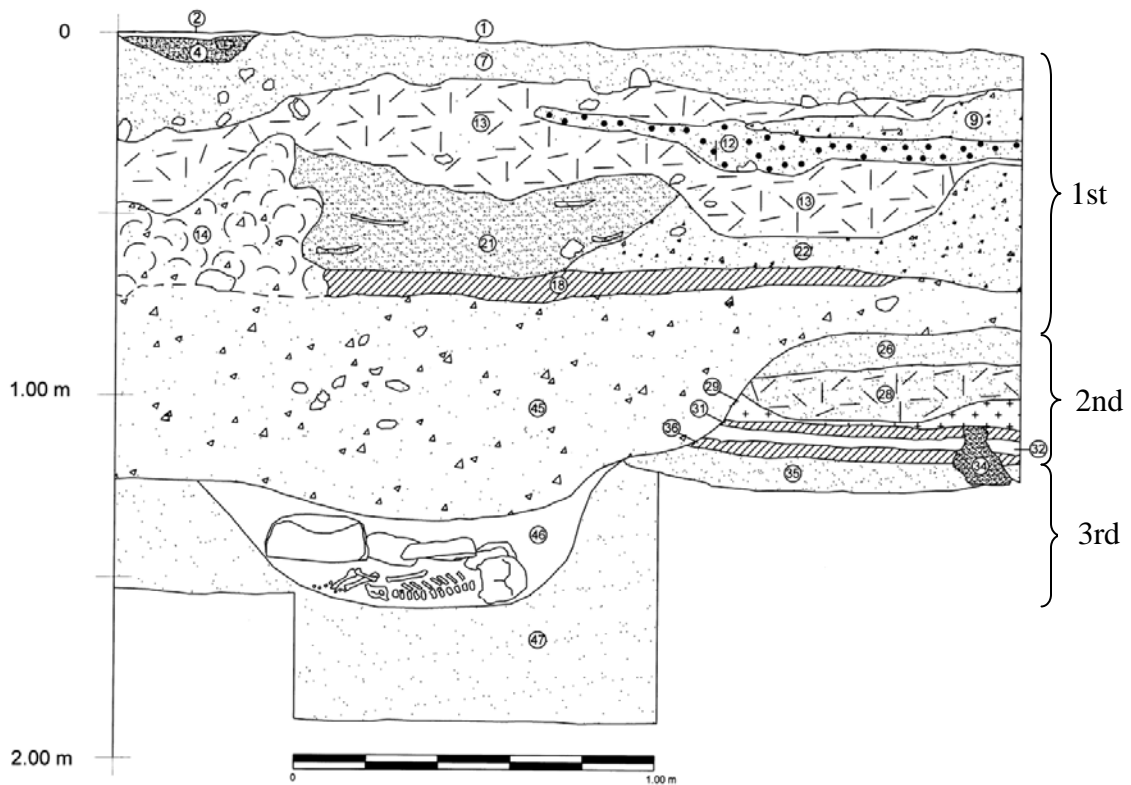


Figure 19. South profile of Unit 9. Three occupations are indicated.

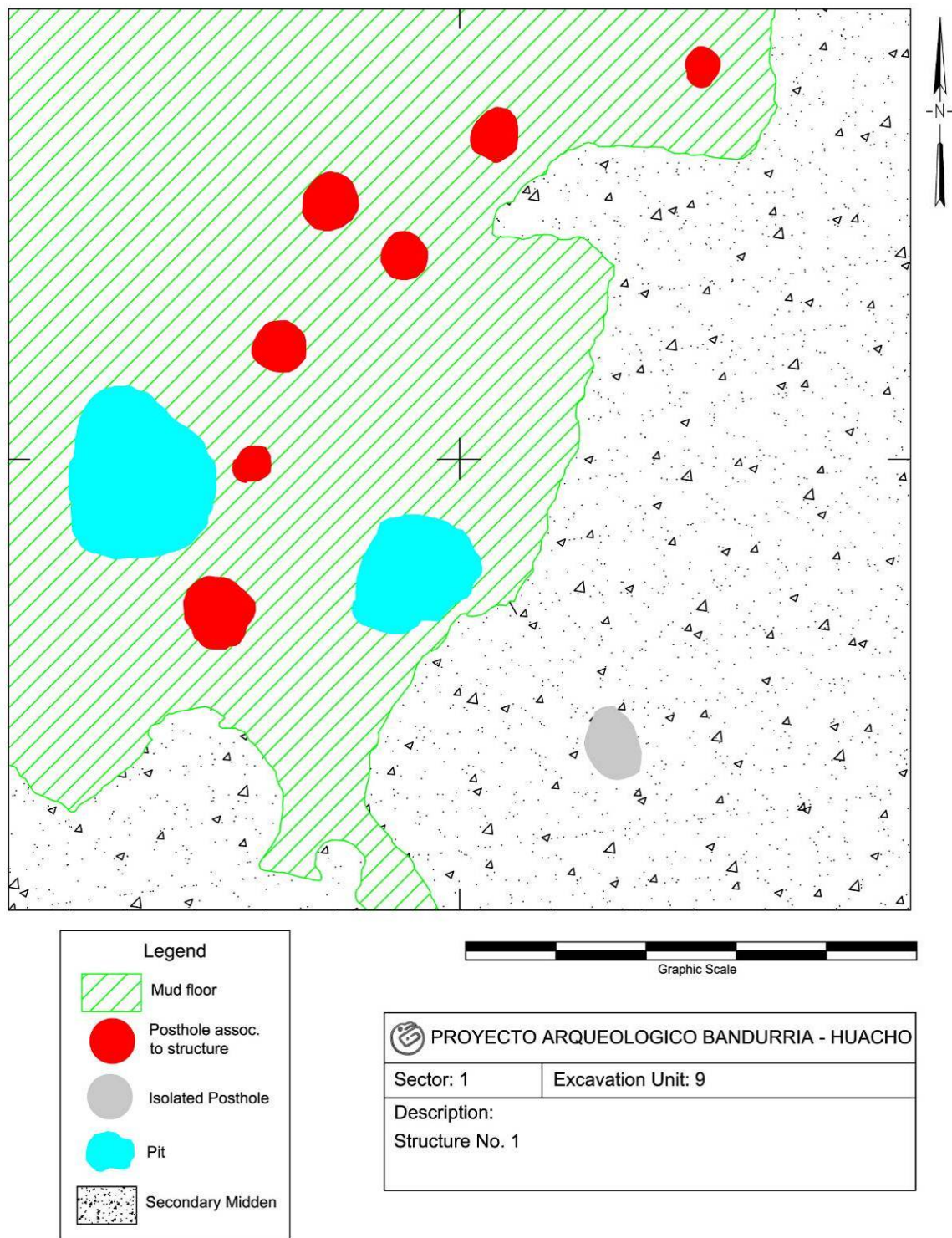


Figure 20. Floor 9.36 with postholes defining a circular structures and associated pits.

Table 7. Summary of Unit 9 Stratigraphic Units and Occupation Phases

Phase	S.U.	Artifacts/Features
IIIb	9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 9.11, 9.12, 9.13, 9.14, 9.15, 9.16, 9.17, 9.18, 9.19, 9.20, 9.21, 9.22, 9.23, 9.24, 9.25	Shell beads: 9.11, 9.16, 9.20, 9.22, 9.24 Wood artifact: 9.19 Lithic flake: 9.10
IIIa	9.26, 9.27, 9.28 Secondary midden	
II	9.29 Floor 9.30 Secondary midden 9.31 Floor 9.32 Floor 9.35 Secondary midden 9.36 Floor	Shell bead (9.31) 9.33 Posthole 9.34 Posthole 9.37 Posthole 9.38 Posthole 9.39 Posthole 9.40 Posthole 9.41 Pit 9.42 Pit 9.43 Posthole 9.44 Posthole 9.45 Posthole
I	9.46, 9.47	Human burial (9.47)
Natural surface	9.48	

Artifacts associations

Excavations at Unit 9 produced very few artifacts and huge amounts of subsistence remains (shell, bone and plant remains). Using screen mesh of 2 mm and 6 mm few artifacts would have been lost. All the excavated layers were sieved. As Table 6 shows most of the artifacts came from the upper layer of the unit belonging to Phase IIIb which were all secondary middens.

Artifacts from the secondary layers of phase IIIb range from shell beads of various shapes and sizes to cotton threads, remains of reed ropes, a small wood artifact, and a quartz flake. These artifacts reflect domestic activities conducted elsewhere at the site and dumped in the excavation area of Unit 9. Floors, postholes and pits from Unit 9 contained mainly subsistence remains as will be discussed in Chapter 5

The only artifact recovered from mud floor 9.31 was a shell bead located over the mud floor. The rest of the floors excavated did not contain artifacts or postholes and pits.

Table 8. Artifact distribution by Stratigraphic Units at Unit 9.

Artifacts \ S.U.	PHASE IIIb							PHASE II	Total
	9.10	9.11	9.16	9.19	9.20	9.22	9.24	9.31	
Bead		1	1		1	1	1	1	6
Lithic artifact	1								1
Wood artifact				1					1
Total	1	1	1	1	1	1	1	1	8

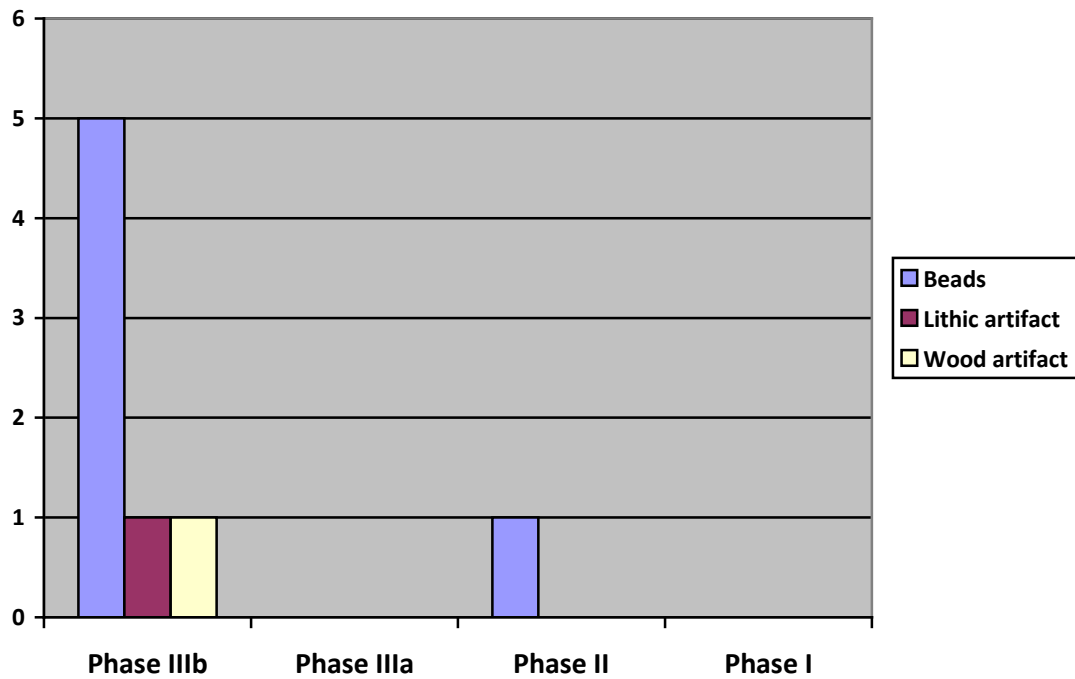


Figure 21. Bar graph of artifact distribution in Unit 9 by occupational Phase.

4.3 UNIT 6A

Unit 6A is located at the east central section of the domestic sector in an area where the terrain presents a slight elevation with a western slope (Fig. 19). In this particular area the site surface there are remains of stone alignments that led us to believe that there were sub-surface structures. The alignment was oriented 10° N. Originally called Unit 6 it was renamed 6A as new excavation units were placed adjacent to this unit.

The objectives of this excavation unit were to support the research questions of this dissertation: to identify the probable domestic units below surface, their architecture, and their association with other archaeological components. The excavations were originally planned for 4 months but were extended into two further field seasons (2005 and 2006) because of the abundance and complexity of the of the excavation units.

As excavation began three stone alignments were recorded that apparently defined a quadrangular area. Each stone alignment had different construction materials and were considered structures walls. The eastern wall (S.U. 6.20) was the first alignment observed on the surface before excavation (Fig. 20). It was impacted by the modern occupation of the site. The south wall (S.U. 6.21) is composed of rectangular stones blocks also impacted by the modern occupation in its central and west sides (Fig. 21). A third stone wall (S.U. 6.130) was located in the western edge of the unit forming a corner with the wall 6.21. This wall is composed of medium size cobbles, and its upper portion was also impacted by the modern occupation (Fig. 22). Finally a fourth wall was found at the northern edge of the Unit 6A extending into Unit 6B. This stone wall was recorded in unit 6B as S.U. 6.03 (Fig. 23). Together the four walls (6.20, 6.21, 6.130 and 6.03B) formed a quadrangular structure of almost 5 x 5 m called structure 6A-I. Excavations at the area defined a stone platform and the quadrangular structure 6A-I (Fig. 24).

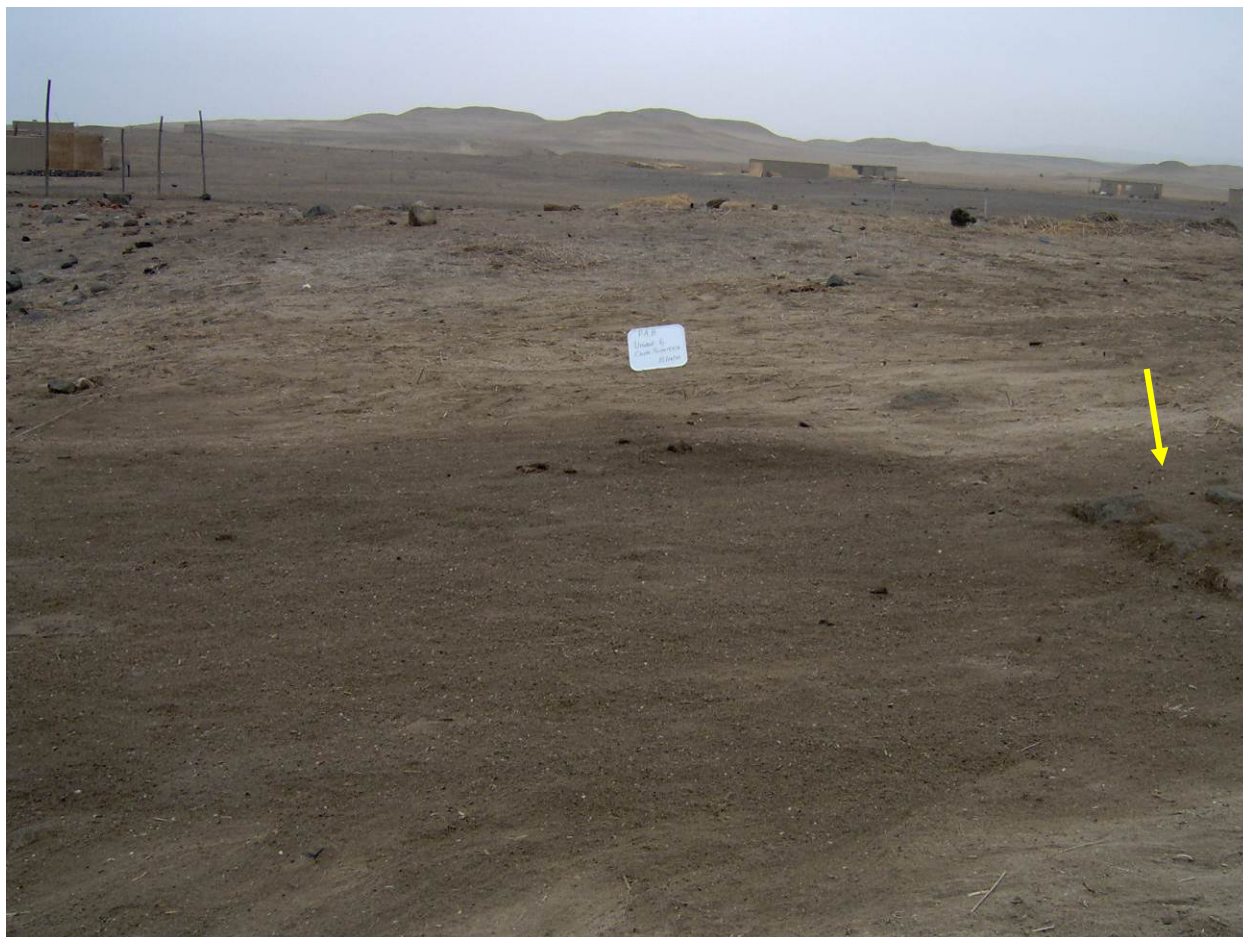


Figure 22. Unit 6A before excavations, at the right side of the picture (arrow) the stone alignment.

Within the area defined by these stone walls excavations were focused within unit 6A, uncovering a series of sand accumulations (S.U. 6.02 and 6.03) containing refuse and ash remains. These layers had the same materials found at the surface of the excavation unit and modern disturbance of the upper layers.

As these sandy layers were excavated the next level of the excavation revealed a series of dense secondary depositions (middens) with evidence of transit on their surfaces and primary features. The upper layer S.U. 6.04 is a black and compact midden composed of organic material, charcoal and ash, a 1 hearth (6.12) and 3 pits (6.13, 6.14 and 6.58) as recorded on the surface. As excavation continued under S.U. 6.04 a sandy deposition (S.U. 6.05) was identified.



Figure 23. Platform wall 6.20 under excavation. A modern intrusion (arrow) destroyed part of the exterior face.



Figure 24. First evidence of south wall 6.21 at the south edge of Unit 6A as the the superficial layer is removed.



Figure 25. South wall 6.21 by the end of the excavations.



Figure 26. Third stone wall (S.U. 6.130) located in the western edge of the unit by the end of the excavations



Figure 27. Fourth stone wall (S.U. 6.03) located within Unit 6A and 6B at the end of the excavations.

Beneath this layer the lower midden S.U. 6.06 was located. This midden also consisted of a black compact surface containing up to 4 hearths and 1 pit. Below this midden a sandy level (S.U. 6.57) was uncovered. A plant sample from this S.U. was dated in 3769 ± 58 BP.

As this S.U. was excavated a compact surface was exposed. S.U. 6.27 is a compact dark gray midden that consists of clay in its matrix giving it a floor like surface. Under this compact layer the excavations uncovered a succession of mud floors that are described in the following pages.

Before continuing with the excavation inside the walls, a test unit was excavated in square number 5 to define the construction characteristics of the eastern wall (S.U. 6.20). The excavations uncovered a S.U. composed mainly of a secondary midden with abundant subsistence remains and fire cracked stones. These excavations allowed us to define the nature of

the wall 6.20. Instead of a standing wall of a structure, this double wall was part of a platform. This wall was a continuous wall that contained the secondary midden found in the excavations.



Figure 28. Quadrangular structure (6A-I) and stone platform at the end of the excavations.

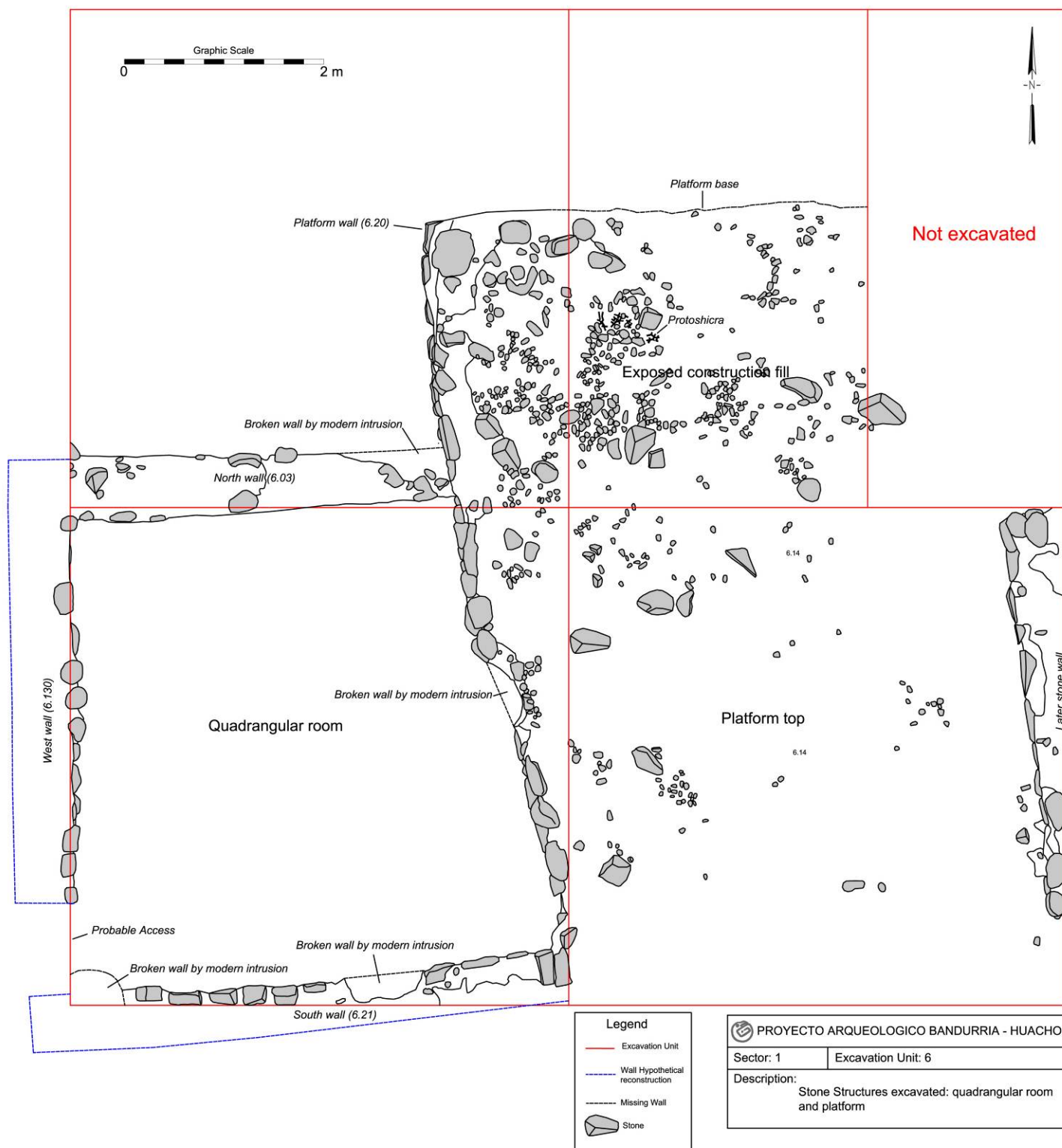


Figure 29. General plan of Unit 6 with stone platform and quadrangular structure 6A-I.

Excavations within the platform

It was decided to expand excavations to the east within the platform surface to try to define the nature of this structure. A 5 x 5 m excavation unit was placed beside Unit 6A. As excavations began a new unit was designated called 6C to differentiate it from the area outside the platform. Evidence of a modern shack that was built over the platform was encountered. This modern occupation affected the upper portions of the Preceramic occupation. The shack was built over the sandy surface and its foundations intruded into a midden deposition composed primarily of charcoal and ash containing burned organic remains. This midden extended over the excavated area and it is very probable that it covered the platform surface. Below the midden a series of features were found. Because of their characteristics they have been considered as offerings related to the closure of the platform. Three baskets were found, two human burials at the southeast side of the platform and a bird burial at the north side (Fig. 30).

The baskets were located at the northeast side of the excavation unit. All of them were made of twine *junco* (*Schoenoplectus americanus*) and were of circular shape with diameters from 20 to 30 cm. They were heavily damaged by modern occupation. The first basket contained 10 pieces of fire cracked stones in a loose sandy matrix with ash; it was located in the east side of the excavation unit (Fig. 31). The second basket contained a small bundle of *junco* and gourd fragments of a crushed small container. It is located near the northeast corner of the unit. The bundle of *junco* was very affected by modern occupation and probably belongs to the same offering event. Near to this offering at 50 cm north from the last basket and near the northern edge of the excavation unit the remains of the third basket was found. It also was badly preserved. Beside it a concentration of thermo fractured stones were found in a small circular hole. At the northern edge of the excavation unit and about 70 cm west from the stones a bird



Figure 30. Offerings and hearths located over stone platform.



Figure 31. Remains of basket with thermo fractured stones.

burial, also very affected by the modern occupation, was found. Crushed bones and some white feathers were recovered. Apparently the bird was covered by a twined cotton textile and a junco mat, but only fragments were recovered of these two elements. From the best preserved bones preliminary identification has determined it was a small white egret (probably *Egretta tula* or *Bubulcus ibis*)

The first human offering consisted of an adult post-cranial skeleton (Fig. 32). It was located at the southwest corner of the excavation unit near the platform edge. Sex determination was not possible because bones were very affected by the modern occupation; all the bones were crushed and very fragmented. This individual apparently was covered in a twine cotton fabric and interred in a shallow oval pit. From the evidence, the individual was buried lying on its side in flexed position with the knees drawn toward the chest body, his right and his left arm bent

over his body. No cranial remains were found. Gourd fragments were found at the elbow of his left arm and probably represent a gourd container placed beside the body crushed by modern activities.

The second human offering was located about 10 cm south from the body described above, was a poorly preserved cranial and vertebrae bones (Fig. 33). Based on the tooth remains, this individual was approximately 6-9 months old. Its bones were not fully ossified. The remains were placed in a semi-circular pit of 35 x 27 cm. Only a small portion of the skull, located at the base of the pit was recovered. The skull was wrapped in plant fiber (*junco*) and tied with *junco* cord. Near the fragmented cervical vertebrae, the remains of a necklace with *Spondylus princeps* beads were found (Fig. 34).

Towards the middle of the excavation unit the remains of a wall was uncovered. This wall apparently related to the platform last construction phase. The wall of 6.13 m long 0.10 m wide and 0.18 m high and was composed of a single row of cobbles. Mud mortar was the same yellowish mud used in the other wall and floors.

After removing the offerings and continuing the excavations a compact layer composed of sand with gravel was found over the platform surface. Below the compact layer the remains of a fragmented mud floor was identified extending over the structure. The wall was built over this floor. Related to this floor were two circular hearths (Fig. 35) located near the middle of the excavation unit and at the center of the exposed platform surface that still contained part of the floor. These two hearths were made using the same yellowish mud used for the floor and all of its surface was plastered with mud presenting a smooth surface. The two hearths reflect two periods of use of the platform within the same construction phase since both hearths are stratigraphically at the same level.



Figure 32. First human offering of a headless body



Figure 33. Second human offering: a head completely crushed by modern occupation.



Figure 34. Spondylus beads recovered from the remains of a necklace found at the head.

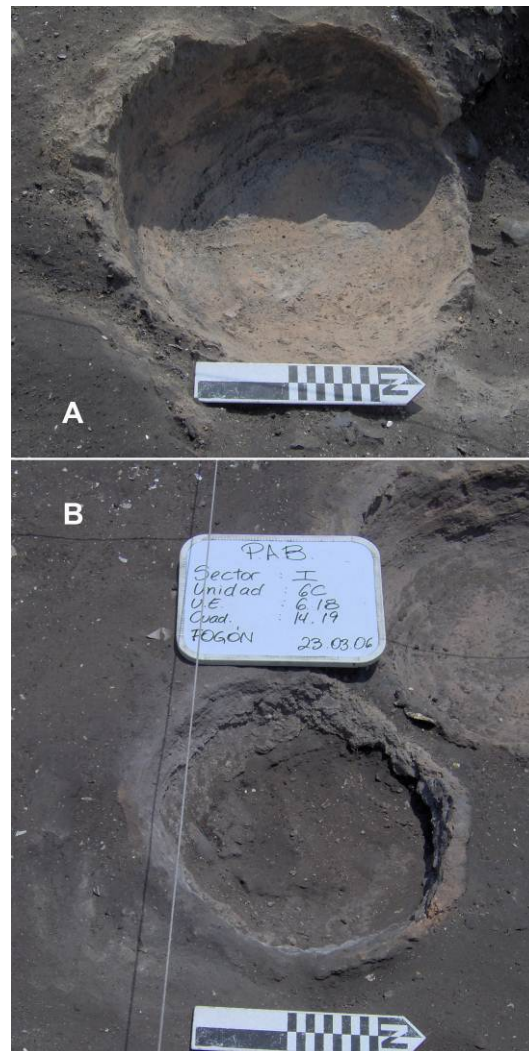


Figure 35. Mud plastered hearths found on top of the stone platform. A. First excavated hearth. B. Second hearth found beside the first hearth in the stone platform.

The platform itself was badly preserved due to the modern occupation and preceramic disturbance. Its north continuation wall and the upper portions of the north side could not be located, instead we found exposed construction fill. This allowed us to determine how the platform was built and what materials were used at its construction. First the continuous walls were constructed using big cobbles and yellowish mud mortar. Then the enclosure was filled with refuse. A very heterogeneous refuse was used to fill the platform. Abundant shell fish bones and plants remains composed the fill, many of them with heat marks or burned. Abundant fire cracked rock were found in the fill indicating that the refuse came from domestic activities associated with processing and consumption of food. Within the refuse fill a *junco* bag, containing midden materials, was found (Fig. 36). This *junco* bag resembles the *shicras* bags found in LPP monumental architecture, but differs in its smaller size and its fragile construction,



Figure 36. *Junco* bag (*proto shicra*) within the platform construction fill.

that make impossible to be used as a construction fill like the big *shicra* bags. A sample from the junco bag was AMS dated to giving us the date of 3878 ± 37 BP which can be considered to date the construction of the platform. After the exposure of the construction fill and the remains of the upper floors of the platform excavations in Unit 6C stopped (Fig. 37) we continued within the quadrangular structure in excavation Unit 6A.



Figure 37. Unit 6C at the end of excavation. The red arrow points to the two hearths and the yellow arrow points to the *proto shicra* within the exposed construction fill.

Excavations outside the platform within the quadrangular structure

After excavations were completed to define the stone platform, excavations continued in Unit 6A in the area within the stone walls, uncovering a series of fragmented successive mud floors (S.U. 6.28, 6.29, 6.30, 6.31 and 6.41). These were made of yellowish clay attached to the exterior face of the eastern wall (S.U. 6.20). It is very probable they extended over the structure, but modern activities have destroyed them. No layers were found within floors as in other excavation units. Over these floor irregular scattered mollusks shells were found, no other

features could be identified. For radiocarbon dating a sample was taken from an upper sandy layer (6.57) that covers the first floor producing a date of 3769 ± 58 BP.

As excavations continued a second radiocarbon sample was taken from S.U. 6.39, an intrusion identified as a primary deposition in sandy layer 6.38 that was under the floors 6.30, 6.31 and 6.41 giving a date of 3764 ± 65 BP.

Below layer 6.38 a second sandy layer 6.47 was identified and under it, the remains of a clay floor 6.63 was defined within the center of the structure. This floor contained 3 hearths (6.51, 6.54 and 6.59). Under it another floor 6.66 extended below floor 6.63 in the center of the unit; a total of 4 hearths (6.67, 6.68, 6.69 and 6.70) were identified on its surface. After a thin secondary deposition identified as two different S.U. (6.64 and 6.65) another floor was found. This floor 6.73 extended through the south east portion of the unit and beside wall 6.20 of the structure. No features were identified on its surface.

Continuing with the excavations under the floor 6.73 another secondary midden was found (S.U. 6.74) and beneath it a succession of two floors (S.U. 6.75 and 6.76) were identified. The first fragmentary floor (6.75) extended through the south side of the structure and had two pits (S.U. 6.77 and 6.78) and sand lens over its surface. The second floor 6.79 is located underneath floor 6.75 and extends over of the structure. On its surface 5 postholes (6.80, 6.81, 6.82, 6.87 and 6.90) were found as well as 1 hearth (6.84). Another element found over the floor were the remains of cotton twine textiles (6.85 and 6.88). Below this floor another thin midden was recorded (S.U. 6.95) and beneath it another floor that like floor 6.79 extends throughout all of the structure. It contained two postholes S.U. 9.92 and 6.93.

After floor 6.91 a succession of secondary depositions were recorded, the first four (6.94, 6.97, 6.99 and 6.100) are mainly sandy depositions. Layer 6.97 is of particular interest because in

its surface has a series of features we are considering to be primary depositions. One hearth (6.104) and three pits (6.105, 6.106 and 6.107) were recorded related to this deposition. A plant sample taken from the hearth gave the date 3769 ± 59 BP.

After the sandy layers a compact midden layer (S.U. 6.98) was exposed on its surface and five postholes were identified. The features from S.U. 9.97 the postholes from S.U. 6.98 reflect a primary deposition in this secondary midden (Fig. 38). Under midden 6.98 two sandy layers (S.U.s. 6.101 and 103) were found and further excavations beneath the midden revealed the remains of floor 6.102.

Under floor 6.102 a thin midden (6.114) was recorded. Below this midden the first clear occupation of the quadrangular structure was defined with floor 6.115. A hearth (6.121) related to this floor was located at the middle of the structure. A series of 5 small postholes (6.116, 6.117, 6.118, 6.119, and 6.120) near the north side of the hearth are the only postholes identified in this occupation (Fig. 39). Below the floor two thin layers, one of midden (6.122) and other of sand (6.126) were found covering the next clay floor. The floor 6.131 extended over all the structure in which there were two hearths (6.149 and 6.151) at the east side of the room near the platform wall. A series of 9 postholes were located at the west side of the room forming a semi-circular pattern (Fig. 40). Another group of 4 postholes were found near the hearths. In the west side of the structure near the west wall the remains of a subadult wrapped in a junco mat was found. The burial is associated directly with the floor 6.131 as it was broken to bury the body. Unlike the human remains found over the platform this burial represented the common elements found in human burials at Bandurria: bodies wrapped in junco mats and cotton twine textile and cobbles on top of the funerary bundle (Fig. 41).



Figure 38. Exposed surface of midden S.U. 6.98 with postholes

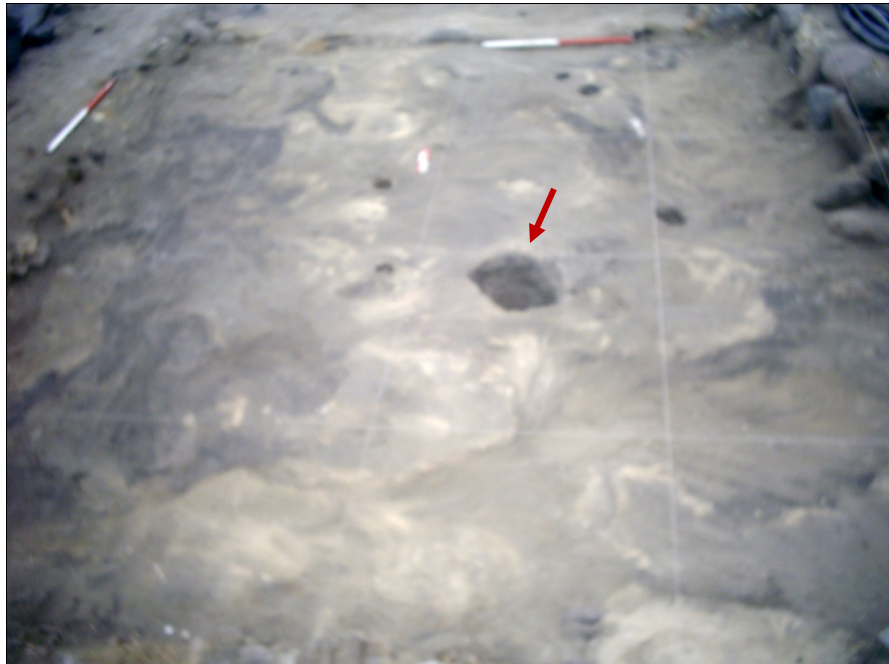


Figure 39. Floor 6.115 within the quadrangular structure. At the center hearth (red arrow) and towards the northern section of the structure there are 5 postholes.



Figure 40. Floor 6.131 within the quadrangular structure. Red arrow shows the location of the human burial.



Figure 41. Subadult burial related with floor 6.131.

The following floors 6.153, 6.154 and 6.155 were found in small areas under floor 6.131. It was not possible to define their occupations clearly. After these fragmented floors, floor 6.157 extended partially from south to the center of the room. Only four small postholes are associated with this floor. No hearth was found related to this occupation. Below floor 6.157 two earlier floors 6.165 and 6.178 were found.

Directly under floor 6.157 floor S.U. 6.165 was identified. This floor contained 10 postholes placed near the center of the structure no clear pattern was observed. As in the previous floor no hearth was found. Part of this floor was under a semi-compact midden (6.176). Excavation of the floor and the midden uncovered the remains of a floor (6.177) that extended to the west side of the structure. Poor preservation did not allow us to identify its surface and excavations continued to expose the second floor during excavations of floor 6.157.

Floor 6.178 is one of the best preserved floors within the quadrangular structure (Fig. 42). This floor is the foundation where the platform and the other walls were built. It represents a previous occupation of the area before the structures were built. Within the floor a total of 15 post holes were identified, more than in any previous floor. The postholes of this floor represent a previous structure that was disassembled when the platform was built. Two walls of this probable simple structure can be defined and it is interesting that they roughly maintain the same orientation as the stone walls. This floor also lacks a hearth.

Below floor 6.178 the remains of another floor was found. Floor 6.195 was partially affected by the later occupation and was only preserved in the central portion of the room. No postholes or other features were discovered.



Figure 42. Floor 6.178 with associated features. Earlier features have been filled with clean clear sand.

Under this floor we found a depositional pattern observed in other excavation units in the domestic sector; a clay floor followed by secondary midden composed of ash and charcoal middens with abundant organic materials and sandy layers that contained lesser amount of cultural remains. Below these secondary depositions, three successive floors 6.199, 6.198 and 6.228 were uncovered. These floors were partially exposed and no postholes or other feature were detected.

After the excavation of these floors an area of 2 x 3 m at the southwest corner of the excavation unit was excavated to see if floors continued under them. But the same depositional pattern that was found elsewhere in the domestic sector was found: a secondary midden composed of organic material with ash and charcoal and sandy layers. Excavations exposed midden S.U. 6.229 composed of dense dark organic remains combined with ash and charcoal (Fig. 43).

At this level it was decided to end excavations and focus on other areas of the domestic sector. In 0.4 m of excavations a total of 21 remodeling episodes were associated with 25 clay floors in this excavation unit.



Figure 43. End of excavations at Unit 6A exposed a compact midden S.U. 6.229. To the upper left: western wall 6.130 and a probable access.

Occupational Sequence:

Excavations at Unit 6A allowed us to identify new architectural elements. There was an intense reoccupation of the built area as seen in successive clay floors in quadrangular dwelling associated with the stone platform. Two clear phases can be defined with the excavations at the Unit 6A:

- Phase I: The earliest phase identified is composed of a series of secondary depositions and floors. No evidence of stone architecture was found in this phase. Four reoccupations are

reflected in five mud floors: S.U. 6.228, 6.198, 6.199, 6.195 and 6.178. Below the earliest floor 6.228 a compact midden was found (Fig. 44). Floor 6.178 is the last floor of this phase and the one that was more fully exposed. On its surface a series postholes were identified (Fig. 45). They define a structure, apparently of a rectangular shape, but no further excavations were done to define it. Over this floor the stone platform and the stone walls of the quadrangular structure were built marking the beginning of the Phase II. Is evident these occupations extended across all of the area.

- Phase II: The second occupational phase is characterized by a continuous remodeling of the inner space within the quadrangular structure. The excavation found 17 remodelings associated with 20 clay floors. I believe that from floor 6.131 there is an important change in the use of the quadrangular room more related to domestic activities as for the first time a hearth is found. Also the burial of an infant is placed under the floor 6.131.

After floor 6.131 all the upper floors have one or more hearths. From the posthole patterns within the quadrangular structure it is clear that the room was divided, creating smaller spaces within the structure. These subdivisions change in each reoccupation as the floor plans show (Figs. 46-50). We subdivided this phase into two subphases: Phase IIa is related to the previous occupations of floor 6.131 where no hearth, therefore no domestic activities and Phase IIb is composed of floor 6.131 to floor 6.28 and reflects domestic activities within the structure.

A total of 4 radiocarbon dates have been obtained from phase II, three from this excavation unit and one from the Unit 6B. The earliest date comes from the sample taken from the protoshicra in the construction fill of the platform. The radiocarbon date of 3878 ± 37 BP can be considered as the construction date of the platform. The next date of 3769 ± 59 BP from the

hearth in S.U. 6.97 and 3764 ± 65 BP from S.U. 6.38 dates the successive occupations associated with the upper floors of the structure.

- Phase III: The latest occupation found at Unit 6A is related to the abandonment of the quadrangular structure since no new floors were found in the upper levels. Although we mentioned that the modern occupation has heavily affected the upper strata of the site we do not believe any floor was present in the surface of Unit 6A since not even a single small floor fragment have been found.

S.U. 6.27 is an important marker for the abandonment of the structures since it was used to seal the earlier floors. After abandonment two main reoccupations are observed, both over secondary middens. S.U.s 6.04 and 6.06 were hearths, postholes and pits have been located over the trampled hardened surface of these middens (Fig. 50). The first one is S.U. 6.06, a black compact midden composed primarily of organic materials that with a series of primary features on its surface: 4 hearths, 1 pit, and a concentration of thermofractured stones used in cooking activities. This evidence clearly suggests food processing activities on this midden. The next midden level is associated with domestic activities. S.U. 6.04 is also a black semi-compact midden composed of organic materials. It has a regular surface with evidence of trampling and containing a hearth (6.12), 2 postholes (6.23 and 6.24) and concentrations of burnt and fire cracked stones (6.14).

The radiocarbon date of 3769 ± 58 BP obtained from the sandy layer 6.57 immediately over the seal 6.27 is related with the end of the occupation of the quadrangular structure and probably all of the stone platform. Although domestic activities continued in the area as recorded in middens 6.06 and 6.04, they are not associated to the stone structures.

Table 9. Summary of Unit 6A Stratigraphic Units and Occupation Phases

Phase	Unit 6A	Postholes	Features
III	6.1 6.2, 6.3 Sand 6.4 Midden 6.5 Sand 6.6 Midden	6.23, 6.24	6.12(H), 6.13(P), 6.14(P), 6.17(ST) [6.07, 6.42, 6.43](H), [6.08, 6.44](P), [6.10, 6.45](H), 6.11(H), [6.18, 6.46](ST), 6.36(H)
	6.57 Sand 6.27 Midden		
IIIb	6.28, 6.29 Floors 6.30, 6.31, 6.41 Floors 6.38 Sand 6.47 Sand 6.63 Floor 6.66 Floor 6.64, 6.65 Midden 6.73 Floor 6.74 Midden 6.75 Floor 6.79 Floor 6.95 Sand 6.91 Floor 6.94 Sand 6.97 Sand 6.99, 6.100 Sand 6.98 Midden 6.101, 6.103 Sand 6.102 Floor 6.114 Midden 6.115 Floor 6.122 Midden 6.126 Sand 6.131 Floor	6.80, 6.81, 6.82, 6.87, 6.90	[6.39, 6.40](P) 6.51(H), 6.54(H), [6.53, 6.59](H) 6.67(H), 6.68(H), 6.69(H), 6.70(H) 6.77(P), 6.78(P) 6.84 (H), 6.86(H) 6.104(H) 6.109, 6.110, 6.111, 6.112, 6.113 6.116, 6.117, 6.118, 6.119, 6.120 6.121(H) 6.132, 6.133, 6.134, 6.136, 6.137, 6.138, 6.139, 6.140, 6.141, 6.142, 6.143, 6.144, 6.147, 6.150
	6.153 Floor 6.154 Floor 6.155 Floor 6.157 Floor 6.165 Floor 6.176 Midden 6.177 Floor		
I	6.178 Floor 6.195 Floor 6.197 Midden 6.196 Sand 6.199 Floor 6.198, 6.228 Floors 6.203 Midden 6.204 Sand 6.210 Sand 6.229 Midden	6.179, 6.180, 6.181, 6.183, 6.184, 6.185, 6.186, 6.187, 6.188, 6.189, 6.190, 6.191, 6.192, 6.193, 6.194	6.200(P)

Key: (H) Hearth, (P) Pitt, (B) Burial, (ST) Fire craked stones

Some features may receive more than one S.U. and they are grouped between [].

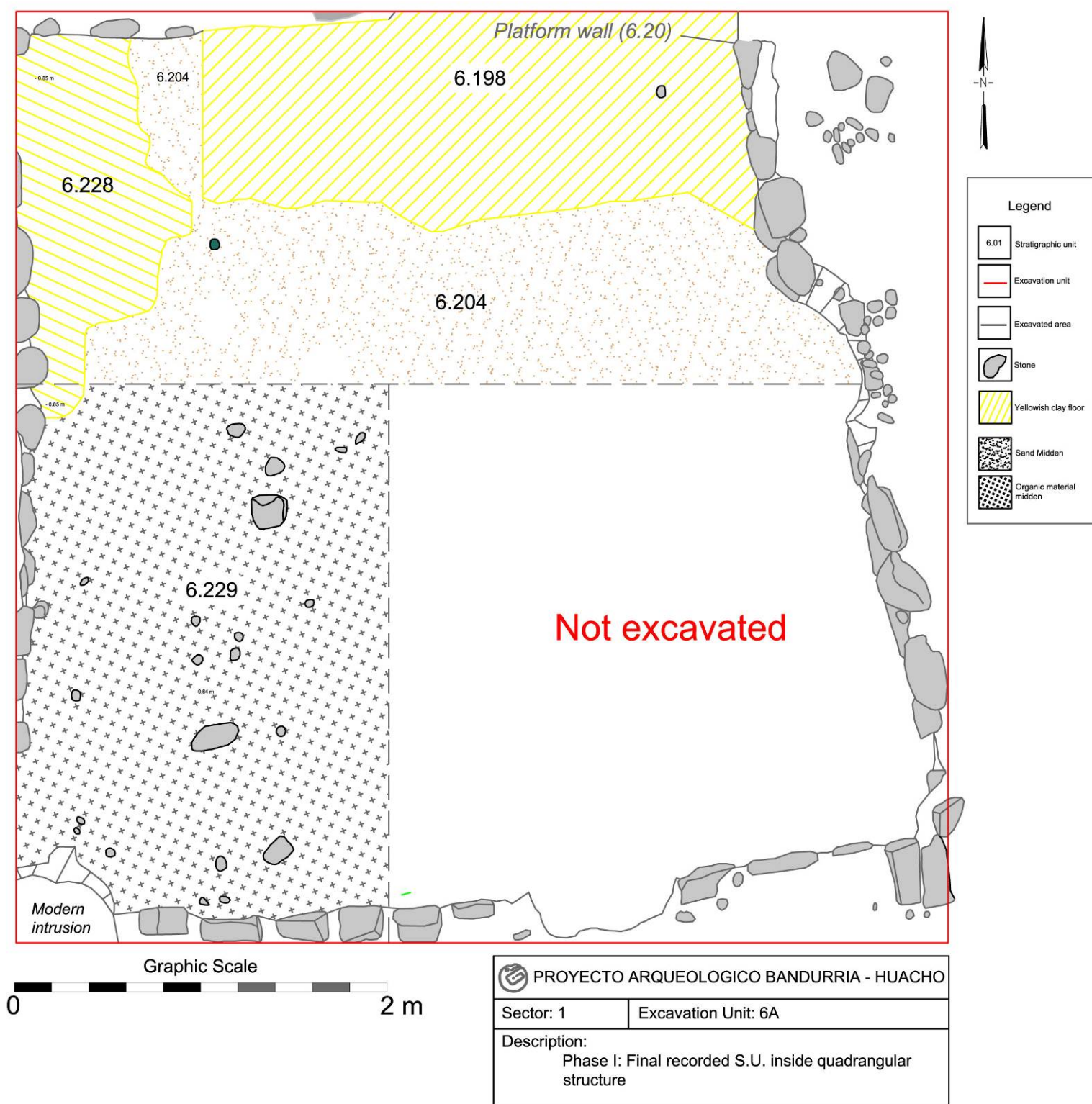


Figure 44. Phase I: Final recorded S.U. at the end of excavation.

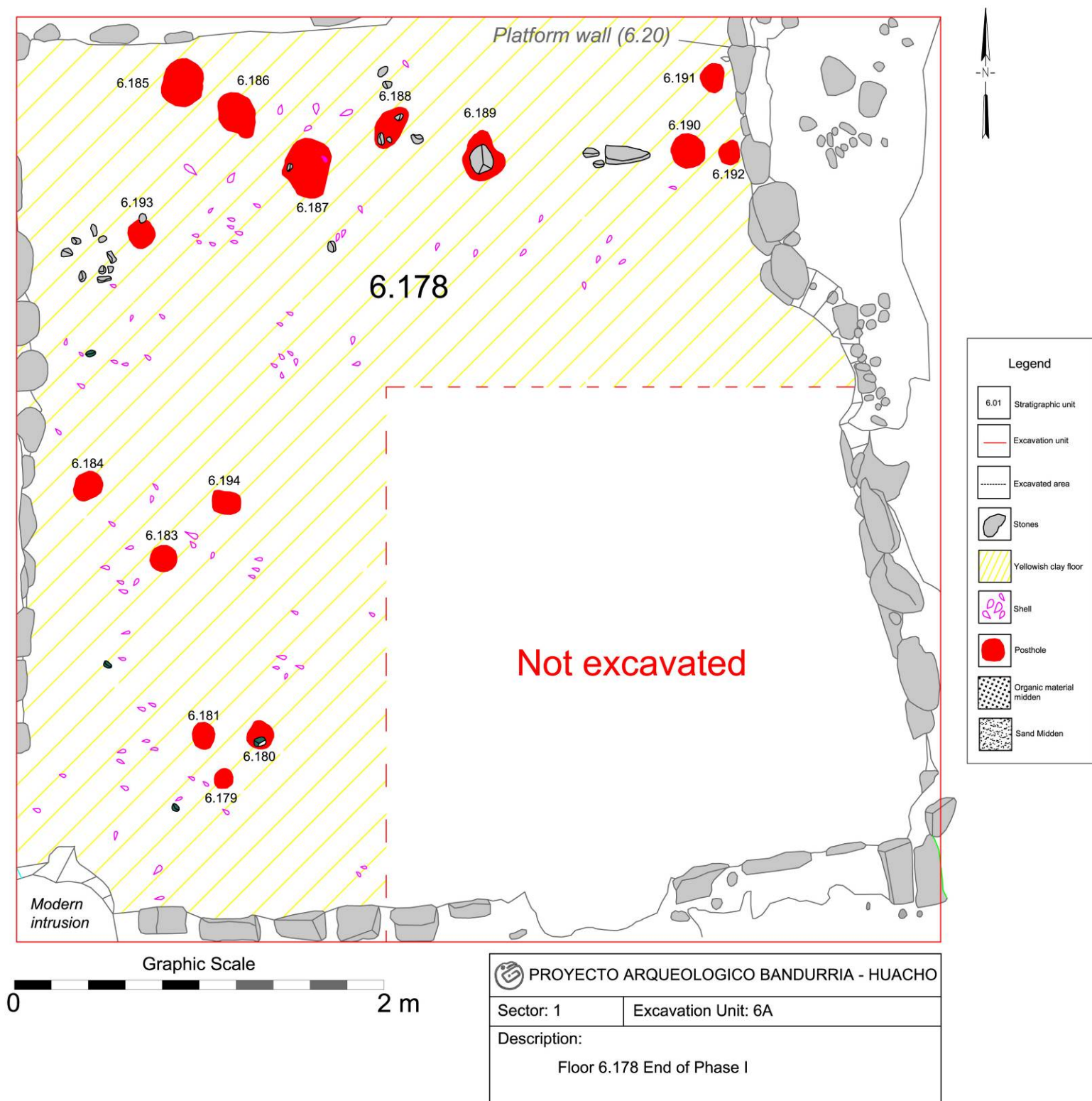


Figure 45. End of Phase I: Floor 6.178 and associated postholes.

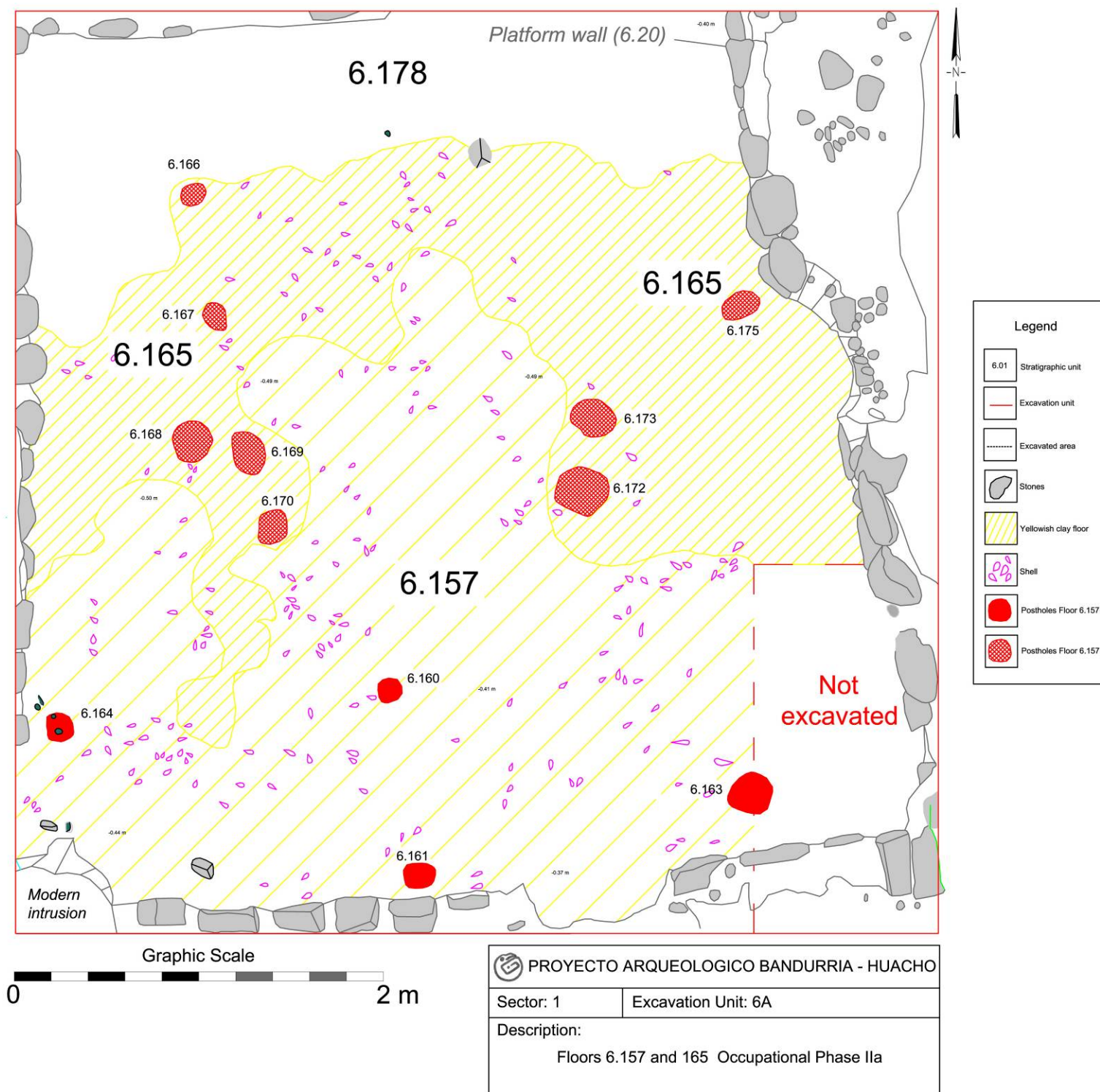


Figure 46. Occupational Phase IIa, floors 6.157 and 6.165

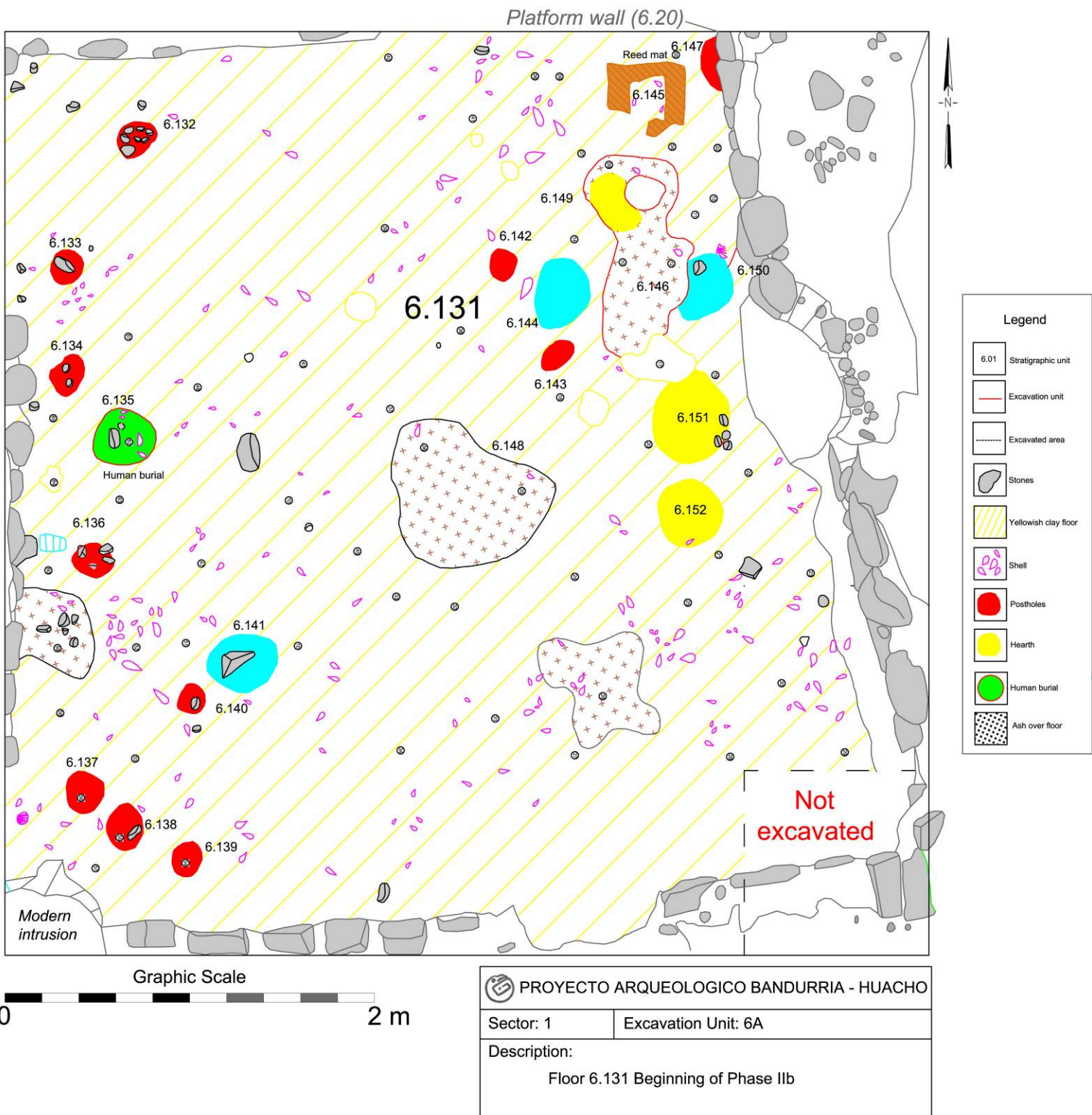


Figure 47. Beginning of Phase IIb: Floor 6.131 and associated features.

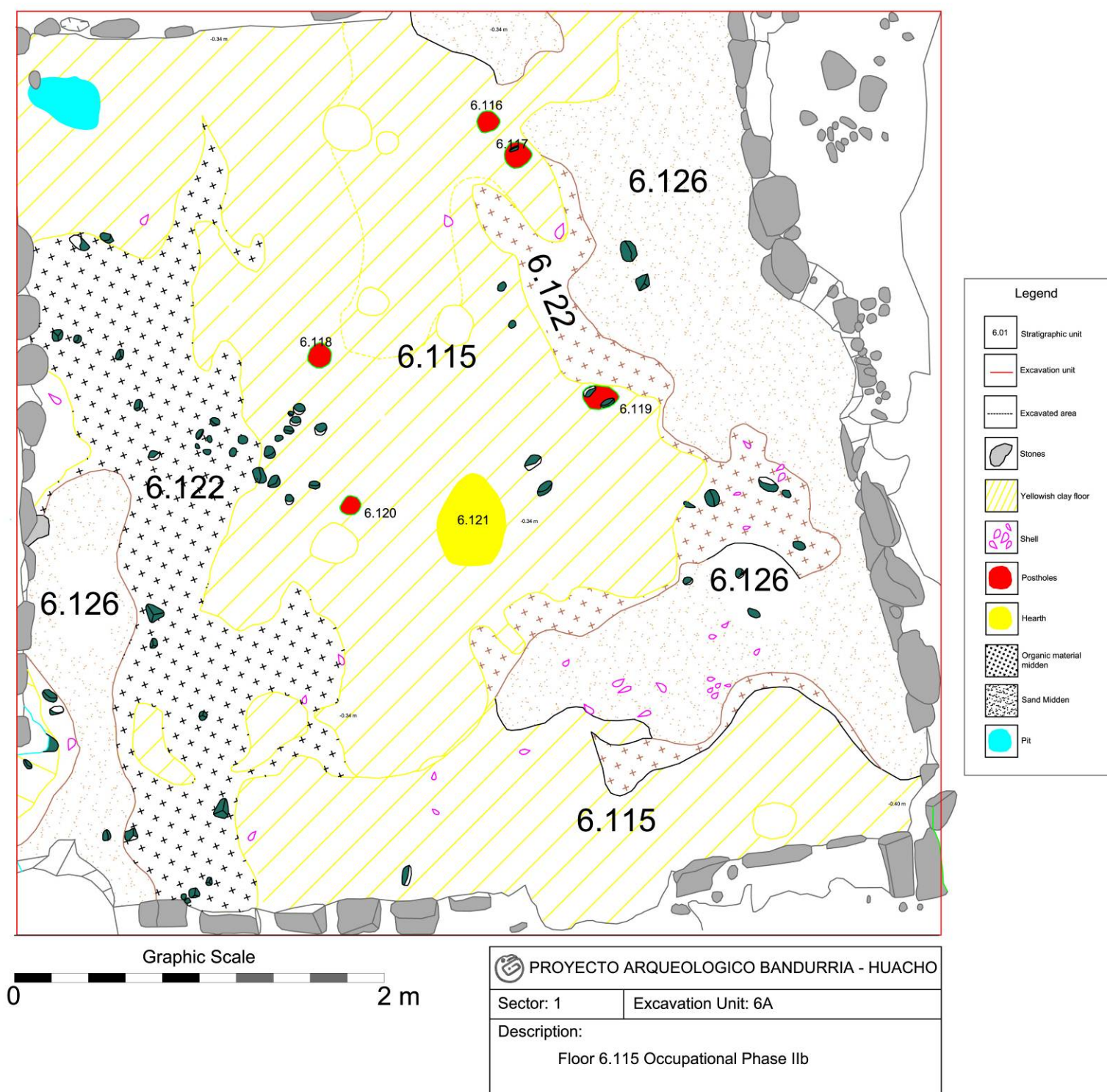


Figure 48. Floor 6.115 of occupational Phase IIb with associated features

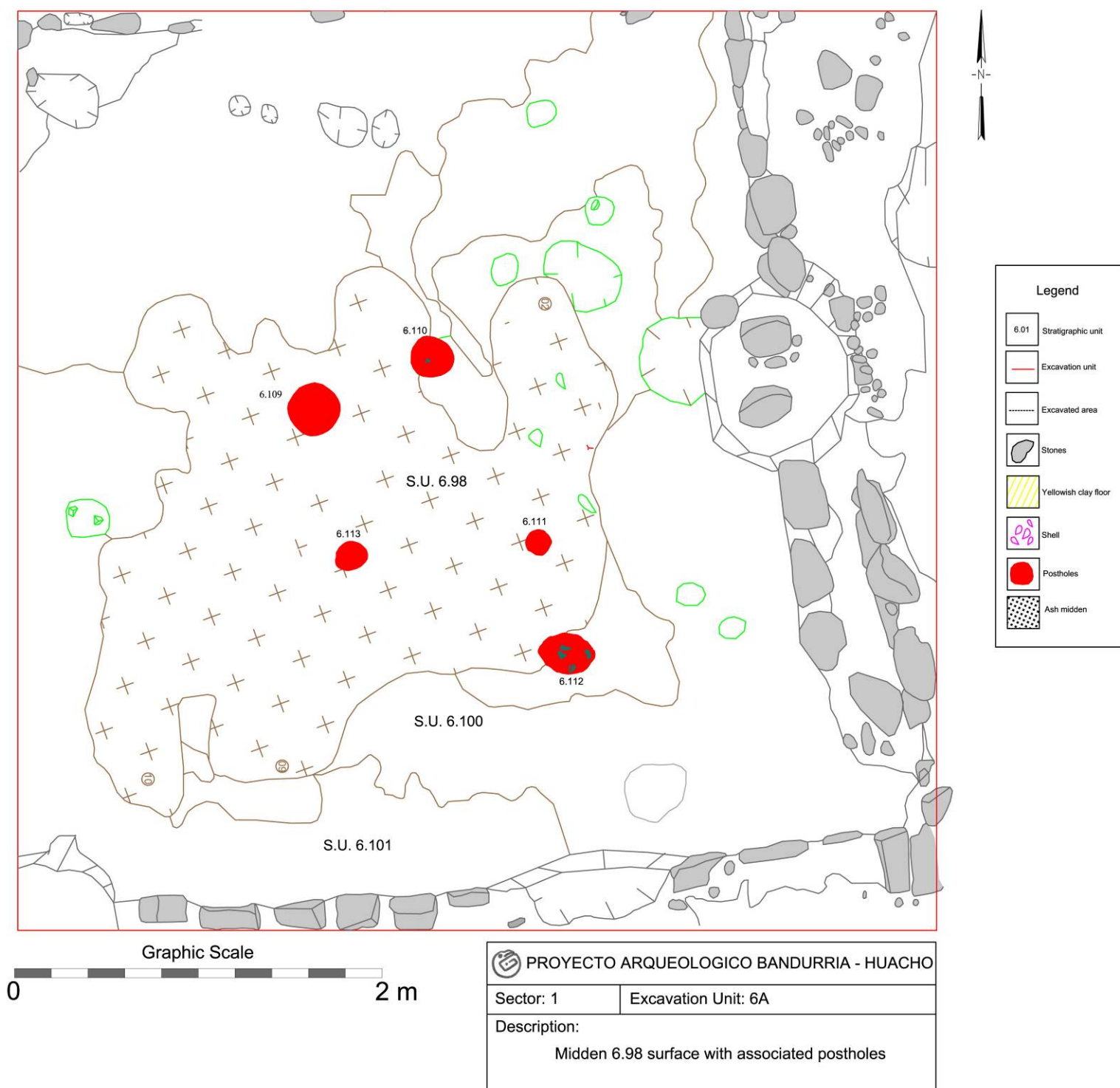


Figure 49. Midden 6.98 of Phase IIb with evidence of postholes on its surface.

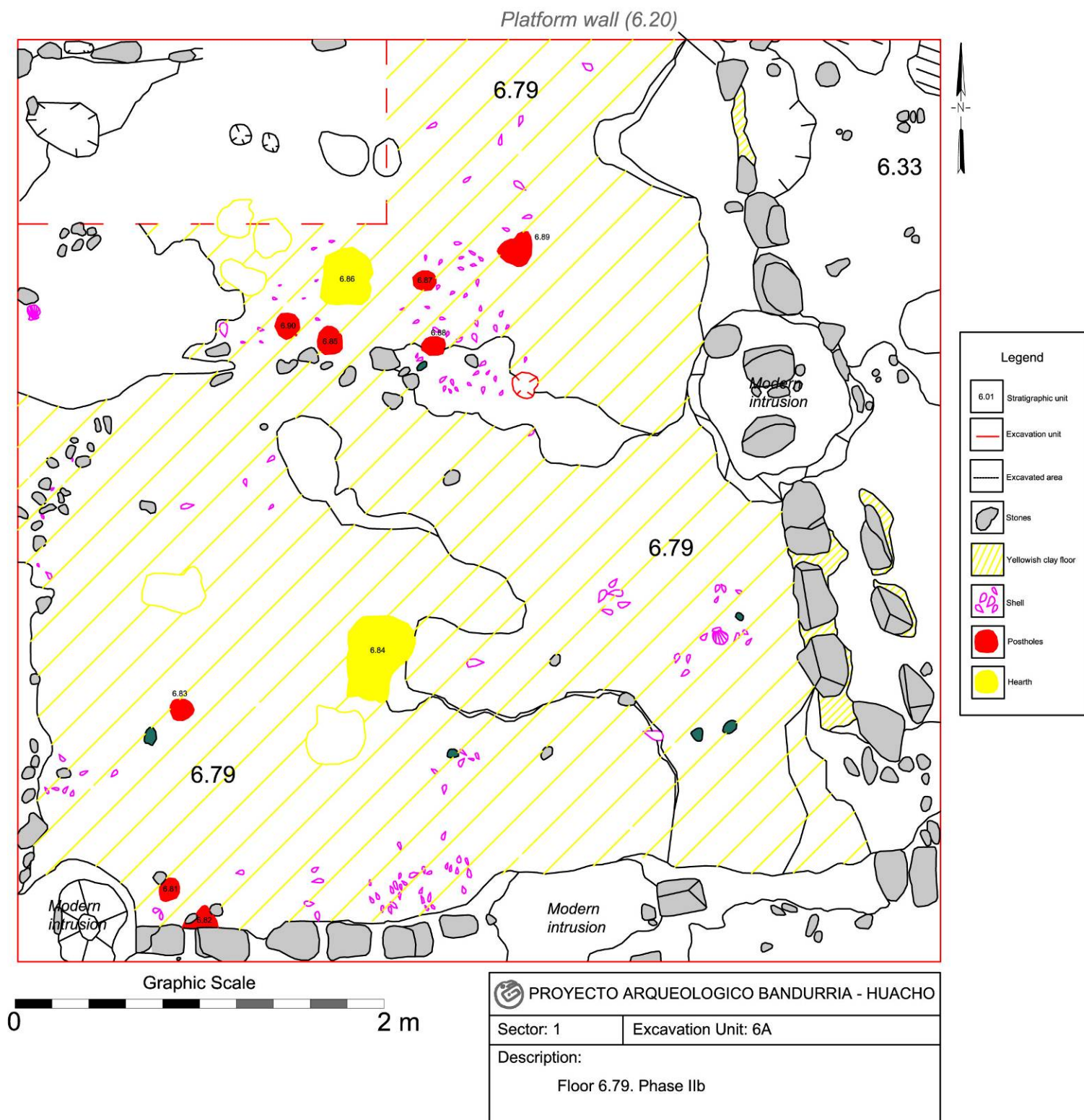


Figure 50. Floor 6.79 from occupational Phase IIb with associated features.

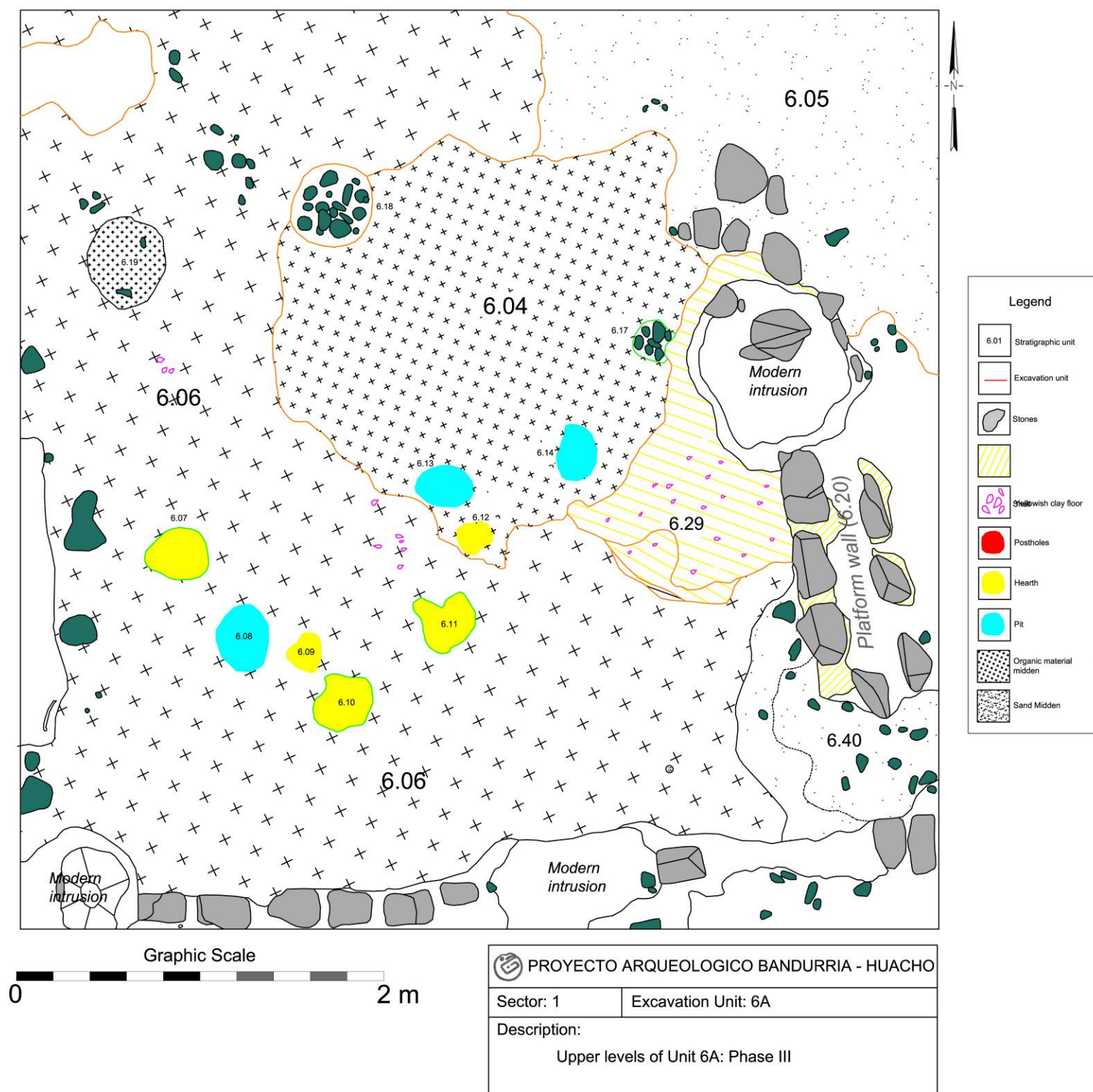


Figure 51. Phase III: Upper levels of Unit 6A with identified primary features.

Artifacts associations

A series of artifacts were recovered from Phases IIB, IIA and I of Unit 6A (Table 10). Like excavations Unit 9, we recovered a low number of artifacts (N= 64) of which quartz crystals represented the 43.75% (n= 28) of the total artifact assemblage. No artifacts were recovered from Phase III. From the three occupational phases that contained artifacts, quartz crystals (N= 38) are the more common artifact type recovered (Fig. 53) with proportions of 33.33% (n= 8) for Phase IIB, 65.22% (n = 15) for Phase IIA, and 29.41% (n = 5) for Phase I. The distribution of artifacts through the 3 phases that contain artifacts are relatively homogenous with a 37.5% of the total number of artifacts for Phase IIB, a 35.9% for Phase IIA, and 26.5% for Phase I. The other types of artifacts were found in lesser frequencies thus it was decided to analyse the artifact distribution without the quartz crystals (Table 11) since the function of the quartz crystals function was not evident in the Bandurria assemblage. The artifact distribution is presented in bar charts with quartz crystals (Fig. 54) and without the crystals (Fig. 55).

Without the quartz crystals, the artifact total changed to 36 artifacts distributed among the 3 phases calculated as 44.45% (n = 16) of the total artifacts for Phase IIB, 22.22% (n = 8) artifacts of the total artifacts for Phase IIA, and 33.33% (n = 12) of the total artifacts for Phase I. Only 4 types of artifacts have been identified in Unit 6A for each occupational phase. Beads are the more ubiquitous artifacts found in the three occupational phases with a proportion of 37.50% (n=6) for Phase IIB, 50% (n= 4) for Phase IIA and 41.67% for Phase I.

The only stone artifacts found were 3 stone weights in occupational Phase I. From their characteristics (Fig. 56) these weights were used in postholes, prior to the construction of the stone platform and the quadrangular structure.

Bone artifacts were rare in Phase IIB where 6 bone tablets (Fig. 57) and a bone needle (Fig. 58) were found. These tablets are made of a single piece of hard bone and some of them have incised lines. The bone needle was finely polished and has an incised line across its upper portion. From phases IIa and I, small bird bone tubes (Fig. 59) were recovered.

No wood artifacts were recovered during excavations. Only one broken shell fishhook (Fig. 60) was recovered from Phase IIa.

A total of 7 human figurines or parts of them (Fig. 61) were recovered from the 3 occupational phases. They represent very simple human features (eyes, nose and mouth) and measure 3 to 5 cm. Another type of unbaked clay artifact was found in Phase IIb is a clay disc with two central holes. It has been identified as a pummet (Fig. 62) as Incan pummets have the same size and shape although they are made of metal.

The presence of bone tablets, bone tubes and unbaked clay figurines clearly reflect some kind of ritual at a domestic level that the inhabitants of the quadrangular structure conducted. Their relationships with other type of remains and the domestic architecture will be presented at the end of this chapter in 4.8.



Figure 53. Unmodified quartz crystal from Phase IIb

Table 10. Artifact distribution Unit 6A: Total counts and frequencies by occupational phases.

	PHASE II B		PHASE II A		PHASE I	
	N	%	N	%	N	%
Beads	6	25.00	4	17.39	5	29.41
<i>Lithic artifacts:</i>						
Flakes	0	0.00	0	0	0	0
Bifacial tools	0	0.00	0	0	0	0
Stone weights	0	0.00	0	0	3	17.65
Quartz crystals	8	33.33	15	65.22	5	29.41
<i>Bone artifacts:</i>						
Tablets	6	25.00	0	0	0	0
Tubes	0		1	4.35	1	5.88
Needle	1	4.17	0	0	0	0
Flute	0	0	0	0	0	0
<i>Shell artifacts:</i>						
Fishhooks	0	0.00	1	4.35	0	0
<i>Wood artifacts:</i>						
Worked Sticks	0	0.00	0	0	0	0
<i>Unbaked clay:</i>						
Figurines	2	8.33	2	8.69	3	17.65
Other	1	4.17	0	0	0	0
Total	24	100	23	100	17	100

Table 11. Artifact distribution Unit 6A without quartz crystals.

	PHASE II B		PHASE II A		PHASE I	
	N	%	N	%	N	%
Beads	6	37.50	4	50.00	5	41.67
<i>Lithic artifacts:</i>						
Flakes	0	0.00	0	0.00	0	0
Bifacial tools	0	0.00	0	0.00	0	0
Stone weights	0	0.00	0	0.00	3	25.00
<i>Bone artifacts:</i>						
Tablets	6	37.50	0		0	0
Tubes	0	0.00	1	12.50	1	8.33
Needle	1	6.25				
Flute	0	0.00	0		0	0
<i>Shell artifacts:</i>						
Fishhooks	0	0.00	1	12.50	0	0
<i>Wood artifacts:</i>						
Worked Sticks	0	0.00	0	0.00	0	0
<i>Unbaked clay:</i>						
Figurines	2	12.50	2	25.00	3	25.00
Other	1	6.25	0	0.00	0	0
Total	15	100.00	8	100.00	12	100.00

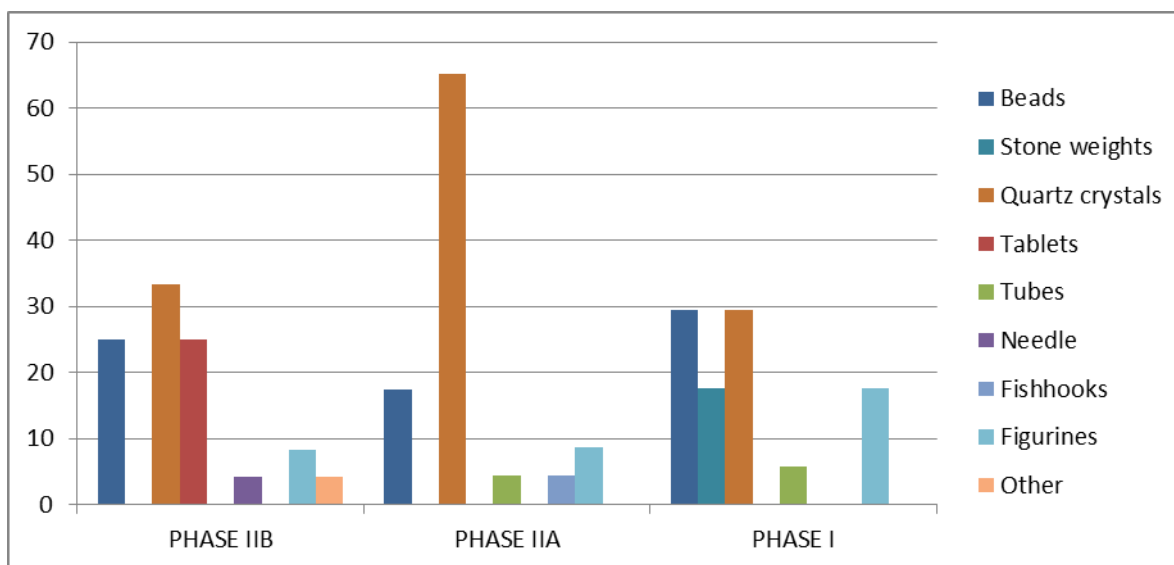


Figure 54. Percentages of artifact distribution by occupational Phases

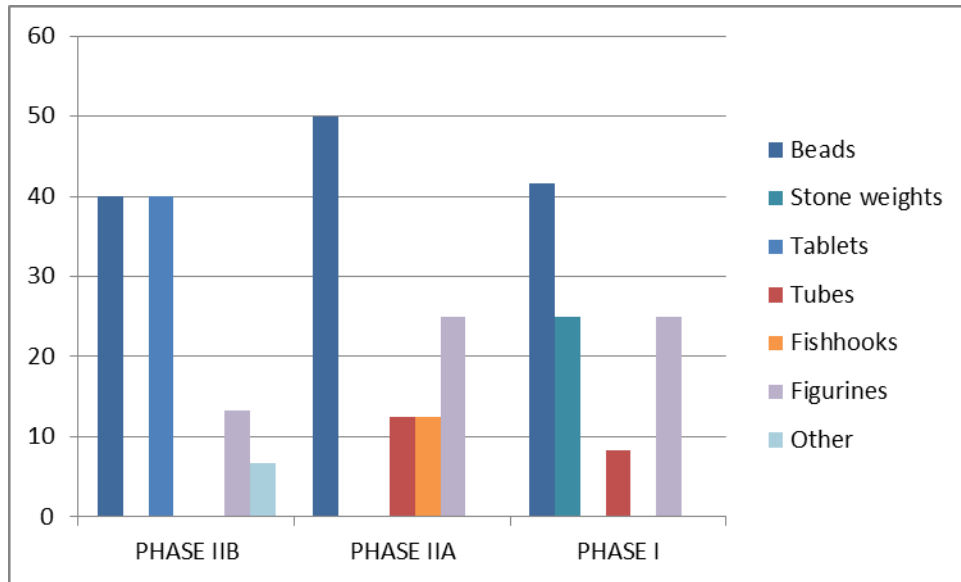


Figure 55. Percentages of artifact distribution by occupational Phases without the quartz crystals



Figure 56. Stone weight from Unit 6A with reed fiber.

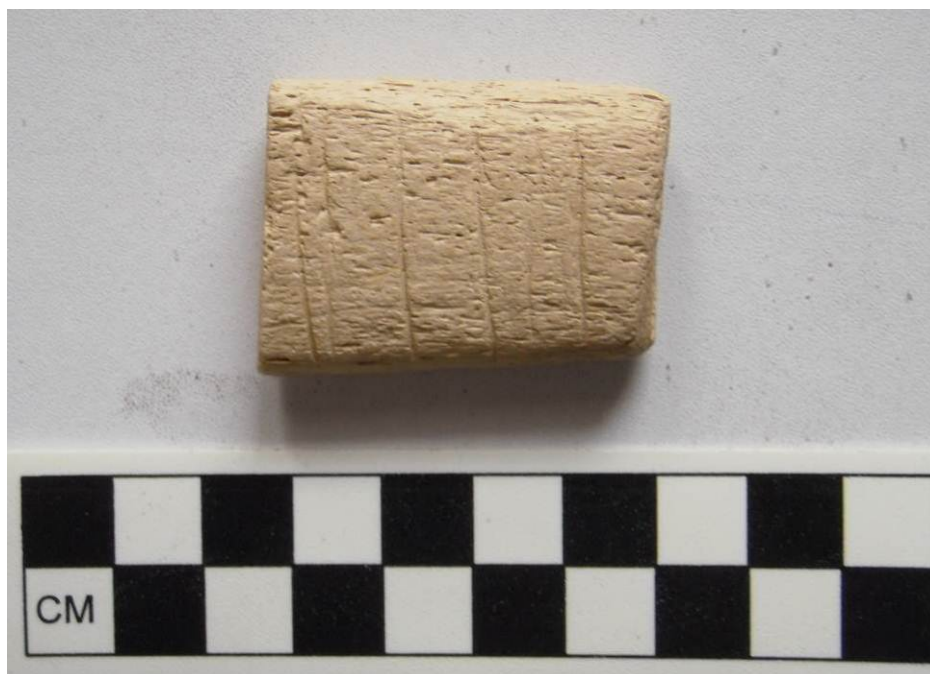


Figure 57. Bone tablet with incised lines.



Figure 58. Polished bone needle with incised line.



Figure 59. Bone bird tube with cut marks it is upper portion.



Figure 60. Broken *Choromytilus chorus* fishhook from Phase IIa.



Figure 61. Pieces of unbaked clay human figurines from Unit 6A: A. Almost complete figurines. B. Broken figurines torsos. C. Broken right arm and hand of figurine.



Figure 62. Unbaked clay disc with two central perforations has been identified as a construction plummet.

4.4 UNIT 6B

Unit 6B is the northern extension of Unit 6A with an initial area of 5 x 2 m it was later expanded to 5 x 5 m. It had a surface affected by modern occupation and trampling as in Unit 6A. Like Unit 6A it represents a stone alignment on its east side surrounded by loose sand and modern reed fragments.

The goal of excavations at this unit was to continue the excavations of the platform wall uncovered in unit 6A and to trace the floor succession. These excavations defined the continuation of the wall and uncovered the remains of a mud floor (S.U. 6.04) belonging to the platform floor. A plant sample from this floor was AMS dated to 3851 ± 38 BP. Similar to Unit 6C the platform has a series of depositions of domestic refuse as part of the construction fill. Excavations uncovered the corner of the platform and part of its northern wall, unfortunately only 1 meter of this wall was preserved as it was destroyed by later occupations and modern intrusions. The only evidence of this platform wall was the base of the wall.

As excavation continued it was evident that a different depositional process occurred in this area very different from Unit 6A. No floor succession were found as in Unit 6A but a series of secondary depositions placed towards the platform's exterior face created midden layers. An intense depositional process was observed in this particular part of the platform exterior where 26 S.U.s were identified. The 21 S.U.s are composed of compact black/dark gray organic midden, only 5 were sandy depositions, no evidence of formal mud floors were recovered. During the excavations of the first middens the excavation area was reduced to a 2 x 4 m excavation unit in the north side of Unit 6B (Fig. 63).

These middens presented compact surfaces with a slight inclination and evidence of human transit. They do not have features as some of the midden surfaces in Unit 6A. Only midden S.U. 6.39 associated with the stone platform had 4 pits.

Under this midden the S.U. 6.51 was a compact secondary midden composed of organic matter on its the surface where the stone platform was built (Fig. 64). Apparently it extended the platform base located in this excavation unit until it reached the wall 6.03 at the unit's south side.

Excavation under S.U. 6.51 uncovered a series of secondary middens composed primarily of organic remains. Midden 6.56 is a dense and compact midden of 0.6 m thick that was located almost immediately under midden 6.51. After it was excavated a sandy midden 6.66 was found; this midden is 0.7 m thick and appears to extend in the entire excavation unit. During excavation of 6.66 it was decided to reduce the excavation area to 2 x 3 meters leaving 1 m² of midden 6.66 exposed and preserved (Fig. 65). As the excavation got deeper, 2.0 m deep from the platform surface, it was decided to reduce the excavation area to a 2 x 2 m unit.

Excavation continued uncovering stratified secondary middens (S.U. 6.70, 6.72, 6.75, 6.76, 6.77, 6.78 and 6.80) that reached a depth of 2.6 m from the platform surface (Fig. 66). Beneath this thick level of deposition the first evidence of mud floors was uncovered. A sample from midden 6.77 located directly over the first mud floor (6.79) was dated to 4023±38 BP. A total of 7 superimposed mud floors were found concentrated in only 17 cm. On their surface a series of postholes were recovered. The floor 6.87, located at a depth of 2.75 m from the surface, was the only one to contain a series of 8 postholes that defined an oval structure (Fig. 67).



Figure 63. Upper levels of Unit 6B. To the left is the continuation of platform stone wall defined in Unit 6B.



Figure 64. Remains of midden 6.51 where the platform stone wall was built. Upper right corner show the platform corner. No mud floors were found as in Unit 6A.



Figure 65. Excavation area reduced to 2 x 3 m.



Figure 66. Stratified secondary middens: S.U. 6.70, 6.72, 6.75, 6.76, 6.77, 6.78 and 6.80



Figure 67. Floor 6.87 with postholes defined an oval structure.

Another feature found in this floor was a hearth (6.98). Between these floors thin layers of midden were identified. The earliest floor of the seven floors, floor 6.104 did not have any feature.

Under this succession of floors the depositions changed radically as we uncovered a series of sandy layers containing less organic remains at a depth of 2.78 m from the surface (Fig. 68). Some of these layers were compact surfaces with evidence of human transit over them. In particular S.U. 6.134 a sandy layer located at a depth of 3.92 m from the unit surface, had a compact surface a hearth and refuse. This S.U. was partially over the sterile sand (6.138). In other areas of the excavation unit two more depositions (S.U. 136 and 137) were found under S.U. 134. From S.U. 6.137 a plant sample was taken obtaining the radiocarbon date of 3822 ± 42 BP.



Figure 68. Sandy layers located under clay floor succession.

Sterile sand (S.U. 6.138) was reached under the cultural deposition at 3.96 m. Within this layer towards the west side of the sub-unit 2 human burials were found in an oval matrix with 4 big cobbles on its surface. The burial is similar to the burial pattern identified elsewhere at the site; cobbles covering the funerary bundle composed of a *juncos* mat. The individual was a sub-adult oriented S15°W semi-flexed with its head towards the north (Fig. 69). This burial many artifacts: at its right side was a gourd bowl (diameter: 8 cm) very badly preserved, beside its right arm a necklace was found. The necklace is composed by beads made of bird bones, 4 snails *Oliva peruviana* and a whorl (Fig. 70). The burial was excavated completely and with its removal the excavations at the unit 6B ended (Fig. 71).



Figure 69. Subadult burial 6.139 within the sterile sand layer 6.138.



Figure 70. Funerary artifacts of burial 6.139



Figure 71. Unit 6B at the end of excavation ~4.0 meters of cultural remains.

Occupational Sequence:

Excavations at Unit 6B allowed us to reach to the base of the human occupation at almost 4 m from the surface. This deep excavation exposed all the different occupations and depositional processes during the occupation of the area. From the S.U. we have reconstructed an occupational sequence divided in 3 phases:

- Phase I: Reflects the first evidence of human occupation of this section of the site. From the type of depositions, mainly sandy layers, and the density of cultural remains, this area was not occupied permanently. Apparently the settlement core was in other part of the site by this time. The burial S.U. 6.139 did not cut into any cultural deposition and it is evident that this was the first human activity in the excavated area. The date of 3822 ± 42 BP from the S.U. 6.137 marks the beginning of human activities there but as we mentioned above mainly transit and some small food preparation as the hearth and refuse at S.U. 6.134 were conducted there.

- Phase II: Represents a more formal occupation of the area with the construction of mud floors related to oval structures. As observed in Unit 6A there is a constant remodeling and reoccupation of the space for we found 7 mud floors and 6 reoccupations in less than 20 cm of vertical deposition. At floor 6.87 a series of postholes defined a partial oval structure (Fig. 72).

-Phase IIIa: After the last reoccupation of floor 6.79 (Fig. 73) the area function changes. A basal date of depositions after the floor 6.79 of 4023 ± 38 BP is clearly an outlier from the rest of radiocarbon dates obtained from the occupational sequence of the area and probably belongs to older material from somewhere else on the site dumped when this occupational phase began. In this phase we observed massive depositions of secondary middens that elevate the area 2 m from the original surface. This deposition is composed mainly of a secondary midden with a high content of organic material (dark middens) reflecting an intense transformation of the area. The last of these dark middens S.U. 6.51 has a compact regular surface over which the stone platform was built. A date from the upper floor 6.04 of the stone platform of 3851 ± 38 BP marks the end of this phase.

Phase IIIb: After the platform was built excavation uncovered a series of secondary depositions directly in contact with the platform stone wall (Fig.76). This middens represents a totally different process than that the observed at Unit 6A where a series of floors have been defined. These middens incline towards the west and did not contain any primary features as the ones identified at Unit 6B.

Table 12. Summary of Unit 6B Stratigraphic Units and Occupation Phases

Phase	Unit 6B	Postholes	Features
IIIb	6.1		
	6.4 Floor, 6.2 Midden		
	6.18 Midden		
	6.19 Midden		
	6.21, 6.22, 6.20 Sand		
	6.28, 6.8, 6.25 Midden		
	6.29 Midden		
	6.30, 6.13 Sand		
	6.33, 6.35, 6.38, 6.39, 6.44, 6.45, 6.46, 6.47, 6.48, 6.49, 6.59 middens		6.36(P), 6.37(H), 6.40(P), 6.41(P), 6.43(P)
	6.51 Midden		
IIIa	6.53, 6.52		
	6.55 Midden		
	6.56		6.59(H), 6.60(H)
	6.62, 6.63 Sand		
	6.64 Midden		
	6.65, 6.66, 6.72 Sand		6.67(ST)
	6.70, 6.75, 6.76, 6.77, 6.78, 6.80 Middens		6.74(H)
II	6.79 Floor	6.81, 6.82, 6.83	
	6.84 Midden		
	6.85 Floor		
	6.86, 6.89		
	6.87 Floor	6.90, 6.91, 6.92, 6.93, 6.94, 6.95, 6.96, 6.97	6.98(H), House 6B-I
	6.88 Midden		
	6.99 Floor	6.100	
	6.102, 6.101 Floors		
	6.103 Sand		6.105(P)
	6.104 Floor		
I	6.107 Midden	6.108	
	6.115, 6.113, 6.112, 6.109 Sand		
	6.116 Sand	6.118	
	6.123, 6.122, 6.119 Sand		
	6.124 Midden	6.125, 6.126	
	6.131, 6.129, 6.128 Sand		
	6.134 Sand		6.132(H)
	6.136 Midden		
	6.137 Sand		
	6.138 Sand		6.139 (B)

Key: (H) Hearth, (P) Pitt, (B) Burial, (ST) Fire cracked stones

Some features received more than one S.U. they are grouped between []

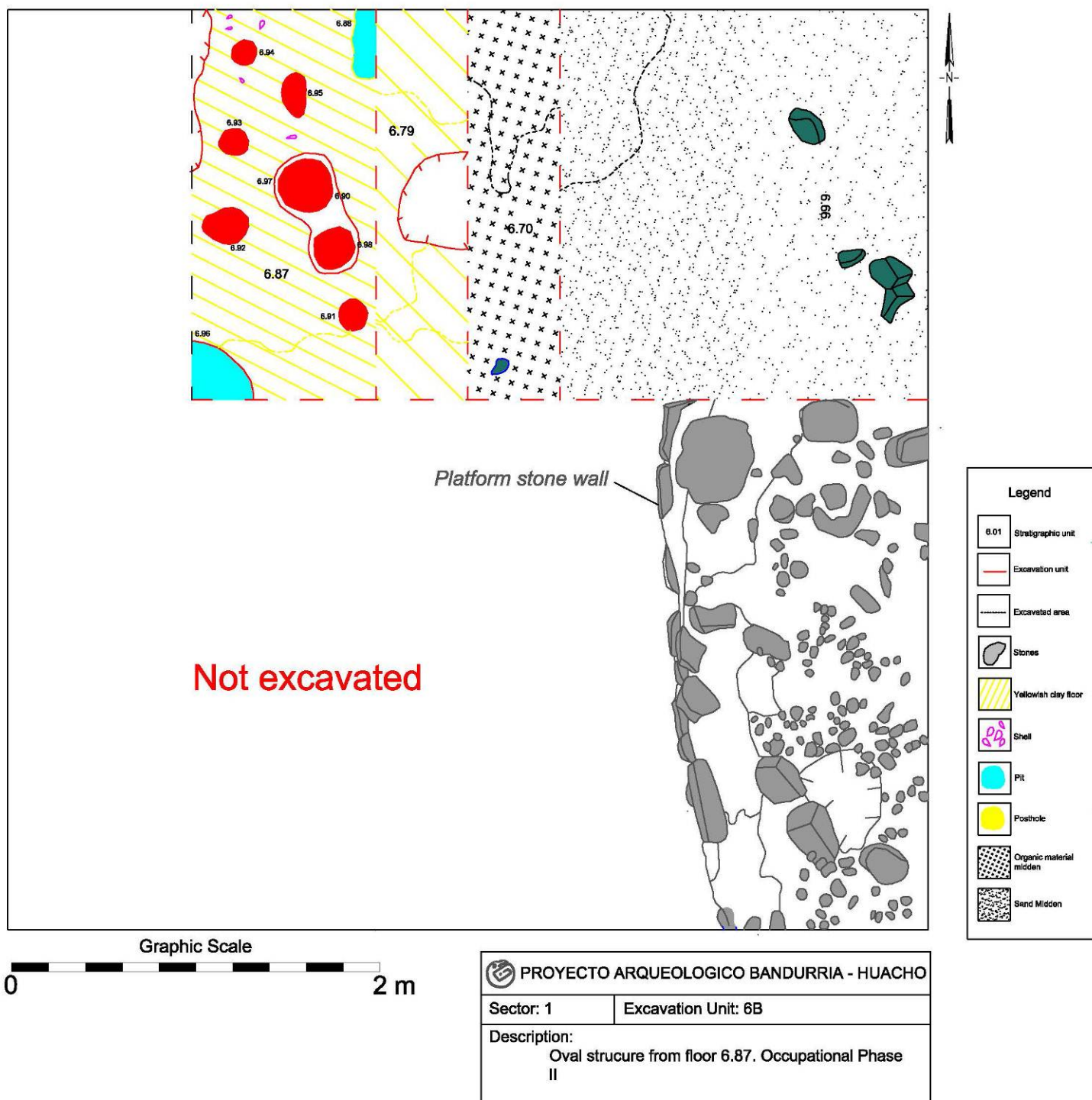


Figure 72. Oval structure from floor 6.87. Occupation Phase II

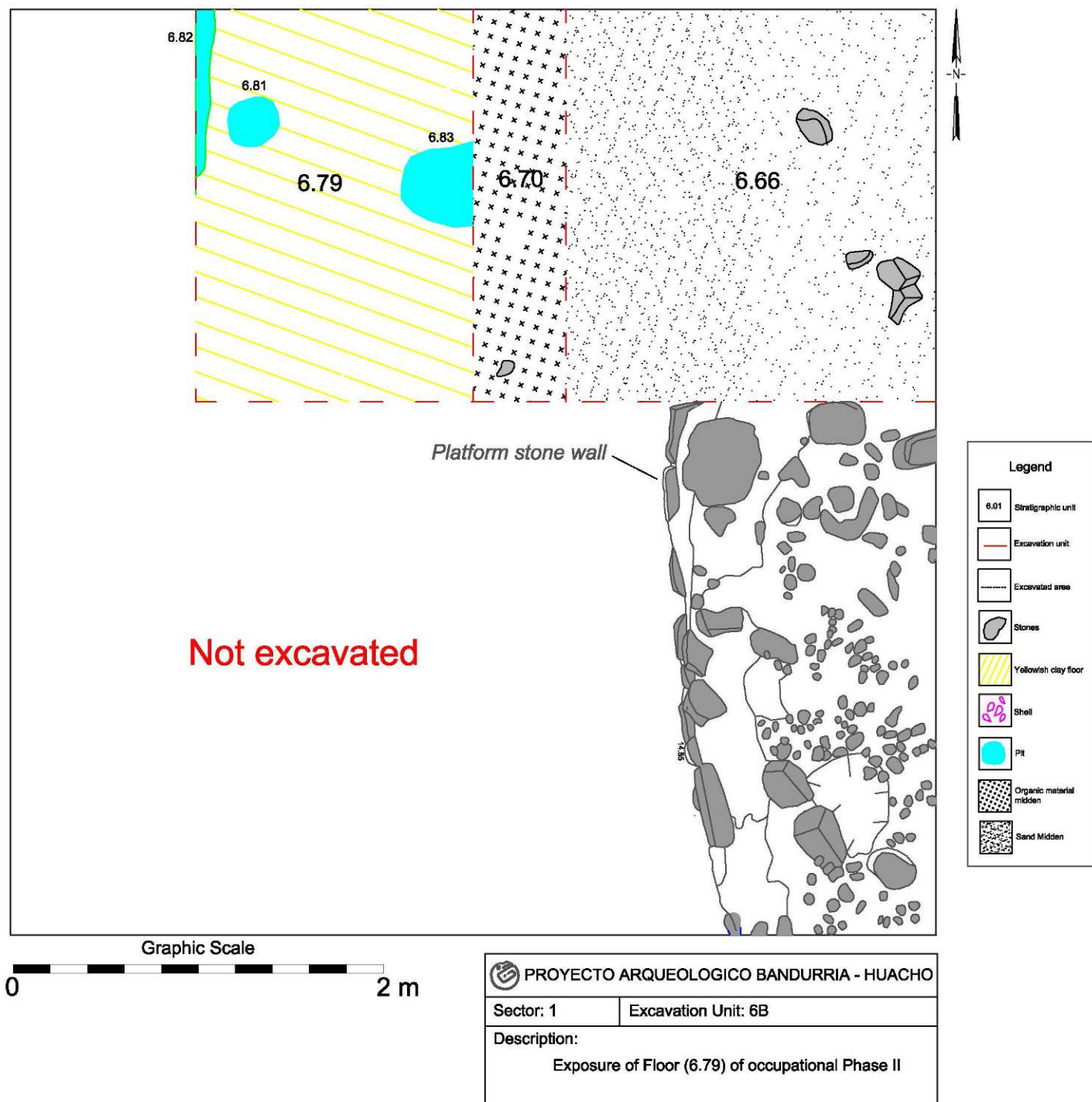


Figure 73. Occupational Phase II. Floor 6.79.

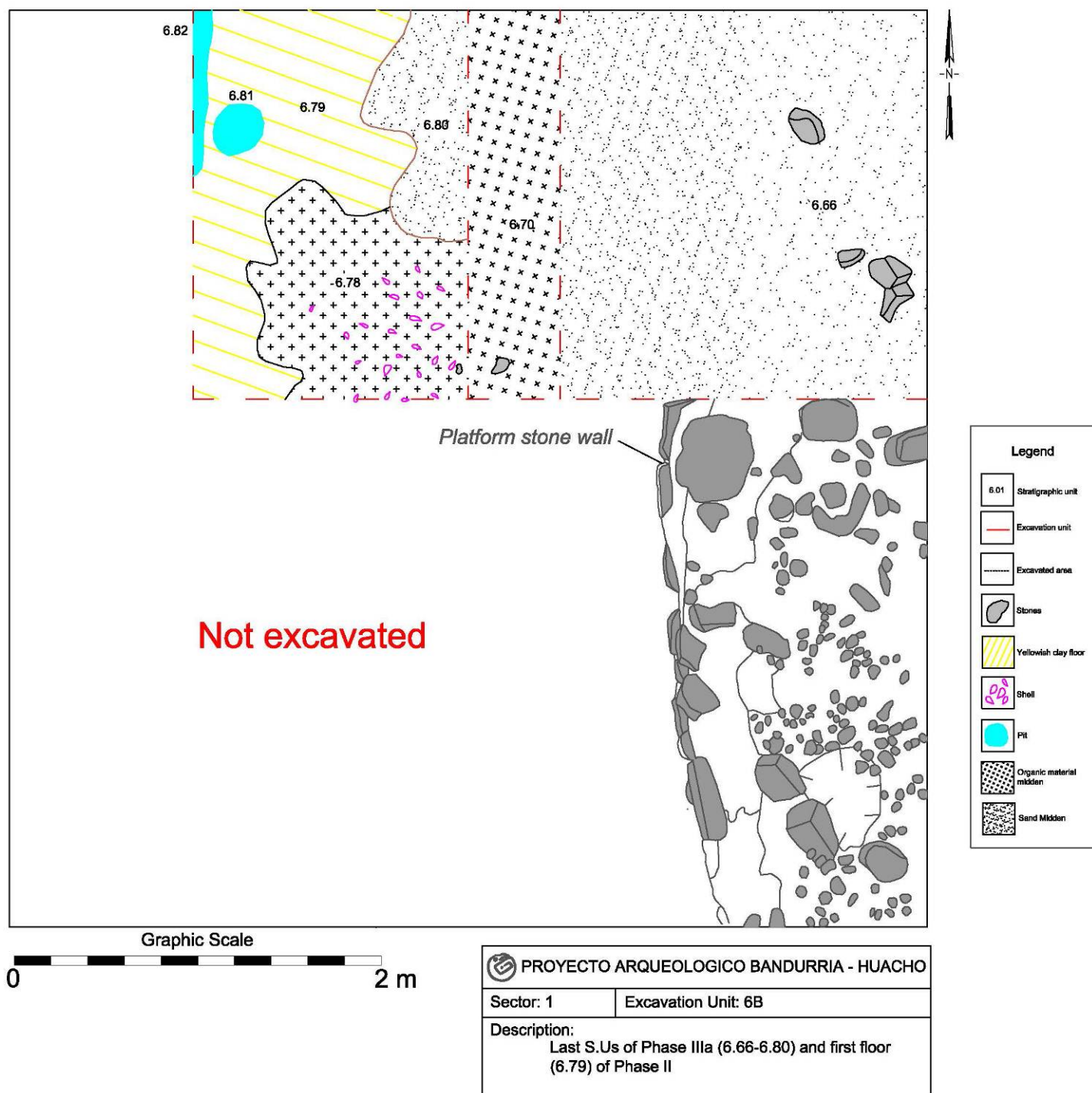


Figure 74. Floor 6.79 of Phase II and lower middens from Phase IIIa

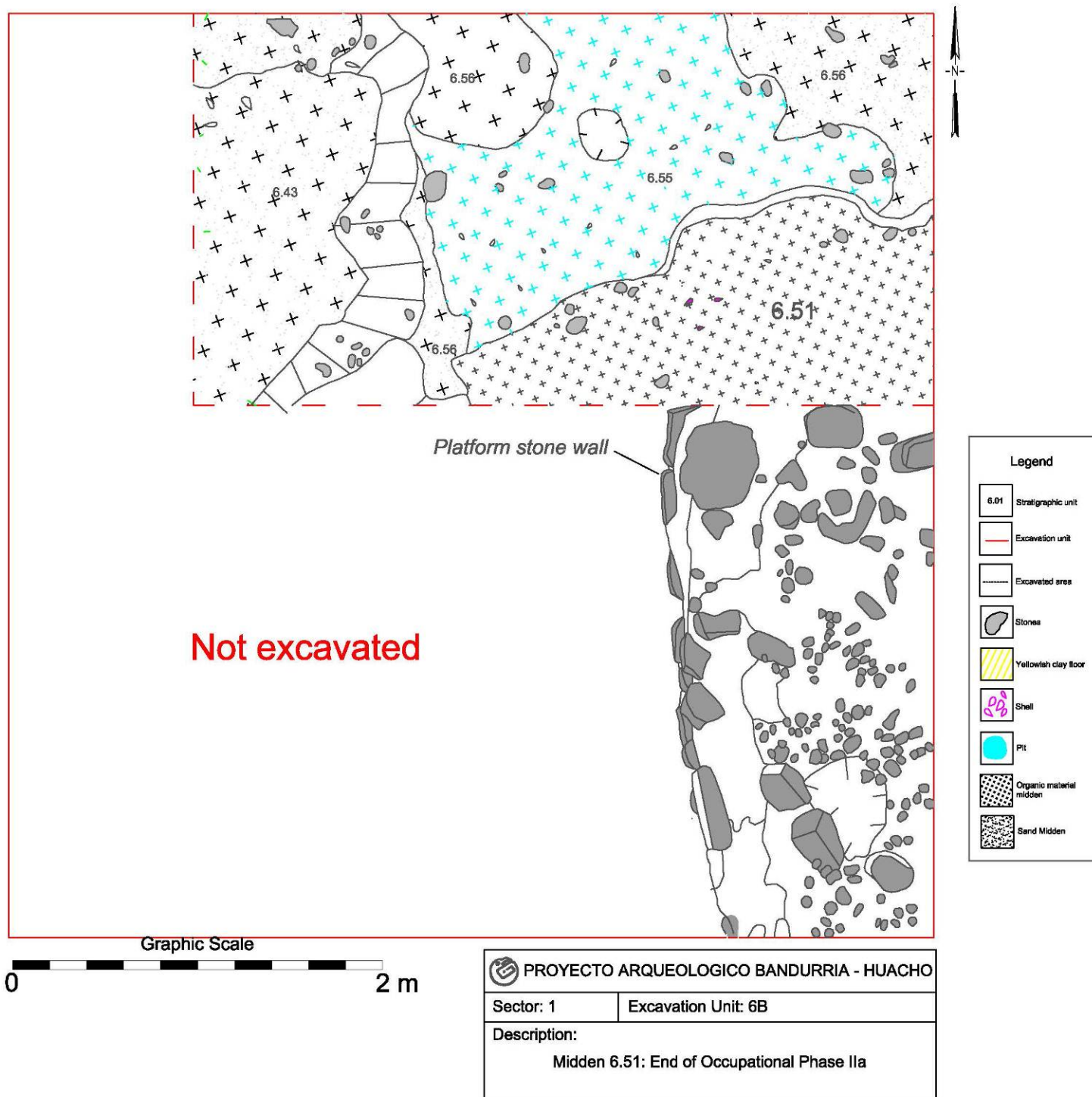


Figure 75. End of occupational Phase IIa. Midden 6.51.

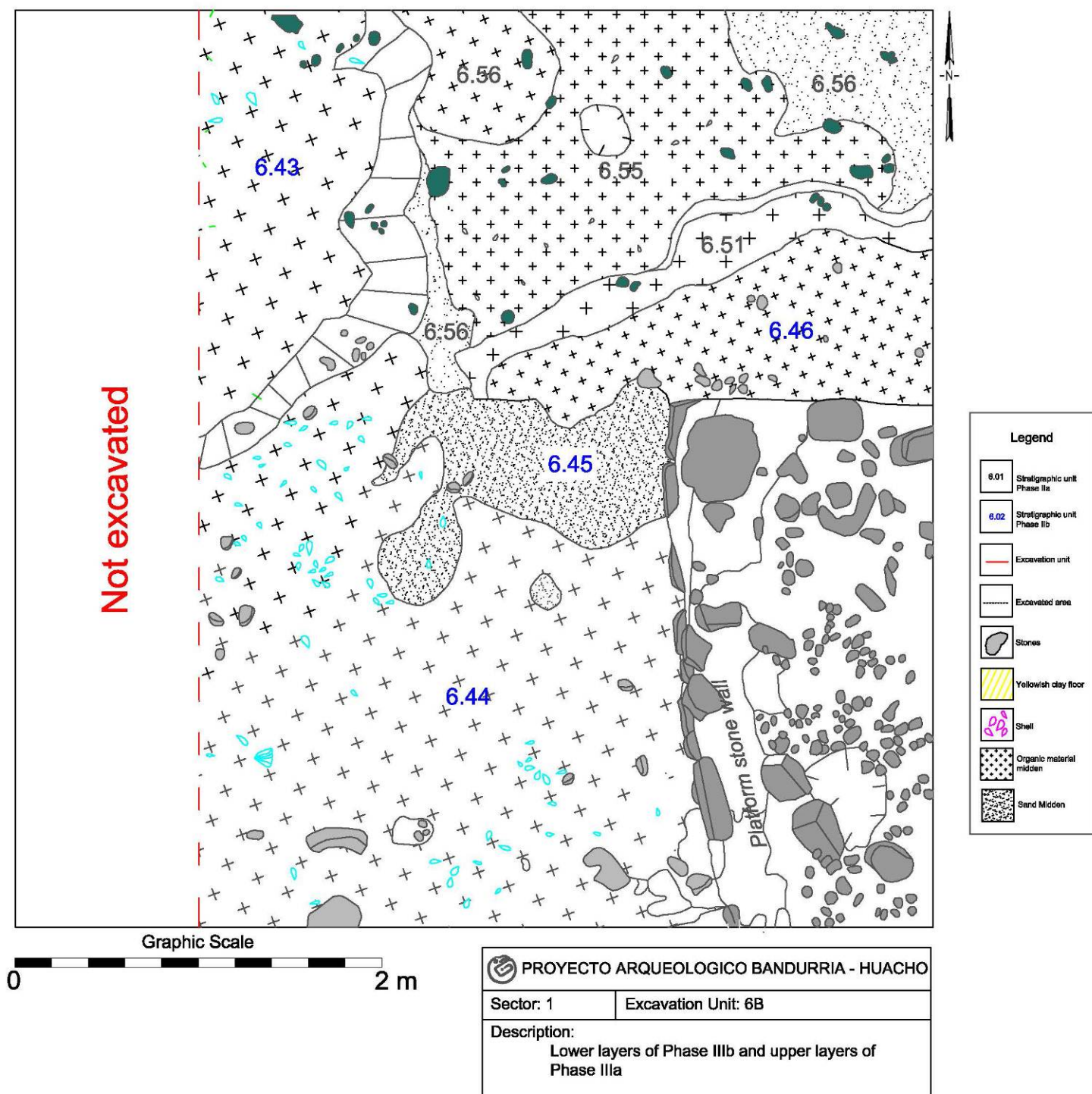


Figure 76. Lower levels of Phase IIIb and upper levels of Phase IIIa.

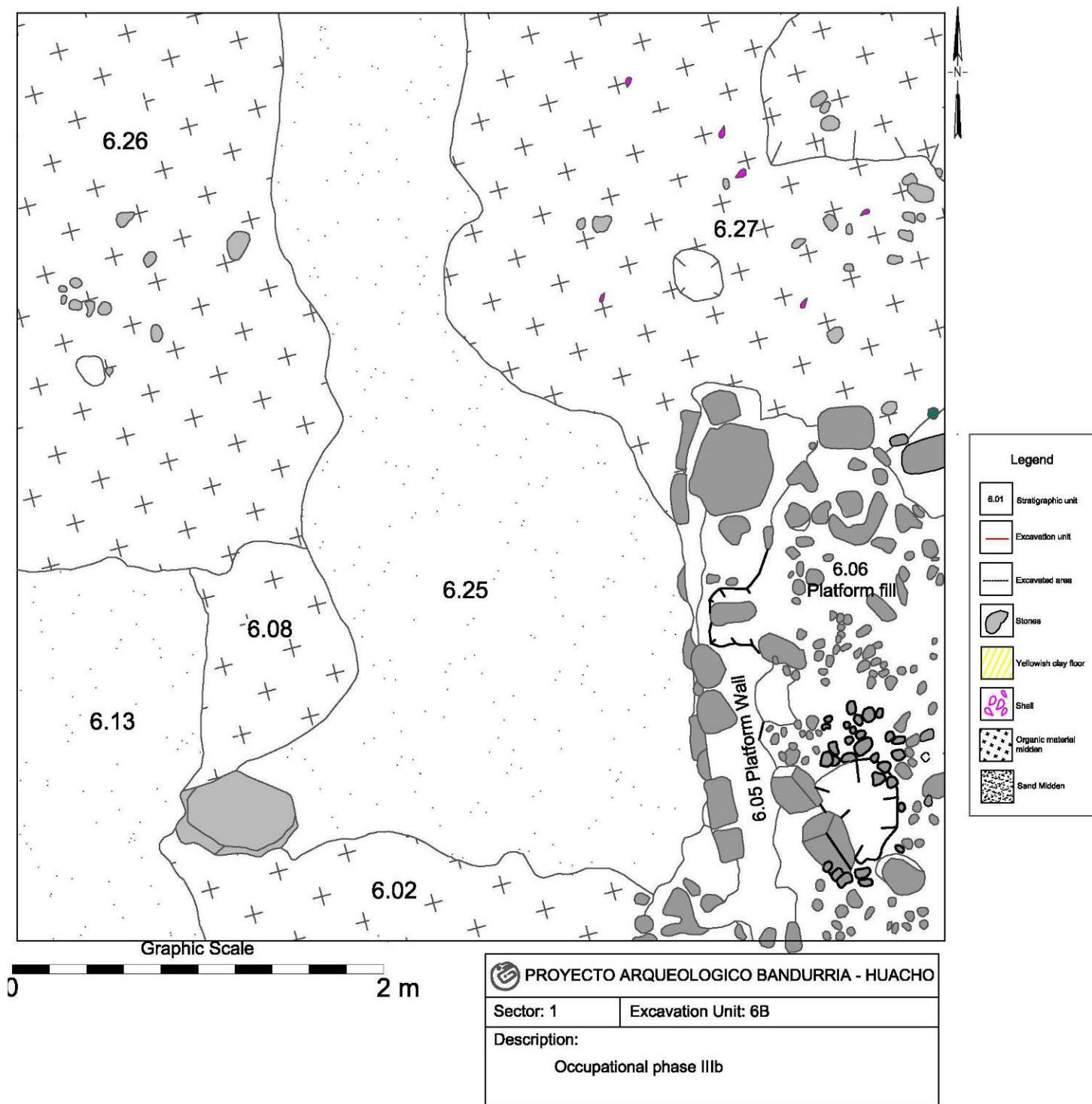


Figure 77. Middens from occupational Phase IIIb.

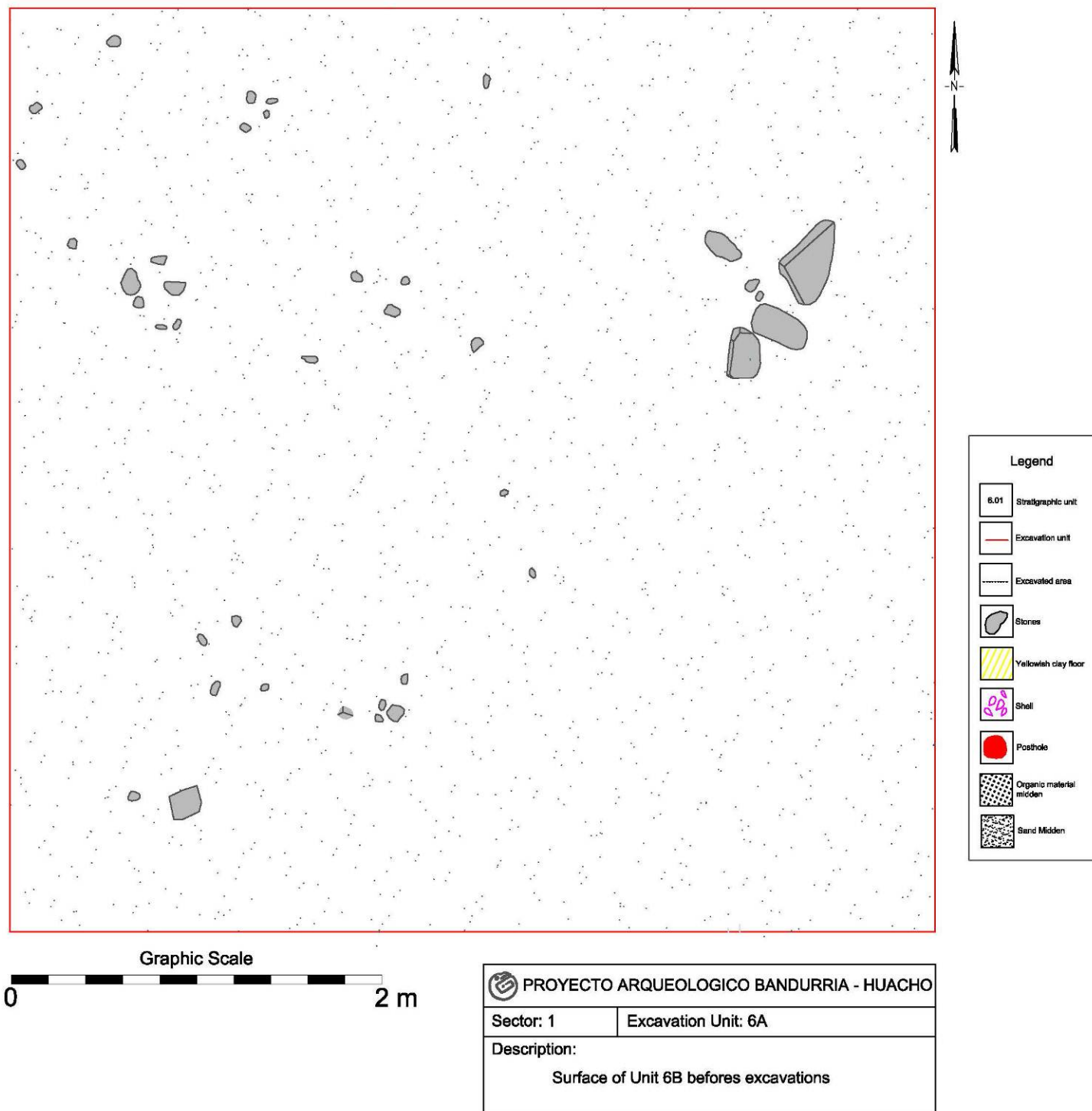


Figure 78. Surface of Unit 6B before excavation.

Artifacts associations

Artifacts were recovered from all the occupational phase at Unit 6B. As with the excavation of Unit 6A, quartz crystals were the most common artifacts recovered from the excavations (Table 13). A total of 100 artifacts were recovered from the four occupational phases identified. Of them the 75% (n = 75) are unmodified quartz crystals. They generally are small pieces of clear and milky quartz, some have been broken from bigger pieces but no use marks were found on the quartz flakes. Of the total of crystals found, Phase IIIb contained 70.67% (n = 53) of the crystals, Phase IIIa the 18.67% n = 14), and Phase I the 10.67% (n = 8). No quartz crystals were found for Phase II (Table 13). Artifacts recovered at the excavations centered in Phases IIIa and IIIb, 65% and 23% respectively; only one artifact (1%) was recovered from Phase II and 11 (11%) artifacts from Phase I.

Again we considered discarding quartz crystals in the artifact distribution; this left us with only 25 artifacts (Table 14). Artifact distributions only slightly changed (Phase IIIb: 48%; Phase IIIa: 36%; Phase II: 4% and Phase I: 12%). Both tables were plotted as bar charts (Figs. 79 and 80) to observe artifact distributions. After quartz crystals (Fig. 81), beads (Fig. 82) are the second most abundant artifact type recovered, although they were only recovered from occupational Phases IIIb and IIIa. No beads were found in Phases II and I.

Only 6 lithic artifacts were recovered from all the excavations in Unit 6B. From Phase IIIb an obsidian flake (Fig. 83) from midden 6.13 and a bifacial tool made of chert (Fig. 84) from midden 6.25 were recovered. From Phase IIIa, 2 stone weights (Fig. 85) were recovered and 2 weights more from Phase I. Only one bone artifact was recovered in Unit 6B; a broken flute made of bird bone (Fig. 86) found in Phase IIIb. It is the only example of a musical instrument

recovered from the Domestic Sector. Found in midden 6.07, near the surface, only 8.0 cm of the lower portion of the flute was preserved. It also shows heat and burnt marks.

Table 13. Artifact distribution Unit 6B: Total counts and frequencies by occupational phases.

	PHASE III B		PHASE III A		PHASE II		PHASE I	
	N	%	N	%	N	%	N	%
Beads	9	13.85	5	21.74	0	0	0	0
<i>Lithic artifacts:</i>								
Flakes	1	1.54	0	0	0	0	0	0
Bifacial tools	1	1.54	0	0	0	0	0	0
Stone weights	0	0	2	8.70	0	0	2	18.18
Quartz crystals	53	81.54	14	60.87	0	0	8	72.73
<i>Bone artifacts:</i>								
Tablets	0	0	0	0	0	0	0	0
Tubes	0	0	0	0	0	0	0	0
Needle	0	0	0	0	0	0	0	0
Flute	1	1.54	0	0	0	0	0	0
<i>Shell artifacts:</i>								
Fishhooks	0	0	0	0	0	0	0	0
<i>Wood artifacts:</i>								
Worked Sticks	0	0	0	0	0	0	0	0
<i>Unbaked clay:</i>								
Figurines	0	0	2	8.70	0	0	0	0
Other	0	0	0	0	1	100.00	1	9.09
Total	65	100.00	23	100.00	1	100.00	11	100

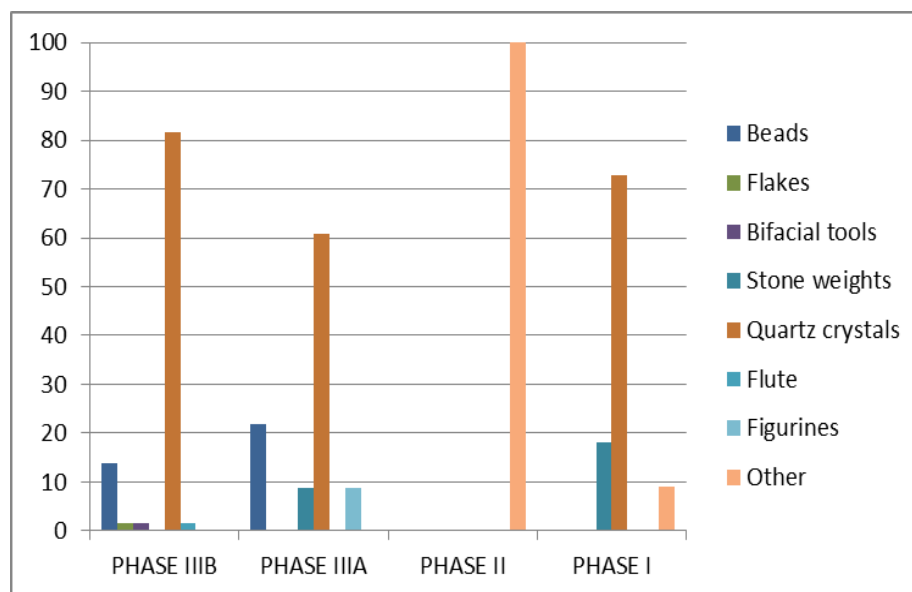


Figure 79. Percentages of artifact distributions by occupational Phases in Unit 6B.

Table 14. Artifact distribution Unit 6B without quartz crystals.

	PHASE III B		PHASE III A		PHASE II		PHASE I	
	N	%	N	%	N	%	N	%
Beads	9	75.01	5	55.56	0	0	0	0
<i>Lithic artifacts:</i>								
Flakes	1	8.33	0	0.00	0	0	0	0
Bifacial tools	1	8.33	0	0.00	0	0	0	0
Stone weights	0	0.00	2	22.22	0	0	2	66.67
<i>Bone artifacts:</i>								
Tablets	0	0.00	0	0.00	0	0	0	0
Tubes	0	0.00	0	0.00	0	0	0	0
Needle	0	0.00	0	0.00	0	0	0	0
Flute	1	8.33	0	0.00	0	0	0	0
<i>Shell artifacts:</i>								
Fishhooks	0	0.00	0	0.00	0	0	0	0
<i>Wood artifacts:</i>								
Worked Sticks	0	0.00	0	0.00	0	0	0	0
<i>Unbaked clay:</i>								
Figurines	0	0.00	2	22.22	0	0	0	0
Other	0	0.00	0	0.00	1	100.00	1	33.33
Total	12	100.00	9	100.00	1	100.00	3	100.00

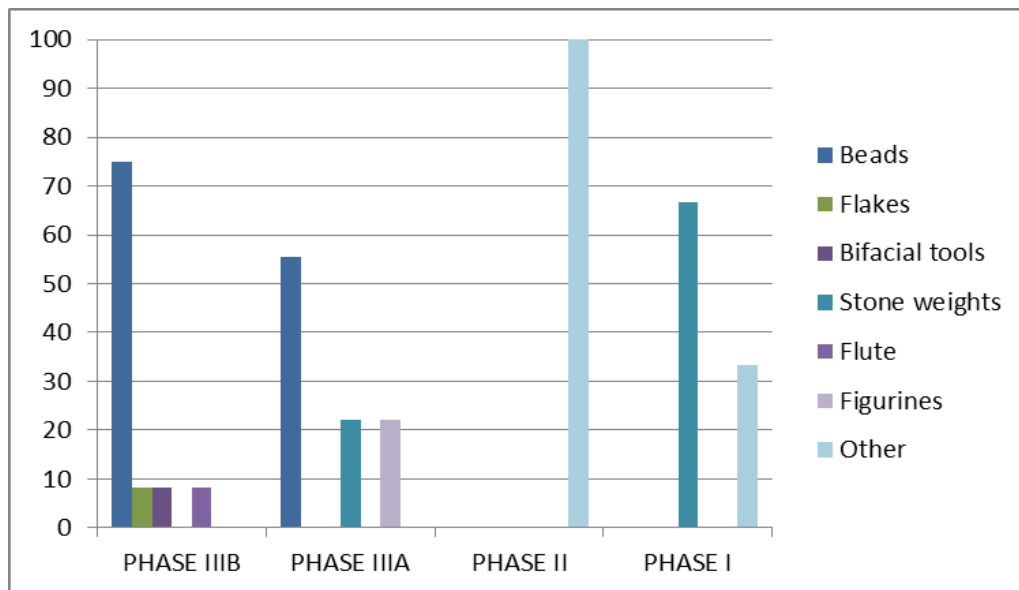


Figure 80. Percentages of artifact distributions by occupational Phases without the quartz crystals in Unit 6B.

No shell or wood artifacts were recovered from Unit 6B. An almost complete unbaked clay figurine and a piece of a figurine were recovered from Phase IIa (Fig. 87) both were found in dark ash middens (6.58 and 6.66).

Finally two torches (Fig. 88) were recovered from Phase II and Phase I. These torches are wooden sticks that have been wrapped at one end with cotton twined textiles. No other torches have been recovered from all the archaeological excavations at Bandurria.



Figure 81. Clear and milky quartz crystals recovered from excavation in Unit 6B.



Figure 82. Beads recovered from excavation in Unit 6B.



Figure 83. Obsidian flake recovered from Unit 6B.



Figure 84. Bifacial lithic tool recovered from Unit 6B.



Figure 85. One of the stone weights recovered from Unit 6B.



Figure 86. Broken bird bone flute recovered from Unit 6B.



Figure 87. Unbaked clay figurine recovered from Unit 6B.



Figure 88. Torch recovered from Unit 6B.

4.5 UNIT 8

Unit 8 was placed in the central area of the Domestic Sector about 20 m southeast from Unit 9. Initially set up as a 2 x 2 m test pit (Fig. 89) the discovery of a clay floor (8.32) with post holes encouraged us to extend this unit to define this domestic occupation. The unit was first extended to a 5 x 5 m excavation unit, then to a 5 x 10 m and finally a 10 x 10 m excavation unit. Each of the 5 x 5 m units received the letter 8A the first excavation unit excavated, 8B the 5 x 5 m unit located to its east, 8C the unit located north from 8A, and 8D the unit located north of 8B.

This excavation unit had as its objective to define the characteristics of the site in its central area and trace site formation by reaching the base of human occupation (as unit 9). But as evidence of clear domestic occupation (floor with post holes) was found it was decided to expand the excavation into an area excavation to define these contexts. The excavation unit expanded until it reached an area of 10 x 10 m.

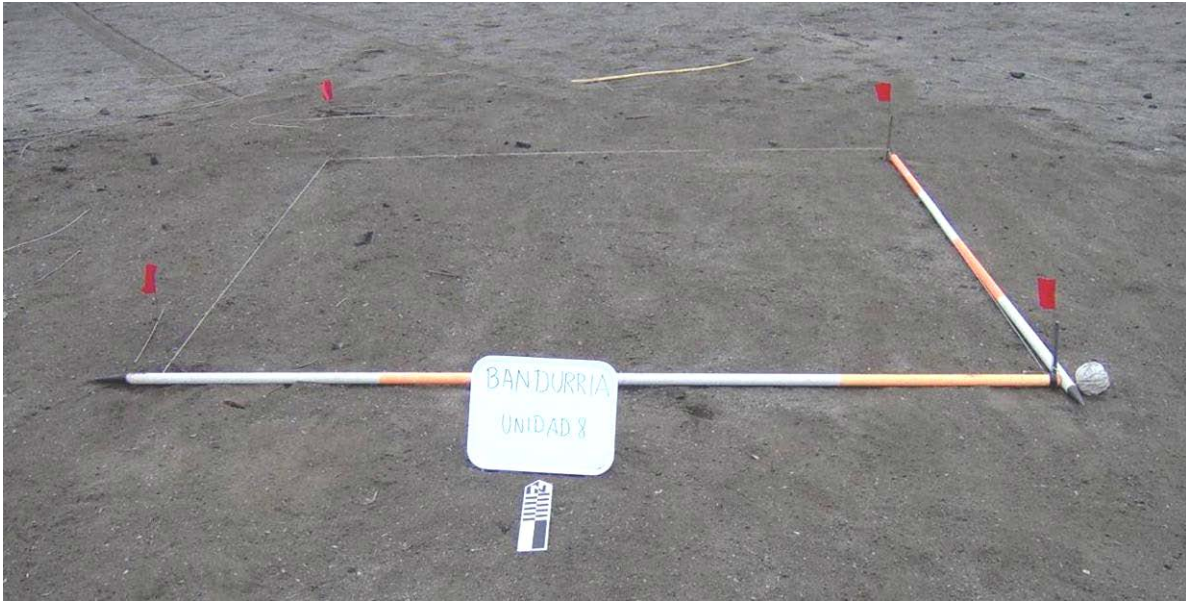


Figure 89. Unit 8 as a 2 x 2 m test pit before excavations modern trampling (vehicle tracks and human footprints) can be seen in its surroundings.

Excavation Process:

Unit 8A

Excavation began in Unit 8 with the extraction of the superficial stratigraphic units. We observed, as in Unit 9, that the modern occupation of the domestic sector has affected this uppermost level. Under the loose upper level a series of holes filled with midden and debris depositions were found with the same characteristics as the upper levels of Unit 9. As excavations continued a clay floor (8.32) was found at -9 cm from the surface, on its surface a series of postholes (Fig. 90) were found. This floor is made of yellowish clay and presented a regular surface. We then expanded the unit to a 2 x 2 m to the north and then the unit was expanded to the east by 2 x 4 m reaching a total area of 4 x 4 m. All the clay floors were exposed in the excavation unit, although several post holes were found but they did not present any clear pattern.



Figure 90. Unit 8: First evidence of floor 8.32 found during excavations.

Not having found any clear pattern among the post holes in floor 8.32 it was decided to expand it to a 5 x 5 m the standard excavation unit used by us. Two expansions of 1 x 5 m each were done in the south and west sides of the 4 x 4 m unit. The Stratigraphic Units found were correlated with the ones previously excavated from the 4 x 4 m unit. During this expansion a later floor was discovered before reaching the floor S.U. 8.32. This later floor S.U. 8.36 was found at only -4 cm from the surface, and appears to be the last domestic occupation of the area. It presented the same characteristics (color, composition, regularity) as floor 8.32. It also contained post holes in its surface, encouraging us to expand the excavation unit. In the west expansion a series of postholes defined a domestic structure. Although the floor 8.36 was broken it was possible to define an ellipsoid structure (Structure 8-I) composed of 10 post holes associated with 3 pits and 1 hearth.

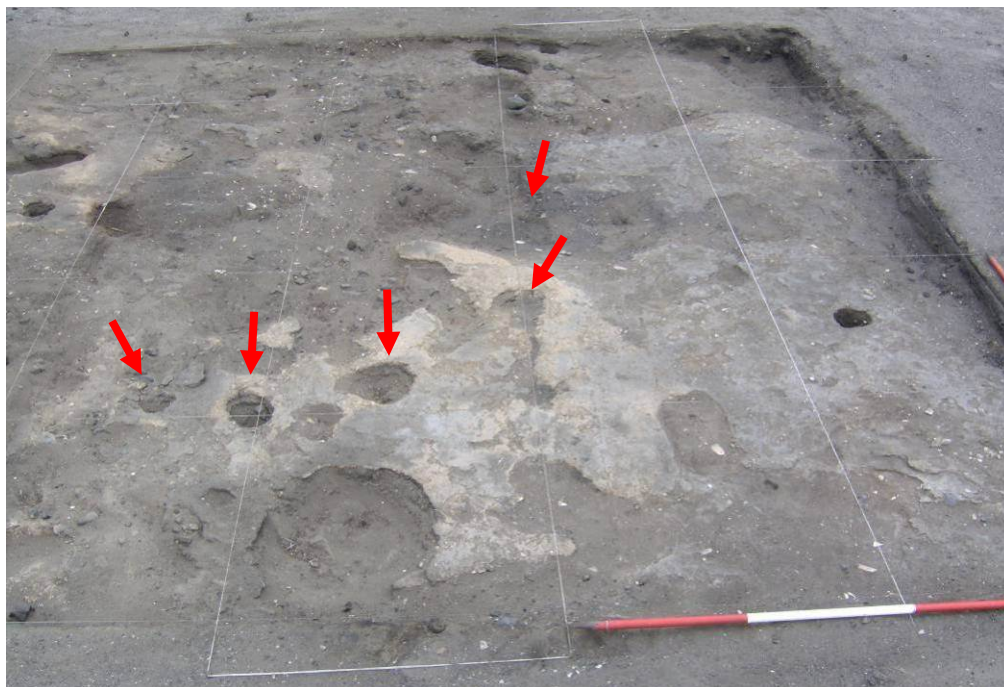


Figure 91. Unit 8: Remains of the domestic structure 8-III associated to floor 8.32.

After removing floor 8.36 an ash layer was found adjacent to the floor. After removing this layer floor 8.32 was appeared. With the complete excavation of the 5 x 5 unit and the exposure of the 8.32 floor another ellipsoid domestic structure was found (Structure 8-III). It was defined by 15 postholes (Fig. 91). A plant sample from this floor was dated by AMS dating obtaining the date of 3802 ± 39 BP.



Figure 92. Unit 8: Excavation of reed mat (S.U. 8.66) over floor S.U. 8.57.



Figure 93. Unit 8: Detail of mat in association with post holes.

To assess the density of cultural remains and probe for more clay floor a 2 x 2 m pit was excavated in the southwest corner of the excavation unit. Almost immediately a third clay floor (8.57) was found, at -13 cm from the surface. The presence of this third floor led us to excavate the remainder. The presence of several post holes in the mud floor was associated with the remains of a reed mat, allowing us to define an ellipsoid structure (Structure 8-IV) composed of 12 post holes. The mat probably was used as part of the walls of the domestic circular structure (Figs. 92 and 93). The 8.57 floor also contained two hearths (S.U. 8.74 and 8.77) and a pit (S.U. 8.62) filled with refuse. Another set of post holes was identified at the east side of the excavation unit. As excavations continued in unit 8B this set of post holes defined a second circular structure related to this floor.

After defining this domestic occupation, excavations continued at the 2 x 2 m pit to probe the cultural deposition and assess its depth. Few centimeters below floor 8.57 and -21 cm from surface, a fourth floor was identified. Floor S.U. 8.64 is also composed of yellowish mud and with the same characteristics of the three previous floors. With this fourth occupation within Unit 8 it was decided to expand the excavation to 5 x 5 m on the east side of Unit 8. The new Unit 8B (the former Unit 8 was renamed 8A) was intended to expose more area and better define the four domestic occupations.

As excavations in Unit 8A continued, floor S.U. 8.64 was reached, it revealed a well defined ellipsoid structure (Fig. 94) composed of 24 post holes (Structure 8-IV). Inside the circular structure a hearth (S.U. 8.155) of 30 cm of diameter and plastered with the same yellow mud was found. A smaller hearth (S.U. 8.154) was found outside the structure. This is the best preserved circular structure found in the excavations. A plant sample from the base of the hearth S.U. 155 gave the AMS date of 3842 ± 38 BP.

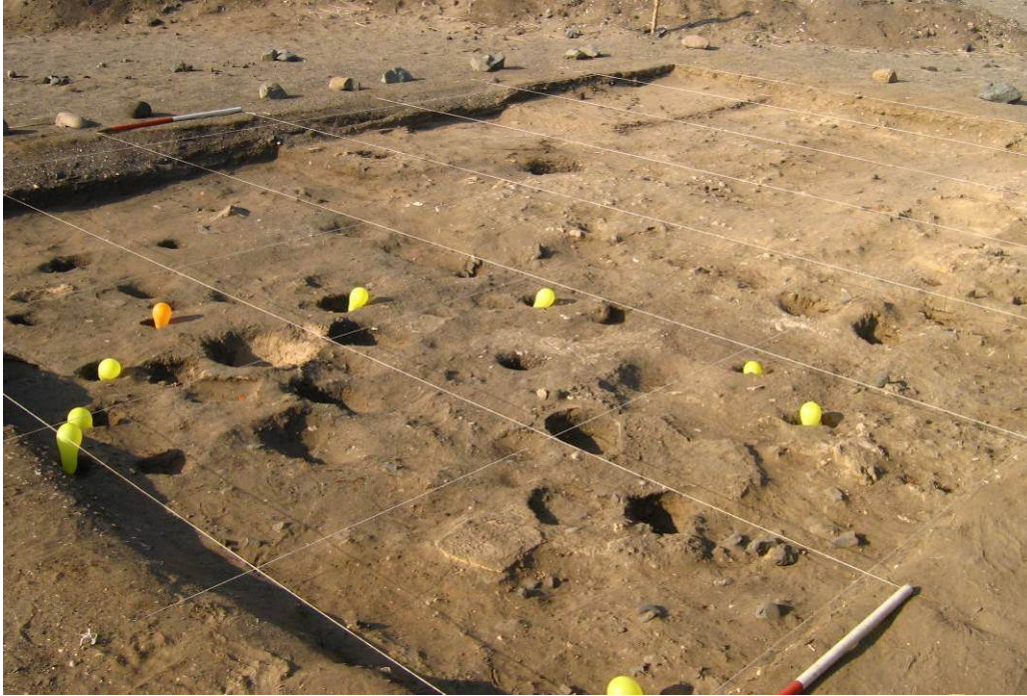


Figure 94. Unit 8A: Oval structure with hearth (8.155) in floor 8.64.

Unit 8B

Excavations at Unit 8B revealed in floor 8.36 a partial ellipsoid pattern of post holes (Fig. 95) of a second domestic structure (Structure 8-II) cut by later occupations and probably modern surface alteration. A total of 9 post holes were found in association with a hearth (S.U. 8.125) of 28 cm of diameter and two pits (S.U. 8.117 and 8.124). Under this floor the same layer of sand debris (S.U. 8.3) was found and below it the floor 8.32. Floor S.U. 8.32 extended almost all the southwest portion of Unit 8B presenting a more eroded surface and alteration by the later occupations.

When floor 8.57 was reached more post holes in this excavation unit complemented the ones found in the east side of unit 8A (Fig. 96) defining almost an ellipsoid structure (Structure 8-V), composed of 11 postholes and associated with a hearth (8.74). This floor 8.57 was also

impacted by later occupations but the remaining post holes were enough to define two structures found on its surface.



Figure 95. Unit 8B: Unit 8B: Remains of the first oval structure associated with floor 8.36. White balloon marks a hearth; yellow balloons mark post holes with the remains of posts inside.



Figure 96. Units 8A and 8B: Floor 8.57 with the remains of a circular structure, the blue balloons marks the post holes.



Figure 97. Unit 86: Second circular structure on floor 8.64 and associated to a hearth (8.173).

After floor S.U. 8.57 was exposed, excavations continued to uncover floor S.U. 8.64 throughout Unit 8B. Excavations uncovered the remains of another ellipsoid structure (Structure 8-VII) composed of 9 postholes associated with a hearth (S.U. 8.173) with the same characteristics as hearth S.U. 8.155 with a diameter of 30 cm (Fig. 97), unfortunately, the floor did not extend throughout the excavation unit.

Each mud floor was made of yellow clay (similar to the mud used in the monumental architecture) with a thickness of 1 to 2 cm. The floors were placed above layers of sand and debris from secondary domestic activities done somewhere else in the site. The abandoned floor was broken, removed or intruded into by holes of various sizes that were filled with trash. We found that it was common that some post holes cut through previous floors since the floors were so close together.

From each of the floors identified (S.U. 8.36, 8.32, 8.57, 8.64) a series of pits and hearths areas have been identified. We believe these are primary depositions and are related with the domestic structures identified for each occupation. The contents of these stratigraphic units will be used for comparisons between floors and (if possible) households.

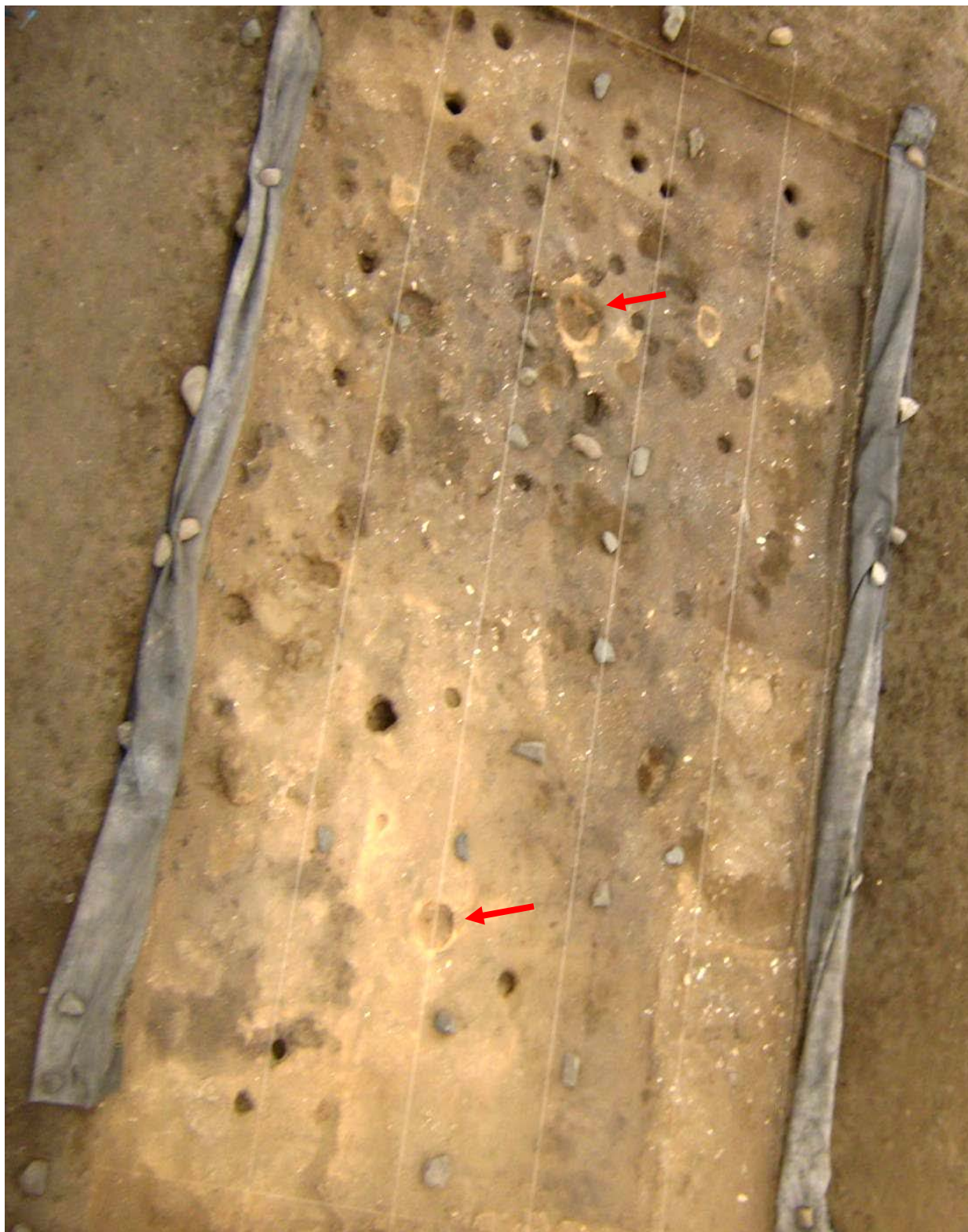


Figure 98. Aerial view of Unit 8A and 8B with floor 8.64 exposed and the two domestic structures associated with hearths 8.155 and 8.173 (red arrows).

Units 8C and 8D

No evidence of domestic structures were found in unit 8C and 8D. Floor S.U. 8.36 was found fragmented over both excavation units, with no clear evidence of post holes associated with mud floors. During the excavation of these two excavation units, the remains of a new mud floor (S.U. 8.127) were found below floor S.U. 8.36. This floor reflects a fifth occupation in the area that extended through the northern edge of Unit 8B towards Unit 8D, where it was found fragmented extending only to the center of the unit. No post holes were found in this floor, although it had the same characteristics of the previous floors. Fragmented floor S.U. 8.32 was found immediately below floor 8.127 in some areas of Units 8C (Fig. 99) and 8D. No post holes were associated with this floor in both excavations units. Floor S.U. 8.57 was found only in a fragment in the center of Unit 8D (Fig. 100). No traces of floor S.U. 8.64 were found in both Units. In Units 8C and 8D most of the floors excavated ended (apparently broken) by the intrusion of a later deposition of sand with debris. The floors also appear constantly fragmented suggesting that the floors did not extend further to the north.



Figure 99. Unit 8C: Remains of floor 8.32, where no domestic structures found.

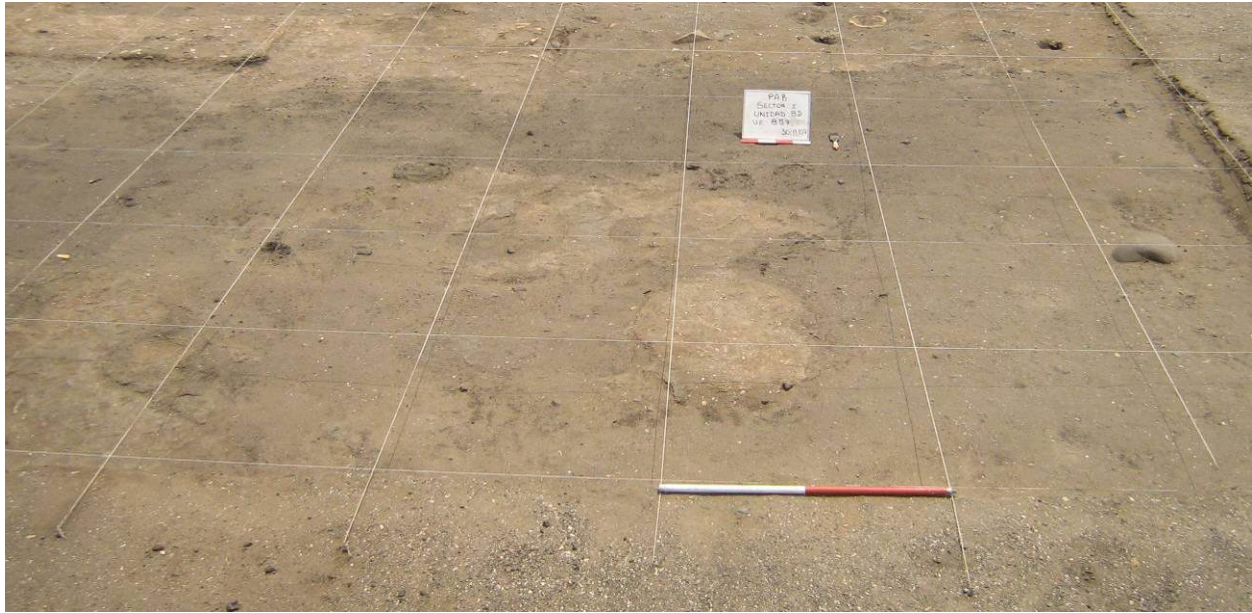


Figure 100. Unit 8D: Remnants of floor 8.57 at the center of the excavation unit.

Due to time limitations excavations at Unit 8 ended after the excavation of Units 8C and 8D, excavations at Unit 8A and 8B were also stopped after the exposure of floor 8.64. As we mentioned before below floor 8.64 a series of midden depositions (e.g. 8.65) were identified but left unexcavated.

Occupational Sequence:

Five successive mud floors were found during excavations of Unit 8 (A, B, C and D). Of these five floors, four of them had clear evidence of domestic structures. It is important to mention that it is very probable that older occupations are located below the last floor exposed (8.64) as the excavation only reached a depth of between 22 to 30 cm in an area where the human occupation is about 1.5 m deep as seen in nearby Unit 9. From hearth and post holes excavated in floor 8.64 we could see that features intruded into lower layers but no floor was located immediately below floor 8.64. From observations at Unit 6 and 9, is very probable that

the floors excavated in Unit 8 represent the upper occupation in this sector of the site. Below this floor there must be a series of secondary depositions like that observed in unit 6 and 9 and below it was probably an earlier floor or a succession of floors like the ones found in unit 9.

From excavation at Unit 6B and Unit 9 we know that these series of floors represent one occupational phase of intense remodeling activity. Under that floor there are probably thick secondary midden desposits such as found at Unit 6B. This is why we have decided to define these floors as subphases.

The latest occupation near the surface belongs to occupational Phase II. It is composed of a series of secondary depositions that cover the last mud floor (8.36) identified at Unit 8. This Phase is only few centimeters thick but in some areas intrudes into floor 8.36. It reflects the previous activities before the abandonment of this sector of the site. No radiocarbon dates were obtained from this occupational phase.

The fifth occupation (Phase Ie), is represented by floor 8.36 and was the most affected by the modern occupation (especially transit of vehicles, animal and people) since it was near to the surface. It was fragmented in many areas of Unit 8. Due to poor preservation only two partial ellipsoid domestic structures (structures 8-I and 8-II) were found during excavations in units 8A and 8B. Both structures were associated with hearths and various pits (Fig. 101). Area estimations from the remains of these structures are 7.24 m² for structure 8-I and 8.03 m² for structure 8-II.

Below floor 8.36 a homogenous midden layer extended over the excavation unit (8.3) like the seal of the previous occupation.

The fourth occupation (Phase Id) belongs to floor 8.127 and is a yellow mud floor (Fig. 102) similar to the mud floors found during excavations of Unit 8 but with no evidence of post

holes or other features (hearths, pits, etc.) as found in the other floors. Because of this and the small amount of material culture recovered from it, the area uncovered belongs to a periphery of the domestic occupation since it only appeared in unit 8D and on the north edge of unit 8B. It also could have been affected by the later occupations since Unit 8D has very fragmented remains of the occupational floors.

Under this floor another midden of secondary origin was defined (8.4). This homogenous layer extended over unit 8 and immediately below midden layer 8.3 as floor 8.127 did not extend over most of units 8A and 8B.

The third occupation (Phase Ic) is represented by floor 8.32 where a one ellipsoid structure (Structure 8-III) was defined (Fig. 103) in Unit 8A. The structure was associated with a hearth but no pit. An area of 6.20 m^2 was calculated for this structure. A twig embedded in the mud floor was radiocarbon dated to $3802 \pm 39 \text{ BP}$. Below floor 8.32 two successive secondary midden layers were found (8.47 and 8.48). Midden 8.48 has a series of post holes on its surface with no clear evidence of structures.

The second occupation (Phase Ib) is represented by floor 8.57 where two ellipsoid structures (Structure 8-IV and 8-V) have been identified (Fig. 104) extending into both units 8A and 8B. Together with the post holes that defined the two ellipsoid structures two hearths and one pit were related to this occupation. Estimation of the areas of the two structures was: Structure 8-IV: 6.16 m^2 and Structure 8-V: 5.49 m^2 . Remains of a reed mat was found in association with Structure 8-IV. After excavation of floor 8.57 another secondary midden layer (8.73) was found over the excavation unit.

Finally, the latest occupation found (Phase Ia) corresponds to floor 8.64 which extended over Unit 8A and 8B and was the best preserved floor found during excavations. It contained the

remains of two ellipsoid structures (Structure 8-VI and 8-VII) associated with three hearths (Fig. 105). Both hearth 8.154 and 8.155 had a circular shape and both were covered by the same yellowish mud used in the floor. A botanical sample from hearth 8.155 was AMS dated to 3842 ± 38 BP. The areas of these structures were estimated to be 6.16 m^2 for structure 8-VI and 5.76 m^2 for structure 8-VII.

It is interesting that the different floor succession of each structure had the same domestic occupation. Structures 8-I, 8-III, 8-IV and 8-VI belong to floor 8.36, 8.32, 8.57 and 8.64 respectively were constructed in the same place (Fig. 106). This shows continuity in the occupation of the area and probably reflects the same people living in this structure during the four phases.

It is evident from the midden depositions observed below the floor 8.64 that this Phase represents the latest occupation of the area and is very probable that earlier floors and structures are below the exposed phase.

Table 15. Summary of Unit 8: stratigraphic units and occupation Phases

Phase	Unit 8A/8B	Postholes	Features
II	8.1, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12, 8.13, 8.14, 8.15, 8.16, 8.17, 8.18, 8.19, 8.20, 8.21, 8.22, 8.23, 8.24, 8.25, 8.26, 8.27, 8.28, 8.29, 8.30, 8.31 8.2 Midden		
Ie	8.36 Floor 8.3 Midden	8.39, 8.40, 8.41, 8.43, 8.114, 8.115, 8.118, 8.119, 8.120, 8.121, 8.122, 8.123, 8.126, 8.178, 8.179, 8.180, 8.181, 8.182, 8.183, 8.184, 8.185, 8.202, 8.203, 8.204, 8.205, 8.206 8.207, 8.208	8.38 (P), 8.42 (H), 8.44 (P), 8.45 (P), 8.116 (H), 8.117 (P), 8.124 (P), 8.125 (H) Houses 8-I and 8-II
Id	8.127 Floor 8.4 Midden	8.209	No houses indentified
Ic	8.32 8.47 Midden 8.48 Midden	8.33, 8.37, 8.40, 8.43, 8.128, 8.129, 8.186, 8.187, 8.210, 8.211, 8.213, 8.214, 8.215, 8.216, 8.49, 8.50, 8.51, 8.52, 8.53, 8.54, 8.55, 8.56	8.46 (H), House 8-III
Ib	8.57 8.73 Midden	8.58, 8.59, 8.60, , 8.63, 8.67, 8.68, 8.69, 8.70, 8.71, 8.72, 8.75, 8.76, 8.78, 8.79, 8.80, 8.81, 8.82, 8.83, 8.84, 8.85, 8.86, 8.87, 8.89, 8.90, 8.91, 8.92, 8.93, 8.94, 8.95, 8.96, 8.97, 8.98, 8.99, 8.100, 8.101, 8.102, 8.103, 8.104, 8.105, 8.106, 8.107, 8.108, 8.109, 8.110, 8.111, 8.113, 8.130, 8.131, 8.133, 8.212, 8.217, 8.218, 8.219, 8.220, 8.112	8.61 (basket), 8.62 (P), 8.66 (mat), 8.74 (H), 8.77 (H), 8.132 (P), Houses 8-IV and 8-V
Ia	8.64 8.65 Midden	8.134, 8.135, 8.136, 8.137, 8.138, 8.139, 8.140, 8.141, 8.142, 8.143, 8.144, 8.145, 8.146, 8.147, 8.148, 8.149, 8.150, 8.151, 8.152, 8.153, 8.156, 8.157, 8.158, 8.161, 8.162, 8.163, 8.164, 8.165, 8.166, 8.167, 8.168, 8.169, 8.170, 8.171, 8.172, 8.173, 8.174, 8.175, 8.176, , 8.191, 8.192, 8.193, 8.194, 8.195, 8.196, 8.196, 8.197, 8.198, 8.199, 8.200, 8.201, 8.221, 8.222, 8.223, Not excavated	8.154 (H), 8.155 (H), 8.173 (H), 8.190 (basket) Houses 8-VI and 8-VII

Key: (H) Hearth, (P) Pitt, (B) Burial, (ST) Fire craked stones

Some features received more than one S.U.and they are grouped between [].

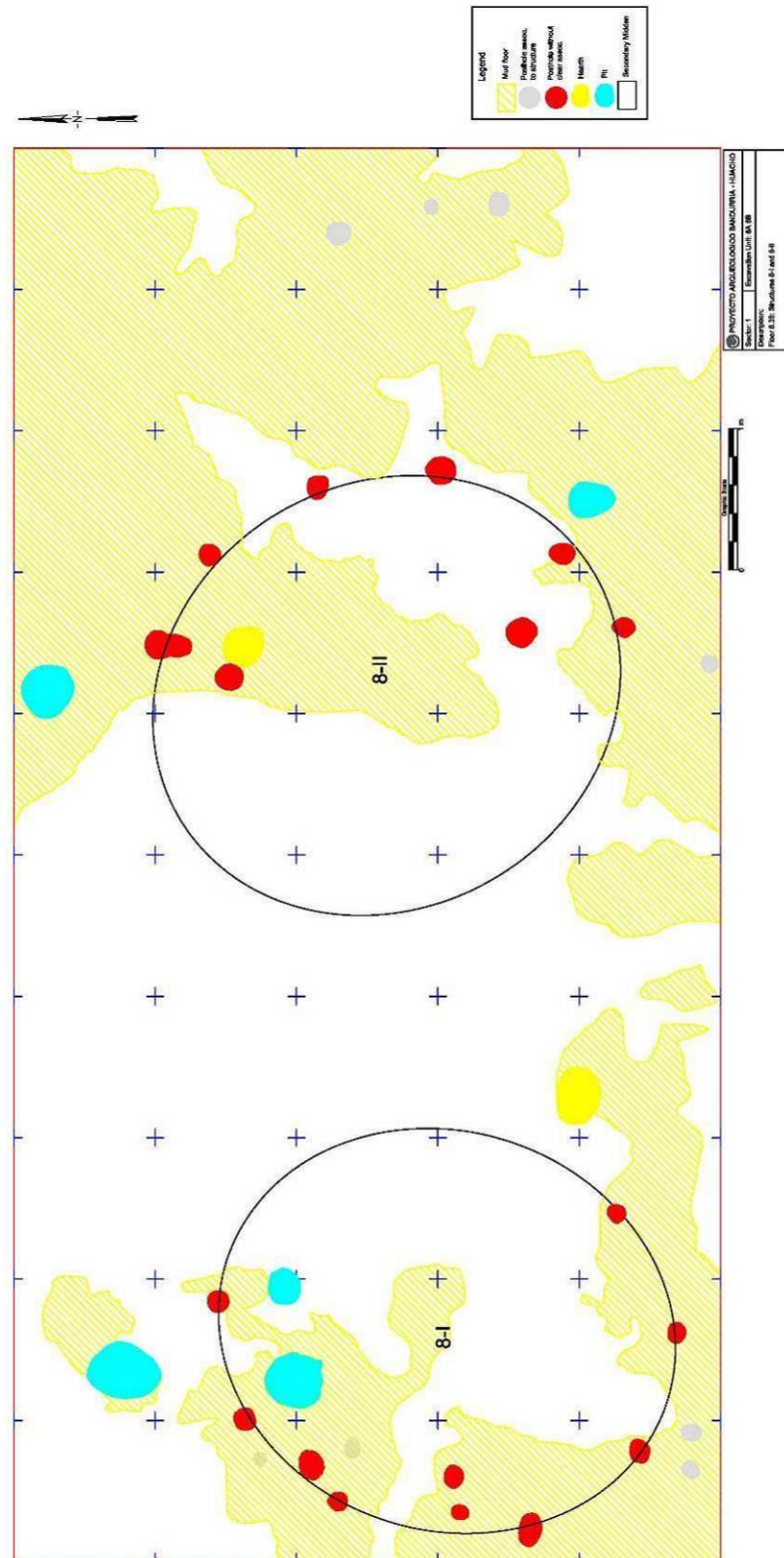


Figure 101. Unit 8: Structures 8-I and 8-II on floor 8.36.

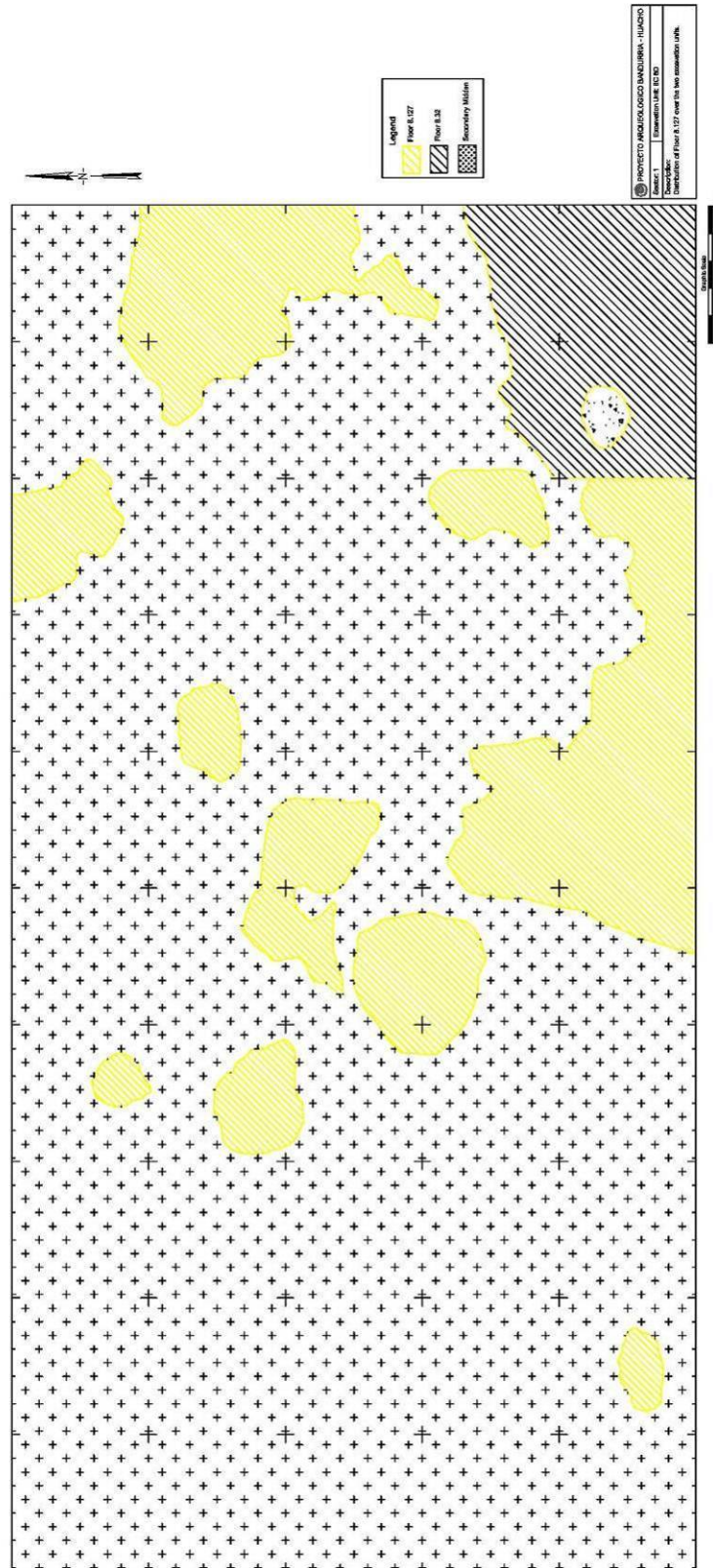


Figure 102. Unit 8: Remnants of floor 8.127.

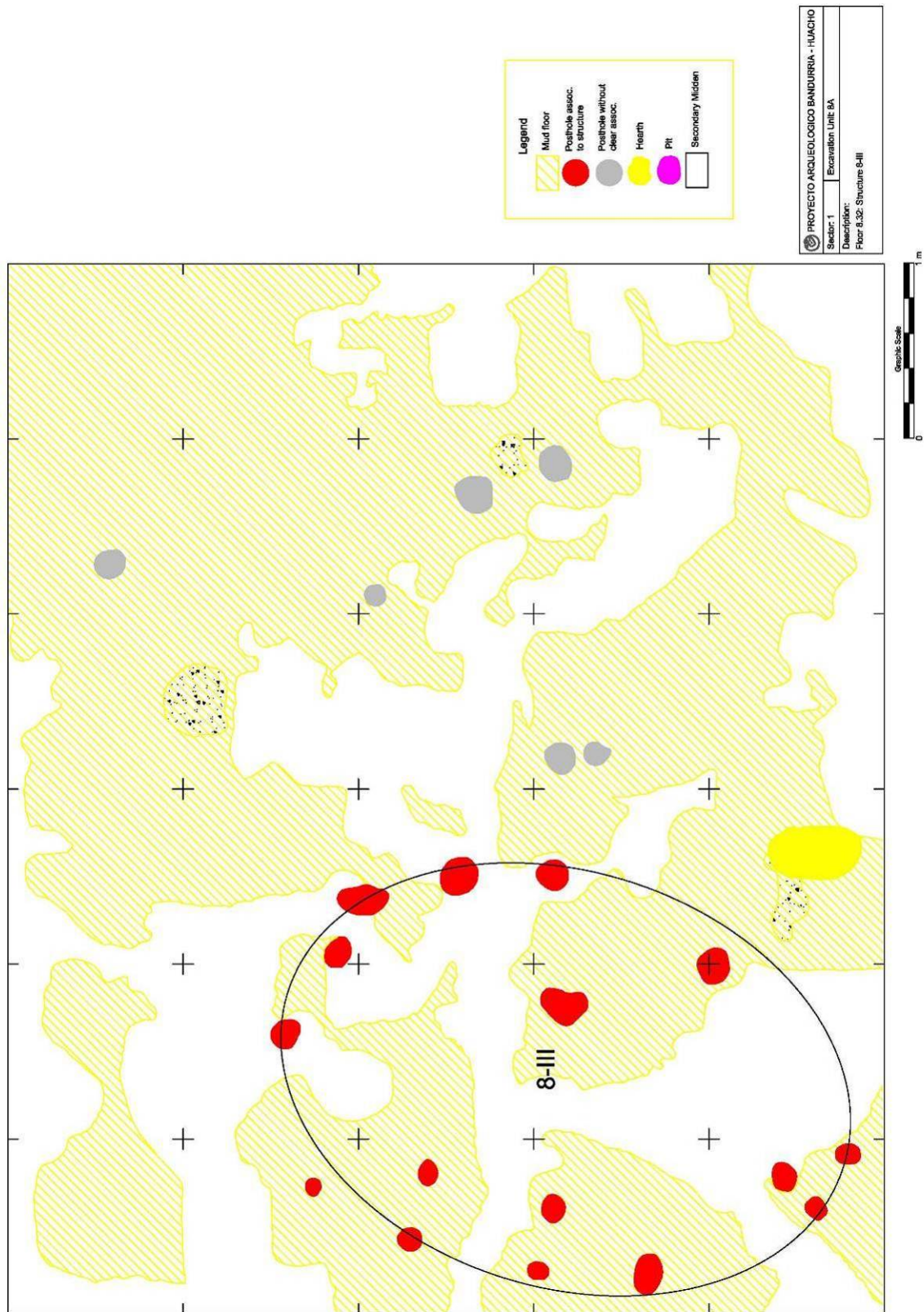


Figure 103. Unit 8: Structure 8-III on floor 8.32

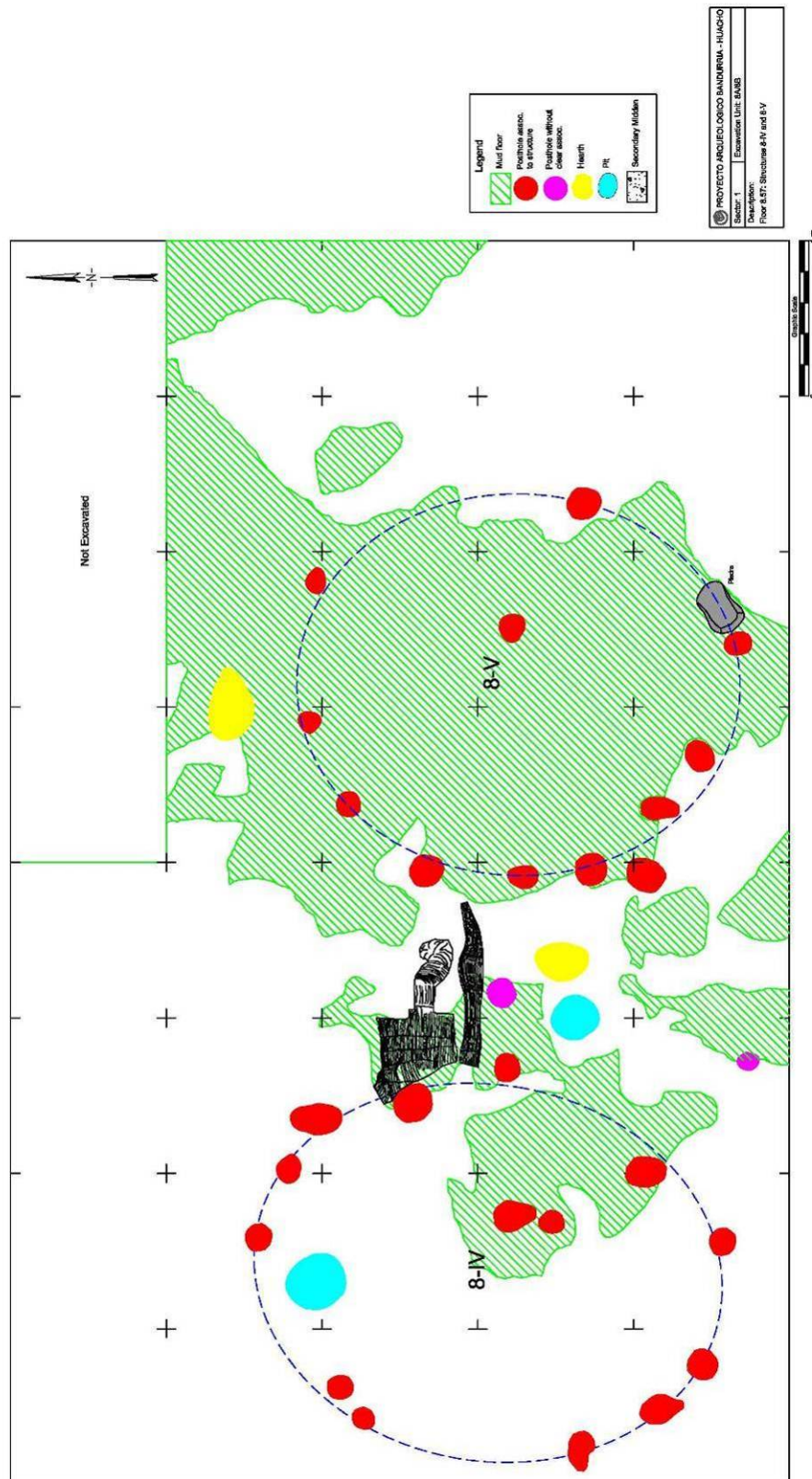


Figure 104. Unit 8: Structures 8-IV and 8-V on floor 8.57

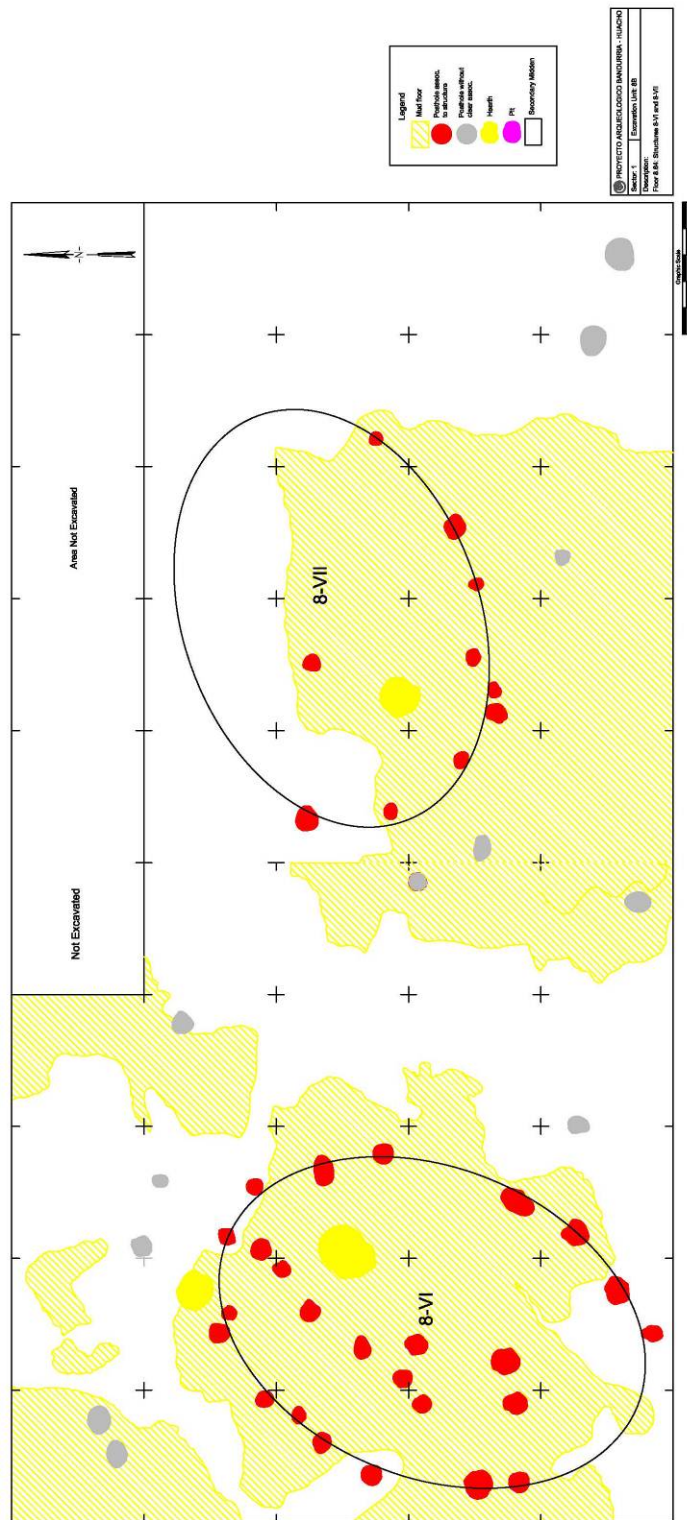


Figure 105. Unit 8: Structures 8-VI and 8-VII on floor 8.64

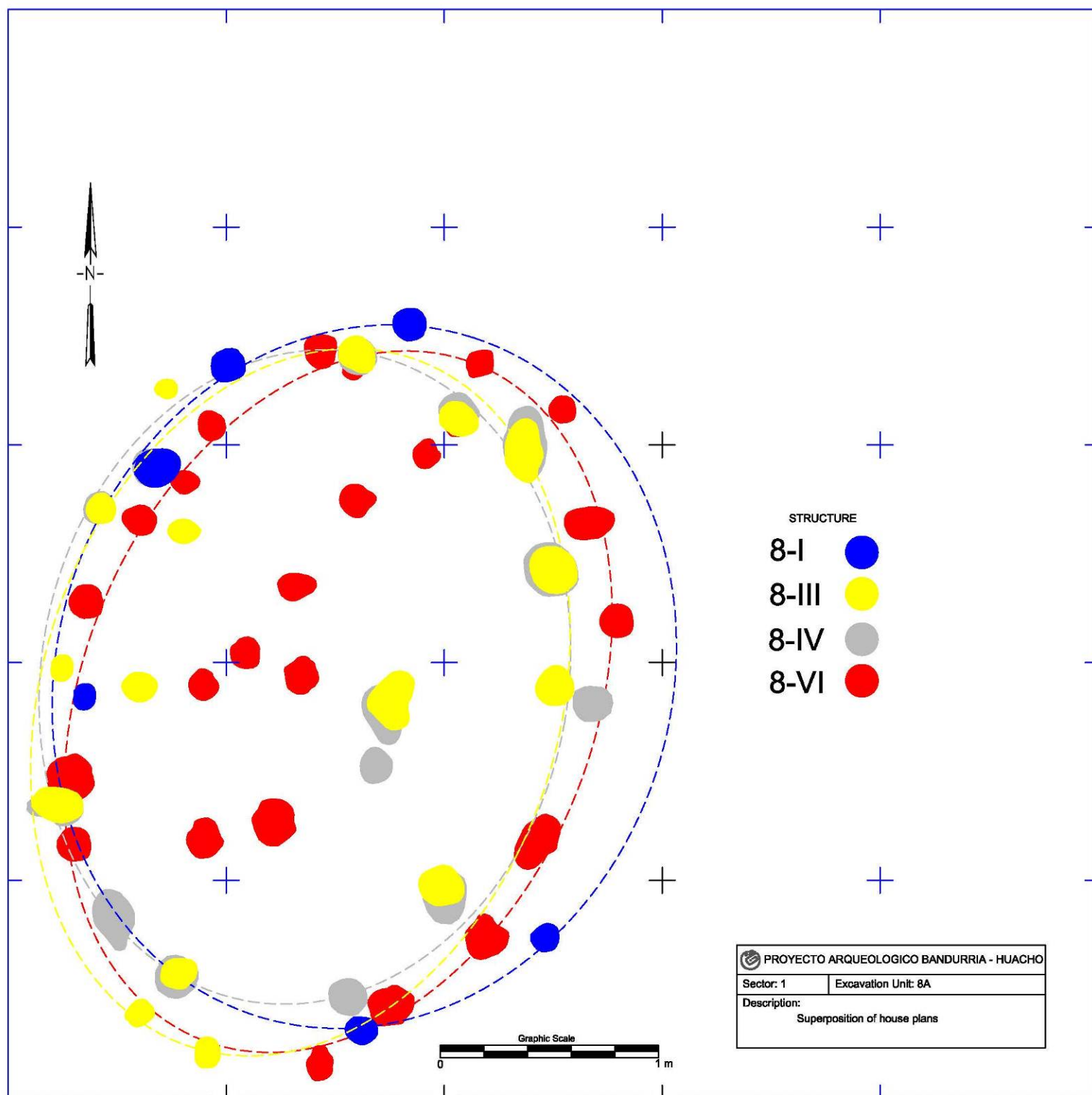


Figure 106. Unit 8: superposition of structures 8-I, 8-III, 8-IV and 8-VI

Artifacts associations

Artifacts were recovered from all the occupational phases in Unit 8. As in excavations in other Units quartz crystals are the most common artifacts recovered from the excavations, but in a lower proportions than Unit 6B. A total of 105 artifacts were recovered from the six occupational phases (Table 16). Of them, the 47.62% ($n = 50$) are unmodified quartz crystals. As in previous Units the quartz artifacts are small crystals of clear and milky quartz (Fig. 107), some have been broken from bigger pieces but no use marks were found on the quartz flakes. Of the total of crystals found, Phase I contained 26.00% ($n = 13$) of the crystals, Phase Ie the 28.00% ($n = 14$), Phase Id the 10.00% ($n = 5$), Phase Ic the 6.00% ($n = 3$), Phase Ib the 24.00% ($n = 12$) and Phase Ia the 6.00% ($n = 3$). Artifact distribution by occupational phases are Phase II: 18.10% ($n = 19$), Phase Ie: 24.76% ($n = 26$), Phase Id the 6.66% ($n = 7$), Phase Ic the 11.43% ($n = 12$), Phase Ib the 27.62% ($n = 29$) and Phase Ia the 11.43% ($n = 12$).

Again we considered discarding quartz crystals in the artifact distribution; this left us with 55 artifacts (Table 17). The artifact distribution changed: Phase II: 10.90%; Phase Ie: 21.82%; Phase Id: 3.64%, Phase Ic: 16.37%, Phase Ib: 30.90%, and Phase Ia: 16.37%. Both tables were plotted in bar charts (Figs. 109 and 108) to observe artifact distributions.



Figure 107. Unmodified quartz crystals from Unit 8.

Table 16. Artifact distribution Unit 8: total counts and frequencies by occupational phases.

	PHASE II		PHASE I E		PHASE I D		PHASE I C		PHASE I B		PHASE I A	
	N	%	N	%	N	%	N	%	N	%	N	%
Beads	4	21.05	2	7.69	2	28.57	4	33.33	16	55.17	1	8.33
<i>Lithic artifacts:</i>												
Flakes	0	0	0	0.00	0	0	0	0	0	0	0	0
Bifacial tools	0	0	0	0.00	0	0	0	0	0	0	0	0
Stone weights	1	5.26	1	3.85	0	0.00	4	33.33	0	0.00	0	0.00
Quartz crystals	13	68.42	14	53.85	5	71.43	3	25.00	12	41.38	3	25.00
<i>Bone artifacts:</i>												
Tablets	0	0	2	7.69	0	0	0	0.00	1	3.45	7	58.33
Tubes	0	0		0.00	0	0	0	0	0	0	0	0
Needle												
Flute	0	0		0.00	0	0	0	0	0	0	0	0
<i>Shell artifacts:</i>												
Fishhooks	1	5.26	1	3.85	0	0	1	8.33	0	0	0	0
<i>Wood artifacts:</i>				0.00	0							
Worked Sticks	0	0	6	23.08	0	0	0	0	0	0	1	8.33
<i>Unbaked clay:</i>												
Figurines	0	0.00	0	0	0	0.00	0	0	0	0	0	0
<i>Other</i>	0	0	0	0	0	0	0	0.00	0	0.00	0	0.00
Total	19	100.00	26	100.00	7	100.00	12	100.00	29	100	12	100

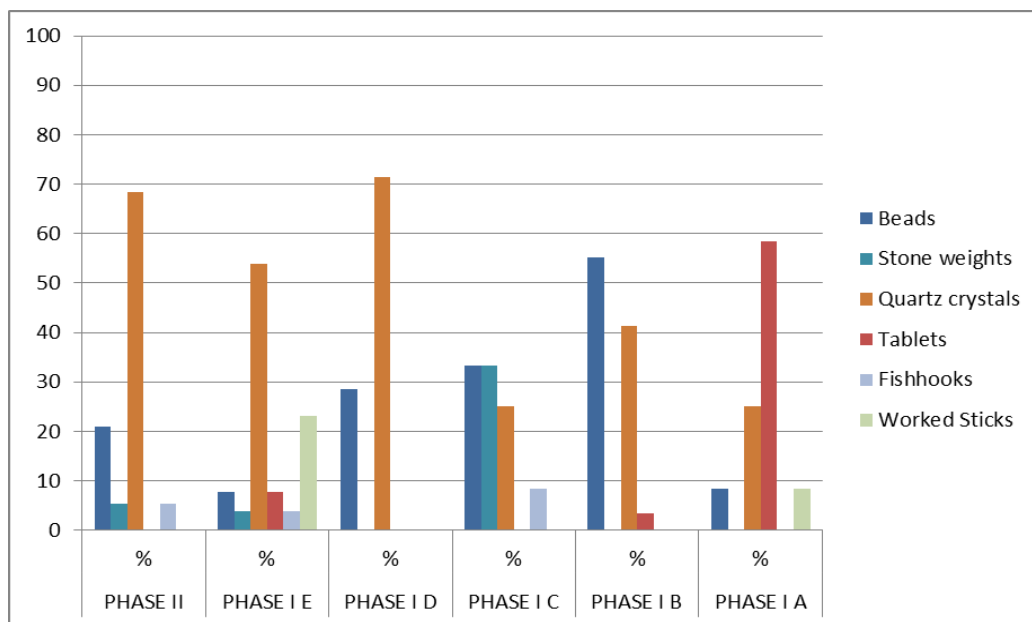


Figure 108. Percentages of artifacts by occupational Phases in Unit 8.

Table 17. Artifact distribution Unit 8 without quartz crystals.

	PHASE II		PHASE I E		PHASE I D		PHASE I C		PHASE I B		PHASE I A	
	N	%	N	%	N	%	N	%	N	%	N	%
Beads	4	66.67	2	16.67	2	100.00	4	44.44	16	94.12	1	11.11
<i>Lithic artifacts:</i>												
Flakes	0	0.00	0	0.00	0	0.00	0	0	0	0	0	0
Bifacial tools	0	0.00	0	0.00	0	0.00						
Stone weights	1	16.67	1	8.33	0	0.00	4	0		0.00	0	0.00
<i>Bone artifacts:</i>												
Tablets	0	0.00	2	16.67	0	0.00	0	0	1	5.88	7	77.78
Tubes	0	0.00	0	0.00	0	0.00	0	0	0	0	0	0
Needle												
Flute	0	0.00	0	0.00	0	0.00	0	0	0	0	0	0
<i>Shell artifacts:</i>												
Fishhooks	1	16.67	1	8.33	0	0.00	1	0	0	0	0	0
<i>Wood artifacts:</i>												
Worked Sticks	0	0.00	6	50.00	0	0.00	0	0	0	0	1	11.11
<i>Unbaked clay:</i>												
Figurines	0	0.00	0	0.00	0	0.00	0	0	0	0	0	0
<i>Other</i>	0	0.00	0	0.00	0	0.00		0.00	0	0	0	0
Total	6	100.00	12	100.00	2	100.00	9	100.00	17	100.00	9	100.00

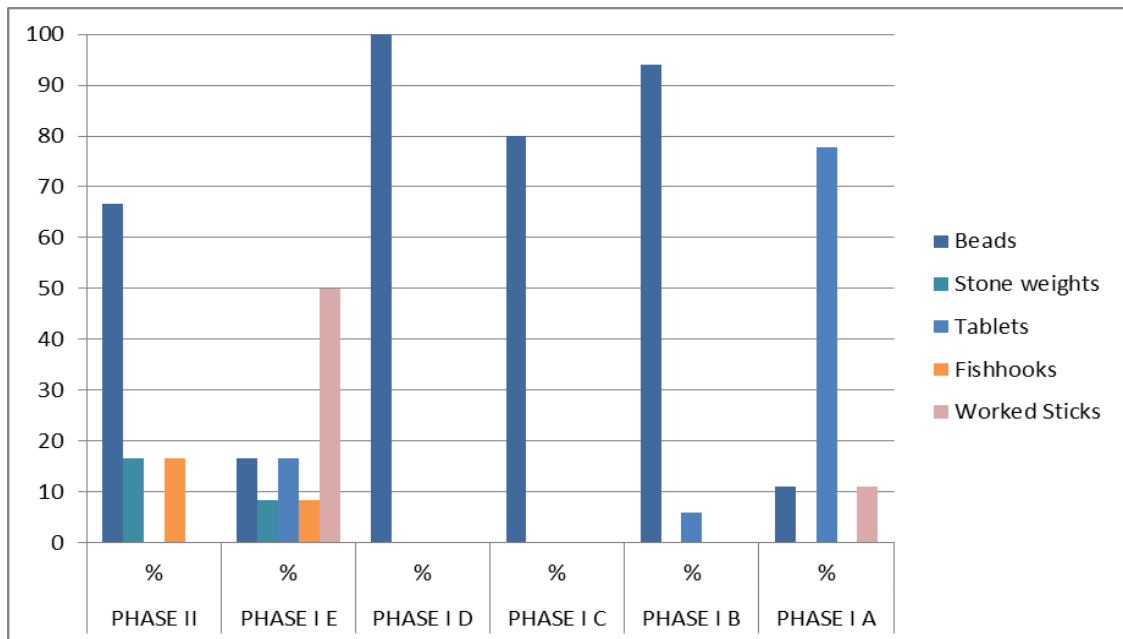


Figure 109. Percentages of artifacts by occupational Phases without the quartz crystals in Unit 8.

Beads (Fig. 110) are the second most abundant artifact type recovered (27.62% of the total artifacts and 52.73% of the artifacts without the crystals). A particularly high proportion of beads were recovered from Phase Ib ($n = 16$) amounting to 29.09% of the artifact assemblage without the crystals.

The only lithic artifacts recovered were stone weights (Fig. 111). A total of 5 weights were recovered from excavations in Phase II, Phase Ie and Phase Ic.

A series of bone tablets ($n = 10$) were found in the excavations of Phase Ie, Ib and Ia. Tablets from Phase Ie ($n = 2$) are very similar to the ones found in Unit 6B and were made of hard bone (from a sea mammal) with incised lines (Fig. 112). The bone tablets from Phases Ib and Ia are made of light bird bone and also had incised lines (Fig. 113).

Three shell fishhooks made of blue mussel were recovered from Phase II, Ie and Ic. One of the fishhooks was complete and the two others broken (Fig. 114).

Wood artifacts recovered are small sticks with incised lines (Fig. 115). A total of 7 wooden sticks were recovered from Phase Ie ($n = 6$) and Phase Ia ($n = 1$). As with the bone tablets the incised designs are simple vertical lines.

No unbaked clay objects were found in Unit 8 but the presence of bone tablets and incised wooden sticks together with the quartz crystals may reflect some kind of ritual related to the different domestic occupations in Unit 8.



Figure 110. Beads recovered from Unit 8.



Figure 111. Stone weight tied with *junco* cord.



Figure 112. Sea mammal bone tablet with central incisions and polished edges.



Figure 113. Bird bone tablets. Some of them have central light incisions.



Figure 114. Shell fishhooks, left: complete fishhook; right: broken fishhook.



Figure 115. Wood stick with incised lines.

4.6 CHRONOLOGICAL CORRELATIONS

After the excavation of Units 6, 8 and 9 it was important to establish a chronological sequence of the occupational phases in order to understand the development of the site from a despositional perspective assuming that these floors and depositional events reflected a social dynamic. From the data obtained two types of data help us to establish a coherent occupational sequence of the site. The different occupational sequences at the three excavations Units will be stratigraphically correlated using a vertical datum. Then, radiocarbon dates obtained from the differents occupational phases will serve as chronological markers to establish chronological relationships between the different occupational phases defined in the excavation units.

Stratigraphical Correlation

Using sea level as a datum the excavation profiles were arranged to correlate the occupational phases in the excavation units. Sea level was considered as a vertical datum based on a control point taken with a diferencial GPS. Using an optical level measurements were taken in meters above sea level (m.a.s.l.) and figure 116 presents the profiles of Excavation Units 6, 8 and 9 and the central profile recorded from the east side of the site correlated with the sea level datum.

At first sight, the natural levels are at different altitudes reflecting an uneven natural surface of the area occupied by the settlement. In Unit 6 the natural level is at 11.37 m.a.s.l. in Unit 9 the natural level is at 13.01 m.a.s.l. and in the Central profile at 12.82 m.a.s.l. The natural sandy surface in Unit 6 is 1.64 meters below the natural sandy surface found in Unit 9. Between Unit 9 and the Center profile there is not much difference between the base of the cultural desposits with a diference of 0.17 m. For some unknown reason Bandurria inhabitants decided to raise the

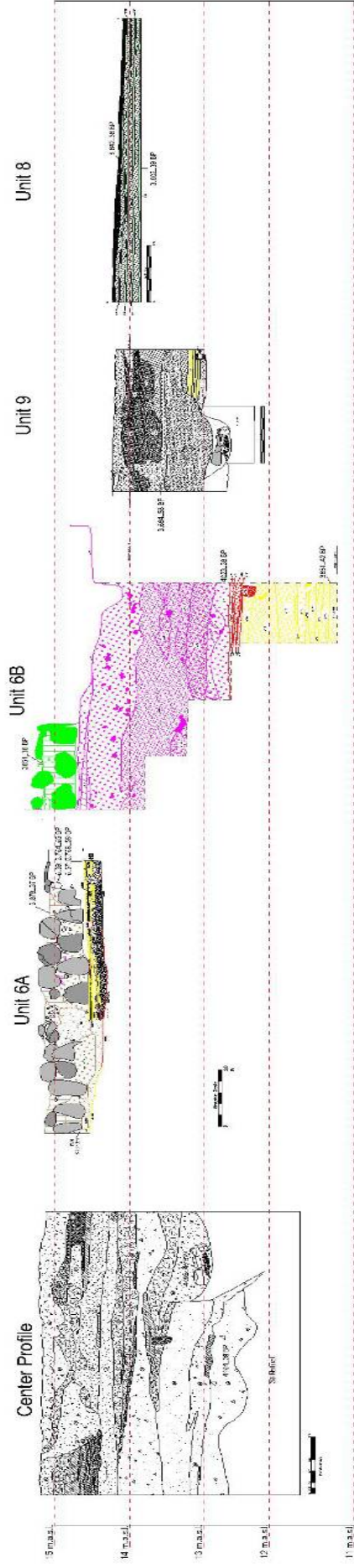


Figure 116. Comparison among the profiles of excavation units in the Domestic Sector using seal level as vertical datum.

area where Unit 6 was located surpassing other site areas such as the area where Units 8 and 9 are located. The top of the stone platform of Unit 6 is 1 m above the upper and latest floor of Unit 8. The surface of the Central profile is at 15 m.a.s.l. reflecting an intense depositional process which elevated this particular area of the site 2.5 m above the natural surface.

The higher cultural deposition in the area located around the Unit 6 and the Central Profile could reflect an older occupation of the area. It is important to consider that almost 2/3 of this area was destroyed by the 1973 flood and comparing the three profiles from the exposed cut (Appendix A) it is very probable that the core of the settlement was washed away, leaving the later western site expansions.

The very complex depositional processes observed and the uneven original site surface in all the research area made it impossible to establish a stratigraphic correlation using only the recorded stratigraphy. No occupations could be correlated by leveling the floor and depositional events with a vertical datum. It was considered necessary to correlate the stratigraphy to absolute dates to establish a coherent depositional history of the domestic sector of Bandurria.

Radiocarbon dates:

As reported a series of AMS radiocarbon dates were obtained from the Domestic Sector; C14 dating was considered very important to establish chronological sequences at the site as no other relative chronological marker (e.i. pottery, lithics artifacts) could be found at Bandurria.

For most Preceramic sites with a limited inventory of cultural remains radiocarbon dating is the only way to establish the absolute date of the site and elaborate on the occupational sequence. If no radiocarbon dates were available it would be very difficult, if not impossible, to establish a stratigraphic sequence that reflected the occupational history of the site.

Table 18. Radicarbon dates from the Domestic Sector.

Location	Date Id	Material	14C age BP	BC Cal. 68%	BC Cal 95%	BC Cal 99%
<i>Center Profile</i>						
S.U. 25 Human Burial	UCI25185	plant	4095±40	2635±65	2670±110	2680±200
S.U. 35	AA77446	plant	4164±38	2745±75	2755±135	2735±165
<i>Unit 6A</i>						
Proto shicra		Plant	3878±37	2375±85	2370±100	2340±150
S.U. 6.39	AA71433	plant	3764±65	2205±85	2180±170	2200±300
S.U. 6.57	AA71437	plant	3769±58	2210±80	2185±165	2225±275
S.U. 6.104	AA71436	plant	3769±59	2210±80	2185±165	2225±275
<i>Unit 6B</i>						
S.U. 6.04	AA84796	plant	3851±38	2310±40	2330±130	2335±145
S.U. 6.77	AA84795	plant	4023±38	2532.5±47.5	2550±90	2600±300
S.U. 6.137	AA84794	plant	3822±42	2270±80	2325±135	2295±175
<i>Unit 8</i>						
S.U. 8.32	AA84792	plant	3802±39	2245±55	2240±110	2290±180
S.U. 8.64	AA84793	plant	3842±38	2310±40	2330±130	2300±170
<i>Unit 9</i>						
S.U. 9.14	AA71440	plant	3684±58	2080±70	2055±155	2050±300

The dates obtained from the excavations at the Domestic sector were calibrated (Table 18) using OxCal 3.01 to calibrated BC years with confident levels of 68%, 95% and 99% (1 σ , 2 σ and 3 σ). These results were plotted in a bullet graph to define a chronological sequence. A total of 9 dates from excavations of Units 6A, 6B, 8 and 9, and 2 dates from the central profile from the exposed flood cut were compared (Fig. 116).

The Center profile, S.U. 35 is the earliest cultural deposition located over the natural level and it was dated to 4164±38 BP. The second date of 4095±40 comes from S.U. 25 a human burial located near the base of the profile. The date from S.U. 35 is the earliest date obtained by us for Bandurria and is 366 years younger than Fung's earliest date of 4530±80 BP taken from the base of the cultural occupation at the same exposed cut. Wind erosion and human activities have affected the exposed cut eroding the profiles from their original location when the flood cut

them in 1973. The dates from the profile are clearly older than the dates obtained from the excavation units. It can be observed from the bullet graph a significant difference between them.

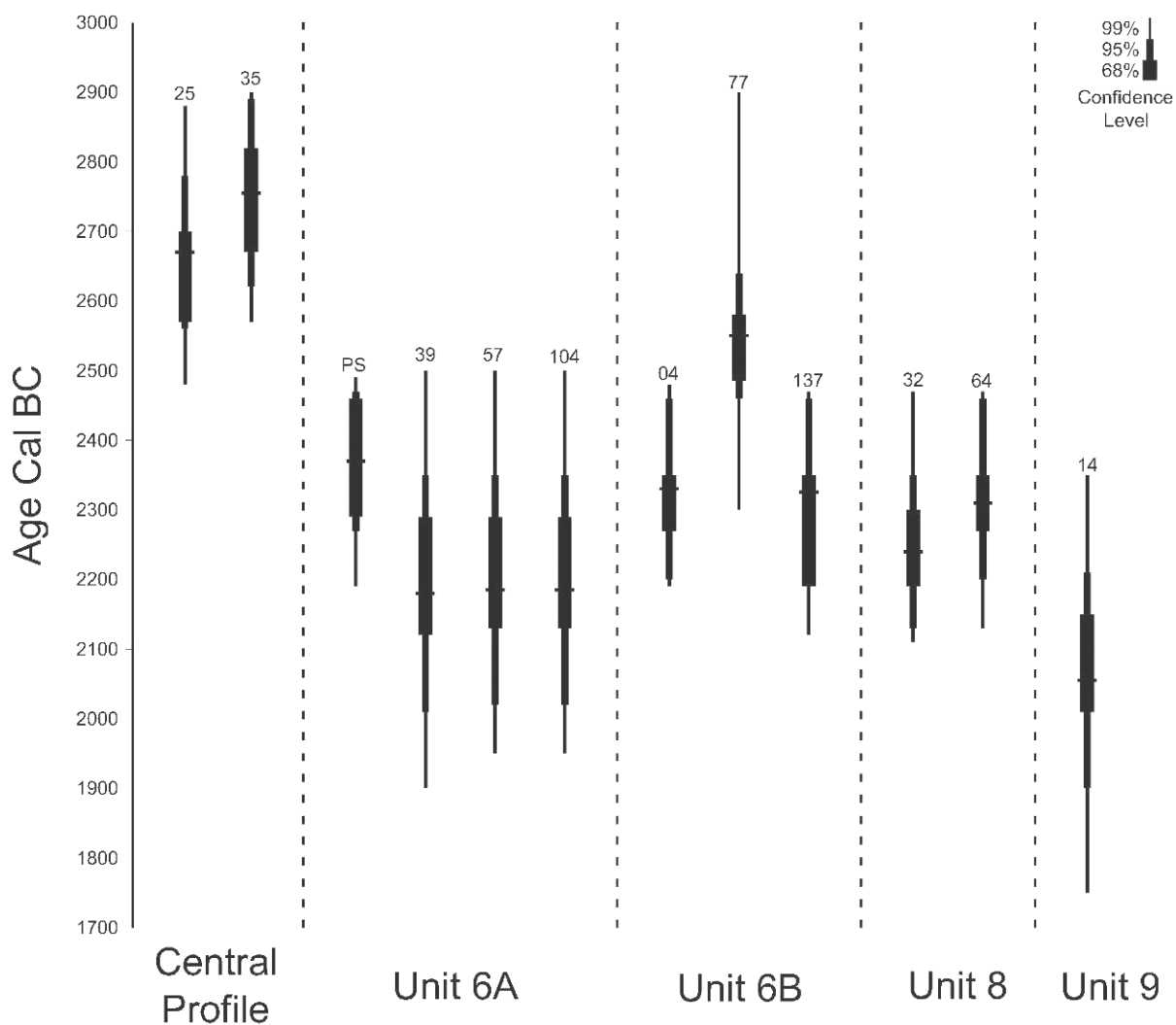


Figure 117. Bullet graph of radiocarbon dates obtained from the Domestic Sector. Each bullet graph has its S.U. number. PS: *protoshicra*

The differences between Fung's profile date, our dates from the profile, and the dates from the excavation units, confirms our initial assumption that the area destroyed by the 1973 flood contained the older occupation of the settlement and it is from this core that later part of the site we excavated was established.

For Unit 6A, 4 dates are correlated with 3 occupational phases. The earliest date of 3878 ± 37 BP from the *protoshicra* within the construction fills of the stone platform dates the construction of the stone platform and the beginning of Phase IIa. Two dates come from occupation Phase IIb (S.U. 6.39 and 6.104) and have no significant difference having the same age ranges at the 3 confidence levels. The third date from Phase III (S.U. 6.57) is similar to the two dates from the previous phases indicating that these different depositional processes occurred in a time range smaller than C14 AMS dating resolution (from ± 37 to ± 58 years). The difference between the three uncalibrated samples only had a difference of 5 years and 106 years when compared with the uncalibrated C14 date from the *protoshicra*. As the bullet graph shows there is some significant differences between the Phase III related with the construction of the stone platform and the later depositional processes of Phase IIb and III.

Three dates were obtained from Unit 6B, of them the date from S.U. 6.77 belonging to Phase IIIa is considered as an outlier as it is significantly older (4023 ± 38 BP) than the other two dates (3851 ± 38 BP and 3822 ± 42 BP). There is no correlation between the position of S.U. 6.77 in the stratigraphy and the C14 age.

The date from S.U. 6.04 belongs to occupation Phase IIIb as mentioned already is from an upper floor of the stone platform. Its age range fits within the date of the *protoshicra* being slightly later. The date from S.U. 6.137 is from Phase I and is from the bottom of the stratigraphy of the excavation unit. This S.U. is among the first human occupation of the area and is just above the natural level. When these two dates are compared there is no significant difference between them, indicating that the depositional process that elevated the natural surface by 4 meters occurred in a period of time shorter than that of the C14 AMS resolution. The difference between the two uncalibrated C14 dates is only 29 years.

From excavation unit 8 two mud floors were dated. Floor 8.32 from Phase Ic has a date of 3802 ± 39 BP and floor 8.64 from Phase Ia a date of 3842 ± 38 BP. Between both dates no significant difference is observed but the dates correlate well with their stratigraphic position, as floor 8.64 is slightly older than floor 8.32. The difference between the two uncalibrated C14 dates is only 40 years. Again is very probable that C14 AMS dating does not have enough resolution to clearly differentiate the two occupations.

Finally, one date from Unit 9 of 3684 ± 58 BP is from the latest occupation, Phase IIIb and is the latest date obtained from the sector. This phase was mentioned before and reflects the intense secondary deposition in the area after the Unit 6 and 8 occupation.

Summary:

When observed these dates from the different excavation units are a compact batch without the outlier from Unit 6B. The earliest occupation belongs to the base of the profile, since the excavations of Unit 6 and 9 that reached the base of the human occupation did not produce similar dates. The latest date from Unit 9 reflects the last activities at this area of the site and is very probable that it was contemporaneous with the latest occupational phases of Units 6A, 6B and 8. This is the post-stone platform and quadrangular structure at Unit 6 and the post-floors despositions at the Unit. The dates from the stone platform of Unit 6A and the successive floor sequence at Unit 8 show similar date ranges and it is very probable that both were contemporaneous. The quadrangular structure associated with the platform was also inhabited at the same time as the oval structures in Unit 8. The partial oval structure found at Unit 6B beneath the thick secondary deposition has the same characteristics of the floor at Unit 8 although it is located further down the stratigraphic profile of Unit 6B. A similar situation is observed at Unit 9

where the oval structure is located at the very low in the stratigraphic sequence over the natural levels.

The area where Units 6A and 6B were excavated had more than 4 meters of cultural strata deposited in less of 100 years. The same is observed in Unit 8 where, although there is a small difference between the dates from floors 8.32 and 8.64 the bullet graph shows almost an overlap of their confidence levels. Again, the construction of the mud floors in Unit 8 and the oval structures on their surface was a rapid event of few years or decades that was not reflected in the AMS dating. An unknown social phenomena generated this rapid depositional process where middens from other parts of the site were deposited to gain height. The continuous floor remodeling and superposition can also to be related to the same phenomena.

4.7 HUMAN BURIALS

Research at the Domestic Sector uncovered a series of human burials from several excavation units. Modern disturbance exposed some burials that had to be rescued during our fieldwork. A total of 29 burials were recovered from different locations (Fig. 118). Appendix D presents a detail description of the skeletal material found in the burials.

From this sample we observed a funerary pattern of the same characteristics reported by Fung (2004: 326) during the flood of 1973 (Fig. 119) and other LPP sites (Engel 1963, Wendt 1964, Bird and Hyslop 1985, Quilter 1991) where burials were excavated.

The burial locations indicate two patterns of interment: burials placed in simple pits dug into domestic middens and burials found in simple pits excavated in sandy natural strata which may reflect cemetery areas. As the settlement grew these areas were covered by refuse. This is the case of the burials from the bottom of excavation Units 6B and 9 where 4 m and 1.5 m of refuse was deposited over the burials by later occupations. Lanning (1967: 65) and Moseley (1975: 74) noticed the presence of burials in two different contexts: within domestic midden and in cemetery areas nearby the settlement. Bandurria and other LPP sites like Culebras (Lanning 1967) and Rio Seco (Wendt 1964) exhibit this same pattern. Lanning (1967: 65) from his research at Culebras suggested a clear difference between the two locations, individuals found interred at middens lack funerary offerings in comparison with the ones interred at cemeteries areas; the latter represents full members of the community while the former are disenfranchised individuals. Excavations at Bandurria have do not show differences between burials located in middens and in cemeteries areas. In general, all funerary contexts excavated do not have grave offerings, but this could be the consequence of the small sample of burials available.

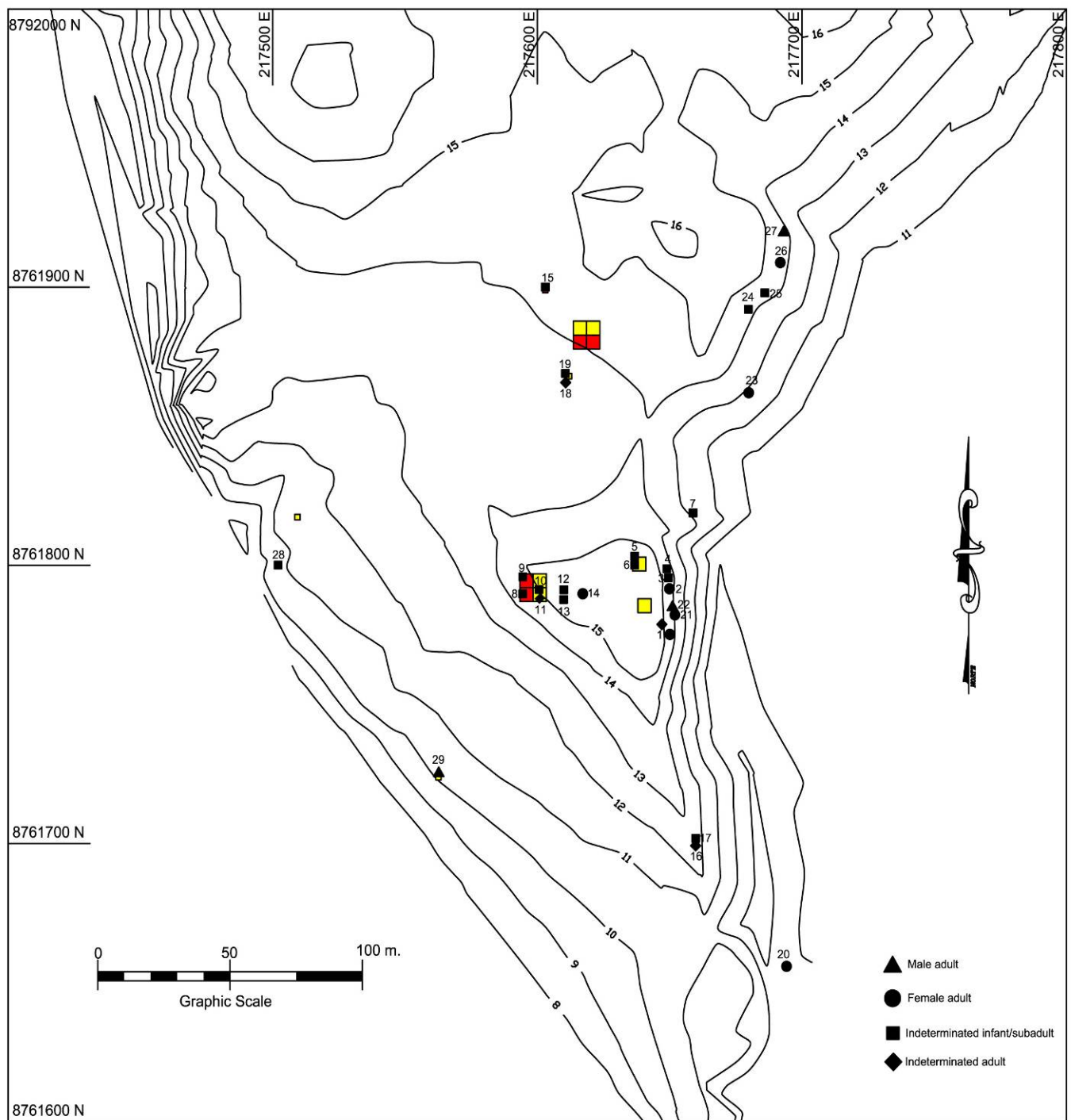


Figure 118. Human burial location in the Domestic Sector



Figure 119. Disturbed burial by the 1973 flood. (Photo Domingo Torero)

Individuals were buried lying on their side with their face to the side in flexed position with the knees drawn toward the chest (Fig. 120). Hands and arms have variable orientations, but are generally flexed with the hands placed near or under the face. There is no pattern of preference on which side (right or left) individuals were interred. All recovered individuals were naked except one of a child (Burial 2) who wore a loincloth. No discernable pattern of orientation in the direction that individuals faced was observed.

Grave goods are absent from the burials, though offerings of gourds, botanicals, and quartz fragments are found near some burials but it is not clear if these are intentional offerings or are coincidental. The only burial with significant grave goods was Burial 8 excavated in Unit 6B. It had a gourd bowl at its right side and beside its right arm a necklace composed of bird bones, 4 snails *Oliva peruviana* and a whorl was found (see Fig. 70). In the disturbed burials, only bits of cotton and *juncos* remained. Undisturbed burials were wrapped with various cotton twined textiles but no objects were found inside the bundles. Outside of this textile, burials were



Figure 120. Common body position found in human burials.



Figure 121. *Junco* mat and ropes covers the body.



Figure 122. Human burial covered by big cobbles

wrapped in *junco* mats with *junco* ropes or cotton textile strips tying the bundle (Fig. 121). On top of these bundles, 3-4 large stones (usually cobbles) were placed (Fig. 122), a common occurrence in the Preceramic tombs (see Pozorski and Pozorski 1979, Quilter 1989, Wendt 1964) which were subsequently buried by the material excavated from the pit. The large stones are not restricted to adult burials, and infant remains have been found with them at Bandurria. In many cases undisturbed burials have been found with crushed bone due to these large stones.

Sex and age determination from the burials was done by Physical Anthropologist Karen Coutts, M.A. of the University of Florida. Of the 29 individuals excavated, half of individuals in the population died before reaching the age of 15, and of these about 44% were under the age of 5 (Table 19). These values are higher than child mortality rates at sites from similar time periods such as La Galgada (Malina: 1989:105) or the Middle Preceramic site of Paloma (Benfer 1990) though samples used in those studies are much larger. The oldest individuals, in this case two

women, died at about 60 years of age, while the oldest male was 45-50. This sample is too small to estimate life expectancy for the site, but the highest percentage of individuals (19%) died between the ages of 5-9 years old with a mean age of 6. This may suggest that weaning in the population took place around the age of 5-6 as this dietary change would create metabolic stress for this age range.

Of the 10 adult burials from the domestic sector seven are female and only three are male. The sample analyzed here is very small, and a chi-square test suggests that this variation is not statistically significant ($\chi^2=1.6$, $\alpha=.05$, $v=1$, $0.5>p>0.1$). However of the males, 1 was between 15-17 years of age, one old ~50 and one about 35. This is in contrast to the female ages, 4 of which were ~20 and 2 about 60. Males of prime and very old age are absent from the sample perhaps indicating variation in longevity or burial practices between the sexes or sexual division of labor with higher death risk for males, such as fishing. This hypothesis of course requires further excavation and a larger sample size for analysis.

Table 19. Age and Sex of Individuals excavated from the Domestic Sector.

Age Group	M	F	Indt*	Total	% Total
0-1			3	3	10.34
2-5			4	4	13.79
6-9			6	6	20.69
10-15			3	3	10.34
16-20	1			1	3.45
21-25		2		2	6.90
26-30					
31-35	1	1		2	6.90
36-40					
41-50	1			1	3.45
51-60					
60+		2		2	6.90
Adult		2	3	5	17.24
Total	3	7	19	29	100.00

* Indt:Indeterminate

4.8 HOUSEHOLD COMPARISONS AND POPULATION ESTIMATES

As mentioned before, one of the main objectives for the excavations at the Domestic Sector was to find domestic structures and estimate the number of inhabitants that occupied these structures to determine the number of individuals that constituted the household at Bandurria. The first step in defining the household was to determine the habitational unit used by Bandurria's inhabitants. Excavations in Unit 6, 8 and 9 uncovered clear domestic occupation reflected in formal mud floors of yellowish clay and habitational units associated to hearths and pits. Figure 123 presents the domestic structures from all the excavations. In these excavation units, a series of floors were found generally in successive reoccupations of the same areas reflecting intense remodeling of the domestic space. As the C14 dates show these remodelings were done in a short time period.

The stone platform found at Unit 6A is considered a non-domestic structure, related to small scale rituals when compared with the monumental architecture of Sector 2. The construction of stone platform at Unit 6A involved the labor investment of only a few individuals. Its importance to the inhabitants of Bandurria is reflected in the series of offerings (birds, baskets and humans) placed on its surface as part of an abandonment ritual. In no other area of the Domestic Sector have such offerings have been discovered.

4.8.1 Habitational Units

A total of 10 domestic structures were found during excavations and 90% of them (n= 9) are oval structures made of perishable materials (wood, *junco*, reed, etc.) with only 10% (n=1) of the structures composed of stone walls with a quadrangular plan. Seven of these nine oval structures were excavated completely in Unit 8. Their areas were directly measured from the

exposed post hole pattern. Excavations in Units 6 and 9 uncovered partial oval structures and their areas were estimated based on reconstructions from the available post holes.

Unit 6A: Quadrangular Stone structure (6A-I)

This structure is composed of three stone walls (north, west and south sides) and the stone platform on its eastern side enclosed a quadrangular space. Inside the structure a series of floors were identified. A total of 17 remodelings were associated with 20 mud floors have been found during the excavation of the structure (Fig. 124). The absence of hearths and pits, combined with the low proportion of fire cracked stones in the floors suggests that the structure was not occupied permanently by the first occupations. The earlier phase before the construction of the stone platform and quadrangular structure had the same characteristics as these earlier occupations. Floor 6.178 has the remains of a post hole structure, probably of a rectangular plan lacking a hearth. It also contained low proportions of fire cracked stones and domestic refuse.

Floor 6.131 marks an important change inside the structure as new features appear (Fig. 124 c). The most important feature is the burial of an infant under this floor and the first appearance of three hearths associated with fire cracked stones and abundant domestic refuse directly over the floor. The presence of a human burial is important as it is considered a way to validate the occupation of the structure with the placement of a kin member. Quilter (1989: 54) reports the presence of burials under the houses floors at Paloma. These burials are assumed to be households members that occupied the dwelling.

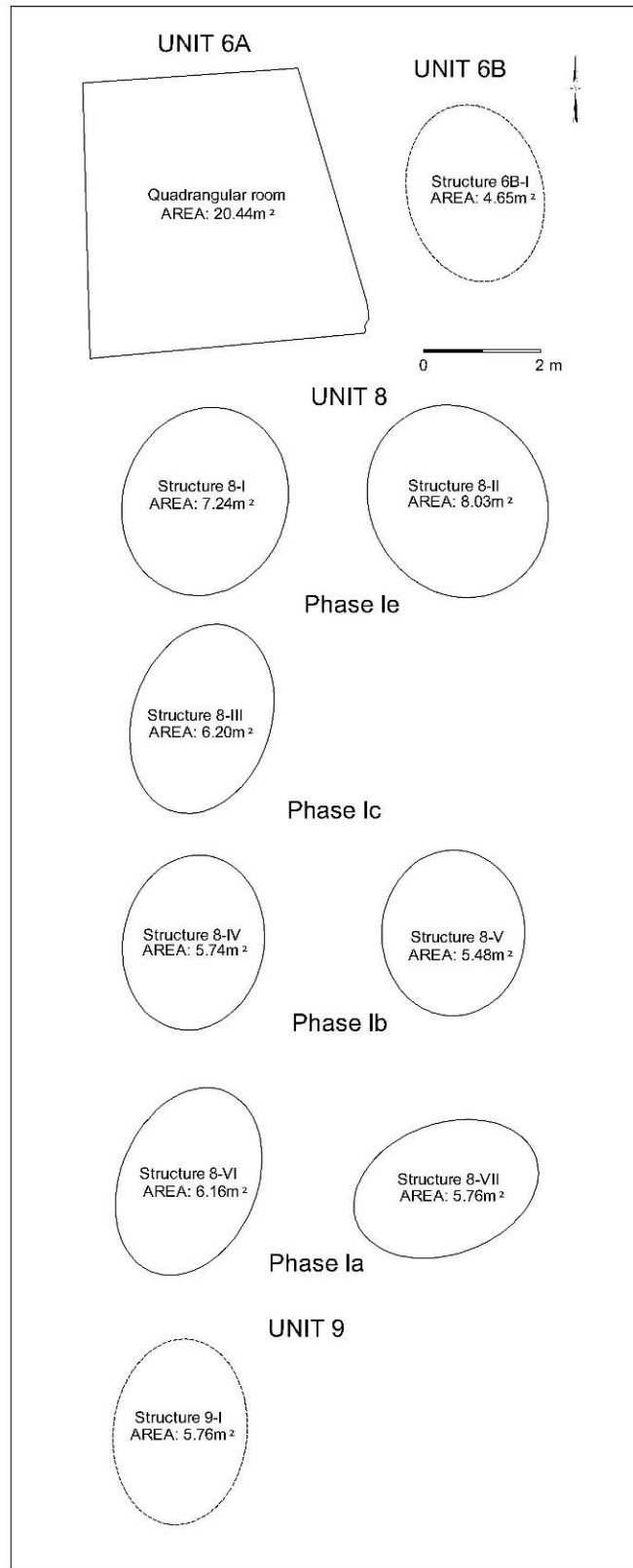


Figure 123. Houses floor plans from the Domestic Sector

Post holes found over these floors reflect internal divisions within the structure and a roof made of reed mats. The structures stone walls were low, about 0.4 m, as no evidence of wall collapse has been found. The remaining walls were of reed mats resembling modern quadrangular huts (Fig. 125) made from *Asentamientos Humanos* (shanty towns). Archaeologically, it resembles the early circular stone structures with low walls from the Levant (e.g. Stekelis and Yizrealy 1963: Fig. 4).

The artifact assemblage is very low in numbers and in the variety of artifacts as in the other excavations units. Within the structure, the presence of unbaked clay figurines in phases IIb, IIa and I, indicates that some kind of ritual was practiced involving the use of figurines by the inhabitants of this structure. In the next phase (Phase III) when the structure was abandoned domestic activities of food processing and consumption continued to be done, but no evidence of figurines or other artifacts were found. The presence of quartz crystals, bone tubes and bone tablets of sea mammal bones also indicates the performance of domestic rituals. A bone needle from Phase IIb and various beads were used by the structure inhabitants. The unique discovery of an unbaked clay plummet reflect that the inhabitants of the structure 6A-I were involved in construction activities.

Structure 6A-I has an area of 20.44 m², 12 m² larger than the biggest oval structure excavated (Structure 8-II) of 8.03 m². Based on the 20.44 m² area of the structure a population of 6.84 persons (with Cook and Heizer's calculations) or 3.33 person (with Brown's calculation) inhabited the structure (Table 20). Computing a mean of 5 person for structure 6A-I suggests that the dwelling was inhabited by a nuclear family.

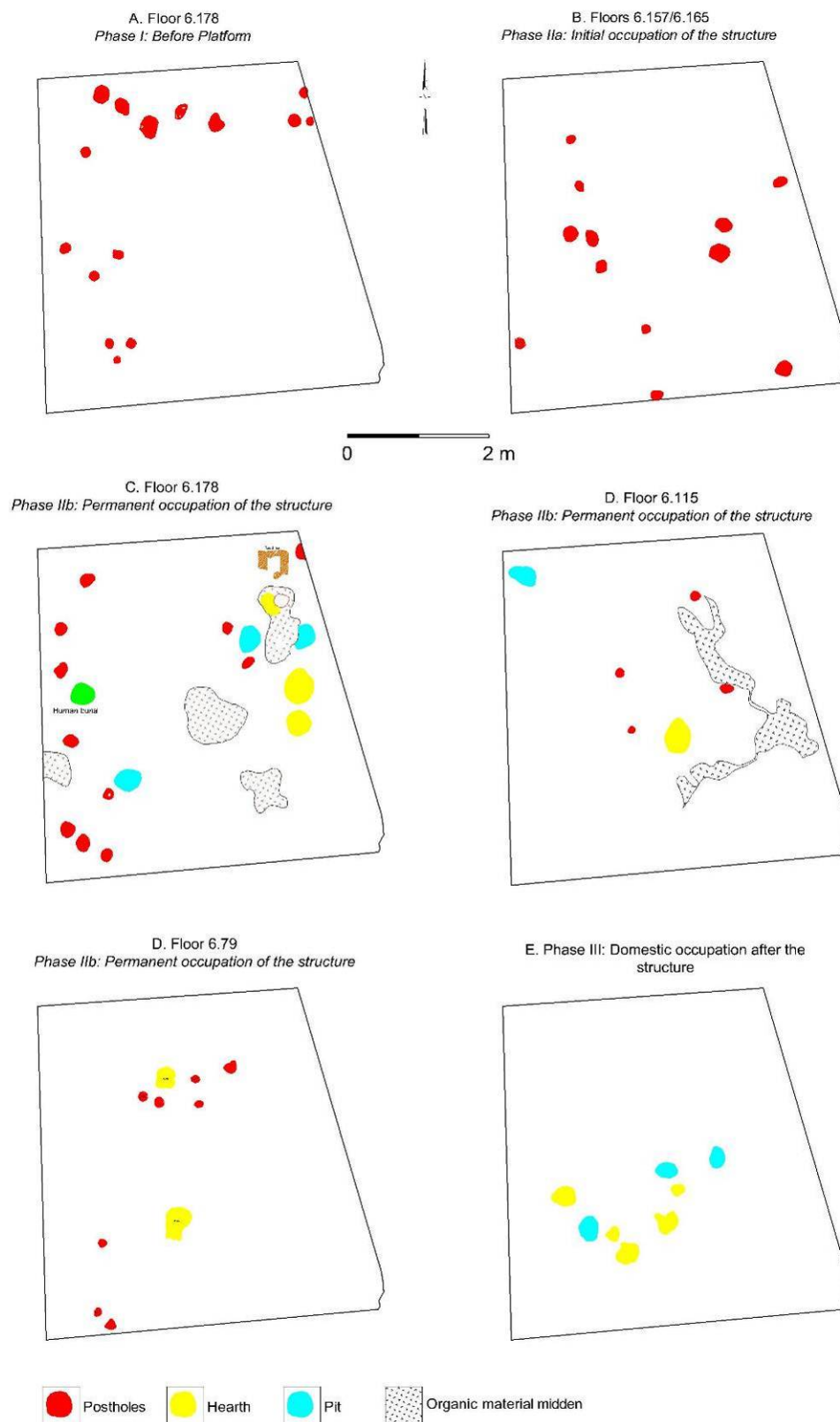


Figure 124. Simplified floor plans of structure 6A-I with identified features within the different occupations.



Figure 125. Perishable quadrangular structures from a modern urban shanty town of Lima. Roofs and walls are made of reed mats. Notice the low stone wall in the nearest hut and the stone platforms in the others.

Table 20. Population estimates from domestic structures from the Domestic Sector.

Structure	Shape of structure	Area (m ²)	Pop. Estimate Cook and Heizer	Pop. Estimate Brown
6A-I	Quadrangular	20.44	6.84	3.33
6B-I	Oval	6.68	3.34	1.11
8-I	Oval	7.24	3.62	1.21
8-II	Oval	8.03	4.02	1.34
8-III	Oval	6.20	3.10	1.03
8-IV	Oval	5.74	2.87	0.96
8-V	Oval	5.48	2.74	0.91
8-VI	Oval	6.16	3.08	1.03
8-VII	Oval	5.76	2.88	0.96
9-I	Oval	5.76	2.88	0.96

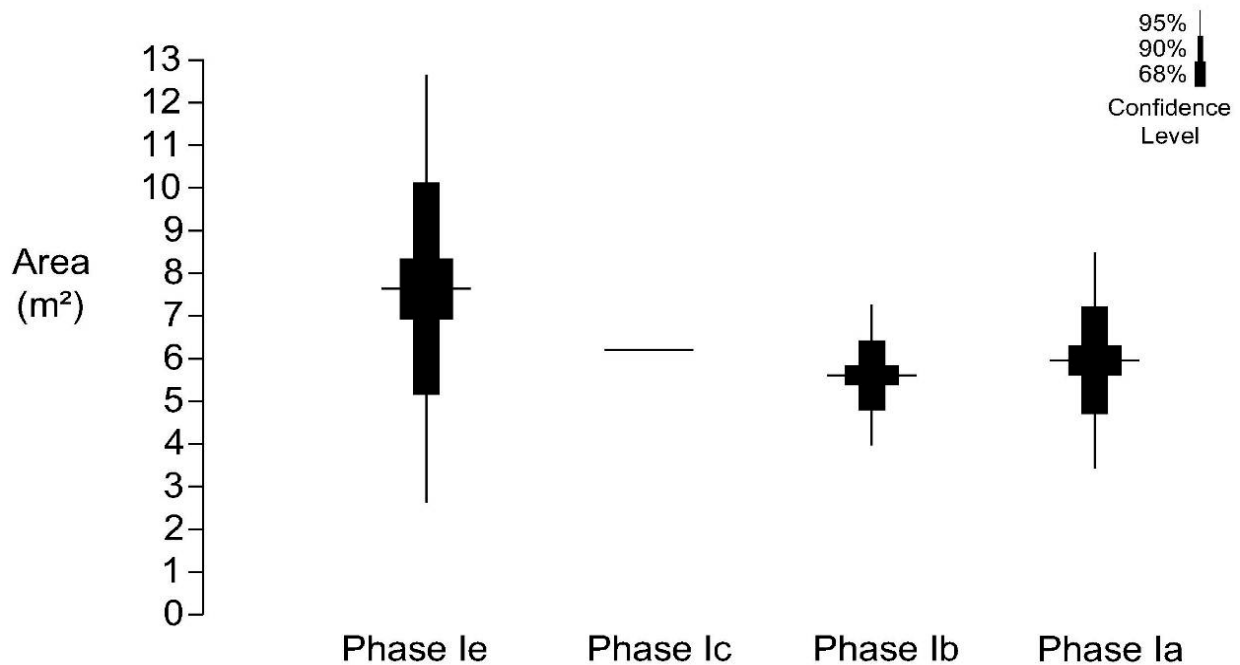
Mean from area from Unit 8 structures: 6.37 m²

Mean from population estimation from Unit 8 structures: 2.125 person/structure

Unit 8: Oval Structures 8-I to 8-VII

A total of 7 structures have been found in 4 floors of Unit 8. All the structures were constructed with perishable materials and have an oval shape. Unlike structure 6A-I with its stone walls and floors within the walled area, unit 8 had a new oval structure built on each floor. In some cases the new structure was built exactly in the same area as the previous one (see Fig. 106). We believe that the same household occupied the remodeled dwelling. This is supported by the C14 dates that have overlapping age ranges between the Phases for this excavation unit.

These structures have small areas ($5.48 - 8.03 \text{ m}^2$) that could only have housed from 0.96 up to 4.02 person (with a mean of 2 person per structure) using both population estimates (see Table 20). No significant differences are observed when the areas of the oval structures are plotted on a bullet graph (Fig. 126). There was only a slight increase of the structures areas through the last phase of occupation. The presence of two oval structures side by side from all the floors clearly suggests that their inhabitants were related. We believe they constitute a household. As the household members increased or reduced it was reflected in the number of oval structures. In the successive reoccupation of the structure and the number of features related to it through the different Phases is clear that the western oval structure (8-I, 8-III, 8-IV and 8-VI) was the main household habitational unit and probably was occupied by the household head. Considering the estimated number of inhabitants for the oval structures and that the household was constituted by two structures, we estimate that a household inhabited these structures. The household was consisted of 4.27 ± 2.57 (rounded to 4 ± 3) persons with a 95% confidence level, a value that is consistent with the number of members of a nuclear family.



Means Ie: 7.635 m², Ib: 5.610 m² and Ia: 5.960 m²

Figure 126. Bullet graph of habitational units identified at Unit 8.

Floor 8.64 from the earliest occupational phase (Ia) has two oval structures with internal hearths (Fig. 127d). The next occupation phase (Ib) is related to floor 8.57 also with have two oval structures. Here a more clear relationship between the structures is seen as they have a hearth and 2 pits between them (Fig. 127c) clearly indicating they were sharing these features. The remains of a reed mat, probably from the structure walls, was found on the mud floor.

The next occupational phase (Ic) is related to floor 8.32 that contained the remains of one oval structure. At the exterior of this structure a hearth was found. In the next phase Id, no evidence of structures were found but floor 8.127 extended partially through the excavation area.

The final occupation phase (Ie) had 2 oval structures with 2 hearths and 5 pits. The two structures have larger areas than the previous structures and probably housing more people.

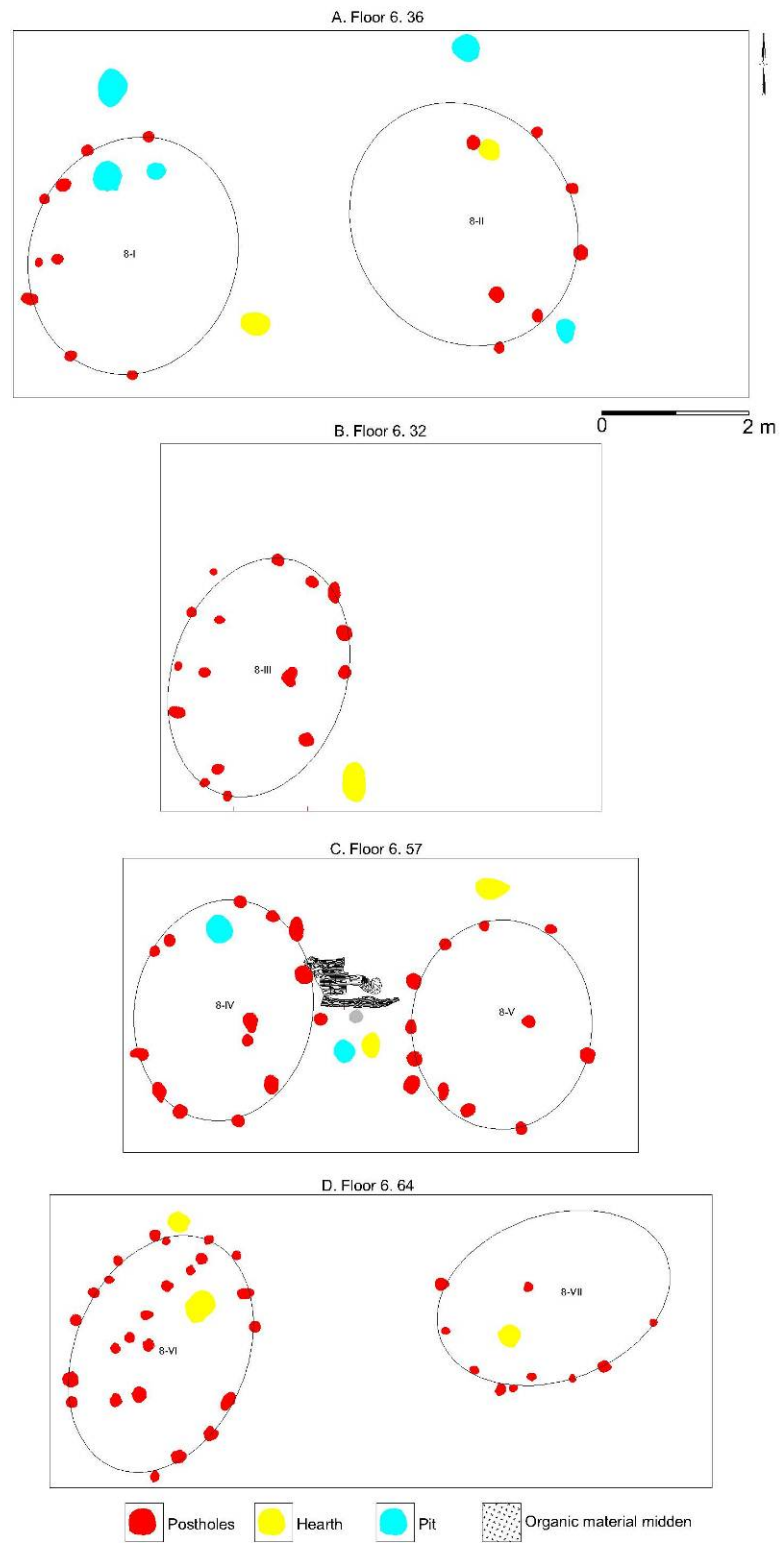


Figure 127. Oval structures plans with main features from floors excavated at Unit 8

It is clear from the small roofed area of the oval structures that most all domestic activities had to be done outside these dwellings. The extension of the clay floors to almost all the excavation area (10 x 10 m) and apparently beyond, supports this assumption. The oval structures were used only in resting and overnight activities.

The artifact assemblage is characterized by the low amount and variety of artifacts, a common denominator of all our excavations at the Domestic sector. No clay figurines were recovered from Unit 8 only small bird bones tablets and worked sticks were recovered from the excavations. Quartz crystals were found in the same proportion as in other excavation units. The presence of quartz crystals, bone and wood tablets reflects some kind of domestic ritual different than the one identified with the unbaked clay figurines in structure 6A-I. Beads for adornment are also present but in same proportion as in the other excavation units.

Units 6B and 9: Structures 6B-I and 9-I

As reported during excavations of Unit 6B and 9 partial oval structures were uncovered in the deep levels of both excavations. From the available post hole patterns oval structures were evident which we compared with the other domestic structures. Both structures had the same characteristics of the structure found at Unit 8 and both were associated with a formal mud floor.

Structure 6B-I from occupational phase II is the only remains of a domestic structure found in Unit 6B excavations. Other floors, all of them from the same phase, did not have any clear post hole pattern. Structure 6B-I, located in mud floor 6.87 has 7 post holes with 2 pits which were partially excavated (Fig. 128a). The reconstruction of this structure produced an oval shape with an area of 6.68 m². Estimates of the number of inhabitants of this structure are 3.34

and 1.33 individuals using Cook and Heizer and Brown's calculations. No artifacts were found directly associated with this structure.

Structure 9-I from occupational phase II of Unit 9, is also the only remains of a domestic structure found in excavations at Unit 9. Also located among a series of mud floor, only floor 9.36 has a series of 8 post holes associated with 2 pits (Fig. 128b) that defined the structure. From the available post hole pattern the structure shape has an estimated area of 5.76 m². In this area the number of inhabitants calculated are 2.88 and 0.96 individuals using Cook and Heizer and Brown's calculations. No artifacts were found directly associated with this structure.

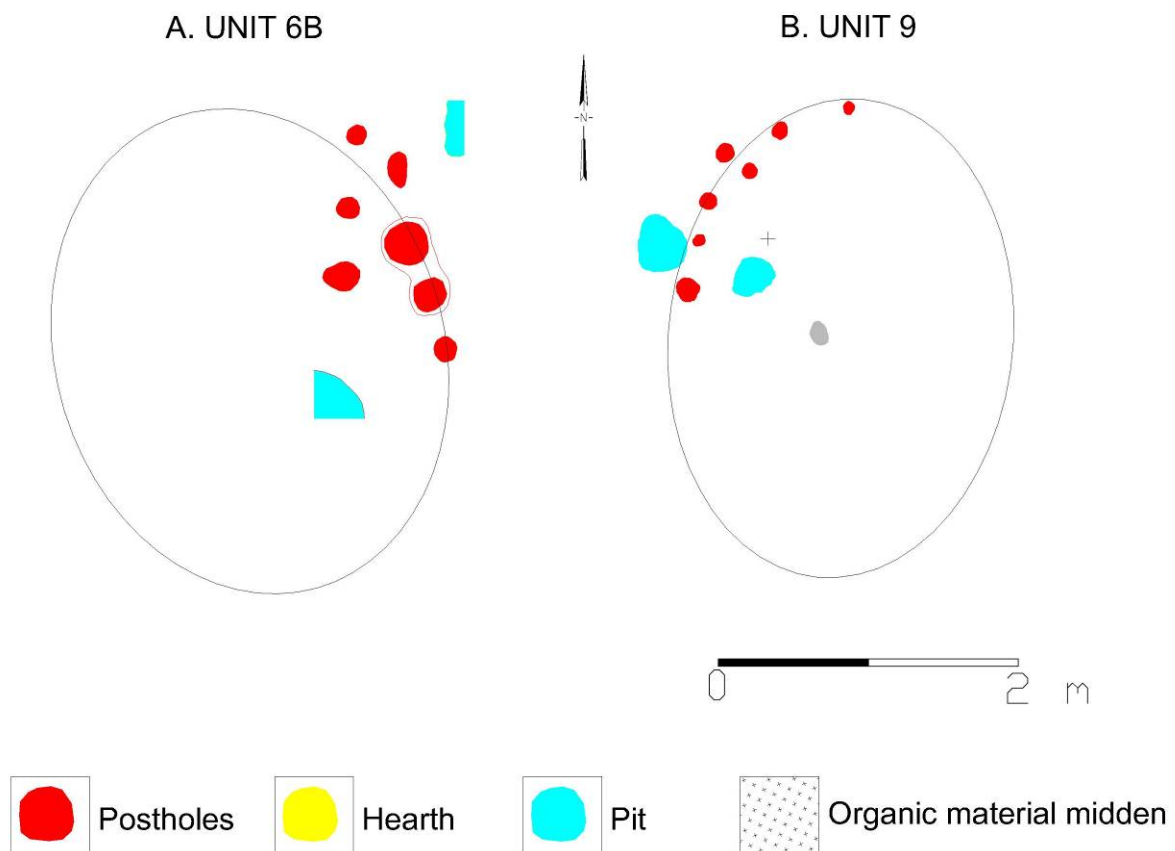


Figure 128. Oval structures plans with main features from Units 6B and 9.

4.8.2 Activity Areas

During the excavation of the different floors and related structures particular care was taken to identify activity areas. Excavations at all the domestic occupations clearly identified one activity: the preparation and consumption of food. Very high proportions of the domestic refuse contained the debris of cooking (e.g. ash, charcoal, burnt food) and food waste (fish bones, shell, seeds, etc.). The most ubiquitous indicator of cooking was firecracked stones used in earth ovens or *pachamanca*. For preceramic societies who lack pottery or other heat resistant containers heating stones and placing raw food in them is the best way to cook the food. Other ways of cooking that could be done in preceramic societies is what today is known as *sopa de piedra* (stone soup) that also used heated stones, but the stones are placed within the raw soup in big gourds. Pieces of broken gourds (Fig. 129) used as containers and abundant firecracked and fire marked stones (Fig. 130) are present in all the domestic occupations identified. This is the clearest activity that can be identified in the excavation in the Domestic Sector.

Other isolated artifacts reflect some of the household activities: fragments and some complete shell fishhooks, and pieces of cotton nets confirm fishing was a very important activity. This is confirmed by the abundance of fish bones recovered from the domestic middens. No evidence of other extractive or productive activity have been identified at the domestic occupation. Cotton threads and textile fragments were recovered in very low proportions but no textile production tools were found.



Figure 129. Fragments of a gourd container tied with a reed rope.



Figure 130. Fragments of a gourd container.



Figure 131. Fireburned stones (cobbles) used in cooking activities.

Beads from shell, stone, and bone have been found in almost all the excavations in low proportions, so it is very likely that nearly all the inhabitants of Bandurria have access to the beads, using them as adornments. Some of the beads are made of exotic materials brought from elsewhere but its low frequency and does not reflect any trade. Again no artifacts for bead production have been found.

Together with subsistence activities some evidence of ritual were found. The evidence suggests two types of rituals: one found in all the domestic occupations which involved the use of bone or wood tablets and quartz crystals and a second one restricted to the inhabitants of the stone structure 6A-I which involved the use of unbaked clay figurines.

4.8.3 Summary

Two different types of habitational units have been identified through excavations at the Domestic sector. The most common type are small oval dwellings made of perishable materials. The second type are quadrangular dwellings made of stone walls. Only one quadrangular structure has been found directly associated with non-domestic architecture. Apparently the emergence of this type of stone dwelling is linked with the appearance of a non-domestic architecture of low stone platforms used for same kind of ritual. As the C14 dates and stratigraphic sequence show, before the construction of the stone platform and the quadrangular dwelling, a semi-quadrangular structure of posts and mats was in use in the same area. The absence of hearths, low proportions of domestic refuse and the presence of figurines may indicate that this structure was used for non-domestic activities. The discovery of figurines in this level supports the ritual oriented space. In the next reoccupation of the structure, the new floors contained hearths, pits and dense domestic refuse. This could be interpreted as a household

occupying the structure and continuing with the rituals as figurines continued to be found in this level. These rituals probably extended to the stone platform. Finally, the stone platform was sealed and a series of offerings were made as part of the closure ceremony. We believe that after its closure the structure was used as a refuse dump that covered the stone walls. No more floors were located in the area but hearths, posts and other features were found on the midden surface. No artifacts were found related to this occupation confirming a mundane use of the area.

The oval structures reflect a different type of domestic occupation, an occupation where almost all activities were done outdoors. The presence of extensive floors with hearths and pits located outside the dwellings is confirmation of this activity. This pattern has been found in Units 6A and 9 in levels near the base of the human occupation of the site. The lack of specialized tools indicates that most of the households were focused on processing and preparation of food. When the areas of all the oval structures area compared in a bullet graph (Fig. 130) no significant differences can be observed between structures in Unit 8 and Unit 6B. The oval structure found at unit 9 is significantly smaller than the structures from Unit 8. Considering this size difference and the slightly bigger area of the structures from the last phase at unit 8 we can see that there is a trend toward larger living areas of the oval structures.

Chronologically, there is a clear superposition of the stone structures over simpler smaller structures of perishable materials. As stone structures were built, the small oval structures continued to be used as the C14 dates demonstrate. From the evidence obtained from the excavation we still do not know if there is complete transition to quadrangular domestic structures as Fung proposed. No clear later domestic occupations have been indentified.

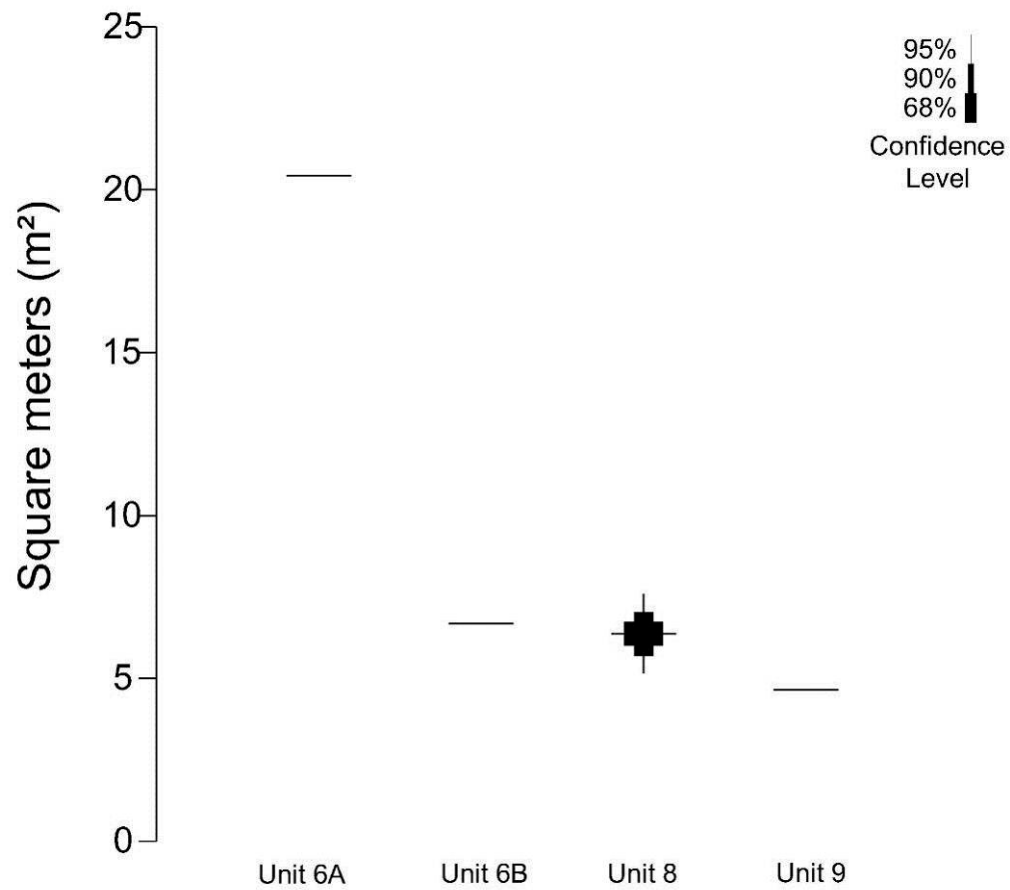


Figure 132. Bullet graph comparing all domestic structures excavated.

4.9 EXCAVATIONS IN THE MONUMENTAL SECTOR 2

After reviewing the surface evidence from the main mounds, we decided to excavate the mound located on the west side of the sector. This mound was named Mound 1 (*Monticulo 1*). From Mound 1, the remaining mounds were given a number. The biggest and highest (12 m high) mound of the site is located east from Mound 1 and was named Mound 2, the third largest (9 m high) mound is located east of Mound 2 and was named Mound 3, finally the fourth largest mound (8 m high) located south of the Mound 2, was named Mound 4. The goal of the excavations in this sector was to confirm the artificial nature of the mound and then define its characteristics.

4.9.1 Mound 1

This mound has a pyramidal relief and its dimensions are 60 m long, 30 m width, and 10 m high. At his north side it has a gentle slope ($\sim 20^\circ$) covered mainly by eolic sand. A slight depression is situated in its central area, connecting the mound with what appears to be a platform. This depression located at the center of the north side of the mound was thought to be the main access or stairway of the structure (Fig. 131).

On its surface the mound has some middle size stones and cobbles (25 to 30 cm long). The top of the mound had eroded stones alignments that may be wall surfaces. Very few cultural remains were observed on its surface, only fragments of eroded shells (mainly *Mesodesma donacium*) and some fragmented animal bones.

The rest of the mound surface has sand, gravel and stones (mainly cobbles) some of them with evidence of mud mortar. Wind erosion has affected the mound surface exposing what appears to be construction fill and eroding and destroyed exposed architecture.

The west side of the mound has a steeper slope (~30°) and has several cobble alignments that appear to be remains of heavily eroded walls. The east side of the mound has a similar slope (~30°) and is connected with a low platform, that links it with Mound 2, located east of Mound 1. This area has been heavily disturbed by the modern occupants of the site in their attempt to build a road across the two mounds during the 1980s. The south side of the mound has a steeper slope (~45°) with a series of small depressions in its central and southeast sides, probably covering access or structures. Along this side of the mound are several concentrations of fragmented shell (*Mesodesma donacium*).

Research at Mound 1 began in October 2005, a 20 x 5 m trench oriented south-north in the central depression of the north side of Mound 1. This trench was named trench 1, and was subdivided in 5 x 5 m square units (Fig. 132). As archaeological structures were found the trench was extended until it reached a length of 45 m. The 5 x 5 m excavations units were numbered 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H and 1I. Further excavation of both sides of the trench added the letter E to the east units and W to the west units (Fig.133).



Figure 133. General view of Mound 1 before excavations.



Figure 134. Excavation of the upper levels of Trench 1, at the northern side of Mound 1.

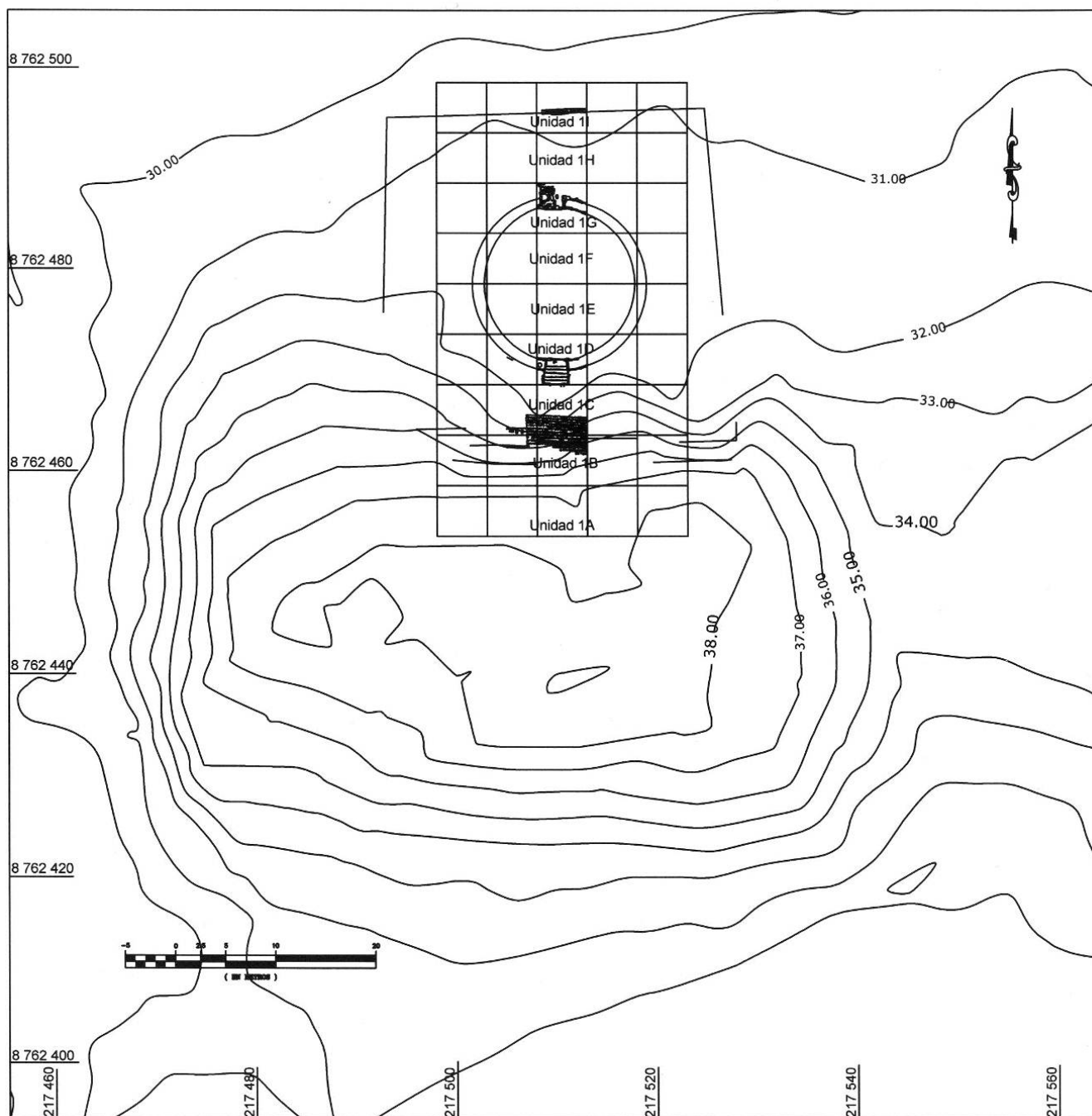


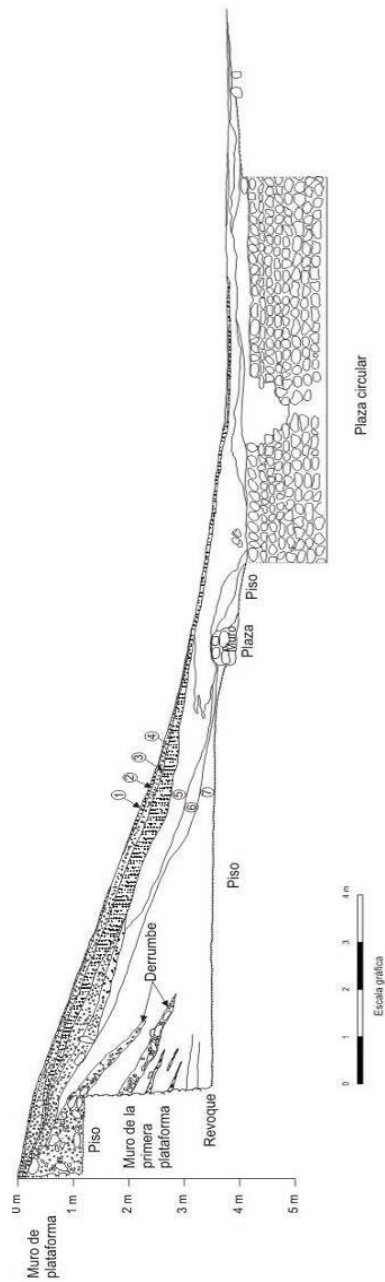
Figure 135. Plan of Mound 1 excavations units and Trench 1

4.9.1.1 Excavation of Trench 1

The excavations began by removing the surface layer covering the trench, as recorded in the west trench profile (Fig. 133). The S.U. 1 was composed of loose sand, gravel and small angular stones. Some isolated medium size cobbles were located along the trench. Towards the upper part of trench (unit 1A) the surface contains more gravel, suggesting the exposure of construction fill. The excavation of Units 1A and almost all 1B exposed the construction fill of the structure. Once it was identified as fill excavation focused on the lower trench units. As the trench was excavated towards the base of the mound the presence of gravel decreased and the sand increased. The sand deposition is clearly eolian in nature. No cultural remains were found within this first S.U.

The S.U. 2 has the same characteristics as the previous S.U. but contained traces of silt and clay probably from eroded structures. This S.U. is distributed irregularly along the trench but is concentrated in the middle section. The trench's upper part is composed of sand and gravel. The S.U. 3 immediately below the previous S.U. is a thin layer of eolian sand, gravel and few small angular stones. It appears to be an old exposed and eroded mound surface, does not have any cultural remains and differs from S.U. 2 in its higher concentration of gravel.

S.U. 4 is a white compact layer that is distributed evenly along the trench, with no cultural remains present. This material is called *caliche* in Spanish. A sample of this material was analyzed by XRD at the Department of Geoscience, University of Alabama by geologist Miguel Etayo. The sample is composed of anhydrite (calcium sulfate or dihydrate gypsum) with about 20% of halite (sodium chloride) and low proportions of quartz and gypsum. The anhydrite is a dehydrated mineral formed in extreme drought conditions (Etayo pers. com.).



220

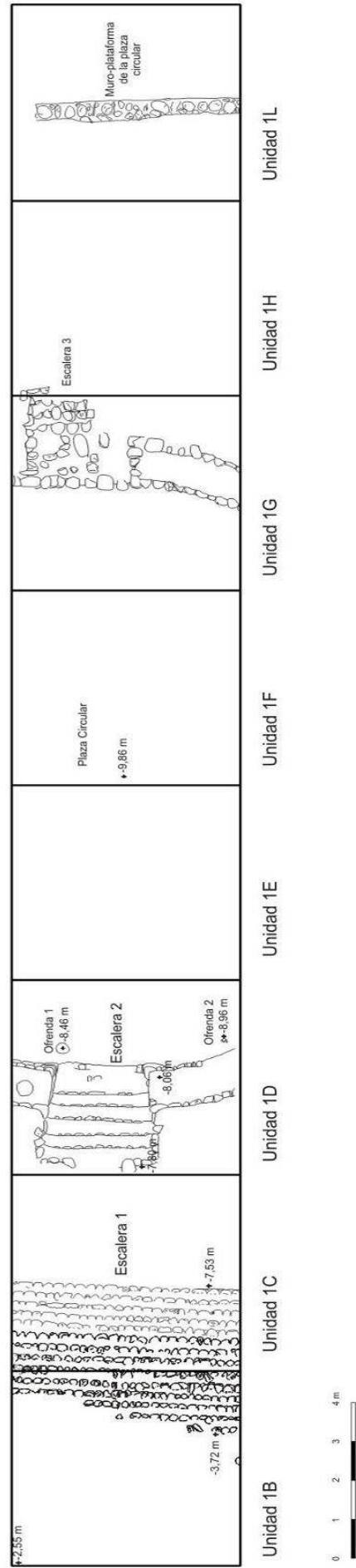


Figure 136. Straigraphy and plan map of Trench I

The caliche formation probably occurred during a strong climatic event since it is found all over Playa Chica.

The S.U. 5 is composed of sand and small angular stones, containing pieces of charcoal and ash, fragmented shell of *Mesodesma donacium* (macha) and fire cracked stone. The layer also contains plant remains such as *lucuma* seeds, maize and others crops. Pottery sherds of the Late Intermediate period (AD1100-1400) Chancay style were found in this layer. This S.U. represents a Chancay seasonal occupation of the area to extract *Mesodemias* from the nearby sandy beach. The S.U. concentrates at the lower part of the trench (Units 1C and 1D) and its thickness decreases towards the upper part of the trench.

Beneath it S.U. 6 is a layer composed of fine eolian sand where its laminated deposit and is the product of the transit and occupation of the above strata (S.U. 5). The human activities must have broken and altered the natural composition of the eolian sand. It only contained small shell fragments probably introduced from the upper human activities during the Late Intermediate period.

The lower layer, S.U. 7, is a natural deposition and is composed by laminated deposits of eolian sand. The creation of this layer is a continuous sand deposition that covered the entire structure. The eolian sand does not have any cultural remains other than small charcoal fragments, plant fiber or other organic materials that could be blown in with the wind and deposited as part of the sand layer. On the lower levels of the sand accumulation near the base of the wall we found concentrations of whole *Mesodesma* shells. These are probably remains of offerings placed on the surface when the sand began to cover the structures.

The eolian sand layer is concentrated near the main mounds walls towards the south of the trench units. The sand deposition in this area is more compact and probably older. The sand

gets looser as it reaches the mound edge. During the deposition of the sand some walls collapsed, probably as a result of earthquakes after the site was abandoned. In some cases this wall collapse was only some cobbles but in other cases we found when the trench was extended to the east the unit C and D massive walls collapsed indicating a very strong earthquake.

Immediately below S.U. 7 we uncovered the remains of a stairway that functioned as the mounds main access. This stairway has a south to north orientation and is composed of a series of rows of cobbles with mud mortar. Erosion has destroyed the upper part of the stairway, where only construction fill was found. A total of 14 steps was found with an average width of 25 cm and a height of 18-20 cm. The stairway is fairly well preserved although some cobbles are missing. It has a steep slope making it difficult to ascend the mound, probably a restrictive architectural. The excavations at both sides of the stairway had a total width of 6.48 m.

The excavation extended west and east of unit 1C uncovering two large well preserved walls. These walls were attached to the main stairway forming the mounds first platform. The walls are constructed with rows of cobbles set in mud mortar. The mortar contained vegetal inclusions that were identified as salt grass (*Distichlis spicata*). The walls of the first platform have very similar heights 2.03 m and 2.05 m for the west and east walls. Excavations at the stairway sides discovered the walls of a second platform with the same construction techniques. The east platform wall has a height of 1.1 m and has lost some of the upper cobble rows but in general it is well preserved. The west platform is more deteriorated than the east platform as there are many wall collapses. A third platform was located in the upper section of the mound although it was affected by erosion. . Near the stairway some cobble rows were located on west and east side, the rest of the platform only had one cobble row.

As the excavation continued in the lower part of the trench, in unit 1D we uncover a second stairway related to curve walls. The stairway and the associated wall were elements of a circular plaza completely covered by the sand and in very good preservation. The circular plaza has a diameter of 15 m and presents two access of trapezoidal plant in the south and north edges. The south access is well preserved and as all the architecture is made of cobbles and mud mortar; its steps appear to have a thin layer of plaster. The stairway has 8 steps of 30 cm wide, but the last one connecting to the plaza floor appeared to be closed. The northern access also presents a stairway but a looters pit (*huaqueo*) just in the center of it has destroyed many of the upper steps. We been able to identified 5 steps. The plaza walls associated with this access also have been affected by erosion that has leave the walls corners without mortar. The plaza enclosure if formed by a 2 m high wall that presents it its upper part a second low wall that gives the plaza a circular ring that appears to be a bench. The plaza as well as the mound has a south-north orientation. The circular plaza north side is more affected by erosion and presents collapsed walls in some areas. The eolic sand has covered this collapses and missing cobbles in the walls. In some areas that lack the stone wall the construction fill, composed of gravel, has fell into the circular enclosure.

In unit 1L at 6 m from the northern access of the circular plaza the foundations of a wall oriented W-E was found. The wall foundation presented a mud base with salt grass inclusions and cobbles. The wall extends through the width of the trench and is 40 cm wide. This wall was the connecting wall of construction fill that defined the platform where the circular plaza was built.

During the excavation of the trench no evidence of *shicra* bags were found in the construction fill. The fill used in the structures is composed of clean compacted gravel and sand.

In some areas *pircas* of sandstone blocks have been found inside the construction fill. These *pircas* have a few sandstone rows that fill levels that form small terraces.

Excavations continued to the western and eastern unit to expose more of the monumental architecture (Fig. 136, 137). Most all of the mound front contains the circular plaza where exposed sand was removed (Fig. 138). The stratigraphy is the same as reported for Trench 1.

4.9.1.2 Offerings

No cultural remains were found in the excavated architecture. But two offerings were found within the eolian sand in the circular plaza. Offering 1 was found next the west corner of the south access. It was a very deteriorated globular basket (Fig. 139). Inside the basket there were (Fig. 140) two bone pins or *tupus*, a bone needle, a bone batten, a small stone bowl and a package of cotton twined textiles. The textiles were carbonized and disintegrating. Below the basket were gourd fragments, bones of a small lorna (*Sciaena deliciosa*) and a piece of a cotton net. This offering was placed inside the circular plaza when the sand had almost covered it completely. The second offering is composed of two bottle shaped gourds (Fig. 140). Offering 2 was placed next to the plaza wall (2.7 m from the south entrance) also when the sand had completely covered the plaza.

The offerings were placed on the sand that covered the mound and the circular plaza and no further human activities could be performed, thus the site had to be abandoned.

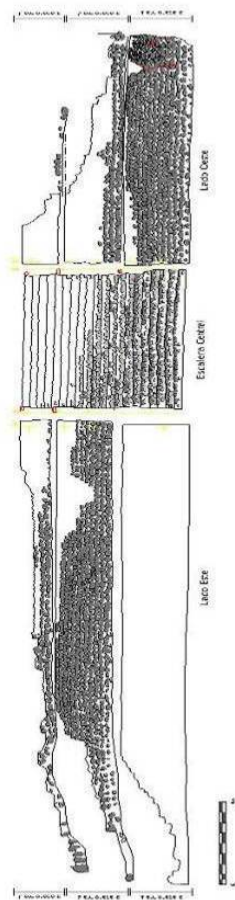


Figure 137. Mound 1 and circular plazar discovered in Trench 1.



Figure 138. Mound 1 and circular plaza after expansion of the excavations to the east and west units.

Mound 1 Platforms



Circular Plaza Wall

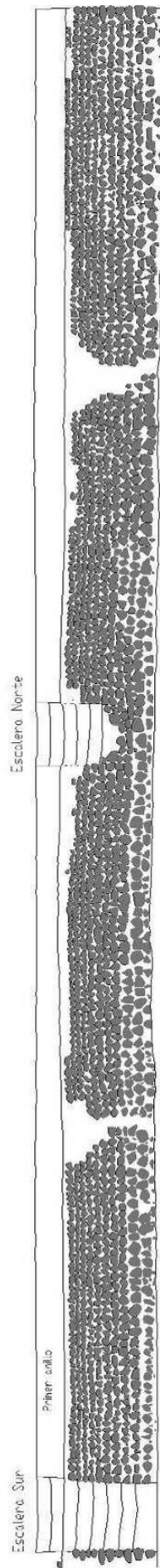


Figure 139. Stone platforms and main stairway of Mound 1 north front and stone walls from the Circular Plaza.



Figure 140. Offering 1: basket found found next the west corner of the south access of the circular plaza.



Figure 141. Bone artifacts and pieces of a cotton net found inside the basket.



Figure 142. Offering 2: Bottle gourds found next to the plaza wall.

4.9.1.3 Radiocarbon Dates

Two AMS radiocarbon dates were obtained from excavations at trench 1. The first date of 3535 ± 15 B.P. comes from a salt grass (*Distichlis spicata*) sample obtained from the mud mortar of the southeast wall of the circular plaza. This date is associated with the construction of the mound-plaza complex. The second date of 3440 ± 15 B.P. was obtained from a sample of the basket vegetal fiber of Offering 1 and clearly dates abandonment of the domestic sector as sand covered all structures. The two dates show a difference of 95 C14 years between the construction of the plaza and its abandonment and placement of the offering. When compared to the dates from the domestic sector (Fig. 142) it is clear that the dates obtained from the Monumental sector are the latest from the site.

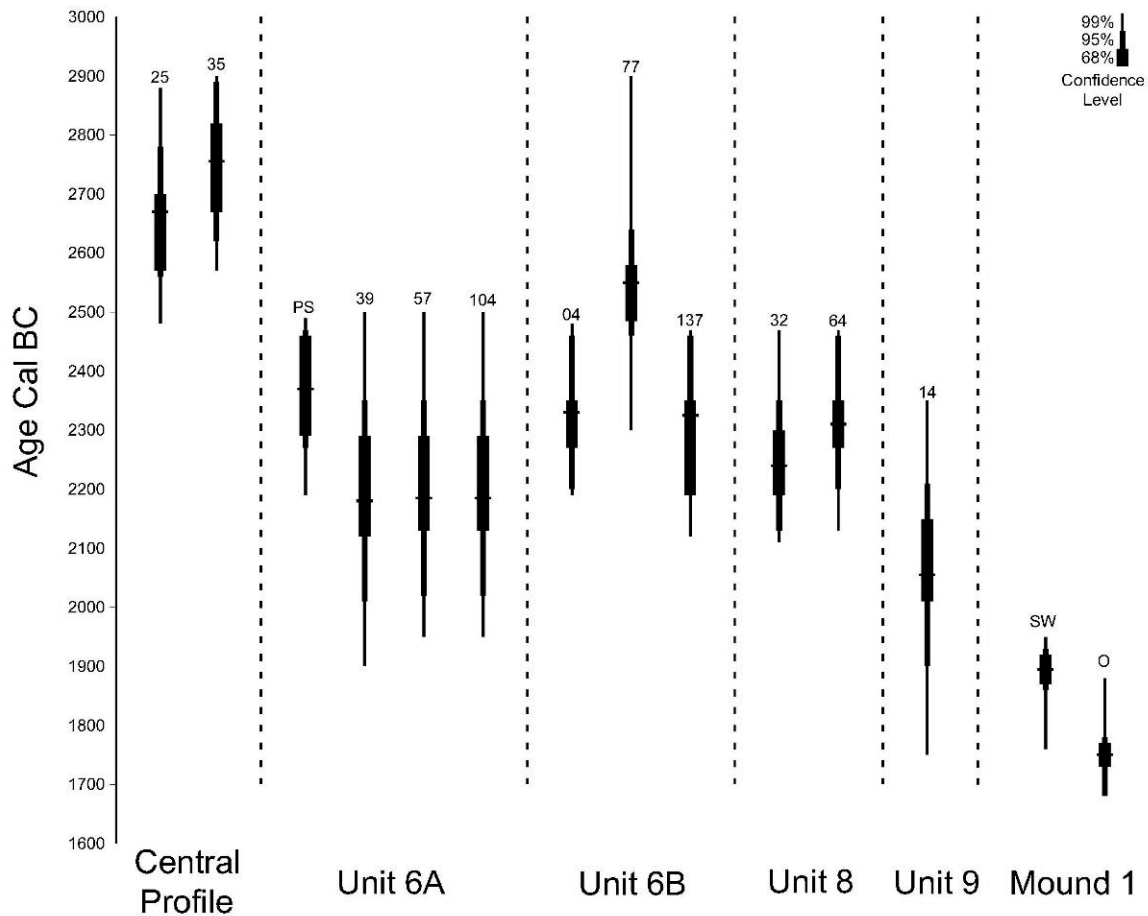


Figure 143. Comparison of radiocarbon dates from Domestic and Monumental sectors.

4.9.2 Early Monumental Architectural Traditions in the Central Andes

The architecture excavated in Mound 1 belongs to an architectural tradition identified in all the Late Preceramic North central coastal and inland monumental sites. No previous evidence of any type of architecture have been found in the archaeological record for the area. The presence of a non-domestic architecture has been defined to reflect a complex social organization differentiated spatially (Fung 2004: 92). This architecture is clearly ceremonial and public in its layout and architectural elements.

In the central Andes another LPP architectural tradition has been identified for the Highlands. The Mito architectural tradition (Bonnier 1992) related with the Kotosh religious tradition (Burger and Salazar-Burger 1980) is composed of small structures called “temples” in Kotosh and “ritual chambers” in La Galgada (Fung 2004: 103). The Mito architecture presents a ceremonial hearth usually with a subterranean ventilation duct in a two level floor chamber (Fig. 143). The two architectural traditions were contemporaneous but with clear different characteristics, the work investment of coastal architecture is much higher than in highland architecture. Although we think that for the late part of the LPP, coastal societies adopted some of the Highland architectural elements as they have been found in Caral (Shady *pers. com.*) reflecting contact and exchange between these two societies.

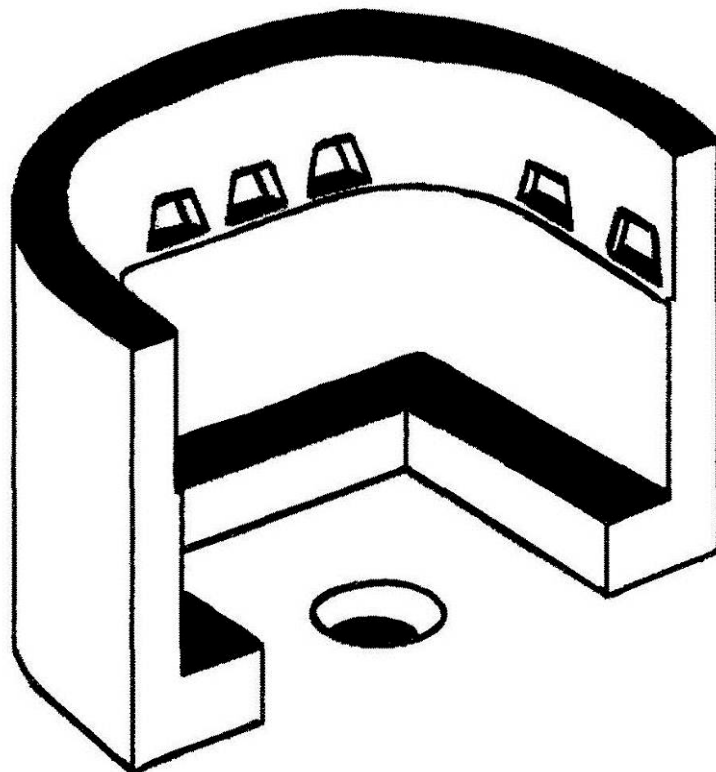


Figure 144. Stylized reconstruction of a Mito chamber with main architectural features. (Redrawn from Quilter 1992: Fig. 12)

Studies previous the excavations at Caral, considered most of the monumental architecture identified in the north central coast and valleys to belong the Initial Period (1800 – 500 BC) as no intensive excavations were done. But now we know that an important monumental architecture tradition emerged during the Late Preceramic at the north central coast.

4.9.2.1 North Central Tradition of Monumental Architecture

During the Late Preceramic the emergence of non-domestic architecture has been interpreted to reflect the emergence of social complexity that allowed work investment in monumental construction projects. These non-domestic activities were ritual oriented and evolved into complex ceremonies and in the next millennia into a standardized religious cult.

The first non-domestic structures differentiated barely from the domestic structures. The constructions of low stone platforms as the one found in Unit 6A probably is a good example of the beginnings of this architectural tradition. This type of platforms required few persons and few construction skills. From there, construction techniques evolved into more sophisticated and elaborated ones allowing the construction of bigger and more complex structures. The Late Preceramic mound composed of superposed platforms is the basic structure in monumental ceremonial architecture. The mound also called truncated pyramid presents characteristic features found in almost all north central coast mounds: a main stairway connecting the mound base with a vestibule or lobby on the top of the mound that connects to an atrium: a smaller open room on the top of the structure. This room appears to be the main feature of this tradition and appears on top of mounds, low platforms or in ground level (Fig. 144) but always is a quadrangular room sometimes with benches or small terraces enclosing it.

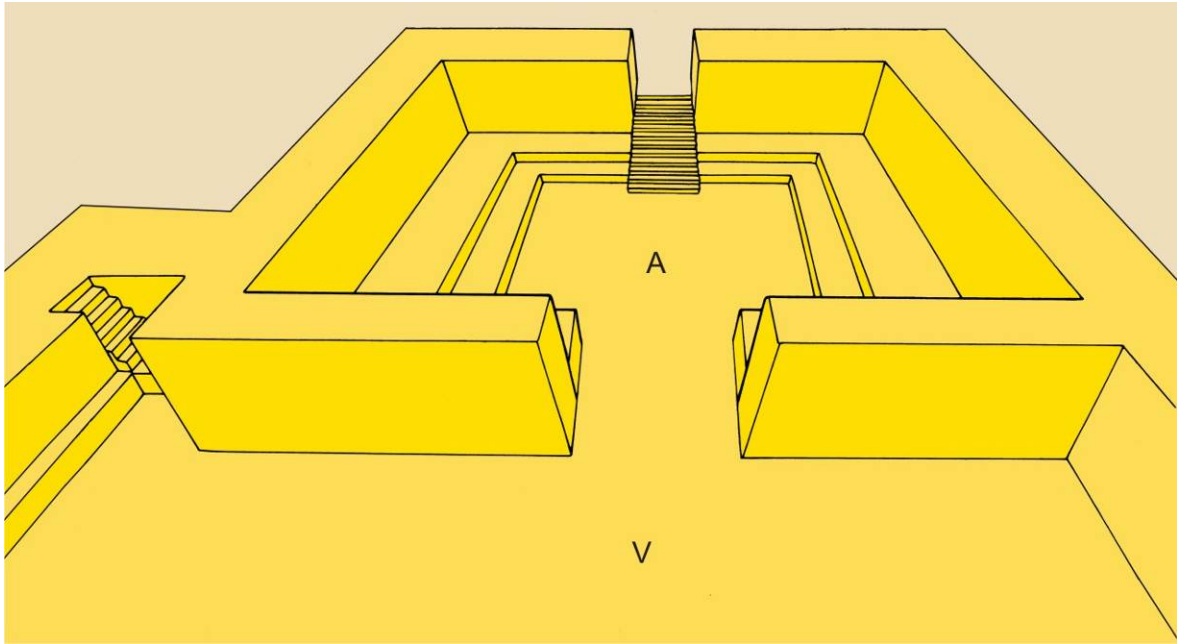


Figure 145. Stylized reconstruction of vestibule (V) and atrium (A).

Stone is the construction material used in public architecture in contrast with perishable materials (e.g. cane, reed, wood or sedge) used in domestic architecture. The type of stone depended upon availability; in the case of Bandurria cobbles extracted from the alluvial terrace where the site is located were used for construction. In Aspero a combination of cobbles and quarried angular stones were used while in inland valley sites like Caral angular stones were quarried from the nearby hills (Shady and Leyva 2004). The cobbles were used unmodified, needing only to be extracted and placed into the construction, while the quarried stone required extraction and modification. All monumental stone architecture used mud mortar in some cases with plant inclusions. Walls and floors of these structures were plastered with clay and in some sites color pigments have been reported.

The building technique itself is very simple and effective to create big construction volumes. Stone walls enclosed areas that were filled to create platforms, the superposition of platforms created pyramidal structures. The platforms were filled with different materials

available at the site. Although not found in Bandurria's construction fill, the use of bagged fill is very common in Late Preceramic monumental architecture. The bag or *shicra* is a net bag of *juncos* or *totoras* filled with stones or rubble and placed in the platform. The use of *shicras* will continue to the Initial Period monumental architecture. Bandurria is one of the few Late Preceramic sites where we do not find *shicras* associated to monumental architecture, builders at Bandurria preferred clean compacted sand and gravel to fill their platforms.

The second main element of this architectural tradition is the circular plaza. Although first related with the Initial Period (Williams 1980: 404, Feldman 1992: 77) recent research confirmed it as a Late Preceramic main architectural element. Circular plazas had been found during the excavation of Initial Period sites but located in peripheral areas as secondary structures of the U-shaped temples (Burger 1992:68). The circular plazas are located in front of the *façade* of the mounds maintaining the same orientation. Two main types of plazas are found: sunken or semi-sunken plazas within platforms as the excavated in Bandurria and walled plazas over the surface as the ones found in Caral (Shady 2004).

The mound or truncated pyramid and the circular plaza form the main architectural Late Preceramic complex of the North central coast. This architectural complex is generally arranged in an imperfect bilateral symmetry system as main stairways usually mark the complex main axis.

Within these complexes open spaces create ceremonial areas as gathering and feasting places. These open plazas do not have particular shapes and usually are delimited by the presence or absence of structures. In Bandurria we have located a long open area in front of the mounds that probably was used as a plaza.

5.0 SUBSISTENCE REMAINS ANALYSIS

5.1 INTRODUCTION

Subsistence remains are the main cultural remains found at the excavation of the Domestic Sector at Bandurria. Analysis of the subsistence remains are important for many reasons and my research I expected that the differences between the subsistence assemblages of the identified households might reflect unequal access to resources or different consumption patterns that may reflect social differences among households. Subsistence analysis from Late Preceramic coastal sites at the North Central coast are very few in comparison with LPP sites excavated. During the 1970s Cardenas (1977-78) published a list of identified mollusks species identified from her excavations at the coastal site of El Paraiso south of Bandurria. More recently, intensive research at Caral has recovered abundant subsistence remains, although only one published paper directly addresses then analysis (Bearez and Miranda, 2000). The species identified from Caral have been reported in all the publications about the site (Shady 1997, 1999a, 2000b, 2004, 2005, 2009) but no quantification or context provenience of the species reported are published. My analysis focuses on the identification and quantification of the subsistence remains recovered from the excavation of the Units 6, 8 and 9. As reported, excavations from the Monumental Sector did not found significant subsistence remains are not included in this analysis, but controlled samples from the faunal and botanical assemblages were analyzed.

My analysis provides detailed information that contributes to the discussion between the maritime or terrestrial economic bases for the emergence of social complexity on the coast. The Maritime Foundations for the Andean Civilization (MFAC), developed by Michael E. Moseley (1975, 1992), engendered heated discussions on the priority of maritime versus agricultural resources (e.g. Osborn 1977, Quilter and Stocker 1983, Raymond 1981, Wilson 1981), although it was clear that domesticated plants were part of the subsistence and industrial plant production. From the excavation of other LPP sites (e.g. excavations by Quilter at El Paraiso) evidence demonstrated that plants were part of a subsistence strategy that was predominately a maritime economic system. At Caral, an inland site, numerous plant species have been identified but even there the subsistence economy was heavily dependent upon marine resources (Sandweiss and Moseley, 2001).

My analysis of the domestic refuse from Bandurria confirms the results obtained by Quilter (Quilter *et al.* 1991) at El Paraiso, although plants were found in all the excavated contexts, most of them were used not for subsistence purposes. Reed, rush, salt grass and *carrizo* where used in construction purposes, cotton in the manufacture of cloth and nets, and *Tillandsia* (an air plant) and other small bushes as firewood. Gourds were used as containers and nets floaters. The remaining food crops are only 5 taxa, a very low number considering the number of marine taxa identified: 31 taxa of marine invertebrates, 24 taxa of fishes and 6 taxa of non-fish (sea birds and marine mammals) fauna. This striking difference between the proportions of maritime resources vs. the land (mainly plant) resources reflects a maritime subsistence economy, complemented by terrestrial plants. Shellfish gathering and fishing were the only activities identified that provided animal protein, reflecting a dependence on marine resources

for virtually all the protein at Bandurria. No agricultural tools (e.g. digging sticks, hoes, sickles, etc) were found in the excavations of the Domestic Sector.

One of the main objectives of the analysis of the subsistence remains recovered from the different domestic occupations was to compare the subsistence assemblages to determine there were significant differences between the type of resources between households. I expected that the inhabitants of the quadrangular house have access to different resources than the inhabitants of oval houses. I will expect to find species of larger sizes that have a lower ratio of bone/shell to meat regardless of its habitats, extracting technique and distance of the resource from the site.

Appendix E presents the complete dataset at the S.U. level of all the excavation units for fish, marine invertebrate and plant assemblages. To allow for comparisons, the S.U.s have been grouped by occupational phases into summary tables that are presented in the following pages.

5.2 FAUNAL REMAINS

Faunal remains are the more abundant subsistence evidence recovered. All of them are of marine origin or marine related (sea birds). Fish and mollusks constitute the more frequent and abundant faunal remains in accordance with a site located 300 m west from the shore. Other non-fish vertebrates identified are sea birds and sea mammals, but they do not represent a significant number in the total sample. This section has been divided in three major sub-sections: marine invertebrates (mollusks, crustaceans, and echinoderms), fish, and other vertebrates (birds and mammals). Each subsection contains the specific methodology for the type of remain and results.

A total of 231,543 faunal fragments were recovered from Unit 6, 8 and 9. From this total, fish represents the most abundant taxa with 130,022 fragments, 56.15% of the total faunal NSPI. Marine invertebrate with 101,434 fragments represent 43.81% of the total. Only 87 fragments were identified as other vertebrates (birds and mammals), representing the 0.04% of the total faunal assemblage (Fig. 145).

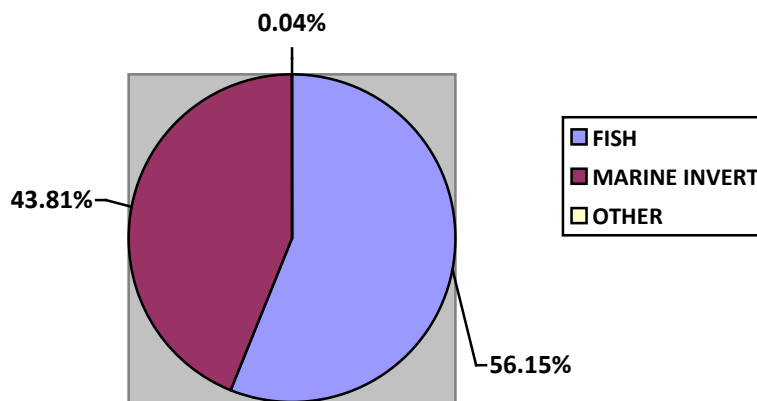


Figure 146. Distribution of faunal remains from the excavations at the Domestic Sector

5.2.1 Fish

Fish are the most numerous vertebrate taxa present in the archaeological record recovered from the excavations. Fish remains were recovered from all excavations at the Domestic Sector, with the notable abundance of anchovy (*Eugraulis ringens*) and sardine (*Sardinops sagax*). Primary contexts presented good preservation of fish. In some cases dry anchovy's heads and bodies were recovered. Secondary contexts preserved bones (mainly otoliths and vertebrae).

5.2.1.1 Methodology:

The procedure used for recovering the fish sample was the same used to recover the other faunal remains: from the controlled sample of 12 liters all the fish bones were recovered from the 6 mm and 2 mm screen. These two fractions were packed and sent to the lab.

Once in the laboratory several of procedures were followed: first, the fish bones were unpacked and cleaned using brushes and metal dental instruments. Second I identified the fish bones by taxon, I used a comparative collection of modern specimens collected from fishermen at the Puerto de Huacho. For the preparation of the modern collection and identification procedures and techniques I was assisted by Dr. Philippe Bearez from the National Museum of Natural History of France (Fig. 146). The flesh from each modern specimen was removed and their bones cleaned, then each bone was classified according to its type and location within the fish (left and right sides and axial body). A comparative collection of 30 fish species was prepared and used in the identification phase. The comparative collection allowed us to identify the bones to the level of species and family. Only diagnostic bones like otoliths, head bones



Figure 147. Dr. Philippe Bearez (at the center) and other crew members processing modern fish

and vertebrae were used to identified taxa. From the head, diagnostics bones used in taxonomic identification were 13 lateral facial elements: cleithrum, supracleithrum, post temporal, palatine, premaxila, maxilla, lachrymal, quadrate, dentary, articular, preopercular, opercular, hyomandibular, and an axial bone the basioccipital (Fig. 147). At this point I noted any particularities with the specimens such as burn marks, pigments coloration or human modification. Next all samples were counted, annotating the number of vertebrae, otoliths and head bones for each taxon identified.

After each analysis a printed form was filled with the taxons identified, abundance of each taxon was recorded, calculating the number of identifiable specimens (NISP) and the minimum number of individuals (MNI). For the NISP all bones (vertebrae, otoliths and head bones) were considered. The NISP is the direct sum of all the fish bones of the identified taxon. For the MNI a series of indicators were applied using the highest estimate available counts of single, paired or multiple elements. The left and right otoliths, the number of right and left head



Figure 148. Diagnostic head bones used for taxon identification: (**dn**) dentary, (**ar**) articular, (**pop**) preopercular, (**op**) opercular, (**hm**) hyomandibular, (**qd**) quadrate, (**la**) lachrymal, (**pl**) palatine, (**pmx**) premaxilla, (**mx**) maxilla, (**cl**) cleithrum, (**scl**) supracleithrum, (**ptp**) post temporal,

bones, the presence of first and last vertebrae and the number of vertebrae (abdominal and caudal) were used to estimate MNI. In the case of the fish vertebrae only anchovy, sardine and drum *Scienadea deliciosa* (Iorna) vertebrae were used to define MNI as they were the more abundant vertebrae in the samples analyzed. The other species did not reach high numbers and were not considered in the MNI calculation.

For the anchovy (*Eugraulis ringens*) a mean of 46 vertebrae per individuals was considered, while for the sardine (*Sardinops sagax*) a mean of 50 vertebrae per individual was used (Bearez and Miranda 2000: 71). For lorna (*Scienadea deliciosa*) the third most common specie a mean of 25 vertebrae per individual was used (Bearez, personal communication). Finally, each taxon was weighed and repacked.

5.2.1.2 Results

A total of 24 taxa from 13 families were identified at the fish assemblage from excavations of unit 6, 8 and 9 (Table 21). The total number of fragments (NSPI) of the fish assemblage is 130,042 fragments and the minimum number of individuals (MNI) is 5070 individuals. All species belong to the cool waters of the Peruvian or Humbolt ocean current. No fresh water (river or lagoon) taxa were identified. For fishes it was decided to use the MNI to estimate the relative frequencies of taxa.

By far the most abundant species is anchovy (*Engraulis ringens*) a small herbivorous schooling fish with 92.56% of the total NSPI and 77.14% of the total MNI. Anchovy grows to a maximum size of 20 cm. Its distribution is within the cool water Peruvian current and it is very sensitive to changes in sea temperature. The second most frequent species is sardine (*Sardinops sagax*) also a herbivorous schooling fish that can grow up to 30 cm and is present in the sample with 5.51% of the total NSPI and 9.21% of the total MNI. Anchovy and sardine live at the same habitat known as the coastal pelagic, and have the same geographical distribution from the Guayaquil gulf in Ecuador in the north to Chiloe in Chile in the south (Fig. 148). To capture these species, fishing nets were used from the shore or from boats or rafts which required specialization in fishing technology.

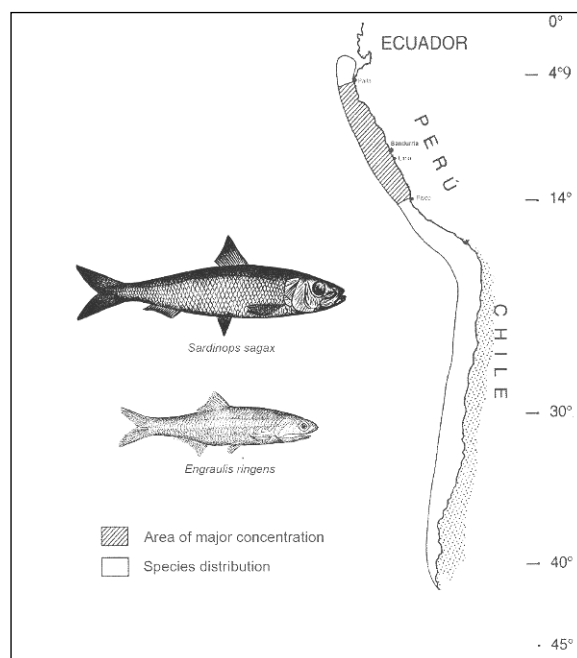


Figure 149. Geographical distribution of anchovy (*Engraulis ringens*) and sardine (*Sardinops sagax*). Redrawn with modification from Bearez and Miranda 2000: Fig. 3

Table 21. Total NSPI and MNI of identified fish with their ranks.

FISH IDENTIFIED FROM THE DOMESTIC SECTOR

Controlled Samples

FAMILY	GENUS SPECIES	TOTAL			
		NSPI	RANK	MNI	RANK
APLODACTYLIDAE	<i>Aplodactylus punctatus</i> leonora	2	18	1	15
ARIIDAE	<i>Galeichthys peruvianus</i> bagre	66	7	44	5
CARANGIDAE	<i>Trachurus murphyi</i> jurel	28	9	21	9
CARCHARHINIDAE	Sharks	5	16	3	13
CHEILODACTYLIDAE	<i>Cheilodactylus variegatus</i> pintadilla	2	18	1	15
CHEILODACTYLIDAE	<i>Seriolaella violacea</i> cojinoba	1	19	1	15
CLUPEIDAE	<i>Sardinops sagax</i> sardina	7164	2	467	2
CLUPEIDAE	<i>Ethmidium maculatum</i> machete	116	4	5	12
ENGRAULIDAE	<i>Engraulis ringens</i> anchoveta	120372	1	3911	1
HEAMULIDAE	<i>Isacia conceptionis</i> cabinza	17	12	13	10
HEAMULIDAE	<i>Anisotremus scapularis</i> Schita	14	14	2	14
MYLIOBATIDAE	<i>Myliobatis</i> sp. ray	20	11	1	15
SCIAENIDAE	<i>Sciaena deliciosa</i> lorna	876	3	429	3
SCIAENIDAE	<i>Cilus gilberti</i> corvina	27	10	22	8
SCIAENIDAE	<i>Cynoscion</i> sp. corvina del norte	4	17	3	13
SCIAENIDAE	<i>Cynoscion analis</i> cachema	40	8	32	6
SCIAENIDAE	<i>Paralanchurus peruanus</i> coco	106	5	59	4
SCIAENIDAE	<i>Cheilotrema fasciatum</i> burro	15	13	8	11
SCIAENIDAE	<i>Menticirrhus ophicephalus</i> mis-mis	2	18	2	14
SCOMBRIDAE	<i>Sarda chiliensis</i> bonito	9	15	5	12
SERRANIDAE	<i>Acanthistius pictus</i> cherlo	1	19	1	15
TRIAKIDAE	<i>Mustelus</i> spp. tollo	103	6	23	7
No Identified		1052		16	
TOTAL		130042		5070	

The third abundant taxon identified at the fish assemblage is the drum lorna (*Sciaena deliciosa*) with 0.67% of the total NSPI and 8.46% of the total MNI. Lorna's habitat is the sandy bentonic and is very common near sandy beaches. As a benthic species it is captured with fishhooks (Sandweiss 1989: 442). These drum fish can growth up to 50 cm and weigh several kilograms. Lorna's rank varies from NSPI and MNI.

Other taxa have very low proportions. The drum family (*Sciaenidea*) has a high proportion of identified species such as *Paralalanchurus peruanus* (Rank 4 in NMI), *Cynoscion analis* (Rank 6 in NMI), and *Cilus gilbert* (Rank 7 in NMI). Other frequent species are the catfish *Galeichthys peruvianus* (Rank 5 in MNI) and various species of smoothhound (*Mustelus mento* and *Mustelus* sp.) with a Rank of 7 of identified NMI. These species live at the same habitat, the sandy bottom (Sandy bentonic). This habitat is the nearest to the site. The Playa Chica beach (a sandy beach with sandy bottom) is located only at 300 m to the west. Table 22 summarizes the habitat distribution of the identified taxa.

Identified species with less than than 100 fragments represents the 78.26% of the entire identified sample. Compared with 120,372 anchovy fragments the percentages obtained from them are very low and can affect direct comparisons between assemblages. The use of NMI reduces our sample from 130,042 fragments to 5070 individuals with a significant reduction between the highest values and the lowest ones. The low proportions and high variety of spicies may reflect random catches.

Table 22. Habitats of identified fish

Pelagic (open sea)
CACHARHINIDAE <i>Sharks</i>
Coastal Pelagic (open sea but also near the shore)
<i>Engraulis ringens</i>
<i>Ethmidium maculatum</i>
<i>Sardinops sagax</i>
<i>Sarda chilensis</i>
<i>Seriotelella violacea</i>
<i>Trachurus murphyi</i>
Sandy Benthic (Playa Chica beach and Salinas bay near Bandurria)
<i>Galeichthys peruvianus</i>
<i>Sciaena deliciosa</i>
<i>Cilus gilberti</i>
<i>Cheilodactylus fasciatus</i>
<i>Cynoscion analis</i>
<i>Cynoscion</i> sp.
<i>Isacia conceptionis</i>
<i>Menticirrhus ophicephalus</i>
<i>Myliobatis</i> sp.
<i>Mustelus</i> spp.
<i>Paralichthys peruianus</i>
Rocky Benthic (Paraiso beach 4km to the south of Bandurria)
<i>Anisotremus scapularis</i>
<i>Aplodactylus punctatus</i>
<i>Cheilodactylus variegatus</i>
<i>Acanthistius pictus</i>

Data compiled from Sandweiss 1992, Chirichigno and Cornejo 2001, Bearez and Miranda 2000.

Diversity between assemblages:

A first approach to the fish assemblage was to compare the diversity of fish taxa in each occupation phase from Units 6, 8 and 9. Simpson's diversity index (L) and its transformation $1-L$ were calculated. The results for each phase assemblages are presented in table 23. Results of Simpson diversity index show in general little diversity in the fish assemblages.

Table 23. Diversity Indexes (Simpson's diversity index) of Occupational Phases. In *italics* Phases with clear domestic occupation.

Unit/Occupational Phase	<i>L</i>	<i>1-L</i>
<i>6A I</i>	<i>0.4332</i>	<i>0.5668</i>
<i>6A IIa</i>	<i>0.2698</i>	<i>0.7302</i>
<i>6A IIb</i>	<i>0.5647</i>	<i>0.4353</i>
<i>6A III</i>	<i>0.0873</i>	<i>0.9127</i>
<i>6B I</i>	<i>0.9755</i>	<i>0.0245</i>
<i>6B II</i>	<i>0.9859</i>	<i>0.0141</i>
<i>6B IIIa</i>	<i>0.9379</i>	<i>0.0621</i>
<i>6B IIIb</i>	<i>0.4510</i>	<i>0.5490</i>
<i>8 Ia</i>	<i>0.8530</i>	<i>0.1470</i>
<i>8 Ib</i>	<i>0.9296</i>	<i>0.0704</i>
<i>8 Ic</i>	<i>0.9084</i>	<i>0.0916</i>
<i>8 Id</i>	<i>0.7761</i>	<i>0.2239</i>
<i>8 Ie</i>	<i>0.9068</i>	<i>0.0932</i>
<i>8 II</i>	<i>0.9569</i>	<i>0.0404</i>
<i>9 I</i>	<i>0.9068</i>	<i>0.1895</i>
<i>9 II</i>	<i>0.8432</i>	<i>0.1568</i>
<i>9 IIIa</i>	<i>0.5494</i>	<i>0.4506</i>
<i>9 IIIb</i>	<i>0.8335</i>	<i>0.1665</i>

The only phase with a high diversity is phase III, related to an occupation dating after the quadrangular stone structure from unit 6A, with a *I-L* index of 0.9127. All phases, but one, with clear domestic occupations have very low *I-L* index that range from 0.0704 to 0.5668. The occupation IIa from unit 6A related with the first occupation of the quadrangular stone structure and is the only one that has a high diversity with a *I-L* = 0.7302.

Occupational phases that have been considered secondary depositions (e.g. Phases 6B I, 6B IIIa, 6B IIIb, 8 II, 9 I, 9 IIIa, and 9 IIIb) also have low diversity of fish taxa, except phase 6A III. The low diversity of these phases ranges from 0.5490 to 0.0245. As table 24 shows, the fish assemblage is mainly constituted of anchovies and sardines with a very high proportion (86.35% of the MNI). After them, sandy bentonic taxa predominate with 12.54% of the MNI. Rocky bentonic taxa only represent the 0.099%.

Table 24. NSPI and MNI of fish by occupational Phase.

[illegible]

Comparing Assemblages from Occupational Phases:

The percentages of the MNI of the taxa from the occupational phases associated to households were compared using histograms. Percentages of the MNI values were used to create graphs at the same scale (Table 25).

The histograms show differences between the domestic occupations of unit 6A (related to the quadrangular stone structure) and units 6B, 8 and 9 (related to oval structures).

The earliest occupation is from unit 6A, before the construction of the stone platform, presents various peaks reflecting the consumption of several species preferring larger specimens such as drums lorna (*Sciaena deliciosa*) 33.33%, cachema (*Cynoscion analis*) 6.944%, corvine (*Cilus gilberti*) 5.556% and coco (*Paralonchurus peruanus*) 4.167%; and sardine (*Sardinops sagax*) 20.83%. In this phase anchovy (*Egraulis ringens*) represent only the 15.28% of the NMI.

The second occupation related to the construction of the platform and the initial occupations of the quadrangular structure reflect a significant increase of the drum lorna (*Sciaena deliciosa*) with the 53.16% of the NMI. The sardine *Sardinops sagax* is the second more abundant specimens with 10.13%. Anchovies *Egraulis ringens* are third with 8.861%.

By the third occupation of Unit 6A, related to the second occupation of the quadrangular structure with a more permanent domestic occuparion; another change in the species consumed by their inhabitants is observed in the histogram. For the first time *Egraulis ringens* dominates the NMI with 35.89%, closely followed by *Sciaena deliciosa* with 31.34%.

The next histograms (phases 6B II, 8 Ia, 8 Ib, 8 Ic, 8 Id, 8 Ie and 9 I) relate to oval structures share the same shape, with a big peak representing *Egraulis ringens* with percentages that range from 68.94 to 95.98% of the total NMI. At the second place is *Sardinops sagax* with a

range of 3.421 to 19.15%. The third most abundant taxon is *Sciaena deliciosa* with ranges of 3.652 to 8.333%.

The inhabitants of the quadrangular stone structure had a more varied diet with larger fish and more species diversity. The species consumed by this household come from the nearby sandy habitat and from the rocky habitat 4 km south of the site. Bigger specimens and the rock fishes were fished with fishhooks.

The oval structures present a very different consumption pattern focusing mainly on small schooling fish like *Egraulis ringens* and in a lower proportion *Sardinops sagax*. Cotton fish nets were used to capture these specimens. The use of cotton nets is also confirmed by the high number of NMI and NSPI of *Egraulis ringens* found in these domestic occupations. The C14 dates from the quadrangular and oval structures show that both structures were occupied by the same time. No chronological differences can be argued to explain the difference fish assemblages. The fishing technology of cotton net was available by the time the structures were occupied and this is reflected in the high proportions of *Egraulis ringens* associated to the oval structures. The only plausible explanation of the low proportions of *Egraulis ringens* in the quadrangular structure is a different consumption pattern that favored bigger specimens and included taxa from rocky habitats.

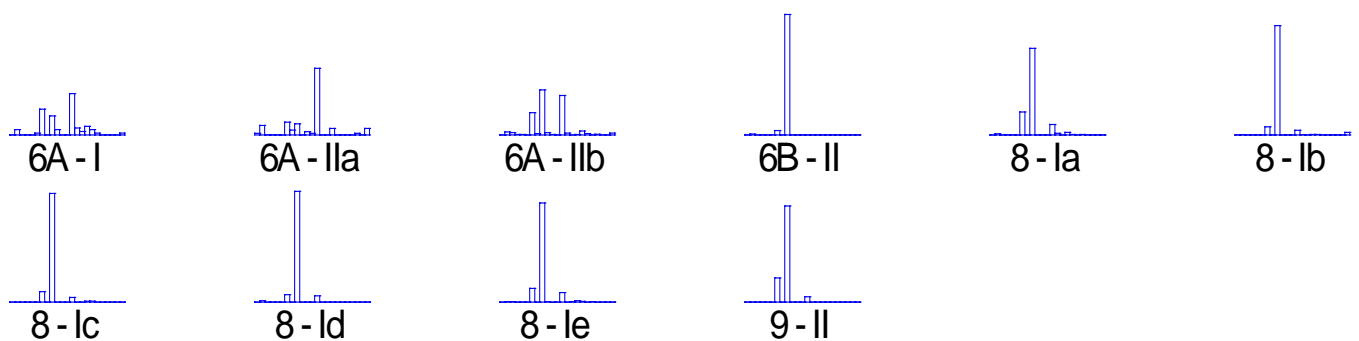


Figure 150. Histograms of the fish assemblages from phases associated to domestic occupations.

5.2.2 Marine Invertebrates

Marine mollusks, crustaceans and echinoderms are within the category of marine invertebrates and were analyzed together. As mentioned before, marine invertebrates were the second most abundant subsistence remains identified at the excavations, with 43.81% of the total faunal NSPI. Many of the contexts excavated fit the description of shell middens, presenting primary and secondary depositions.

5.2.2.1 Methodology:

The procedure used for recovering the sample of mollusks and other marine invertebrates was the same used for other faunal remains: from the controlled sample of 12 liters all the marine invertebrate remains (complete and fragmented) were recovered from the 6 mm and 2 mm screen. These two fractions were packed and send to the lab.

Once in the laboratory several procedures were followed: first, the shells were unpacked and cleaned using brushes and metal dental instruments. If needed, the shells were washed with deionized water and dried. Second we separated the shells by taxon, I have a comparative collection of modern specimens and a series of shell guides (e.g. Alamo and Valdivieso, 1987, Guzman *et al.*, 1998, Olsson, 1961, Zuñiga 2002) for identification. After the separation each taxon was divided in complete (bivalve or univalve) specimens and fragments. At this point I noted any particularities with the specimens such as burn marks, pigments, coloration or human modification. Next, all sample was counted counting the number of complete valves and fragments for each taxon. Data forms designed for the research were filled out. A form was filled out for each S.U. In the case of bivalves, complete valves were divided in left and right sides and

also in a size range (very small, small, medium, big, and very big) taking as basic measurement the valve length (VL). With univalves (Gastropods) only size was considered taken as measurement the shell height. Finally, each taxon was weigh and repacked.

The analysis forms were filled out with each taxon identified, their quantification (complete valves, fragments) and weight. The abundance of each taxon was recorded calculating the number of identifiable specimens (NISP) and the minimum number of individuals (MNI). For the NISP all specimens (complete valves, fragmented valves, fragments) where considered. The NISP is the direct sum of all the specimens of the identified taxon. For the MNI a series of indicators were applied according to their class, bivalves left and right hinges were counted using the largest number as the MNI.



Figure 151. Two of the most important mollusk species identified in shell assemblages are the clam *Mesodesma donacium* and the mussel *Choromytilus chorus*



Figure 152. Third most common mollusk identified in shell assemblage is the clam *Mulinia edulis*.

For Gastropods the apices and columellas were counted using the largest number as the MNI. For the family *Fissurellae* (keyhole limpets) the apex with the oval hole was considered as MNI. For the family *Chitonidae* (chitons), composed of eight plates, the MNI for this class was estimated dividing, the number of plates by 8.

5.2.2.2 Results

A total of 31 species of marine invertebrates divided 23 families were identified in the Bandurria samples analyzed from excavation units 6, 8, and 9. Mollusks were the most abundant genus with a total 24 identified taxa and 1 family. Of the mollusks identified, 8 taxa are of marine pelecypods and 16 taxa are marine gastropods. The family *Chitonidae* included various species of chitons. A total of 4 taxa of crustacean were identified and 2 taxa of echinoderms (Table 26).

Table 26. Taxonomic list of identified marine invertebrates from the analyzed sample.

MOLLUSCA	Scientific Name	Common Name	Common Name in Spanish
PELECYPODA			
	Mactridae		
	<i>Mulinia edulis</i>	Small clam	Almeja
	Mesodesmatidae		
	<i>Mesodesma donacium</i>	Wedge clam	Macha
	Mytilidae		
	<i>Choromytilus chorus</i>	Blue mussel	Choro azul
	<i>Aulacomya ater</i>	Black mussel	Choro negro
	<i>Perumytilus purpuratus</i>	Small mussel	Chorito
	<i>Semi-mytilus alcosus</i>	Small mussel	Chorito
	Pectinidae		
	<i>Argopecten purpuratus</i>	Scallop	Concha de abanico
GASTEROPODA			
	Acmaeidae		
	<i>Collisella</i> sp.	Limpets	Patela
	<i>Scurria</i> sp.	Limpets	Patela
	Calyptaeidae		
	<i>Crepidatella</i> spp.	Slipper shell	Pique
	Fissurellidae		
	<i>Fisurella crassa</i>	Keyhole limpets	Lapa
	<i>Fisurella limbata</i>	Keyhole limpets	Lapa
	<i>Fisurella maxima</i>	Keyhole limpets	Lapa
	<i>Fisurella peruviana</i>	Keyhole limpets	Lapa
	Muricidae		
	<i>Trophon peruvianus</i>	White snail	Caracol
	Nassariidae		
	<i>Nassarius gayi</i>	Small snail	Caracolito
	Naticacea		
	<i>Polinices uber</i>	Small snail	Caracolito blanco
	Olividae		
	<i>Oliva peruviana</i>	Olive shell	Oliva
	Thaidadae		
	<i>Concholepas concholepas</i>	False abalone	Chanque
	<i>Thais chocolate</i>	Gray snail	Caracol gris
	<i>Thais haemastoma</i>	Gray snail	Caracol gris
	<i>Xanthochorus buxea</i>	Small snail	Caracolito
	Trochidae		
	<i>Tegula atra</i>	Small snail	Caracol turbante
	Turbinidae		

	<i>Prisogaster niger</i>	Small snail	Caracolito negro
POLIPLACOPHORA			
	Chitonidae		
	<i>Chiton</i> spp.		Barquillo, chiton
CRUSTACEA			
	Balanidae		
	<i>Balanus</i> spp.	Barnacles	Pico de loro
	Calippidae		
	<i>Hepatus chilensis</i>	Crab	Cangrejo
	Hippidae		
	<i>Emerita analoga</i>	Sand crab	Muy muy
	Xanthidae		
	<i>Platyanthus orbigny</i>	Crab	Cangrejo violáceo
ECHINODERMA			
	Cucumariidae		
	<i>Pattalus mollis</i>	Sea cucumber	Pepino de mar
	Echinidae		
	<i>Loxechinus albus</i>	Sea urchin	Erizo

All the taxa recovered from the excavation at the Domestic Sector are indigenous to the cool water Peruvian Molluscan Province. Some of the identified species (e.g. *Mesodesma donacium* and *Choromytilus chorus*) have disappeared from the area because of the gradual warming of the ocean. The most common marine invertebrates found in the excavations are mollusks the total NSPI and MNI with their respective ranks are presented in table 27. In this table I observed a significant difference when ranks produced from NSPI and MNI are compared. This occurs for 2 reasons: first to estimate MNI in bivalves two valves make an individual, reducing the bivalves NMI by half; while one gastropod is counted as one NSPI and one MNI; and second usually the bivalves have more fragile shells. This is confirmed when the NSPI number of the bivalves is compared with their MNI counterparts. The blue mussel *Choromytilus chorus* presents a larger but fragile valve that easily breaks when excavated. Even harder parts of the shell like the hinges, used for individual estimates in mollusks, breaks with

time. This is why from rank 2 in NSPI figure the *Choromytilus* descends to rank 5 within MNI. Other bivalves, *Mesodesma* or *Mulinia* maintain the same rank in both NSPI and MNI mainly because of their harder shell. The opposite case is observed for the small mussel *Perumytilus purpuratus* which in NSPI values is in rank 4 but in MNI rises up to rank 2 mainly because of its small size and harder shell. After this observation NSPI was used as a better reflection of the assemblage studied.

Table 27. Total NSPI and MNI of identified marine invertebrates with their ranks.

MARINE INVERTEBRATES IDENTIFIED FROM THE DOMESTIC SECTOR					
Controlled Samples					
FAMILY	GENUS SPECIES	TOTAL BY SPECIES			
		NSPI	RANK	MNI	RANK
i. BIVALVES					
MACTRIDAE	<i>Mulinia edulis</i>	4783	3	1045	3
MESODESMATIDAE	<i>Mesodesma donacium</i>	72029	1	1904	
MYTILIDAE	<i>Aulacomya ater</i>	376	11	145	11
MYTILIDAE	<i>Choromytilus chorus</i>	16225	2	814	5
MYTILIDAE	<i>Perumytilus purpuratus</i>	2070	4	1119	2
MYTILIDAE	<i>Semimytilus algous</i>	1095	6	323	8
PECTINIDAE	<i>Argopecten purpuratus</i>	439	10	106	13
VENERIDAE	<i>Protothaca sp.</i>	1	27	1	30
ii. GASTROPODS					
ACMAEIDAE	<i>Collisella orbigny</i>	38	17	37	18
ACMAEIDAE	<i>Scurria sp.</i>	20	19	20	20
CALYPTRAEIDAE	<i>Crepidatella sp.</i>	790	8	663	7
COLUMBELLIDAE	<i>Mitrella unifasiata</i>	9	22	9	25
FISSURELLIDAE	<i>Fisurella spp.</i>	113	14	112	12
MURICIDAE	<i>Tropon peruvianus</i>	3	25	3	28
NASSARIIDAE	<i>Nassarius gayi</i>	1013	7	873	4
NATICACEA	<i>Polinices uber</i>	1185	5	796	6
NATICIDAE	<i>Sinun cymba</i>	13	21	12	24
OLIVIDAE	<i>Oliva peruviana</i>	22	19	19	21
THAIDADAЕ	<i>Concholepas concholepas</i>	113	14	74	15
THAIDADAЕ	<i>Thais chocolata</i>	110	15	83	14
THAIDADAЕ	<i>Xanthochorus buxea</i>	29	18	28	19
THAIDADAЕ	<i>Thais haemastoma</i>	13	21	13	13
THAIDADAЕ	<i>Thais sp.</i>	2	26	2	29
TROCHIDAE	<i>Tegula atra</i>	213	12	167	9
TURBINIDAE	<i>Prisogaster niger</i>	14	20	14	22
iii. POLYPLACOPHORA					
CHITONIDAE		477	9	164	10
iv. CRUSTACEANS					
BALANIDAE	<i>Balanus sp.</i>	9	23	6	27
CALIPPIDAE	<i>Hepatus chilensis</i>	5	24	2	29
HIPPIDAE	<i>Emerita analoga</i>	3	25	1	30
XANTHIDAE	<i>Platyxanthus orbigny</i>	130	13	49	16
Crustaceo no identificado		10	22	8	26
v. ECHINODERMS					
CUCUMARIIDAE	<i>Patallus mollis</i>	1	27	1	30
ECHINIDAE	<i>Loxechinus albus</i>	81	16	43	17
TOTALS		101434		8656	

From table 28 the most abundant remains are from sandy beach species, although more species identified are from rocky habitats (10 vs. 21 species). The abundance of sandy beach mollusks is a consequence of the site location at only 300 m from a sandy beach. Of the sandy beach species identified, the clam *Mesodesma donacium (macha)* is the most abundant mollusk of all the shell assemblages with 71.01% of the total NSPI and 22.00% of the total MNI. Its habitat is the sandy subtidal zone at 5 to 20 cm from the surface. *Mesodesma's* banks extend through the surf zone. Being near the shore it could be easily gathered by hand. The beach (Playa Chica) beside Bandurria is the perfect habitat for this species and this is why it is the most common mollusk at the site.

The second most abundant sand beach mollusk (Rank 3) is the clam *Mulinex edulis*. Its habitat is the sandy intertidal zone and the upper subtidal zone. Its habitat partly overlaps with the *Mesodesmas d.* upper distribution and is very probable that *Mulinex* were collected among *Mesodesmas d.*

From rocky habitats, the blue mussel *Choromytilus chorus* is the most abundant taxa (Rank 2). Its habitat is the rocky subtidal zone from 4 to 20 m deep. For its collection diving skills were necessary. Due to its large size and meat content it must have been a highly desired food. The nearest rocky habitats where *Choromytilus* and other rocky species were extracted is about 4 km SW in the Paraiso area. The next rocky species in abundance is the small mussel *Perumytilus purpuratus* (Rank 4). The rocky intertidal zone is the habitat for this small mussel and its collection did not require any specialization. Other rocky and sandy species with a high meat content such as *Argopecten purpuratus* and *Protothaca thaca* from sandy habitats or *Concholepas concholepas* and *Thais chocolata*; from rocky habitats are underrepresented in the assemblage although they share some of the habitats of the more common species.

Table 28. Habitats of the marine invertebrate identified.

Sandy Intertidal/Upper Subtidal Zone

Emerita analoga

Mesodesma donacium (C)

Mulinia edulis (C)

Sandy Subtidal Zone

Nassarius gayi

Oliva peruviana

Polinices uber

Protothaca thaca (C)

Sinum cymba (C)

Platyanthus orbigny (C)

Sandy/Muddy Bay Floor

Argopecten purpuratus (C)

Rocky Intertidal Zone

Balanus sp.

Collisella orbigny

Concholepas concholepas (also found in Upper Subtidal) (C)

Crepidatella spp. (C)

Chiton spp (C)

Fisurella spp. (C)

Hepatus chilensis (C)

Patallus mollis (C)

Perumytilus purpuratus (C)

Prisogaster niger

Semi-mytilus algaus (C)

Scurria sp.

Tegula atra

Thais chocolate (also found in Subtidal) (C)

Rocky Subtidal Zone

Aulacomya ater (C)

Choromytilus chorus (C)

Concholepas concholepas (C)

Loxechinus albus (C)

Mitrella unifasciata

Thais chocolata (C)

Thais haemastoma

Trophon peruvianis

Xanthochorus buxea

(C): evidence of consumption by Bandurria inhabitants.

Data compiled from Alamo and Valdivieso 1987, Guzman *et al.* 1998, Olsson 1961, Sandweiss 1992, Zuñiga 2002.

The abundance of *Mesodesma d.* and *Choromytilus ch.* appears to reflect shellfish gathering focused on the two species. The next two abundant mollusks *Mulinia edulis* and *Perumytilus purpuratus* are byproducts of the *Mesodesma* and *Choromytilus* extraction and they not require any specialization. The low proportions of the remaining taxa reflect opportunistic and fortuitous collecting.

The next step would be to look for significant difference among the marine invertebrate assemblages from the occupational phases paying particular attention to the phases that contain clear domestic occupations (*i.e.* floors, dwellings, hearths, etc.).

Comparing the assemblages from the domestic occupations of Unit 6A and Unit 8 related to domestic dwellings I expect to find differences between the stone quadrangular structure and the oval perishable structures molluscan assemblages.

Diversity between assemblages:

As with the fish assemblage the first approach to the marine invertebrate assemblage is to compare the diversity of the assemblages from each occupation phase from Unit 6, 8 and 9 using Simpson's diversity index (L) and its transformation ($1-L$). The results for each assemblage using NSPI, is presented in table 29.

Results of the Simpson diversity index show a great diversity in all the assemblages that contain clear domestic occupations associated with domestic structures and those that have been considered secondary depositions related to the domestic occupations (e.g. Phases 6AIII, 6B I, 6B IIIa, 6B IIIb, 8 II, 9 I, 9 IIIa, and 9 IIIb). This very low diversity of occupational phase 6A I, is due to the fact that this phase has very few excavated S.U.s. Its low $1-L = 0.0638$ also reflects a very small sample (2 taxa, MNI = 92). A similar case is phase 9 I where the diversity index was

0 (2 taxa, MNI = 2). A detail look (Table 30) at the the taxa distribution from the different assemblages show the presence of very low NSPI and NMI of various taxa that are the responsables of high *I-L* values.

Because of this I believe the best way to compare the domestic occupations is to choose between the most significant consumed species in order to avoid any interference produced by the high diversity and low NSPI of some species. The presence of these species can be interpreted as accidental collections when focusing in the extraction of *Mesodesma d.* or *Choromytilus ch.* The species selected for comparison among the domestic occupation are from sandy habitats: *Mesodesma donacium* and *Mulinia edulis* and from rocky habitats: *Choromytilus chorus*, *Perumytilus purpuratus*, *Semi-mytilus algius*, *Aulacomya ater*, *Crepidatella* sp., *Concholepas concholepas*, *Thais chocolata* and Chitonidae family.

Table 29. Diversity Indexes (Simpon's diversity index) of Occupational Phases. In *italics* Phases with clear domestic occupation.

Unit/Occupational Phase	<i>L</i>	<i>1-L</i>
6A I	0.9362	0.0638
6A IIa	0.1499	0.8501
6A IIb	0.0783	0.9216
6A III	0.1121	0.8879
6B I	0.2947	0.7053
6B II	0.2863	0.7137
6B IIIa	0.3137	0.6863
6B IIIb	0.1655	0.8345
8 Ia	0.1480	0.8520
8 Ib	0.1581	0.8419
8 Ic	0.1078	0.8922
8 Id	0.2067	0.7933
8 Ie	0.1259	0.8741
8 II	0.1250	0.8750
9 I	0	0
9 II	0.1716	0.8284
9 IIIa	0.2479	0.7521
9 IIIb	0.2121	0.7879

Comparing Assemblages from Occupational Phases:

The percentages of the selected species (from the marine invertebrate assemblage) were compared using histograms. Percentages of the NSPI values as shown in table 31 were used to correlate all the graphs at the same scale. In the table, the first two columns of the graph belongs to sandy habitat species clams *Mulinia edulis* and *Mesodesma donacium*. Next the rocky habitat species are represented at the histogram. The last column is for *Choromytilus chorus*. The histograms show there is a clear difference between the consumption patterns related to the two occupations of the quadrangular stone structure from Unit 6A (phase IIa and IIb) compared to the occupations associated to oval structures.

As the figure 152 shows, high proportions of *Mesodesma donacium* are present in all the occupational phases except in 6A IIa and 6A IIb where the percentage of *Choromytilus chorus* is higher. All the occupations related to structures made of perishable materials (6A I, 6B II, 8 Ia, 8 Ib, 8 Ic, 8 Id, 8 Ie and 9 II) present similar histogram shapes reflecting an overall similarity in the composition of the assemblages.

As the quadrangular structure is built and occupied, its inhabitants consumed more *Choromytilus ch.* than *Mesodesma d.* The occupation in the structure intensifies in phase IIb with the presence of hearths, pits, postholes and more domestic refuse, the consumption of blue mussel increases. From the perspective of the marine invertebrate assemblage, the inhabitants of the quadrangular structure had access or exploited more *Choromytilus chorus* which contained more meat, but with its banks 4 km south from the site, instead of the easy accessible *Mesodesma donacium* with its banks at a very short distance in front of the site.

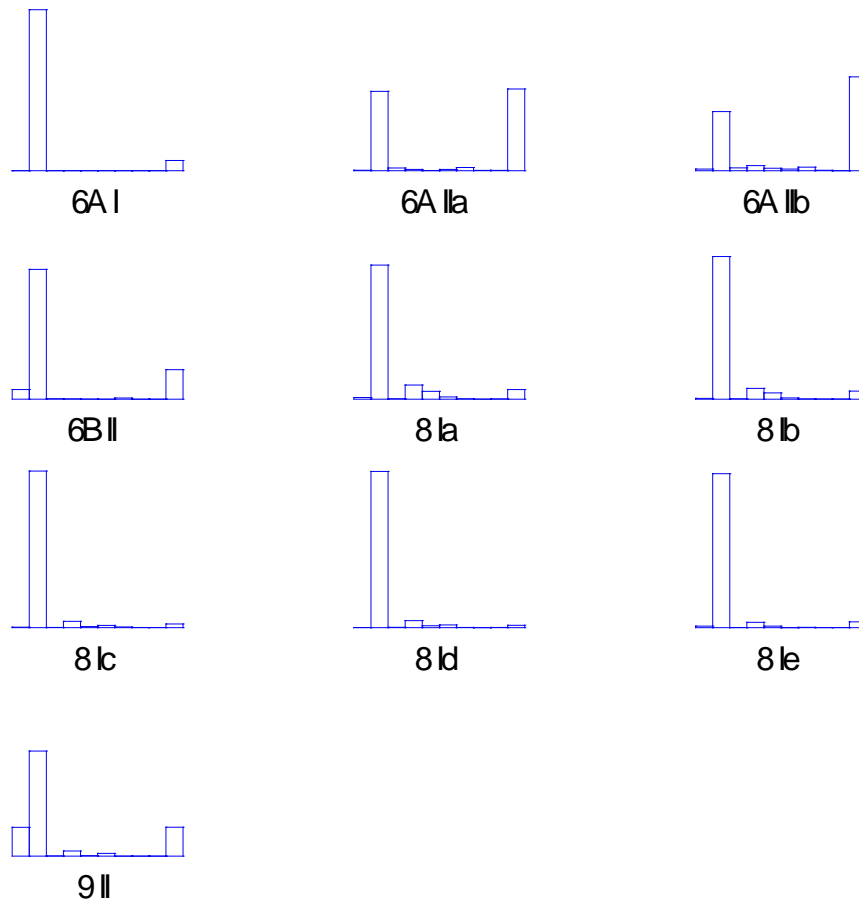


Figure 153. Histograms of the mollusks assemblages from phases associated to domestic occupations.

5.2.3 Other

As mentioned before the other category includes non-fish vertebrates found in the excavations. They represent a very small fraction in comparison with the fish and marine invertebrates. Marine mammals, mainly sea lions, and marine birds were recovered from both primary and secondary contexts; representing almost all the assemblage. A very small proportion of bones identified as *Oryzomys* sp. (field mouse) were also found at the excavations.

5.2.3.1 Methodology:

The procedure used for recovering the sample of non-fish vertebrate was the same used to recover the other faunal remains: from the controlled sample of 12 liters all non-fish bones were recovered from the 6 mm and 2 mm screen. These two fractions were packed and sent to the lab.

Once in the laboratory several procedures were used: first, the bones were unpacked and cleaned using brushes and metal dental instruments. Second the bones were grouped by taxa; I used a comparative collection of modern specimens collected locally. Dead sea birds were collected from the Paraiso-Playa Chica wetland and a dead sea lion was found stranded in Huacho's beach. Dr. Christine Lefevre and Dr. Philippe Bearez from the National Museum of Natural History of France identified and helped process the modern specimens. As for fish, the flesh from each modern specimen was removed and their bones cleaned, then each bone was classified according to its type and location. A comparative collection of 9 bird specimens and a South American sea lion (*Otaria byronia*) was prepared and used in the identification phase. At this point we noted any particularities with the specimens like burn marks, pigments coloration or human modification. Next, all samples were counted annotating the number of different bones identified. This data was placed on analysis forms; a form was used for each S.U. Finally, each

taxon was weighed and repacked. After each analysis, the form was filled with the taxons identified; the abundance of each taxon was recorded, calculating the number of identifiable specimens (NISP) and the minimum number of individuals (MNI). For the NISP all identified bones were considered. The NISP is the direct sum of all the bones of the identified taxon. Due to the small sample and poor preservation (especially bird bones) it was not possible to calculate the MNI or age and sex of the taxon.

5.2.3.2 Results

Excavations of Unit 6, 8 and 9 only produced 87 bone fragments distributed among 7 taxa. In many cases identification could only attained for the Order (e.g. plovers), Family (e.g. egrets) and genus (e.g. seagulls, cormorants, sea lions and field mice) level. Table 32 presents the total NSPI and MNI of the assemblage with their ranks. Because of the small size of the sample I decided not to use this assemblage to compare the domestic occupations from Unit 6, 8 and 9 like with the other faunal remains. Table 33 presents the NSPI and MNI values from each occupational phase. The analysis of this assemblage remains for future studies.

Table 32. Total NSPI and MNI of identified marine invertebrates with their ranks.

FAMILY	GENUS SPECIES	TOTAL			
		NSPI	RANK	MNI	RANK
Birds					
ARDEIDAE	<i>Egrets</i>	9	5	6	4
LARIDAE	<i>Larus sp. seagulls</i>	12	4	7	3
PELECANIDAE	<i>Pelecanus thagus pelican</i>	5	6	3	5
PHALACROCORACIDAE	<i>Phalacrocorax sp. cormorant</i>	14	2	5	4
ORDER Charadriiformes	<i>Plovers</i>	10	3	4	2
Sea mammals					
OTARIIDAE	<i>Otaria sp. sea lion</i>	25	1	18	1
Mammals					
CRICETIDAE	<i>Oryzomy sp. field mouse</i>	5	6	4	5
N.I.		10		10	
	TOTAL	90		57	

Table 33. NSPI and MNI of Birds and Mammals

FAMILY	GENUS SPECIES	Unidad 6A						Unidad 6B						Unidad 8						Unidad 9										
		I fase NSPI	Ia fase MNI	IIa fase NSPI	IIb fase MNI	III fase NSPI	III fase MNI	I fase NSPI	II fase NSPI	IIa fase NSPI	IIb fase MNI	III fase NSPI	III fase MNI	Ia fase NSPI	Ib fase NSPI	Ic fase NSPI	Ic fase MNI	II fase NSPI	II fase MNI	I fase NSPI	I fase MNI	IIa fase NSPI	IIa fase MNI	IIIa fase NSPI	IIIa fase MNI					
Birds																														
ARDEIDAE	Egrets				1	1							1	1		2	1					1	1			2	1			
LARIDAE	Larus sp. seagulls																													
PELECANIDAE	Pelecanus thagus pelican				3	2				2	1		1	1																
PHALACROCOR	Phalacrocorax sp. cormorant	2	1							2	1																			
ORDER Charadri	Plovers				4	1									2	1														
Sea mammals																														
OTARINAE	Otaria sp. sea lion	1	1	2	2					3	2			3	2	1	1	2	2	1	1	3	1	2	1	1	2	1		
Mammals																														
CRICETIDAE	Onychomys sp. field mouse																													
N.I.		1	1		1	1	1	1	1					1	1	1	1	1	1											
	TOTAL	4	3	3	8	4	5	5	1	1	5	3	5	4	2	2	3	2	4	3	6	3	0	0	4	3	10	3	7	3

5.3 BOTANICAL REMAINS

The analysis of plant remains provided an important complement to the faunal data for two main reasons: at the household level to compare and identify significant differences between the quadrangular structure versus the oval structures, and at a broader level, contrast the marine versus terrestrial resources within the MFAC discussion. Because of the dry environment of the Peruvian coast, good preservation is observed among the botanical remains. This allowed recovering a goodly amount of macroscopic plant specimens from all the excavation units.

5.3.1 Methodology

The identification and quantification of the plant remains from Bandurria followed a methodology similar to that used in the analysis of faunal remains. The botanical samples were also recovered from the controlled sample of 12 liters. All the plant remains were recovered from the 6 mm and 2 mm screen. These two fractions were packed and send to the lab.

Once in the laboratory a several of procedures: first, the plant remains were unpacked and sorted by provenience. Each of these groups was them separated according to the plant part and similarities. If some remains were dirty, the dirt was a removed using a soft brush and an air bulb. Next, the remains where identified at the species, genus and family level using published descriptions, taxonomic keys and a comparative collection gathered by me. Each specimen was identified to the lowest possible taxonomic level. For taxa identification several part of the plants were used. I used 6 plant parts for taxa identification: leaves, seeds, stems, pods, inflorescences and fruit pericarps. After identification the specimens were counted. A form was filled with the taxons identified and the abundance of each taxon was calculated by the number of identifiable

specimens (NISP). Unlike faunal remains it was very difficult to estimate minimum number of individuals (MNI). The best example is the presence of seeds in the archaeological record. One fruit can contain many seeds and a plant can contain many fruits, which can be called the individual when a seed is discovered, the parent plant or the fruit? Finally, analysis forms were compiled into summary tables from each excavation Unit.

5.3.2 Results

A total of 16 taxa were identified from the plant sample analyzed. Table 34 summarizes the results. From the 16 taxa only 5 of them were consumed by the site inhabitants. The remaining 11 taxa were used as containers or net floaters (*Lagenaria siceraria*), for basketry and hut construction (*Phragmites communis*, *Typha* sp., *Schoenoplectus* sp., *Scirpus* sp.), as firewood (*Distichlis spicata*, *Tillandsia* sp., *Antheophora hermaphrodita*) or for weaving textiles and ropes (*Gossypium barbadense*).

From the food plants the most abundant taxa is *Psidium guajava* (guayaba) whose seeds were found in all excavation units (Table 35). It represents 83.57% of the total plant assemblage. This tree fruit's natural habitat is the mid-coastal valley, but due to its abundance in the site this suggests that *guayaba* trees may have grown near Bandurria. Its presence does not reflect cultivation. As Quilter (1991: 399) mentions is very difficult to estimate whether the tree fruits were under full domestication by humans or simply exploited with no human intervention. The next food plants present had a very low NSPI among the plant assemblage. Chili pepper (*Capsicum* sp.), squash (*Cucurbita* sp.), peanuts (*Arachis hypogea*) and paca (*Inga feuillei*) another fruit tree, together represent 0.051% of the plant assemblage.

From the non-food plants, cotton (*Gossypium barbadense*) is the second in abundance for all the plant assemblage with 5.09% reflected in seeds and fibers. The cotton fiber is used for weaving, natural medicine (Vreeland 1985: 5) and the production of fishing gear. It has been defined as an industrial plant (e.g. Quilter 1991: 406) and is a key element for the technological LPP breakthrough of introducing cotton nets for the capture of fish. Without cotton nets it would be very difficult to capture small schooling fish represented by the high number of specimens recovered from the excavations.

Native cotton is well adapted to coastal soils with high salt concentrations. A native cotton plant can survive up to five years without irrigation water, due to their fine and extensive root system (Vreeland, 1985: 6). Studies by ONERN indicate that the greatest advantage of native cotton cultivation in the Peruvian coast is its resistance to drought, to salinity and high concentrations of boron, a situation that affects large areas of the coast. There have been reports in which the native cotton grows in dry soil containing 900 ppm of boron, the level of toxicity for agriculture is 4 ppm of boron. In the surroundings of Bandurria and other LPP coastal sites this type of coastal environment with highly saline soils is found. Because of this, unlike other researchers, I believe that cotton was grown initially on the coast, in wet areas near the sites following Quilter (1991: 399). Cotton cultivation in orchards would cover all the needs of clothing and fish nets for coastal sites. Later, with the increase of population and an increasing demand for nets and textiles, cultivation extended inland in the coastal valleys. This is when the inland monumental ceremonial centers (e.g. Caral) emerged and flourished as the cotton demand increased. Is very possible that cotton fiber began to be used before the plant was fully domesticated. At Huaca Prieta, Stephens (in Bird *et al.* 1985: 234-235) noted the presence of hairy seeds in preceramic levels and smooth seeds in ceramic levels. Smooth seeds prevail in

modern varieties; their fiber is easier to remove by hand. There is a clear trend of increasing seed size, capsule and fiber at all levels of Huaca Prieta, suggesting the management and cultivation of cotton on the coast during the LPP.

Continuing with the analysis, the diversity index was calculated for different occupational phases. These assemblages were compared using histograms. The procedure is similar to that employed with faunal assemblages.

Diversity between assemblages:

As in the faunal remains, a first approach to the floral assemblage was to compare the diversity of the assemblages from each occupation phase from Unit 6, 8 and 9 using Simpson's diversity index (L) and its transformation ($I-L$), searching for significant differences among the occupational phases. The results for each occupational phase using NSPI are presented in table 36.

Results of Simpson's index show low diversity in all the assemblages. The only phase with a high diversity is phase II from unit 9 with a $I-L = 0.7695$. The occupational phases related with the quadrangular structure present relative low indexes ($I-L$ from 0.3741 to 0.6831). Domestic occupation associated with oval structures, with the exception of phase 9 II, had low diversity indexes from 0.0871 to 0.5638. The other occupational phases, considered secondary depositions (Phases 6AIII, 6B I, 6B IIIa, 6B IIIb, 8 II, 9 I, 9 IIIa, and 9 IIIb) did not reflect clear differences, when compared with the phases related to domestic structures. Their diversity indexes vary from 0.1117 to 0.4585.

Table 34. NSPI and MNI of Birds and Mammals

FAMILY	GENUS ESPECIE	Common name	NSPI	RANK	USE
SOLANACEAE	<i>Capsicum sp.</i>	Aji	12	12	Food
CUCURBITACEAE	<i>Cucurbita sp.</i>	Calabaza	22	10	Food
POACEAE	<i>Distichlis spicata</i>	Grama salada	339	8	Firewood/Construction
MALVACEAE	<i>Gossypium barbadense</i>	Algodón	5063	2	Weaving/Firewood
CUCURBITACEAE	<i>Lagenaria siceraria</i>	Mate	214	9	Container
POACEAE	<i>Phragmites communis</i>	Carrizo	12	12	Basketry/Construction
POACEAE		Grama	1439	5	Firewood/Construction
POACEAE	<i>Antheophora hermaphrodita</i>	Calaberita	1924	4	Firewood
MYRTACEAE	<i>Psidium guajava</i>	Guayaba	83151	1	Food
BROMELIACEAE	<i>Tillandsia sp.</i>	Achupalla	3708	3	Firewood
TYPHACEAE	<i>Typha sp.</i>	Totora enea	22	10	Basketry/Construction
CYPERACEAE	<i>Schoenoplectus sp.</i>	Junco	1391	6	Basketry/Construction
CYPERACEAE	<i>Scirpus sp.</i>	Totora	516	7	Basketry/Construction
LEGUMINOSAE	<i>Inga feuillei</i>	Pacae	15	11	Food
LEGUMINOSAE	<i>Arachis hypogaea</i>	Mani	2	13	Food
Dicotyledonia n.i.			1658		
TOTAL			99488		

Table 36. Diversity Indexes (Simpson's diversity index) of Occupational Phases. In *italics* Phases with clear domestic occupation.

Unit/Occupational Phase	<i>L</i>	<i>1-L</i>
6A I	0.4362	0.5638
6A IIa	0.3169	0.6831
6A IIb	0.6259	0.3741
6A III	0.8883	0.1117
6B I	0.8369	0.1631
6B II	0.5699	0.4301
6B IIIa	0.8051	0.1949
6B IIIb	0.6492	0.3508
8 Ia	0.8162	0.1838
8 Ib	0.4982	0.5018
8 Ic	0.7575	0.2425
8 Id	0.9129	0.0871
8 Ie	0.7525	0.2475
8 II	0.8558	0.1442
9 I	-	-
9 II	0.2305	0.7695
9 IIIa	0.5415	0.4585
9 IIIb	0.8836	0.1164

Comparing Assemblages from Occupational Phases:

The plant assemblages from the phases that contain a domestic structure were compared using histograms. Percentages of the NSPI values as shown in table 37 were used to standardize all the graphs at the same scale. Some differences are observed when the histograms are compared. Occupations of Unit 6A present slightly differences among them in the three occupational phases. Before the stone structure (Phase I) one high peak belonging to *Psidium guajava* is observed together with a smaller one of *Tillandsia* sp. Cotton is the third peak at the left side of the histogram. The next phase IIa related to the first occupations of the structure presents the same two peaks. There is an increase in the proportion of *Antheophora hermaphrodita* a small bush used as firewood and a slight reduction of *Tillandsia* sp. also used as firewood. The last occupation presents a significant increase in *Psidium guajava* and a decrease

of the species that were used in the previous occupations. Cotton and *tillandsia* are still visible in the histogram of phase IIb, but in very low proportions compared with the previous phase.

Occupational phases from Units 6B and 8 present a similar histogram with a very high proportion of *Psidium guajava* seeds. Cotton also is observed in this phase, although with a much smaller NSPI than guayaba. Together with *Psidium guajava* and cotton, *Tillandsia* sp. is present in all the phases of the excavations units with variable proportions.

Finally, the phase II, from Unit 9, presents a different histogram pattern with a lower proportion of *Psidium guajava* and more firewood (*Tillandsia* sp. and *Antheophora hermaphrodita*).

As the histograms show there is a small difference between the occupational phases of the quadrangular and the oval structures. This difference is not as marked as that observed in the faunal assemblage. The inhabitants of the quadrangular structure have less *Psidium guajava* but higher proportions of cotton and firewood species. The inhabitants of the oval structures have very high proportions of *Psidium guajava* in their assemblages, with the exception of the oval structure from Unit 9 that like the occupations of the quadrangular structure, presents higher proportions of cotton and firewood.

Other food plants like *Capsicum* sp., *Cucurbita* sp., *Inga fuellei* and *Arachis hypogaea* are present in very low proportions through all the occupational phases. The inhabitants of the site seem to have had equal access to these species.

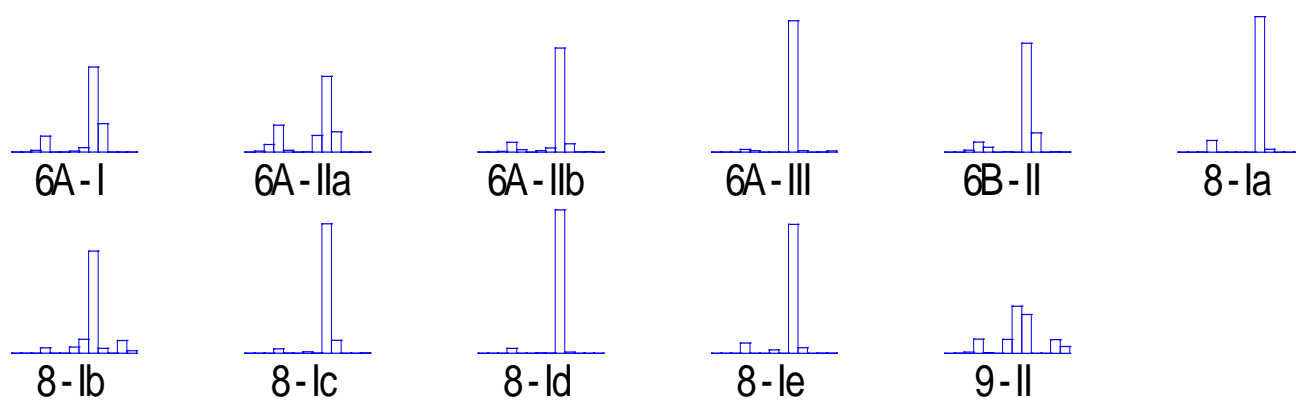


Figure 154. Histograms of the plant assemblages from phases associated to domestic occupations.

Table 37. NSPI and % of plant assemblages related to domestic occupations

FAMILY	GENUS ESPECIE	Common name	Unit 6A						Unit 6B						Unit 8						Unit 9	
			Phase I		Phase IIa		Phase IIb		Phase II		Phase Ia		Phase Ib		Phase Ic		Phase Id		Phase Ie		Phase II	
			NSPI	%	NSPI	%	NSPI	%	NSPI	%	NSPI	%	NSPI	%	NSPI	%	NSPI	%	NSPI	%	NSPI	%
SOLANACEAE	<i>Capsicum</i> sp.	Aji					2	0.0512					1	0.0074							1	0.1280
CUCURBITACEAE	<i>Cucurbita</i> sp.	Calabaza	2	0.0906	4	0.6885	2	0.0512					1	0.0074							6	0.7682
POACEAE	<i>Distichlis spicata</i>	Gramma salada	26	1.1775	30	5.1635	19	0.4862	19	1.3889	16	0.22042										
MALVACEAE	<i>Gossypium barbadense</i>	Algodón	235	10.6431	104	17.9002	256	6.5507	92	6.7251	570	7.85232	482	3.5895	161	2.9051	114	3.2442	648	6.8586	74	9.4750
CUCURBITACEAE	<i>Lagenaria siceraria</i>	Mate	3	0.1359	7	1.2048	65	1.6633	45	3.2895			9	0.0670	6	0.1083	1	0.0285	5	0.0529	4	0.5122
POACEAE	<i>Phragmites communis</i>	Carizo	2	0.0906			4	0.1024	1	0.0731												
POACEAE		Gramma	15	0.6793	1	0.1721	43	1.1003	5	0.3655			538	4.0066	58	1.0466	11	0.3130	220	2.3285	72	9.2190
POACEAE	<i>Antheophora hemaphrodita</i>	Calaberita	67	3.0344	64	11.0155	110	2.8147					1239	9.2270	12	0.2165	5	0.1423	6	0.0635		
MYRTACEAE	<i>Psidium guajava</i>	Guayaba	1247	56.4764	292	50.2582	2700	69.0890	990	72.3684	6532	89.9848	9105	67.8061	4765	85.9798	3346	95.2191	8087	85.5948	244	31.2420
BROMELIACEAE	<i>Tillandsia</i> sp.	Achupalla	418	18.9312	79	13.5972	216	5.5271	177	12.9386	141	1.94242	438	3.2618	481	8.6792	27	0.7684	359	3.7997	202	25.8643
TYPHACEAE	<i>Typha</i> sp.	Totora enea					7	0.1791														
CYPERACEAE	<i>Schoenoplectus</i> sp.	Junco					16	0.4094	6	0.4386			1141	8.4972					23	0.2434	71	9.0909
CYPERACEAE	<i>Scirpus</i> sp.	Totora					2	0.0512	4	0.2924			223	1.6607	23	0.4150			16	0.1693	36	4.6095
LEGUMINOSAE	<i>Irga feuillei</i>	Pacae	10	0.4529			1	0.0256														
LEGUMINOSAE	<i>Arachis hypogaea</i>	Mani																				
Dicotyledonia n.i.			183	8.2880			465	11.8987	29	2.1199			251	1.8692	36	0.6496	10	0.2846	83	0.8785	71	9.0909
TOTAL			2208	100	581	13.5972	3908	100	1368	100	7259	100	13423	100	5542	100	3514	100	9448	100	781	100

5.4 CORRELATION BETWEEN HOUSEHOLD SUBSISTENCE ASSEMBLAGES

To confirm the differences observed at the analysis of faunal and floral remains between the occupations related to the quadrangular stone structure and the oval structures, a series of graphs combining two variables of the floral and faunal assemblages with the area of the domestic structures were plot.

The variables selected are species that presented variation among the domestic occupations or represent different habitats. A total of 9 variables of subsistence remains were correlated with the house area in order to obtain clear patterns of the different subsistence between quadrangular and oval structures.

Selected marine invertebrates are: 1) the clam *Mesodesma donacium* the most abundant mollusk recovered from the excavations that inhabits the nearby sandy beach. Because its banks are located in the beach surf zone it is easy to extract and do not requires specialization. 2) The blue mussel *Choromytilus chorus* a highly appreciate mollusk because of its high meat content and the use of its shell for manufacturing shell artifacts like fishhooks. Its habitat is the rocky beaches and cliffs located 4 km south of the site. Its banks are located at a depth of 4 to 20 m requiring diving skills to extract it. 3) The small mussel *Perumytilus purpuratus* is found in all the defined occupational phases. The habitat where it is found is the rocky beaches although it can live in any hard substrate in the intertidal zone. It banks are located very near to the shore and do not require any specialization for their extraction.

Three fish species were selected from the fish assemblage. 1) Anchovy (*Engraulis ringens*) the most abundant fish recovered from all the excavations at the domestic sector was selected. It is a schooling fish that lives in the open ocean but is common that it approaches to the coast where it can be captured using cotton nets. Its capture requires specialization and access to

cotton nets. 2) Sardine (*Sardinops sagax*) is the second abundant fish recovered from the excavations. It is another schooling fish that share the same habitat and fishing technique with the anchovy. 3) Drum (*Sciaena deliciosa*) was selected as it is the third most abundant fish from the assemblage and lives at the sandy bottom of the nearby beach. It can grow up to 50 cm and is very popular because of the amount and quality of its meat. It can be fished with nets and with fishhooks.

Three plant species were selected from the plant assemblage to be compared. These species reflect different plant uses at the site and where found in all the excavated contexts. Guayaba (*Psidium guajava*) is a fruit and is the most abundant plant remains found in the excavations. Cotton (*Gossypium barbadense*) is another very frequent plant found in most of the excavated levels, it is the second most abundant plant remain. As mentioned before its fibers were used in weaving and fuel. Finally, the airplant *Tillandsia* sp. used as firewood was selected.

For this comparison I decided to use only the phases that contained a habitational unit. My assumption is that the subsistence remains from these phase reflect the consumption patterns and species preferred by the households that inhabited the dwellings. Nine occupational phases were considered. From unit 6A only phases IIa and IIb are directly related to the quadrangular structure and were used. Phase I although presented a clear domestic occupation can not be correlated to a domestic structure because the postholes found did not define a clear pattern. For both phases IIa and IIb the area of the quadrangular structure have been assigned to them.

Only one partial oval structure was identified at Unit 6B in phase II it estimated area have been used. From Unit 8 all 4 floors with oval structures were used. In this unit some phases

contain 2 oval structures, in these cases the mean of the two have been used. At unit 9 another partial oval structure was identified; its estimated area was also included to the dataset.

For comparison among the different assemblages percentages were used to standardize the NSPI or MNI used. The table 38 presents the variables selected and the percentages from each species.

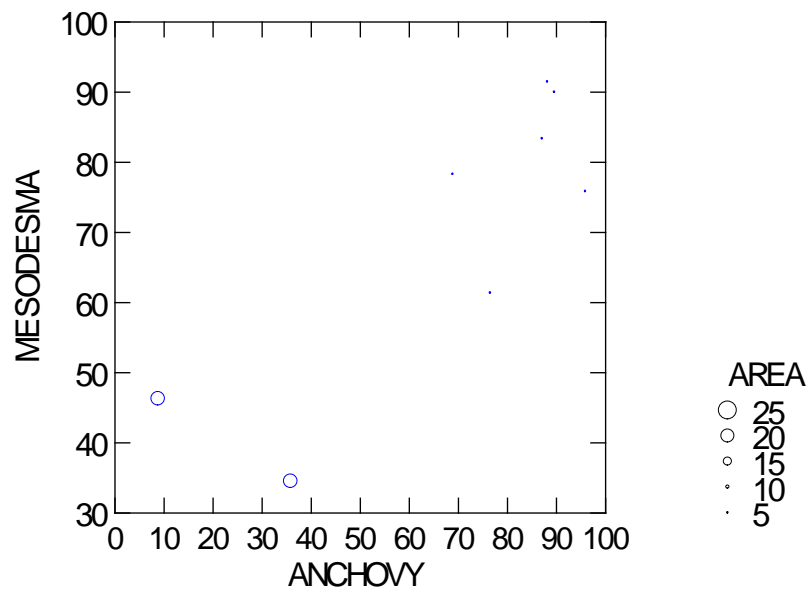
Table 38. Selected variables and values for each identified house

HOUSE	MESODESMA	CHOROMTYLUS	PERUMYTILUS	ANCHOVY	SARDINE	DRUM	GUAYABA	COTTON	TILLANDSIA	AREA
6A IIA	46.25	47.74	0.777	8.861	10.13	53.16	50.26	17.9	13.59	20.44
6A IIB	34.49	54.77	3.026	35.89	17.7	31.34	69.09	6.56	5.527	20.44
6B II	75.8	17.2	0.23	95.98	3.42	0	72.37	6.73	12.93	6.68
8 IA	78.26	5.623	8.348	68.94	18.18	8.333	89.99	7.85	1.942	5.96
8 IB	83.34	4.69	6.329	87.15	6.42	3.65	67.8	3.58	3.262	5.61
8 IC	91.44	2.148	3.643	88.24	8.14	3.704	85.98	2.91	8.679	6.2
8 ID	89.96	3.404	3.14	89.66	10.78	7.519	85.59	6.86	3.799	7.635
9 II	61.34	19.93	2.95	76.6	19.15	4.255	31.24	9.47	25.864	5.76

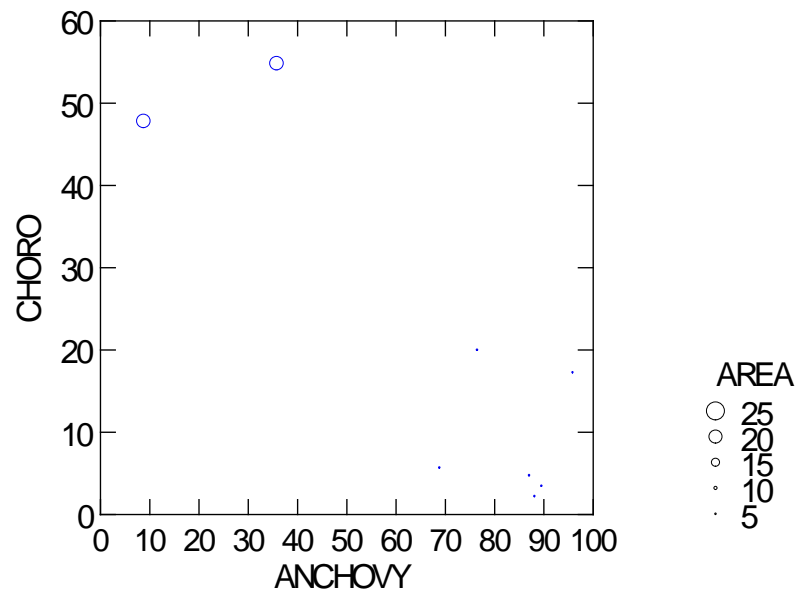
Results:

The graphs plotted show marked difference between the quadrangular structure and the oval structures when selected taxa is compared among them. Each graph was produced by plaining two of the selected variables at the X and Y axis. The area of the houses was used to control the size of the symbols. In this case the bigger houses (quadrangular) would have bigger circles allowing easy differentiation of the smaller houses (oval) represented with small circles. A total of six graphs were plotted comparing different species from the faunal and floral assemblages.

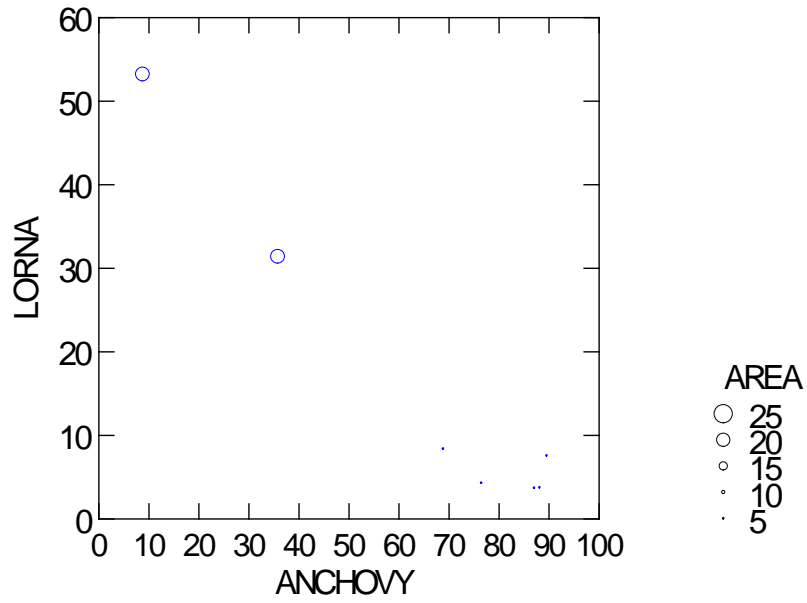
1. Anchovy vs. *Mesodesma donacium*:



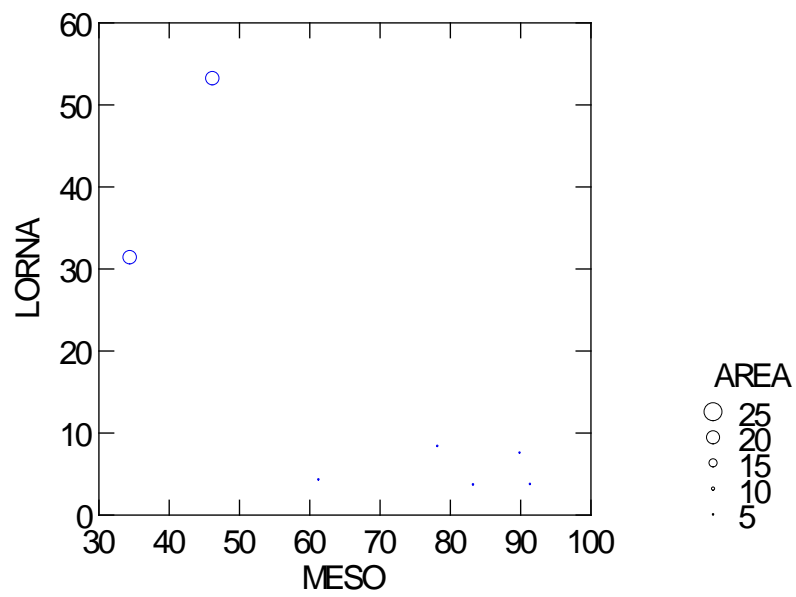
2. Anchovy vs. *Choromytilus chorus*



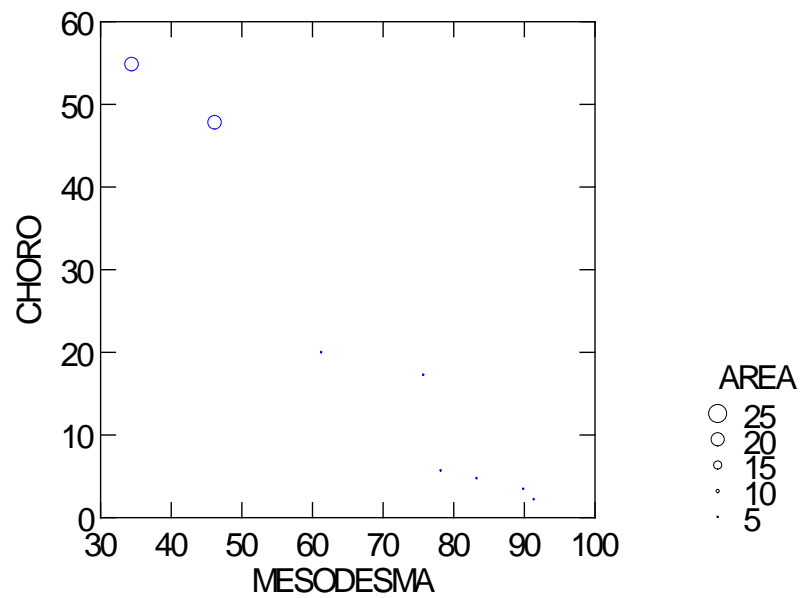
3. Anchovy vs. Drum



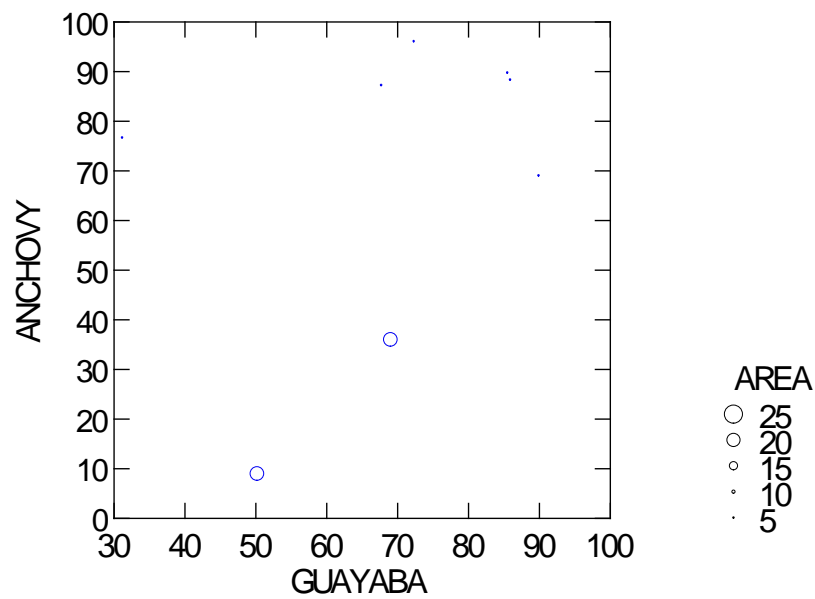
4. *Mesodesma donacium* vs. Drum



5. *Mesodesma donacium* vs. *Choromytilus chorus*



6. Anchovy vs. Guayaba



Summary:

As the graphs show, there is a significant difference between the subsistence assemblages of the quadrangular and oval structures. By linking habitational units to households I infer that the differences reflect different consumption patterns by the households of the quadrangular and oval structures. From the quantification of the subsistence assemblages it seems that all the inhabitants have access to all the species from the assemblages, the difference is that in the domestic occupation related to the quadrangular structure, the proportions of species that have a high meat content (e.g. *Choromytilus chorus* and *Sciaena deliciosa*) are significantly higher when compared with the proportions of the same species found in the oval structures.

The oval structures are dominated by species that can be mass extracted in nearby areas, like *Eugralis ringens* using cotton nets or *Mesodesma donacium* that are near the shore where no specialization is required to extract them.

In the next chapter I will correlate all the information presented in previous chapters to characterize the household of Bandurria and answer my research questions.

6.0 CONCLUSIONS AND PERSPECTIVES

From the results obtained from the excavations and analysis of the recovered data I can:

- Reconstruct site growth and development.
- Define the household for Bandurria (answering the research questions from chapter 2).
- Track household change and the emergence of social differentiation.
- Place my results within the social organization models proposed for the LPP.
- Contribute to the debate about marine vs terrestrial resources and the emergence of complex societies at the Peruvian coast.
- Propose future research directions.

6.1 SITE DEVELOPMENT

At the site level my research allowed a better characterization of the settlement by tracking site growth. My research results challenges Fung's research from the 1970s; my excavations did not find a clear transition from circular perishable structures to quadrangular stone structures at the site. The stone structure discovered in Unit 6A, although it fits with the type of structure she described, it does not have a perfect rectangular plan and its construction is related to a stone platform. Although the oval structures appeared first at the site there was a period of time when both structures coexisted, I found no evidence of other stone structure from

the excavations that suggest that after this coexistence period only stone structures were used at Bandurria.

From the C14 dates obtained from the excavation units and the exposed profile it is very probable that the site's core was located in the area destroyed by the 1973 flood. The site's oldest C14 date obtained by Fung from the same profile 30 years earlier are hundreds of year older than the dates I obtained from the same place. As decades passed the profile have been eroded about 1.5 m from its original position, the basal levels Fung date apparently are older to the ones I dated decades later.

From the earliest available date I can say that Bandurria was settled before 4530 BP as a small settlement and increased in size and complexity until it was abandoned. From the C14 dates obtained at Mound 1 from the monumental sector it appears to be the last monumental structure built at Bandurria around 3535 BP and it was still in use when the site was abruptly abandoned 100 years later (3440 BP). From the earliest Fung's date of 4530 BP from the base of the occupation at the Domestic Sector and date I obtained from the basket offering when the circular plaza was abandoned around 3440 BP, there was 1000 years of continuous occupation of the site (Fig. 155).

All the excavated units reflect an intense reoccupation and remodeling of the domestic space as a succession of mud floors related to domestic structures and occupations have been found. Dense middens of domestic refuse found between these floors are considered as secondary depositions also reflect intense domestic activities elsewhere at the domestic sector of the site. But from the excavations an intense occupation of the south west side of the domestic sector has been recorded. In some decades this side of the site grew in height up to 4 m. Radiocarbon dates show that around 3800 B.P. these depositions took place at Unit 6. I think this

deposition was deliberately done and is related to the construction of the stone platform. More excavations in other areas of the sector are needed. The lack of these depositions at the monumental sector reflects more the sacredness of the space than the lack of domestic activities at the area.

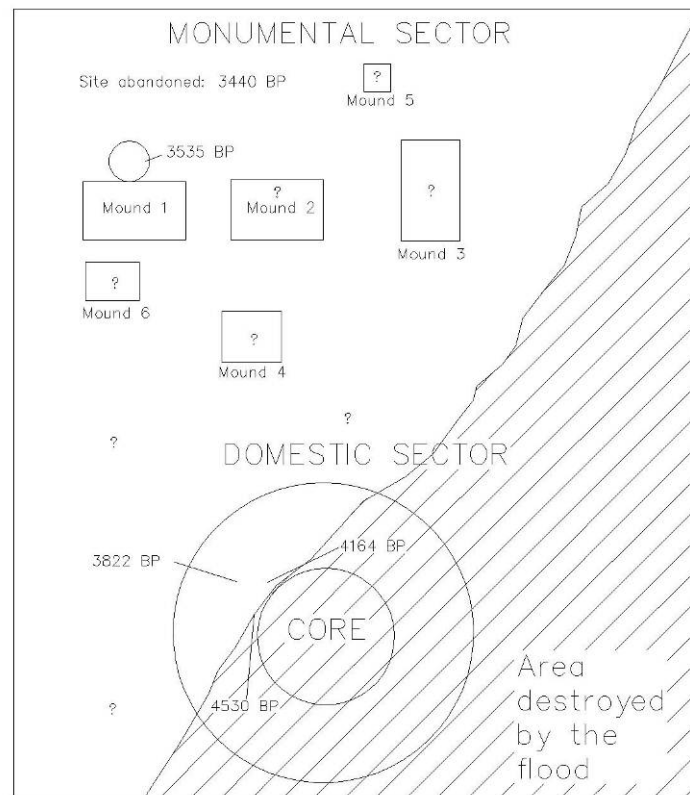


Figure 155. Sketch of site growth from C14 dates.

Excavations in both of the sites sectors have revealed 2 chronologically separate occupations. Based on the radiocarbon dates and evidence from the Domestic Sector is earlier than the emergence of the monumental architecture. Although the latest date of 3684 BP from the Domestic Sector partially overlaps with the date range of Mound 1, there is little evidence that the Domestic Sector and the Monumental Sector were contemporaneous. The quadrangular structures and associated platforms were abandoned prior to the construction of the monumental architecture in the Monumental sector. Apparently by this time the domestic occupation had

relocated to another part of the site. It remains unclear how the settlement extended to the monumental sector and if there is a domestic occupation there. It is also important to date the other mounds in order to confirm my assumption that Mound 1 is the latest mound built at Bandurria. As the settlement growth is perceived, a logical assumption is to consider the mound near to the domestic sector the oldest. Unfortunately, this was not one of the goals of my research. Further research with more C14 dates and more excavations in the remaining domestic sector and in the monumental sector are required to establish a clear occupational sequence of Bandurria.

6.2 DEFINING THE HOUSEHOLD AT BANDURRIA AND TRACKING HOUSEHOLD CHANGE

The main goal of this dissertation is to define the household from Bandurria. The results obtained from the excavations in the Domestic Sector made it possible to answer the research questions postulated in Chapter 2. Our characterization of Bandurria households is from a morphological perspective using two categories: 1) habitational units: the physical area occupied by the household and adjacent activities areas and 2) the association and concentration of artifacts and raw material products of the household.

6.2.1 Habitational Units

Excavations have uncovered two types of habitational units with significant differences in building materials, shape and area. The first is the habitational unit of oval shape built of

perishable materials reflected in the archaeological record by clear posthole pattern over mud floors associated to hearths, pits and domestic refuse over floors. The oval structures have a mean of $6.339 \pm 0.644 \text{ m}^2$ (95% *c.l.*) a relatively small area compared with other LPP dwellings. From the small area of the structures and the mud floors most of the domestic activities were done outdoors. From the evidence found at Unit 8, where two oval structures were found on the same floor sharing hearths and pits, I proposed that the 2 structures were occupied by a household. More horizontal exposure is needed to confirm this hypothesis. With the areas of the habitational units the number of inhabitants for a household was calculated using the paired structures found at Unit 8. The result was 4 ± 3 (95% *c.l.*) persons per household. This range fits within a nuclear family.

The second habitational unit is the quadrangular structure with stone foundations related to a stone platform where non-domestic ritual activities have been identified. Excavations under the platform uncovered the remains of an older semi-quadrangular structure of perishable materials over a formal mud floor. The presence of unbaked clay figurines related to this structure suggests it was also used for rituals. When the platform was built, three low stone walls were attached to the platform's wall defining the quadrangular room. The area of this room is 20.44 m^2 and within it an intense reoccupation was recorded with a succession of 20 floors. For this structure 5 ± 3 (95% *c.l.*) persons was estimated to inhabited it The mean and range also reflect that the household was composed of a nuclear family. The excavation data from both type of habitational units clearly indicate that the household at Bandurria were composed of the nuclear family.

6.2.2 Activities Areas

As mentioned before only direct evidence of food processing and consumption were identified in the excavation of the domestic occupations. Hearths, food remains, ash, charcoal, fire cracked stones, and broken gourd containers are the clearest indicators of this domestic activity. Significant differences are observed between the 2 types of habitational units when their subsistence assemblages are compared.

Both types of structures have a primarily marine based diet. Oval habitational units food remains reflect a diet based on net fished species such as anchovy and sardine. Both are coastal pelagic species and it is very probable that they were from the nearby sandy shore. Of the marine invertebrates identified, the clam *Mesodesma donacium* is the more abundant mollusk. Its habitat is also the nearby sandy beach that extends at 300 m from the site. In contrast the occupations identified for the quadrangular structure show a different diet based in the bigger drum *Sciaena deliciosa* from the nearby sandy benthos and mainly fished with shell fishhooks. The other main species consumed is the blue mussel *Choromytilus chorus* whose habitat is the rocky beaches located 5 km southwest from Bandurria. This big mussel is located from 4 to 20 m deep requiring diving to extract it. Its large size and high meat content as well as supplying the material for fish hooks makes it a very attractive mollusk. The other vertebrates identified are birds and mammals (marine and terrestrial) that are rare when compared with the fish, marine invertebrates and plant assemblages thus it was decided not to use them for comparisons.

The plant assemblage recovered from both types of structures did not present significant differences as did the marine faunal remains. Industrial plants like cotton, gourd, reed and rush predominate in the domestic occupations with food plant accounting for only 5 species of which the most abundant is the fruit *Psidium guajava*. Chili pepper, squash, peanut and *paca* were

identified but in low frequencies in all the domestic occupations. The evidence from the plant assemblages indicates that the inhabitants of both types of structures had equal access to plants.

Activities related to the household reflect two types ritual activity. Pieces of unmodified quartz crystals found in all the domestic levels may relate to a domestic ritual. The presence of unmodified crystals has already been mentioned (Rick 1980) for the Early Preceramic reflecting some kind of religious activity. Quartz crystals are important elements in modern Andean rituals (Kuznar 2001) and in shamanic ceremonies worldwide as it symbolizes, for example, the Cosmic Serpent within Australian aborigine society and for the Desana of the Colombian Amazon. It was also used by Native Americans and Australian aborigines in rain rituals (Simmons and Ashian 2005: xxi). The second type of ritual involves the use of unbaked clay human figurines found only at the excavations in unit 6. At Unit 6A a total 7 broken figurines were recovered. The figurines are date from the first occupation phase before the construction of the platform and the quadrangular structure and were used through the occupation of the platform and quadrangular structure. The presence of these types of figurines is common in the construction fill of monumental architecture in Aspero and Caral, but not in Bandurria's architecture. The presence of fishhooks, baskets, cotton net and fabric reflect the production of these elements but no tools or production areas were found within the domestic areas excavated.

Together with the quartz crystals, beads are presents in all the domestic occupations suggesting an equal access to all the households. Exotic items like *Spondylus* shell or obsidian flakes are very rare and do not reflect any kind of exchange network, much less trade of any kind. They cannot be linked directly to any of the houses as both came from the last occupation of Unit 6. The *Spondylus* beads were found on the human head on top of the platform and the obsidian flake came from the last occupation of Unit 6B.

6.2.3 Burial Data

Although 29 individuals were excavated from the Domestic Sector no clear indicators of social status or wealth were found among them. All of the 29 burials have the same funerary pattern and were interred naked. The lack of offerings is common between sexes and age range. The only exceptions are two child burials that contained grave goods. The first was buried with offerings of a bird bones necklace, 4 snails and a spinning whorl and in the second one only a loincloth. Infant burials with grave goods are common since the Middle Preceramic and are found in many Andean mortuary traditions. This special treatment of infants has been interpreted as a symbolic expression of the role of the very young as encapsulating the life force (Quilter 1992: 83).

Based solely on the limited burial data, the Bandurria inhabitants were members of a relatively egalitarian society. In the 1970s rescue Fung recovered a stone necklace from a damaged bundle (Fung 2004: 328), and Torero also recovered a stone necklace with an engraved bird motif (Fig. 155). These necklaces are the only elaborate exotic item found in Bandurria graves.

A larger burial sample is required to obtain a significant idea of the burial pattern at Bandurria. For example the site of Paloma has a much larger burial data base reflecting more variability in grave goods and burial treatment than at Bandurria.



Figure 156. Necklace of red stone beads and bird motif. (Photo Domingo Torero).

6.2.4 Evidence of the Emergence of social differentiation

The burial data together with the excavations from Unit 6 reflects changes in the domestic occupation and the transformation of the site associated with the construction of the non-domestic ceremonial architecture and the rise of emergence of social inequality. In that particular area I believe that the site inhabitants intentionally dumped refuse to produce a higher terrain. Once the area was elevated above the rest of the site upon which the first quadrangular structure was constructed of wood and mats. Rituals were conducted at this structure as evidenced by the unbaked clay figurines, the absence of cooking hearths and firecracked stones. After a short period of time a stone platform and an attached quadrangular room were built. Within the room an intense reoccupation was recorded with 20 mud floors. The first occupation

(Phase IIa) also lacked hearths and clear evidence of domestic occupation, but on the seventh floor (6.131) the room was occupied by a household constituted by a nuclear family. Three hearths with clear evidence of cooking and domestic refuse appear for the first time in the structure. The presence of an infant below this floor can be interpreted as a ritual act to sanctify the household. This have is also the pattern found in the villages of the Middle Preceramic (e.g. Paloma). Subsequent floors have hearths and evidence of domestic activities associated with the remains of unbaked clay figurines. The household that moved into the structure consumed higher proportions of species with high meat content regardless of the capture method or the distance from the site to obtain the resource.

The occupation of this structure reflects a process of ritual appropriation by a household and with this, the beginning of a differentiation in the subsistence resources this household had consumed compared with the earlier domestic households. Because of its proximity with the stone platform is very probable that they conducted rituals there that involved the use of figurines and plastered hearths found on its surface. At the same time the ritual in which quartz crystals were used remained a communal domestic ritual.

The social scenario of the emergence of social inequality fits within Hayden's model of transegalitarian societies (Hayden 1995, 1996, 2001). Although applied elsewhere (e.g. North American NW coast) this is the first time that this model has been applied to archaeological data from the Peruvian north central coast.

Transegalitarian societies are defined as human groups with private ownership of resources and produce. The evidence found at the quadrangular structure reflects the first steps toward the privatization of ritual that culminates in an institutionalized hierarchy based on the control of ritual. For transegalitarian societies the transition to social inequality is accomplished in

a series of alternative pathways. Factors significant to the emergence of social inequality are production and transformation of food surpluses, economically based competition, use of prestige goods and a range of feasting patterns. Hayden's model is political agency based and the Triple A individuals (accumulators, aggrandizers, acquirers) are the main figures for the emergence of complexity. These types of individuals are the best candidates to appropriate a communal ritual and gain personal benefit from it. For Hayden (2001: 243) prestige items are basic markers for his model to work, he tracks the earliest evidence of these goods and argues that inequality roots can be traced to the middle Paleolithic. In the case of LPP coastal societies ritual practices was the best option for aggrandizers to promote their own self-interest and take advantage of the vast marine resources. This can be observed in the preference for larger and meatier marine resources by the inhabitants of the quadrangular structures. For Hayden, the production of surplus is a main characteristic of his model, which often involves the intensification of agricultural production to support more activities. But it is proven that food surplus can be achieved in hunter and gatherers societies without the development of agriculture and in the case of the Peruvian coast the abundance of marine resources combined with the technological breakthrough of cotton net fishing easily collected marine mollusks that created huge amounts of surplus as proposed in Moseley's (1975) Maritime Foundations of Andean Civilization hypothesis.

The large surpluses of marine resource must have been the trigger for the growth of the site and the modification of its surface as seen in Unit 6. Surplus also created the social conditions necessary to allow aggrandizers to take control of the rituals of the community. The confirmation of the success of the aggrandizers' strategies to impose a new social structure in the community at Bandurria is reflected in the construction of the extensive ceremonial complex

located beside the residential area decades after the construction of the stone platform. To be able to mobilize the necessary labor to build the massive pyramidal structures of the monumental sector the aggrandizers must have exercised their control of communal rituals. This strategy give them supernatural control with privileged access to receive and control divine messages and deliver them to the populace. They consolidated and justified their power by linking the rituals to a religious design. The material expression of this “divinity” at Bandurria is reflected in the monumental ceremonial architecture. I believe that the construction of the ceremonial structures itself more than the ritual use of them was the main strategy used by aggrandizers to control the population and gain power. This explains the high number of monumental structures and smaller platforms at the Monumental Sector. As excavation at Mound 1 showed once the structure was built no further remodeling or maintance was conducted. Apparently once the first pyramid was finished the community began a new construction project under the direction of their religious leaders

6.3 IMPLICATIONS OF BANDURRIA HOUSEHOLDS ON THE LATE PRECERAMIC PERIOD ARCHAEOLOGY

The results from the excavations from a household perspective is counter to the models proposed to characterize Late Preceramic society based solely upon the monumental architecture. When all the domestic data is combined with the monumental architecture data there is no doubt that the LPP society was a corporate or group oriented polity.

As Feinman (2000: 38) summarizes the corporate mode fits the archaeological evidence found at Bandurria. Table 39 contrasts corporate polities with the archaeological evidence found

at Bandurria. The emphasis is on communal ritual and public monumental construction which is clearly represented by the ceremonial monumental architecture and the evidence of domestic rituals that include quartz crystals and clay figurines. There is no significant difference in wealth distribution observed in the Bandurria households. For example there is almost no difference in beads frequencies between the oval and the quadrangular structures. The burial data also supports this model since no elaborate burials were found in our excavations or reported for the archaeological rescue of 1973. An emphasis on food production is clearly observed when the domestic refuse is analyzed with its strong marine component.

The initial aggrandizer emerged as a ritual specialist developing more complex rituals and recruiting labor from the community to fulfill the sacred requirement of their gods. Religion under their religious leaders became the social fabric of LPP society.

Table 39. Comparisons of Corporate modes compared with the Bandurria data. (Based on Fienman 2000: Table 3.2)

Corporate Mode	Bandurria archaeological record
More even wealth distribution	Artifact distribution reflects an even distribution of wealth items (e.g. beads, bone tablets).
Shared power arrangement	No leader(s) are indentified
More balanced accumulation	Lack of storage pits within structures.
Control of knowledge, cognitive codes	Control of rituals and religious knowledge.
Corporate labor systems	Corporate labor systems reflected in corporate ceremonial architecture.
Emphasis on food production	Emphasis on fishing and mollusk gathering
Staple finance	Staple finance based in fishing and mollusk gathering
Monumental ritual spaces	Monumental temples and circular sunken plazas
Segmental organization	No clear evidence
Power embedded in group association/affiliation	No clear evidence
Symbols of office	The quadrangular stone bead necklaces
Broad concerns with fertility, rain	Quartz crystals and female figurines

This evidence of a corporate mode of organization at Bandurria is counter to explanations proposed for other LPP monumental centers in the middle parts of the Supe and Pativilca valleys. I propose that these up valley sites are not urban centers or capitals of centralized polities but that these sites were seasonal ceremonial centers that reflect the same corporate mode as Bandurria. Until now no clear evidence have been presented that these sites were permanently occupied, although there was extensive construction and remodeling of monumental structures. These ceremonial centers were visited by different communities under the guidance of their leaders and were involved in major construction projects. Religious leaders from coastal communities like Bandurria competed with other centers to achieve higher status than those of other ceremonial centers. The presence of abundant status indicators and ritual paraphernalia deposited in Caral structures (usually in construction fills) such as figurines, quadrangular beads necklaces and other exotic items can be interpreted as symbols of leadership that differentiate them from their followers.

6.4 DIRECTIONS FOR FUTURE RESEARCH

Although research at Bandurria clarifies some issues and improves our understanding of the LPP at the North Central Coast from a household perspective a series of new questions arises. One of the main issues is the relationship between the domestic occupation and monumental architecture, the C14 dates from both sectors show chronological differences. The domestic occupation is clearly earlier than the construction of Mound 1 and its circular plaza. More research is needed to locate the domestic occupation directly related with the monumental architecture.

More burials are needed to obtain a representative sample of Bandurria population and locate more aggrandizers or leaders identified by their stone necklaces. Most of Bandurria's cemetery on the west side of the site remains unexcavated.

At a regional level more data on domestic occupation is needed to confirm or refute the data obtained at Bandurria. The publication of the raw data and contexts of the finds in sites excavated for over 10 years at Caral and 5 years at Aspero is needed to compare with the data obtained from Bandurria. It is also important to mention that we really do not know what is happening at other coastal regions during the LPP. No monumental architecture has been reported for the south coast although they had the access to the same abundant marine resources. Recently reported LPP sites with monumental ceremonial architecture from the Casma and Lambayeque valleys challenge the premise that the development of social complexity was focused only in the North Central Coast. Other coastal valleys in between such as Huarmey, Culebras or Nepeña do not have evidence of LPP monumental sites, only small sites have been reported (e.g. Gavilanes, Culebras, Los Chinos) for these valleys. Detailed regional surveys are necessary to locate LPP sites.

Finally, I hope that this dissertation will inspire more archaeologists to focus their research at the household level to provide a bottom up approach in reconstructing prehispanic Andean societies that will challenge the *status quo* of only excavating monumental architecture.

APPENDIX A: PROFILES

As we mentioned before one of the first field activities was to clean and record the extensive profile produced by the 1973 flood in the east side of the domestic sector of Bandurria. From interviews with local inhabitants who witnessed the destruction and participants of the archaeological rescue, the flood appears to have cut through the center of the domestic occupation. The waters extended to the east edge of the site washing out all the cultural remains. Approximately, 11 hectares were destroyed. Three locations in the 300 meter long profile was selected to explore the density and depth of the cultural occupation. In all of the profile, erosion had created a steep slope of fallen cultural material. It was necessary to clean up this collapsed material and cut into the profile to expose a clear stratigraphic sequence. Each cut was 5 meters long.

NORTH PROFILE

The north profile is located in the northeast edge of the domestic sector. It is 5 meter long. Initially the Unit 1 was traced within its upper side, but it was not excavated. The profile exhibited a human occupation of 2.5 m deep deposited over semi--compact eolian sand. A total of 51 stratigraphic units were recorded (Fig. 155). These 51 units have similar compositions that vary in the amount of sand, ash, fragmented and whole shells, salt grass, botanical remains, wooden sticks, fish bone, and small and large stones. Only S.U. 18, 26, 30 and 32 have any cultural materials, mainly cotton thread. Except for the floors (S.U. 8, 13, and 16), they represent

refuse accumulations. They also vary in color due to the amount of ash and other refuse in the deposit. Only the floors will be described below since the remaining units are primarily refuse lenses.

UTM coordinates of the profile upper part:

North Corner: 8'761,702 N/ 217,658 E

South Corner: 8'761,707 N/ 217,656 E

Description of Relevant Stratigraphic Units:

S.U. 8: Compact clay floor of regular texture. Color 7.5Y 7/6 reddish yellow, it does not contain any cultural remains.

S.U. 13: Semi--compact clay floor with a color of 10R 8/6 yellow. The floor extends discontinuously along the profile and contains no cultural remains.

S.U. 16: A succession of 5 clay floors. The central part has remains of semi--compact white clay of regular texture with no cultural remains. Sand lenses are present between each clay floor. The floors are of a compact clay and the color 10R 8/6 is yellow and has a regular texture. The sandy lens are semi-compact and its color 2.5Y 4/4 is olive brown. The floor does not contain cultural remains; the lense contains few cultural remains such as salt grass, shell and fish bones.



Figure 157. North Profile Stratigraphy as recorded

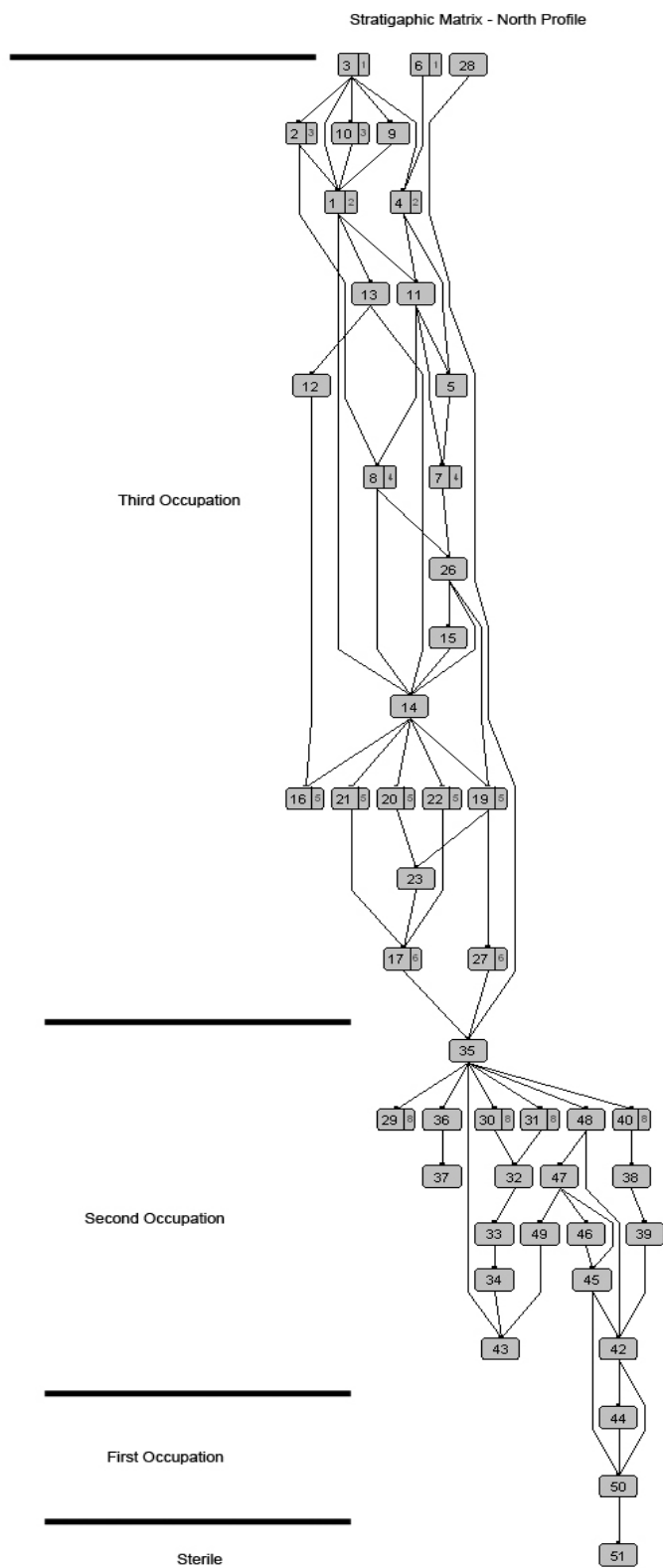


Figure 158. Stratigraphic Matrix of the North Profile indicating occupation phases identified.

Discussion

The profile defines the occupation of that part of the site that began to develop around 4421-4647 cal. B.P. (or 2857-2811 cal B.C.) and probably ended when the site was abandoned. In the 2.5 m of human occupation three occupational phases were identified.

The first occupation indicates that this area of the site was not heavily occupied circa 4421-4647 cal. B.P. The loose sand of the S.U. 43 and the type and density of cultural materials reflect an occasional deposition in the transit area from the core of the settlement to the periphery of the site.

The second occupation reflects a more intensive occupation of the area, with the presence of transit surfaces and midden layers with high concentrations of domestic refuse. The nature of the cultural depositions reflects domestic activities related to food preparation. Apparently the refuse was brought from other parts of the site where these activities took place.

The third and final occupation of this area reflects a formal human occupation with the presence of clay house floors and post holes. The superposition of various living floors reflects a continuous remodeling of the area that reaches to the upper most part of the profile.

CENTER PROFILE

The center profile, also 5 meter long, is located in the central portion of the cut at the highest point of the terrain. This profile was placed near Unit 2. The cultural deposition found in this profile is almost 3 meter deep. Like the North profile we discovered eolian sand at the base of the human occupation. A total of 36 stratigraphic units were recorded. Only the floors (S.U. 12, 13, 15, and 16) and a burial (S.U. 25) will be described. The remaining units are refuse lenses

similar to that of the North Profile, with a few cultural remains, primarily domesticated plants such as cotton threads.

UTM coordinates of the profile upper part:

North Corner: 8'761,777 N/ 217,647 E

South Corner: 8'761,772 N/ 217,646 E

Description of Relevant Stratigraphic Units:

S.U. 12: Compact clay floor of regular texture. Color is 5Y 8/2 pale yellow. The floor does not contain any cultural remains.

S.U. 13: Clay floor similar to S.U. 12.

S.U. 14: Loose lens of fine sand of irregular texture. Color is 2.5Y 4/3 olive brown. The lens presents abundant fragmented plant remains that give the irregular texture.

S.U. 15: Clay floor similar to S.U. 12 and 13.

S.U. 16: Clay floor similar to S.U. 12, 13 and 15.

S.U. 25: Human burial. The funerary context was composed of 5 cobbles that covered the burial. Beneath the stones a *junco* mat was found tied around the body with a *junco* cord. After removing the mat, a cotton twined textile was found covering the body. The human remains belonged to an adult individual flexed in fetal position oriented from south to north. A sample of the *junco* mat (*Scirpus sp.*) was AMS dated to 4,095±40 uncal B.P.

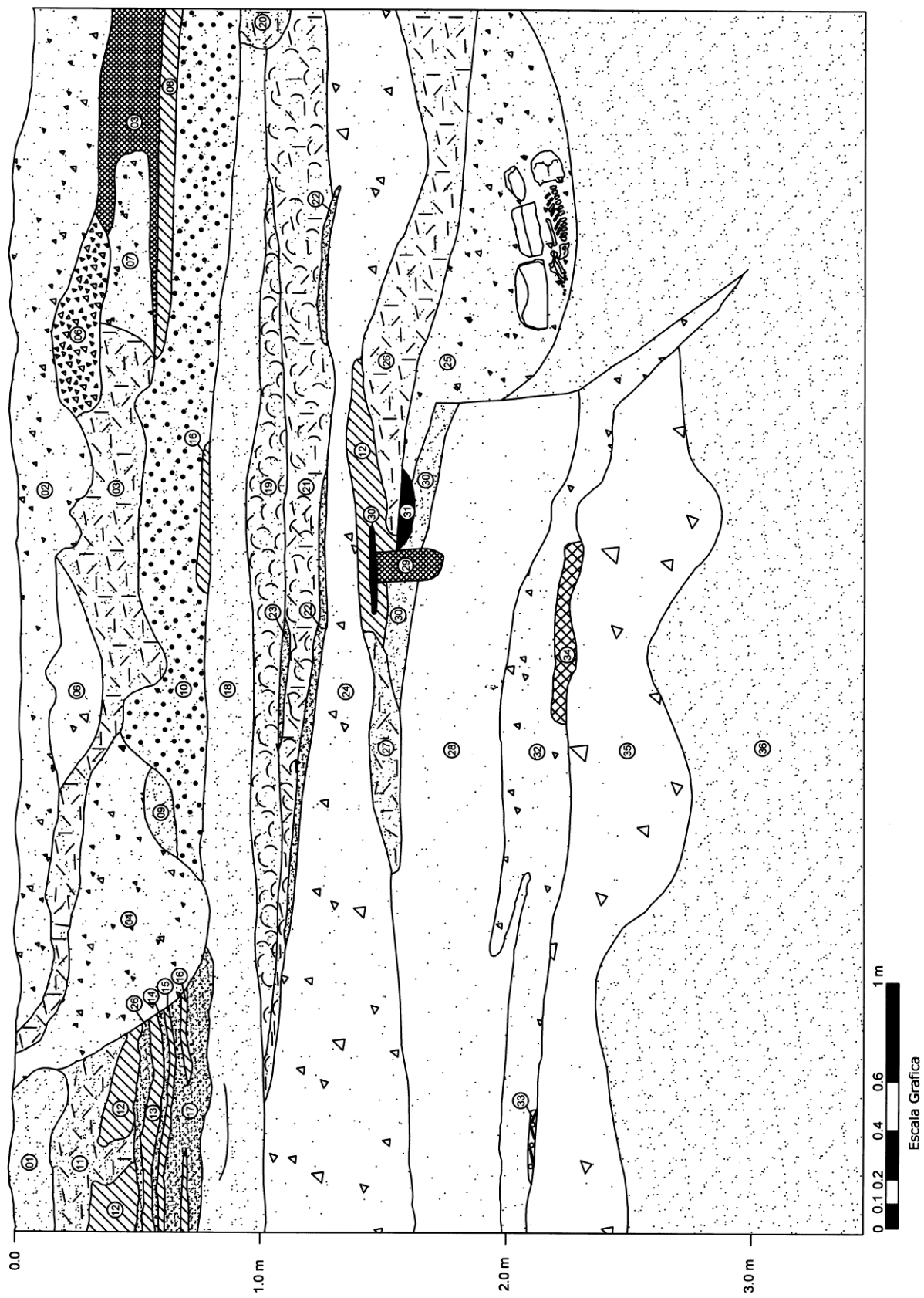


Figure 159. Center Profile Stratigraphy as recorded

Discussion

At this section the profile reaches its highest concentration and elevation. Heavy depositions composed of dense domestic refuse related to cooking activities are observed in all the center profile. One radiocarbon date shows that the human occupation at this section of the profile began around 4,519-4744 cal. B.P. (or 2,795-2,570 cal. B.C.). The profile has 4 occupational phases.

The first occupation has a low concentration of cultural remains composed of mainly of foodstuffs. It differs significantly with the upper layers of the profile. The human occupation appears to be sporadic since it is composed of a sandy layer containing few cultural remains. Only towards the end of this occupation, does S.U. 28 increase in the density of cultural remains observed in the profile.

The second occupation reflects a significant increase in human activities in the profile area. The cultural levels have higher concentrations of cultural remains related to food preparation activities. A junco sample from the burial S.U. 25 is dated to 4,423-4580 cal. B.P. (or 2,631-2,474 cal. B.C.) approximately 130 years after the first human activities in this section of the profile.

The third occupation of this profile reflects a formal human occupation with the presence of clay floors that were continuously remodeled. From the profile we identified at least 4 clay floors superimposed. This occupation is sealed with a loose sandy layer containing abundant remains of shell, plants and fish bones reaching the modern site surface. These living floors appear to continue in the south section of the profile and remain unexcavated. This occupation is only found at the southern edge of the center profile as it was disturbed by the last occupation.

The fourth and last occupation disturbed the previous occupation. No clear evidence of floors or living surfaces were identified. The layers found in this occupation appear to be refuse from domestic activities done elsewhere in the site. As with the previous occupation this last occupation reached the surface.

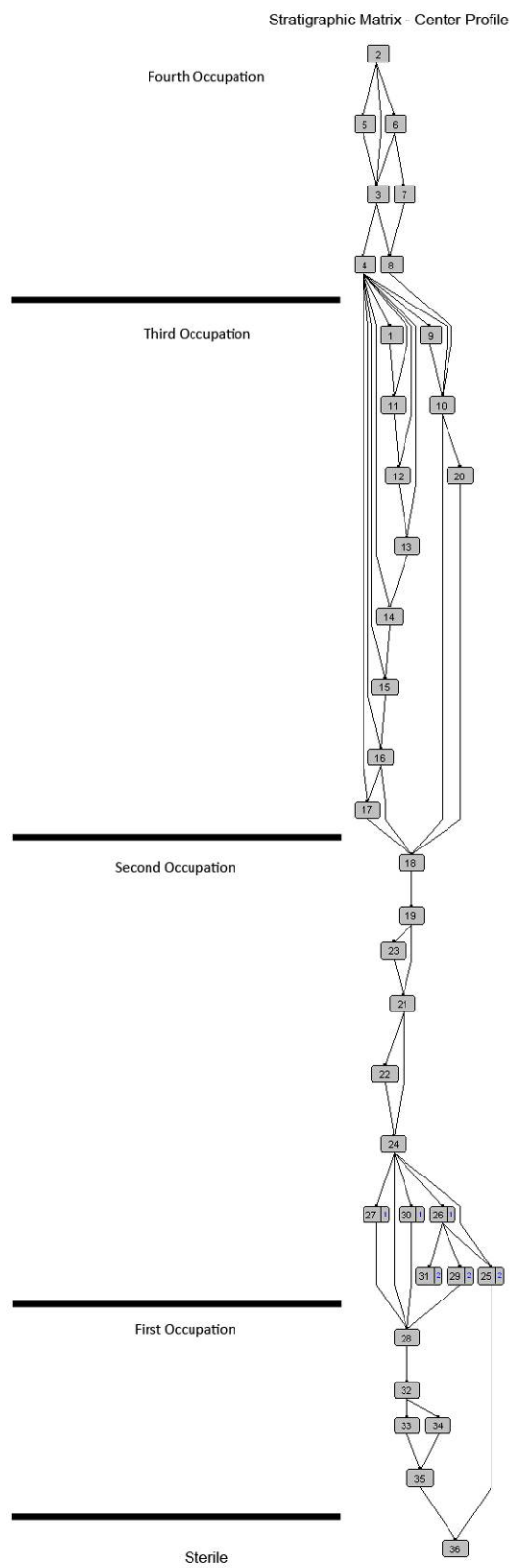


Figure 160. Stratigraphic Matrix of the Central Profile indicating occupation phases.

SOUTH PROFILE

This 5 meter long profile is located on the southern edge of the profile in the east side of the site. The profile was located to include part of a stone wall where Unit 4 was placed. Due to time restrictions unit 4 was not excavated. The cleaning of the exposed profile revealed superficial cultural deposition related to the stone wall that was only 15 cm deep. To be sure no earlier occupations were located below the superficial occupation, the profile was cleaned to a depth of 2 m. No previous occupations were found. This profile is made up of 9 units, all except S.U. 3 the stone wall, are refuse units similar in composition and color of those from the North and Center Profiles. They contain only scant cultural remains, mainly botanical materials. Only S.U. 3 will be described.

UTM coordinates of the profile upper part:

North Corner: 8'761,881 N/ 217,665 E

South Corner: 8'761,876 N/ 217,663 E

Description of Relevant Stratigraphic Units:

S.U. 3: Stone wall completely covered with a hard crust of salt (*caliche*). The salt crust did not allow us to discern the wall features. The salt crust color is 2.5Y 6/2 a light grayish brown. Some big irregular stones can be distinguished within the crust. No cultural remains are present.

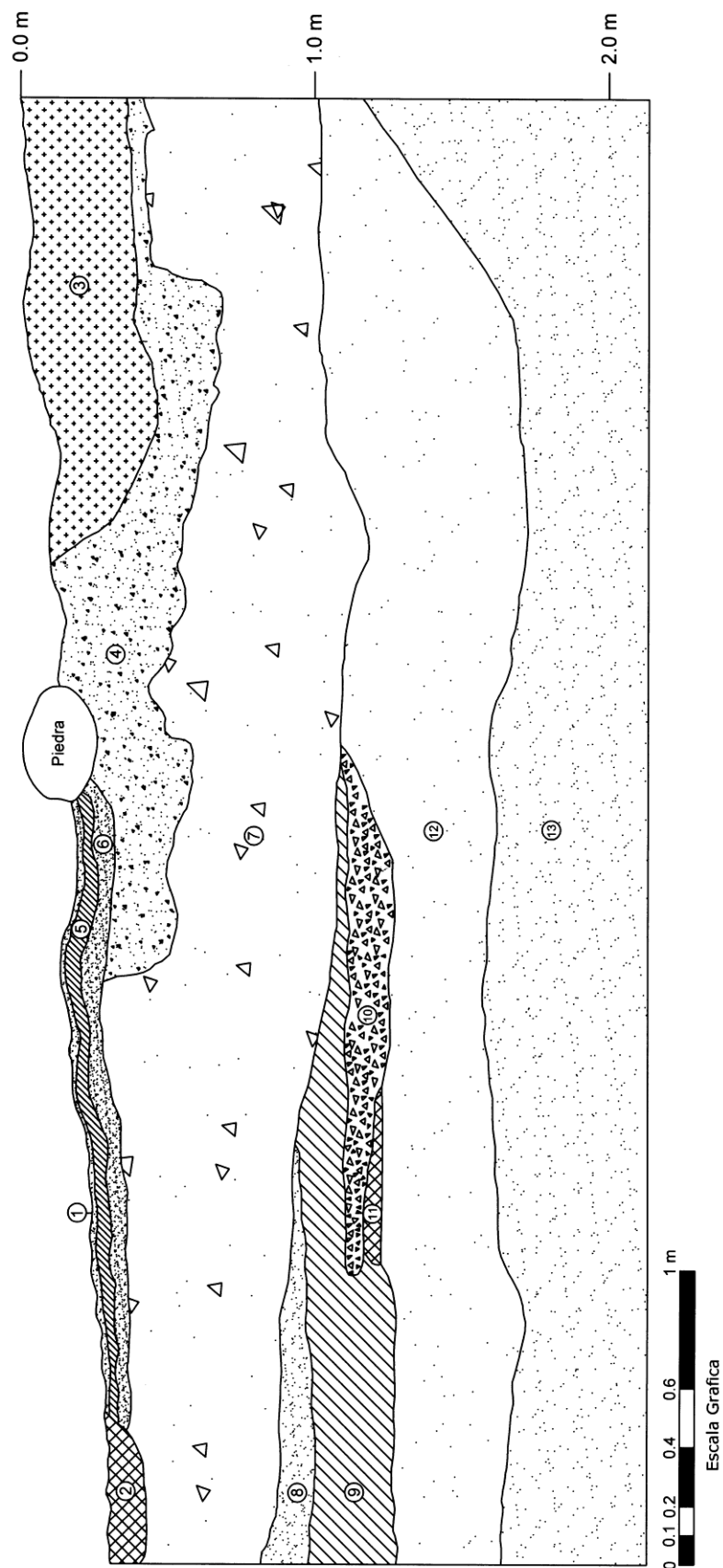


Figure 161. South Profile Stratigraphy as recorded

Discussion

At the South profile only one occupation has been identified. The stone wall observed on the surface appears to be part of a stone platform partially destroyed because of the 1973 flood and later wind erosion. Related to this platform there was a cultural layer of refuse of less than 20 cm thick. The rest of the profile only shows natural sand depositions. Because of the scarce cultural remains we can infer that this is the southern edge of the sites domestic occupation.

APPENDIX B: DESCRIPTION OF STRATIGRAPHIC UNITS EXCAVATED

UNIT 6A

Location:

UTM Coordinates: NW Corner: 8'761,769N / 217,598E

Datum: PSAD56 NE Corner: 8'761,796N / 217,603E


SW Corner: 8'761,791N / 217,598E

SE Corner: 8'761,791N / 217,603E

Unit Description:

Unit 6A is a northern expansion of Unit 6 and has an area of 25 m² (5 x 5 m). For recording purposes the unit was divided into 1 x 1 m sub-units numbered from 1 to 25. The unit has a homogenous surface with the presence of a cobble alignment located on its east side. The entire surface is covered with modern debris.

The excavation was accomplished in two field seasons the first one from November 2005 to June 2006 and the second one from January 2007 to July 2007. A total of 211 stratigraphic units were recorded.



1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Sub-units of Unit 6A

Description of the Stratigraphic Units:

S.U. 6.01 (Surface)

Surface of the archaeological site. It is composed by fine loose sand, small and medium stones and fragmented shells. It has two colors: the first one is light brownish gray (10YR – 6/2) and the second one is brown (7.5YR – 5/3). The last color could be referred to the humidity in the zone. Nowadays, this area is used to dry reed.

S.U. 6.02 (Sand and ash layer)

It is composed by fine sand and ash, small stones, disintegrated shells and carbon fragments. In some parts there are concretions of clay and saltpeter. It has a semi--compact consistency and its color is very dark gray (7.5YR – 3/1).

S.U. 6.03 (Sand layer)

It is composed by fine sand, small and medium stones, malacological fragmented material and clay concretions. It has a semi--compact consistency and its color is light olive brown (2.5Y – 5/4).

S.U. 6.04 (Floor)

It has an irregular shape, with a homogeneous surface. It is composed of sand and ash black in color (7.5YR – 2.5/1). On its surface, there are 7 holes (S.U. 6.12, 6.13, 6.14, 6.15 (6.56), 6.16, 6.17 and 6.25). It has a semi--compacted consistency, with fragmented shells and charcoal.

S.U. 6.05 (Sand lens)

It is located at the northeast corner of the unit, in the sub-units 4, 5 and 9. It is a sand concentration of irregular shape and homogeneous surface. It is composed by small angular stones, sand, ichthyologic and malacological fragmented material. It has a loose consistency and fine texture, and is brown in color (10YR-5/3).

S.U. 6.06 (Sand and ash layer)

Its composed of sand, ash, malacological fragmented and botanical material. It is compact, with irregular texture, and is black color (2.5Y – 2.5/1). On its surface, it has the S.U. 6.07 (6.42, 6.43), 6.08 (6.44), 6.09, 6.10 (6.45) and 6.11.

S.U. 6.07, 6.42 and 6.43 (Hearth)

It is oval (0.30 x 0.26 m). In the central part of its surface it has a depression. It is black (2.5Y – 2.5/1) and has an irregular texture. No additional elements were observed on the surface.

The first S.U. (6.07) is composed of sand and semi--compact ash, with malacological fragmented material, few ichthyologic material and charcoal fragments. It has fine granularity and it is 6cm thick. The next S.U. (6.42) has an irregular semi--compact surface, with fine granularity, shell pieces, ichthyologic material, charcoal and small stones. It is black (2.5Y – 2.5/1). The last S.U. (6.43) has an irregular surface. It is dark gray (5Y – 6/2); and is composed of sand and ash, with shell pieces and fragmented charcoal. It has fine granularity.

S.U. 6.08 (Pit)

It is circular (0.20 x 0.19 m), composed of sand and little ash, and is dark grayish brown in color (2.5Y – 4/2). It has fine granularity, with small stones, few botanical materials and shell pieces.

S.U. 09 (Hearth)

It is circular (0.20 x 0.15m), composed of clay (yellow color 2.5Y – 7/6) and saltpeter (in black color 5Y – 2.5/1). It is compact, with shell pieces, charcoal and fine sand. It is 0.57 m thick.

S.U. 6.10 and 6.45 (Hearth)

It is circular (0.32 x 0.30m), with an irregular and compact surface, in dark gray color (2.5Y – 4/1). It has whole and fragmented shells and some small angular stones. There may be a second hearth (S.U. 6.45), but it is obscured by salty solidification.

S.U. 6.11 (Hearth)

It is semi--circular (0.33 x 0.29m). On its surface there was a salty compaction with ash that caused the partial loss of this element during excavation. It has an irregular and compact surface and its colors are yellowish red (5YR – 5/8), light olive brown (2.5Y – 5/3) and dark brown (10YR – 2/2). It is composed of sand and ash, with fragmented charcoal, wood and twined textile remains. It has fine granularity and 0.17 m thick.

S.U. 6.12 (Hearth)

It is circular (0.23 x 0.25m), with a regular surface, of yellow color (5Y – 5/8). It is a salty compaction with ash, wood remains, shell pieces and botanical material.

S.U. 6.13 (Pit)

It is circular (0.16 x 0.18m) and its surface is brown (10YR – 4/3). It is composed of semi--compact sand, small shell pieces and small angular stones. It has fine granularity.

S.U. 6.14 (Pit)

It is circular (0.12 x 0.21m), with an irregular surface of olive brown color (2.5Y – 4/4). It is composed of loose sand, small angular stones, malacological material (whole and fragmented), 10 fire cracked stones, charcoal, botanical material and straw remains. It has fine granularity and is 0.6 m depth.

S.U. 6.15 and 6.56 (Accumulation of *junco*)

It is circular (0.26 x 0.33) with an irregular surface. It is composed of loose sand, shell pieces and ichthyologic material. It has fine granularity of olive brown color (2.5Y – 5/6). The next S.U. is an accumulation of junco (0.56m) of brown color (7.5YR – 4/4).

S.U. 6.16 (Gourds)

It is semi--circular (0.22 x 0.23m), with a regular surface. It is composed of fine sand and has a flat stone of bluish gray color (GLEY 2 – 5/10B) surrounded by gourds pieces. It has a loose consistency and fine granularity. Inside this element, there are two fragmented gourds in poor preservation.

S.U. 6.17 (Stone accumulation)

It is circular (20 x 23 cm), with a regular surface, of light olive brown color (2.5Y – 5/3). It is composed of fine loose sand, 5 small angular stones with clay and *junco* on the surface, 9 small fire cracked stones, shell pieces, a cylindrical lithic artifact (10 x 15 cm) and an accumulation of *junco* in poor preservation.

S.U. 6.18 and 6.46 (Concentration of stones)

It is a concentration of angular stones and small fire cracked round cobbles, deposited in an ellipsoidal matrix. The surface is compact because due to salinization and is brown (7.5YR – 5/4). The next S.U. (6.46) is composed of fine sand, with round cobbles and small angular stones.

S.U. 6.19 (Ash lens)

It is oval (0.55 x 0.40m), with irregular borders. On its surface there are shell pieces with ash, fragmented charcoal and salty concretions.

S.U. 6.20 (East Wall)

It is located in the east side of the unit, in the sub-units 5, 10, 15, 20 and 25. The orientation is N10°E. It is attached to Wall 6.21 outside the unit. It is on the surface of the S.U. 6.178, its dimensions are 4.20 m length by 0.50 m width by 0.65 m high. It has a regular straight face with regular masonry of two rows, without inclination or plastering. The mortar is composed of clay of pale yellow color (5Y – 7/4), mixed with saltgrass and *junco* fibers.

The wall was remodeled. It was composed of four medium round cobbles (0.38 x 0.16), joined with clay mortar, located in the sub-units 15 and 20. The remodeling is in S.U. 6.30. At the central part of the wall, a modern alteration was registered; the stones of the wall of the platform were dislocated.

S.U. 6.21 (South wall)

It is at the South of the unit, in the sub-units 21, 22, 23, 24 and 25. The orientation is S04°W. It is attached to Wall 6.20 outside the unit. It is on the surface of the S.U. 6.178; its dimensions are 4.42 m length by 0.40 wide by 0.20 m high. It has a regular straight face with irregular masonry of rectangular cut stones, of one row, without inclination or plastering. The mortar is composed of clay, in a pale yellow color (5Y – 7/4), mixed with saltgrass and *junco* fibers.

The wall has an intrusion at the central part, registered with the S.U. 6.80; also it was affected by modern remodeling at its SW corner.

S.U. 6.22 (Gourd)

It is oval (0.11 x 0.10m), showing the borders. The inside is composed of fine sand and gravel, of brown color (10YR – 4/3), with whole and fragmented shells. It has loose a consistency. The gourd was fragmented and is in poor preservation.

S.U. 6.23 and 6.58 (Accumulation)

It is semi- circular (0.22 x 0.18m) and on its border there are *junco* remains. The surface is composed of sand of light yellowish brown color (2.5Y – 6/3), it is surrounded by another of very dark brown color (10YR – 2/2), and has small fire cracked stones of red color (10R – 4/6). It

has loose consistency, fine granularity, with shell pieces. The next S.U. (6.58) has a regular surface of gray color (2.5YR – 5/1), loose consistency, composed of fine sand, small fire cracked stones and shell pieces. Junco remains and a piece of trunk over a valve of *Mesodesma donacium* (0.12 m length by 0.02 m of diameter) were registered attached to the south side of the hole.

S.U. 6.24 (Post hole)

It is circular (0.14 x 0.16m) and has an irregular surface surrounded by small angular fire cracked stones of very dark gray color (7.5YR – 5/8). At the center there is a piece of trunk of strong brown color (7.5YR – 5/8). These stones supported the post. This S.U. was not excavated.

S.U. 6.25 (Hole)

It is semi--circular (0.14 x 0.13m), composed of sand of yellowish brown color (10YR – 6/8). It has loose consistency, with malacological and botanical fragmented material.

S.U. 6.26 (Hole)

It is oval (0.46 x 0.20m), with loose sand of brown color (7.5YR – 4/4). It has a few shell pieces on the surface and whole and fragmented shells inside.

S.U.6.27 (Floor)

It has an irregular, compact and granular surface of very dark grayish blue color (GLEY 2 – 3/1). It is composed of fine clay. On its surface were located S.U. 6.17 and 6.26. It has ichthyologic and malacological material.

S.U. 6.28 (Floor)

It has an irregular and compact surface with an irregular texture in dark gray color (5Y – 4/2). It has whole and fragmented shells (*Choromytilus chorus*). It has loose granular sand inside of pale yellow color (2.5YR – 7/4).

S.U. 6.29 (Floor)

It has an irregular and compact surface with an irregular texture of dark gray color (5Y – 4/2). It has whole and fragmented shells (*Choromytilus chorus*). It has loose granular sand inside and is pale yellow in color (2.5YR – 7/4).

S.U. 6.30 (Floor)

It has an irregular and compact surface with an irregular texture of dark gray color (5Y – 4/2). It has whole and fragmented shells (*Choromytilus chorus*). It has loose granular sand inside and is pale yellow in color (2.5YR – 7/4).

S.U. 6.31 (Compact surface)

It has an irregular and semi- compact surface with an irregular texture in grayish brown color (2.5Y – 5/2). It has whole and fragmented shells (*Choromytilus chorus*). It has loose granular sand inside and is a pale yellow color (2.5YR – 7/4).

S.U. 6.32 (Floor)

It is located in the sub-unit 5. It has an eroded, discontinuous and semi--compact surface of light yellowish brown color (10YR –6/4). It is composed of fine sand, small angled stones and shell pieces.

S.U. 6.33 (Ash)

It is located in the sub-units 5 and 10. It has a compact surface of black color (7.5YR – 2.5/1) and fine granularity. Also, it has malacological and botanical material, with small and medium fragmented stones.

S.U. 6.34 (Hearth)

It is located in the sub-unit 10 (Not excavated).

S.U. 6.35 (Lens)

It is located in the sub-unit 4. It is composed of fine sand, with granular consistency of dark olive gray color (5Y – 3/2). It has mainly malacological and botanical material.

S.U. 6.36 (Hearth)

It is located in the sub-unit 4. It has an irregular surface and texture of dark gray color (5Y – 4/1). It is composed of compact and granular sand caused by salinization, so it was excavated in blocks. It has malacological, botanical and ichthyologic material.

S.U. 6.37 (Ash)

It is located in sub-units 5 and 10. It has an irregular surface of 3 colors: very dark gray (7.5YR – 3/1), black (7.5YR – 2.5/1) and light yellowish brown (10YR – 6/4). It has semi-- loose consistency, semi--fine granularity, with few malacological and botanical materials and small and medium angular stones.

S.U. 6.38 (Sand layer)

It is located in sub-units 4 and 9. It has a discontinuous surface of dark gray color (10YR – 4/1). It is composed of loose fine sand, with whole and fragmented shell and botanical material.

S.U. 6.39 and 6.40 (Intrusion)

It is located between the sub-units 20 and 25. It has an irregular surface of brown color (10YR – 5/3). It is composed of angular stones and whole and fragmented shells. It has a semi--compact and granular consistency, with malacological, botanical and ichthyologic material. The next S.U. (6.40) has a compact surface of black color (2.5Y – 2.5/1), an irregular texture caused by the presence of medium angular stones with a lot of malacological material.

S.U. 6.41 (Floor)

It is located in sub-units 9, 14 and 19. It has an irregular surface of dark gray color (5Y – 4/2), with whole and fragmented shells like *Choromytilus chorus*. It is composed of loose granular sand of pale yellow color (2.5YR – 7/4).

S.U. 6.47 (Sand lens)

It is located in sub-units 3, 4 and 9. It is an irregular sand lens, with a grayish brown (10YR-5/2) surface, in which there are willow and *junco* remains. It has a loose consistency and fine texture, with ichthyologic material and shell fragments.

S.U. 6.48 (Hearth)

It is located in sub-unit 9. It is semi--circular (0.31 x 0.25 m) with an irregular surface of dark gray color (5Y – 4/2), shell fragments and a medium angular stone. It has a compact consistency because of salinization. Inside, there are four different depositions: an ash surface in gray color (2.5Y – 5/1), a second one composed of ash and charcoal fragments of very dark gray color (2.5Y – 3/1), a third one composed of sand in a light grayish brown color (2.5Y – 6/2) and the last one composed of ash in a light gray color (5Y – 7/1).

S.U. 6.49 (Shell accumulation)

It is located in sub-unit 4. It is composed of whole and fragmented *Mesodesma donacium* and *Choromytilus chorus*. It has an area of 0.15 m by 0.10 m.

S.U. 6.50 (Seed accumulation)

It is located in sub-unit 9, partially covered by fine sand of a light olive brown color (2.5Y – 5/4). It has a loose consistency with malacological and ichthyologic material. The seeds were identified as guava.

S.U. 6.51 (Hearth)

It is located in the sub-unit 13. It is semi--circular, with an irregular and compact surface of a dark greenish gray color (GLEY 2 – 4/10EB). It is composed by ash and sand, it has fine granularity. It has charred fragmented shells, ichthyologic material and *achupalla* (*Tillandsia sp.*).

S.U. 6.52 (Gourd)

It is located in sub-unit 8. It is oval (0.22 x 0.17) and 0.02m thick. The surface is composed of sand and clay of an olive yellow color (2.5Y – 6/6), with fine granularity. Inside, it has ash of black color (7.5Y – 2.5/1) and shell pieces. After the excavation it was possible to determinate that the gourd was deposited on a clay layer of yellow color (10YR – 7/6).

S.U. 6.53 and 6.59 (Hearth)

It is located in sub-units 7 and 8. The hearth 6.53 has an irregular shape, with salty concretions of black color (5Y – 2.5/1). It has semi--compact consistency and fine texture. It is composed by sand and ash, with fragmented shell and few botanical materials. Under it a second hearth 6.59 was found. It has an irregular semi--compact surface, semi--fine texture of grayish blue color (GLEY 2 – 5/1.5PB). It is composed of sand and ash, with charred fragmented shells and botanical material.

S.U. 6.54 (Hearth)

It is located in the south of the sub-unit 7. It has a semi--circular shape (0.28 x 0.26 m) and a compact wavy edge. It has a black (7.5YR – 2.5/1) surface with shell fragments. Inside it is

composed of semi--compact fine grain ash with shell fragments, botanical and ichthyologic material.

S.U. 6.55 (Hole)

It is located in the northeast of sub-unit 1. It has a circular shape (0.30 x 0.28 m) with a sandy surface of light olive brown color (2.5Y – 5/4). There are small fire cracked stones and shell fragments on the surface. It has a loose consistency, fine texture, with few botanical and ichthyologic materials.

S.U. 6.60 (Sand layer)

It is located in the sub-units 1, 2, 6 and 7. It has an irregular shape and a homogeneous surface of olive gray color (5Y – 5/2). It has loose consistency and fine texture, with shell fragments and medium fire cracked stones at the center.

S.U. 6.61 (Salt compactation)

It is located in the sub-unit 1. It has an irregular shape and a compact surface of dark gray color (7.5YR – 4/1). At the interior it has a very compact granular texture, composed of sand, ash and salt. Because this, it was excavated as a whole.

S.U. 6.62 (Hearth)

It is located in the sub-unit 1. It has an ellipsoidal shape (0.25 x 0.14 m) and an irregular surface of black color (7.5YR – 2.5/1) with *achupalla* remains (*Tillandsia sp.*), charred shells, botanical

and ichthyologic material, and small fire cracked stones. It is composed of sand and ash, with semi--compact consistency and fine texture.

S.U. 6.63 (Floor)

It is located in the sub-units 7, 8, 12, 13 and 18. It has an irregular surface of dark gray color (2.5Y – 4/1), with shell fragments and holes recorded as S.U. 6.51, 6.52, 6.53, 6.54 y 6.59. It is composed of sand and clay; it has semi--compact consistency and medium texture, and contains complete and fragmented shells, botanical and ichthyologic material.

S.U. 6.64 (Ash layer)

It is located in the sub-units 2, 3, 4, 7, 8 and 9. It has a homogeneous surface of very dark grayish blue color (GLEY 2 - 5/1 5PB), where there are a lot of whole and fragmented malacological material, with botanical and ichthyologic material and some medium and small stones. It is composed of sand and ash, with semi--loose consistency and fine texture.

S.U. 6.65 (Sand layer)

It is located in the sub-units 2, 3, 4, 7, 8 and 9. It has an irregular surface of light grayish brown color (2.5Y – 6/2) and grayish brown color (2.5Y – 5/2). It is composed of fine texture loose sand, with shell pieces and ichthyologic material.

S.U. 6.66 (Floor)

It is located in the sub-units 7, 8, 12 and 13. It has a semi--circular shape and a compact surface color dark gray (2.5Y – 4/1) and gray (5Y – 6/1). It has depressions registered as S.U. 6.67, 6.68 y 6.69, and shell fragments. It is composed of fine texture sand and semi--compact ash.

S.U. 6.67 and 6.69 (Hearth)

They are located in sub-units 8 and 13. The first one has a semi- circular shape (0.62 x 0.65 m). In the surface it presents 2 colors: light reddish brown (2.5YR – 7/3) in the border and gray (5Y – 6/1) inside it. It is composed by clay and sand, with semi--compact consistency, granular texture and few malacological materials; also there is a compact block of salinized clay of light gray color (5Y – 7/1) it measures are 0.15 x 0.10 x 0.035m. The next S.U. (6.69) is next to the first one. It has a circular shape (0.42 x 0.57m) and a semi--compact surface color: very light brown (10YR – 7/4) in the border and dark gray (2.5YR – 4/1) inside it. It is composed by clay and sand, with an ash level, lots of charcoal fragments, few shell fragments and ichthyologic material.

S.U. 6.68 (Hearth)

It is located in the sub-units 8 and 13. It has a semi--circular shape (0.24 x 0.32 m) and a very dark gray surface (2.5Y – 3/1), with burning remains, some straw and charred fragmented shells. It is composed of fine texture loose ash. Also, it contain whole and fragmented shells, some of them are charred, few botanical and ichthyologic materials.

S.U. 6.70 (Hearth)

It is located in the sub-unit 3. It has an oval shape (0.59 x 0.40 m) with a very dark grayish blue surface (GLEY 2 – 3/5PB) abundant botanical material, ash remains, shell fragments and small fire cracked stones. It is composed of sand and fine texture semi--compact ash.

S.U. 6.71 (Accumulation of ropes)

It is located in the sub-unit 8. It has a circular area (0.26 x 0.33 m) a fine loose sand layer covers the S.U. composed of *junco* ropes.

S.U. 6.72 (Gourd)

It is located in the north of the sub-unit 7 (0.40 X 0.30). It is a fragmented gourd deposited on an accumulation of *junco*; inside, there are 3 small angled stones, few shell fragments and light brown color (10YR – 7/4) sand.

S.U. 6.73 (Floor)

It is located in the sub-units 7, 12, 13, 14 and 18. It has a compact surface of very dark gray color (5Y – 3/1), there it contains shell fragments, specially *Choromytilus chorus*. It is composed of sand and ash. Inside it is composed of light yellow color (2.5Y – 8/4) clay.

S.U. 6.74 (Ash layer)

It is located in the sub-units 6, 7, 8, 12, 13 and 17. Its surface is black (7.5YR – 2.5/1). It is composed of sand and compact ash, with fine texture and charred whole and fragmented shells.

S.U. 6.75 (Floor)

It is located in the central part of the unit. It has an irregular surface with some dark grayish brown color (2,5Y – 4/2) cracks; also it has 2 holes registered as S.U. 6.77 and 6.78. It has complete shell valves of *Choromytilus chorus*, as the other excavated floors. It is composed by semi--compact clay with granular texture. It also contains few ichthyologic and botanical materials.

S.U. 6.76 (Sand layer)

It is located in the sub-units 13, 14, 18 and 19. It has an irregular shape and a homogeneous surface in light olive brown color (2.5Y – 5/3). It is composed by fine loose sand with shell pieces, ichthyologic material and few botanical materials.

S.U. 6.77 (Hole)

It is located in the sub-unit 11. It has a circular shape (0.10 x 0.10 m) and a grayish brown color (2.5Y – 5/2) surface. It is composed by semi- fine loose sand, with shell pieces, botanical and ichthyologic materials.

S.U. 6.78 (Hole)

It is located in the sub-unit 11. It has a circular shape (8 cm of diameter) and olive brown color (2.5Y – 4/3) surface with straw remains in the border. It has loose consistency, with shell and gourd fragments.

S.U. 6.79 (Floor)

It is located in almost all the unit. The highest part of the surface is in the sub-unit 4, with a slope from East to West. It has holes registered as S.U.s 6.80, 6.81, 6.82, 6.83, 6.84, 6.85, 6.86, 6.87, 6.88, 6.89 and 6.90 and accumulation of shells in the sub-units 14, 19, 21 and 22, near the walls. Also, pieces of twined textiles with shells were found in the sub-units 7 and 8, and a lithic artifact in the sub-unit 16. The surface has different colors (caused by the poor conservation): light yellowish brown (2.5Y – 6/3) in the southeast, dark gray (2.5Y – 3/1), and gray (7.5YR – 5/1) in the north. It is composed of semi--compact clay and sand of granular texture, with whole and fragmented shells and ichthyologic material.

S.U. 6.80 (Hole)

It is located in the sub-units 23 and 24. It has an oval shape and a bluish black color (GLEY 2 – 2.5/1 5PB) semi--compact surface. It is composed of fine sand and ash remains with botanical material, charred shell fragments and ichthyologic material. Also, another deposition was identified which has a homogeneous semi--compact dark grayish brown color (10YR – 4/2) surface. This deposition has sand mixed with junco, whole and fragmented shells, bird bones and other bone material. Another surface was identified composed of a gourd with botanical material. Inside, it has granular dark olive gray color (5Y – 3/2) sand.

S.U. 6.81 (Hole)

It is located in the sub-unit 21. It has a circular shape and a surface in black color (7.5YR – 2.5/1), with small fire cracked stones and shell fragments. It is composed of loose and fine texture sand and ash.

S.U. 6.82 (Hole)

It is located in the sub_unit 21. It has a circular shape (0.12 x 0.11 m) and a homogeneous surface composed of fine loose sand in gray color (10YR – 5/1). It has botanical material and few malacological and ichthyologic materials.

S.U. 6.83 (Accumulation of shells and *junco*)

It is located in the sub-unit 16, in an area of 0.17 x 0.18 m. It is composed of whole and fragmented shells with *junco*, partially covered by fine loose dark gray color (5Y – 4/1) sand. It also has few ichthyologic materials.

S.U. 6.84 (Hearth)

It is located in the sub-units 16 and 17. It has an oval shape (0.40 x 0.30 m) and a surface composed of sand with ash in very dark gray color (2.5Y – 3/1). It has loose consistency and fine texture, with charred fragmented shells, *junco* remains and pieces of charcoal.

S.U. 6.85 (Textile)

It is located in the sub-unit 7. It is composed by a charred twined textile (olive gray color 5YR – 5/2), located in an area of 0.15 x 0.12 m. It is partially covered by sand of bluish black color (GLEY 2 – 5/1 5PB). It has loose consistency and fine texture, with shell fragments, ichthyologic and botanical material like charred *achupallas* (*Tillandsia* sp.).

S.U. 6.86 (Hearth)

It is located in the sub-unit 7. It has a semi--circular shape (0.35 x 0.28 m) and a surface composed of clay and compact ash in pale yellow color (2.5Y – 7/3), with charred fragmented shells. It has semi--compact consistency and fine texture.

S.U. 6.87 (Hole)

It is located in the sub-unit 8. It has a circular shape (8 cm of diameter). The surface is composed of ash in black color (2.5Y – 2.5/1), with loose consistency and fine texture. It has charred *achupallas* (*Tillandsia* sp.) and few malacological materials.

S.U. 6.88 (Textile)

It is located in the sub-unit 8. It is composed of fragmented charred twined textiles of bluish black color (GLEY 2 – 5/1 5PB) and bluish gray color (GLEY 2 – 7/1 5B). It is surrounded by *ahupalla* remains, malacological and ichthyologic materials.

S.U. 6.89 (Ash layer)

It is located in the sub-unit 8. It has an irregular shape (0.28 x 0.12 m) and a surface composed of ash in very dark gray color (2.5Y – 3/1). It has compact consistency and medium texture, with charred fragmented shells, few ichthyologic and botanical materials.

S.U. 6.90 (Hole)

It is located in the sub-unit 7. It has a circular shape (0.09 m of diameter). Its surface is composed of fine loose sand in dark gray color (5Y – 4/1) surrounded by pale yellow color (2.5Y – 8/2) clay blocks. It has shell pieces and *junco* remains placed vertically.

S.U. 6.91 (Floor)

It is located in almost all the unit. It has a semi--compact pale yellow color (2.5Y – 7/3) surface of fine texture. It is composed of clay and sand, whole and fragmented shells like *Aulacomya ater* and *Perumytilus chorus* and few ichthyologic materials. It presents holes recorded as the S.U.s. 6.92 and 6.93.

S.U. 6.92 (Hole)

It is located in the sub-unit 9. It has a circular shape (0.13 m of diameter) and a sandy surface of light brown color (7.5YR – 4/3), with shell valves of *Aulacomya ater*. It has loose consistency, fine texture and few ichthyologic materials.

S.U. 6.93 (Hole)

It is located in the sub-units 11 and 12. It has a circular shape (0.17 m of diameter) with a dark grayish brown color (2.5Y – 3/2 surface containing shell fragments (*Mesodesma donacium*), *junco* remains and stone flakes. It has loose consistency and fine texture with wood pieces and human hair remains.

S.U. 6.94 (Sand layer)

It is located in almost all the unit (80% approximately). It has an irregular shape, composed by fine loose, olive gray (5Y – 4/2), sand with fish vertebrae and shell fragments.

S.U. 6.95 (Sand layer)

It is located in the sub-units 15, 19, 20 and 24. It has an irregular surface composed of pale yellow color (2.5Y – 3/1) sand. It is surrounded by some medium fire cracked stones in the south corner; also there is an area composed of compact ash with malacological material (*Mesodesma donacium*). It has loose consistency, fine texture, and fragmented ichthyologic remains.

S.U. 6.96 (Compact clay blocks)

These compact clay blocks are located in sub-units 7 and 12. They have compact consistency and coarse texture. They have an irregular surface color pale yellow (5Y – 8/2) and shell fragments with saltgrass remains.

S.U. 6.97 (Sand layer)

It is located in the northeast part of the unit. It has a homogeneous surface, with semi--loose consistency, fine texture and gray color (2.5Y – 6/1). It has shell fragments, small fire cracked stones and ichthyologic material. On its surface were registered the S.U. 6.104, 6.105, 6.106, 6.107 and 6.108.

S.U. 6.98 (Ash layer)

It is located in almost all the unit. Its surface has irregular borders in very dark gray color (10YR – 3/1), with holes registered as the S.U. 109, 110, 111, 112 and 113. It has semi--compact consistency, fine texture, with ichthyologic and malacological material.

S.U. 6.99 (Compact surface)

It is located in the sub-units 2, 3, 4, 7, 8 and 9. Its surface has irregular borders in dark gray color (2.5Y – 4/1). It has semi--compact consistency, fine texture and is composed by ash with charred fragmented shells and few botanical and ichthyologic materials.

S.U. 6.100 (Floor)

It is regularly located in the south part of the unit, from the sub-units 17 to 25. It has a dark grayish brown color (2.5Y – 4/2) surface composed of clay color light yellowish brown (2.5Y – 6/4) mixed with semi--compact semi--coarse sand. It contains whole shells, ichthyologic and botanical material.

S.U. 6.101 (Floor)

It is located in the east part of the unit. It has an irregular shape, with an eroded surface in gray color (2.5Y – 6/1). It is composed of fine texture and semi--compact clay and ash. It has charred shells (*Mesodesma donacium* and *Argopecten purpuratus*), ichthyologic and botanical material.

S.U. 6.102 (Floor)

It is a floor in poor preservation, located in the central part of the unit. It has an homogeneous surface with shells (*Mesodesma donacium* and *Choromytilus chorus*). Its color is yellowish

brown (10YR-6/6). It is 1cm thick and has semi--compact consistency. It is composed by whole and fragmented shells, abundant ichthyologic material and few botanical remains.

S.U.6.103 (Sand layer)

It is located at the northeast of the unit, next to the wall S.U. 6.20. It is composed of sand, regularly distributed, in dark grayish brown color (10YR – 4/2). It has loose consistency and fine texture, with shells, small round cobbles, ichthyologic and botanical materials.

S.U. 6.104 (Hearth)

It is located in the sub-unit 9. It has a circular shape and an irregular surface in olive gray color (5Y – 4/2). There are whole and fragmented shells, charcoal and *junco* remains, ichthyologic and botanical materials. It has loose consistency and is associated with the surface of the S.U. 6.97.

S.U. 6.105 (Hole)

It is located in the sub-unit 9. It has a circular shape (14 cm of diameter), with a dark grayish brown color (2.5Y – 3/2) surface and shell fragments. It is composed of fine loose sand with medium fire cracked stones and contains a stone artifact, malacological and ichthyologic materials. It is associated with the surface of the S.U. 6.97.

S.U. 6.106 (Hole)

It is located in the sub-unit 8. It has a circular shape (12 cm of diameter) and an irregular surface in olive gray color (5Y – 4/2). It is composed of fine sand with small fire cracked stones, ichthyologic and malacological materials. It is associated with the surface of the S.U. 6.97.

S.U. 6.107 (Hole)

It is located in the southeast part of the sub-unit 3. It has a semi- circular shape (0.15 x 0.20 m). It is composed of sand in light olive brown color (2.5Y – 5/3), with fine texture and loose consistency. It contains shell fragments of *Mesodesma donacium* and few ichthyologic materials. It is associated with the surface of the S.U. 6.97.

S.U. 6.108 (Clay lumps)

These clay lumps are located in the sub-unit 9. Their color is pale yellow (2.5Y – 7/4). They have loose consistency and are mixed with fine sand in olive brown color (2.5Y – 4/3). They are associated with the east facing of the S.U. 6.20.

S.U. 6.109 (Hole)

It is located in the sub-unit 12. It has a circular shape (0.29 m of diameter) and a surface in olive gray color (5Y – 4/2). It is composed of semi--compact fine sand, with shell fragments, ichthyologic and botanical materials. It is associated with the surface of the S.U. 6.98.

S.U. 6.110 (Hole)

It is located in the sub-unit 8. It has a circular shape (0.22 m of diameter) and a surface in dark grayish brown color (2.5Y – 4/2). It has small concretions of sand and shell fragments. It is composed of fine loose sand, with ichthyologic material. It is associated with the surface of the S.U. 6.98.

S.U. 6.111 (Hole)

It is located in the sub-unit 13. It has a semi-circular shape (0.15 m of diameter), with irregular borders and a very dark grayish brown color (2.5Y – 3/2) surface. It is composed of sand and ash with semi-compact consistency and fine texture. It presents charcoal and shell fragments, and ichthyologic remains. It is associated with the surface of the S.U. 6.98.

S.U. 6.112 (Hole)

It is located between the sub-units 18 and 19. It has a semi-circular shape (0.22 x 0.31 m), with a surface in very dark grayish brown color (2.5Y – 3/2), it contains bones pieces like the epiphysis of long bones, shell fragments and a round cobble. It is composed by fine loose sand with clay lumps in light yellowish brown color (10YR – 6/4) and concretions of sand. Also, it has botanical material and two medium stones. It is associated with the surface of the S.U. 6.98.

S.U. 6.113 (Hole)

It is located between the sub-units 12 and 17. It has a circular shape (0.14 m of diameter) and a surface in dark gray color (5Y – 3/2). It is composed of sand and ash, with loose consistency and fine texture. It has charred fragmented shells and *junco* remains.

S.U. 6.114 (Ash layer)

It is located in the north-central part of the unit. It is an ash fill, with an irregular shape, wavy edges and a surface in black color (10YR-2/1), where there are charred fragmented shells. It has semi-compact consistency; it is 1 to 3cm thick, being denser at the center. It is composed by shell fragments, ichthyologic and charred botanical material.

S.U. 6.115 (Floor)

It is located in almost all the unit. It is a fragmented floor (at the edges) that is attached to the four surrounding walls of the unit. On its surface there are five holes (S.U. 6.116 to 6.120) and a hearth (S.U. 6.121), also, there are shell pieces. The surface's color is yellow (10YR-8/6). It is from 1 to 3cm thick at the north. It has semi--compact consistency and granular texture, with malacological materials like clams, limpets, mussels and other species, ichthyologic and botanical material, few crustaceans and echinoderms.

S.U. 6.116 (Hole)

It is located 12 cm at the northeast of the S.U. 6.117, in the sub-unit 3. It is a circular hole (0.15x0.13 m) located on the surface of the floor S.U. 6.115. On its surface in grayish brown color (10YR-5/2) there are shell fragments and loose sand. It is composed by malacological and ichthyologic materials with some fire cracked stones.

S.U. 6.117 (Hole)

It is located 12 cm southeast of the S.U. 6.116, in the sub-unit 3. It is a circular hole (0.13 x 0.15 m) on the surface of the floor (S.U. 6.115). On the surface in grayish brown color (10YR-5/2) there are two angled fire cracked stones with shell pieces, mixed with loose sand. During the excavation, were identified three stones and a piece of rope made of *junco*, with five blocks of salinized clay. Inside, there are shell pieces, ichthyologic material and charred botanical material.

S.U. 6.118 (Hole)

It is in the south part of the sub-unit 7. It is a circular hole (0.12 x 0.14 m) at the surface of the floor (S.U. 6.115). The surface is brown color (10YR-5/3) loose sand. Inside, there are shell fragments, ichthyologic material and charred botanical material with gravel.

S.U. 6.119 (Hole)

It is located in the northeast corner of the sub-unit 14. It is a circular hole (0.15 x 0.14 m) on the surface of floor (S.U. 6.115). Its surface is dark gray color (2.5Y-4/1) and it composed of two angled fire cracked stones with loose sand.

S.U. 6.120 (Hole)

It is located in the southeast corner of the sub-unit 12. It is a circular hole (0.11 x 0.13 m) on the surface of the floor (S.U. 6.115). On the surface in dark gray color (2.5Y-4/1) there is loose sand. Inside, there are fragmented shell very fragmented and charred ichthyologic material and salinized sand granules.

S.U. 6.121 (Hearth)

It is located in the central part of the unit (sub-unit 13). This oval hearth is on the surface of the floor (S.U. 6.115). On the surface of very dark brown color (10YR-3/2) there are ash concretions. During the excavation were identified burn levels which were graphically recorded. It has semi--compact consistency with very fragmented and charred ichthyologic material.

S.U. 6.122 (Ash layer)

It is located in almost all the unit. This ash fill has two holes (S.U. 6.124 and 6.125) and a hearth (S.U. 6.123) on the surface. Its color is black (10YR-2/1). Its surface contains shell pieces, ichthyologic material and angled and round stones. It has semi--compact consistency; it is from 1 to 4 cm thick, being denser at the center. It is composed by malacological and ichthyologic materials, crustacean remains, fragmented echinoderms and charred botanical material.

S.U. 6.123 (Hearth)

It is located between the sub-units 14-15 and 19-20. This hearth (0.46 x 0.53 m) is on the surface of the ash layer (S.U. 6.122). On the surface in light gray color (10YR-7/1) there are two small round stones with valves of *Mesodesma donacium*. It is composed by ash with charred ichthyologic and botanical materials.

S.U. 6.124 (Hole)

It is located in the east of the sub-unit 7. It is a circular hole (0.22 x 0.18m) at the surface of the ash layer (S.U. 6.122). Its surface is olive brown color (2.5Y-4/3) with four reeds wrapped with a charred textile, they are vertically deposited at the center of the hole, 2 cm east there is an angled fire cracked stone. Inside there are malacological and ichthyologic materials with loose sand. The six angled stones that surrounded the reeds were used as wedges.

S.U. 6.125 (Hole)

It is located between the sub-units 11 and 12. It is a circular hole (0.19 m of diameter) on the surface of the ash layer (S.U. 6.122). On the surface in light brown color (7.5YR-6/3) there are

four small angled fire cracked stones with loose sand. Inside, there are four angled stones and four blocks of salinized clay. The sand has ichthyologic material with shell fragments and charred botanical material.

S.U. 6.126 (Sand layer)

It is located in almost all the unit. It is a sand layer, with loose consistency on which surface was registered a fine sand lens (6.127), a charred textile (6.129) and a hole with angled stoned (6.128). Also, there were whole and fragmented shells (clams, mussels, scallops and other species) with small angled stones. It is composed of malacological and ichthyologic materials, crustaceans, echinoderms, fragmented gourds and twined textiles.

S.U. 6.127 (Sand lens)

It is located between the sub-units 6 and 11, to the west. It is a fine sand lens with an oval shape; it is on the surface of the sand layer (6.126). On the light yellowish brown color (10YR-6/4) surface there are three medium round cobbles with shell valves, to the north. It has loose consistency and fine texture, composed of abundant malacological and ichthyologic material, and fragmented botanical material.

S.U. 6.128 (Hole)

It is located in the south part of the sub-unit 9. It is a circular hole (0.13 x 0.13m) on the surface of the sand layer (6.126). On the surface in light olive brown color (2.5Y-5/3) there are three fire cracked stones surrounded by *juncos* matted remains. It is composed of six medium angled fire

cracked stones deposited on a *junco* matted in bad preservation, in a loose sand landfill composed by malacological and ichthyologic material.

S.U. 6.129 (Charred textile)

It is located between the sub-units 9 and 14. It is a circular hole (0.16 x 0.13 m) on the surface of the sand layer (6.126). The surface color black (10YR-2/1) there are charred folded textile remains with charred botanical material.

S.U. 6.130 (Wall)

It is located in the west of the unit, in the sub-units 1, 6, 11 and 16. Its orientation is N10°E. It is attached to the Wall 6.21 outside the unit. It is on the surface of S.U. 6.178. It measure 3.22 by 0.20 by 0.40 m. It has a regular straight face with irregular masonry of one row, without plaster. The mortar is composed of pale yellow color (5Y – 7/4) clay mixed with saltgrass and *junco* fibers.

S.U. 6.131 (Floor)

It is located in almost all the unit. This floor is attached to the surrounding walls of the unit, on which surface there are holes, hearths (from S.U. 6.132 to S.U. 6.152) and a Funeral Context (S.U. 6.135/FC14). The surface has a slight upward tilt to the south, of pale yellow color (5Y-7/4). It is composed by abundant malacological and ichthyologic remains mainly *Mesodesma donacium* and *Choromytilus chorus*. These species were found on the surface of the floor, with the valves facing down. It is composed of semi--compact clay of medium texture; it is from 1 to

5 cm thick deepening to the north. Crustaceans, echinoderms, botanical material, sea cucumber and ornithological material were also found.

S.U. 6.132 (Hole)

It is located in the central part of the sub-unit 1, 62 cm northeast of the S.U. 6.133. It is a circular hole (0.22 x 0.20 m) on the surface of the floor (6.131). The surface is brown color (10YR - 5/3) and has nine small round fire cracked stones. The fill of the hole has loose consistency, composed of malacological and ichthyologic materials, crustaceans, echinoderms and charred fragmented botanical material.

S.U. 6.133 (Hole)

It is located in the north side of the sub-unit 6, 34 cm north of the S.U. 6.134. It is a circular hole (0.18m of diameter) on the surface of (6.131). Its surface is light olive brown color (2.5Y-5/4) there are shell pieces and a stone vertically deposited in the central part of the hole. Its fill is composed by loose sand, with malacological and ichthyologic materials, crustaceans, few charred botanical materials and gravel.

S.U. 6.134 (Hole)

It is located in the south side of the sub-unit 6, 36 cm south of the S.U. 6.133. It is a circular hole (0.20 x 0.18m) on the surface of the floor (6.131). Its surface is grayish brown color (2.5Y-5/2) there are two small round stones with shell fragments. Its fill is composed of loose sand, with abundant ichthyologic remains, whole and fragmented shells salinized clay granules, crustaceans, echinoderms and charred botanical material.

S.U. 6.135 (Funeral Context)

It is located in the north side of the sub-unit 11, 22 cm south of the S.U. 6.134. It is a funeral context in an oval matrix. It is a sub-adult human individual, with a bundle composed of a *junco* mat, with an orientation of N35°W. The position of the body is dorsal decubitus with the cranium facing to the northwest. The upper extremities are flexed.

The F.C. is associated to the surface of the floor (S.U. 6.131). It is cover by the following elements: a first level of clams (U.E. 6.131), with round and angled fire cracked stones, sea lion's vertebrae and a piece of charred cooked clay. A second level composed by two cut stones and finally, a third level composed by two medium round cobbles with burn evidence. The tomb fill is composed of abundant ichthyologic remains with fragmented shell.

S.U. 6.136 (Hole)

It is located in the south side of the sub-unit 11, 42 cm southwest of the S.U. 6.135. It is a semi--circular hole (0.26 x 0.34 m) on the surface of the floor (6.131). The surface is olive brown color (2.5Y-4/4) and has angled stones with blocks of salinized clay and whole valves of *Mesodesma donacium*. The hole is filled of abundant ichthyologic materials, whole and fragmented shells, blocks of salinized clay, crustaceans, echinoderms and charred botanical material.

S.U. 6.137 (Hole)

It is located in the west side of the sub-unit 21. It is a circular hole (0.23 m of diameter) on the surface of the floor (S.U. 6.131). On the surface is dark grayish brown color (2.5Y-4/2) loose sand with few malacological and botanical remains (mainly *Choromytilus chorus* and *Mesodesma donacium*). At 18 cm depth were found whole valves of shells deposited on a

fragmented *junco* mat. After that, a complete fragmented gourd (31 cm of diameter) in which there was a piece of cotton textile was found.

S.U. 6.138 (Hole)

It is located in the central part of the sub-unit 21, between the S.U. 6.137 and 6.139. It is a circular hole (0.12 m of diameter). On its surface dark olive brown color (2.5Y-3/3) is sand with remains of straw. It contains loose sand, with ichthyologic, malacological and botanical remains, finding at its base complete valves of *Mesodesma donacium*.

S.U. 6.139 (Hole)

It is located in the northeast of the sub-unit 21, next to the S.U. 6.138. It is a circular hole (0.23 m of diameter) on the surface of floor (S.U. 6.131). It is composed of loose sand in dark olive brown color (2.5Y-3/3) with malacological and botanical materials (mainly *Choromytilus chorus*). At 5 cm below a charred round cobble (0.20x 0.10 m) was found.

S.U. 6.140 (Hole)

It is located between the sub-units 16 and 17. It is an oval hole (0.35 x 0.25 m) on the surface of the floor (S.U. 6.131). It is composed of loose sand in dark olive brown color (2.5Y-3/3), with malacological and ichthyologic materials. The base of the hole is formed by a clay floor.

S.U. 6.141 (Hole)

It is located in the sub-unit 17, next to the S.U.6.140. It is a semi--circular (0.34 x 0.30 m) hole. At the center, it has a concretion of clay. Inside, it is composed of loose sand in dark brown color (7.5YR-3/2), with malacological and botanical remains (mainly *Choromytilus chorus*).

S.U. 6.142 (Hole)

It is located in the sub-unit 8, next to the S.U. 6.143 and 6.144. It is a circular hole (0.19 x 0.18 m). On its surface there are *junco* remains that form the lining of the hole. It is composed of loose sand in dark grayish brown color (10YR-4/2) with malacological and ichthyologic materials.

S.U. 6.143 (Hole)

It is located between the sub-units 8 and 9. It is an oval hole (0.33 x 0.14 m), composed of a sandy fill with loose consistency, in dark grayish brown color (10YR-4/2). It has malacological and botanical materials.

S.U. 6.144 (Hole)

It is located between the sub-units 8 and 9. It is an oval hole (0.35 x 0.24 m), composed of sand and ash with loose consistency, in dark grayish brown color (10YR-4/2). It has charred malacological and botanical materials.

S.U. 6.145 (Mat)

It is located in almost all the sub-unit 4. It is a complete fragmented *junco* mat placed on the surface of the floor (S.U. 6.131); it is about 0.60 x 0.78 m.

S.U. 6.146 (Burn area)

It is located between the sub-units 4, 9 and 13. This burn area is on the surface of the floor (6.131), next to the wall 6.20. On the surface in dark grayish brown color (10YR-4/1) there is a botanical concentration composed of *achupalla* and other plant species. It has oblong shape with sinuous edges. It is composed of ashy sand, with loose consistency. It has shell fragments, ichthyologic material, crustaceans, echinoderms and charred botanical material.

S.U. 6.147 (Hole)

It is located in the northeast corner of the sub-unit 4, between the walls 6.20 and 6.3 (Unit 6B). It is a circular hole (0.16 x 0.30 m) on the surface of the floor (6.131). On the surface in dark grayish brown color (10YR-4/1) there are whole shells, near one of the edges. Inside, it contains loose sand with whole shell valves like *Mesodesma donacium* and *Choromytilus chorus*. Also, there are ichthyologic remains.

S.U. 6.148 (Ash concentration)

It is located in the center of the unit, in the sub-unit 13. It is an ash concentration deposited on the floor (S.U. 6.131). The surface is very dark gray (2.5Y-3/1), with semi--compact consistency, finding charred malacological material. It is 2 cm thick and is composed of ash with charred malacological and botanical materials, crustaceans and ichthyologic material.

S.U. 6.149 (Hearth)

It is located between the sub-units 4 and 9. It is a hearth without lining or stones nearby. It has an oval shape (0.24 x 0.32 m), it is on the surface of the floor (6.131). On the surface in gray color (2.5Y-6/1) there are charred fragmented shells. It is composed of semi- compact ash with medium texture. It has ichthyologic and botanical materials. It is 2 to 3cm thick.

S.U. 6.150 (Hole)

It is located in the sub-unit 9, about 34cm southeast of S.U. 6.149. It is a circular hole (0.34 x 0.36 m) on the surface of floor (6.131). On the surface in olive brown color (2.5Y-4/3) there are pieces of a *junco* mat and a piece of cooked clay. The hole is surrounded by a *junco* mat very poorly preserved. At the deepest part a complete valve of *Concholepa concholepa* was found. The hole is filled of fragmented gourd with abundant ichthyologic and malacological materials, charred botanical material and other species. Under the mat, the remains of a gourd were found inside the gourd charred *achupalla* fragments were identified.

S.U. 6.151 (Hearth)

It is located between the sub-units 9 and 14, at 12 cm north of the S.U. 6.152. It is an oval hearth (0.50 x 0.44 m) on the surface of floor (6.131). On the surface in grayish brown color (10YR-5/2) there is a round cobble with charred shells and *achupalla*. It is composed of semi--compact ash with charred malacological and botanical materials. During excavation three different depositions of ash were identified, these were photographed. The third deposition is composed by ash and charred *achupalla*, taking a sample for dating. After the excavation of the three levels 47 angled and round fire cracked stones were found.

S.U. 6.152 (Hearth)

It is located in the south side of the sub-unit 14, at 12 cm south of the S.U. 6.151. It is an oval hearth (0.35 x 0.37 m) on the surface of the floor (6.131). On the surface in gray color (2.5Y-5/1) shell valves (*Mesodesma donacium*) with charred botanical material were found. It is composed of semi--compact ash with charred malacological and ichthyologic materials. Inside the hearth and in the east side was found a concentration of small round stones with ash and charred *achupalla*, taking a sample for dating.

S.U. 6.153 (Floor)

It is located toward the ends of the unit, associated to the surrounding walls. It is a clay floor that is attached to the four walls of the Unit. It has a homogeneous and fragmented surface, being the south side the higher. On its surface in olive gray color (5Y-4/2) there are valves of *Mesodesma donacium* and *Choromytilus chorus*. Also, it has botanical material (like cotton seeds, guava and charred *achupalla*), crustaceans, echinoderms, sea cucumber and ornithological material.

S.U. 6.154 (Floor)

It is located in the southeast of the unit. It is a fragmented floor. Its surface in dark gray color (2.5Y-4/1) has a slope to the north and shells (mainly *Choromytilus chorus*). It is 1 to 3 cm thick, with shell fragments, ichthyologic and ornithological materials, crustaceans, botanical material, echinoderms and other species. It has semi--compact consistency and medium texture.

S.U. 6.155 (Floor)

It is located in the north side of the unit, in the sub-units 1, 2, 3, 4, 6, 7, 8, 11, 12 and 13. It is an incomplete floor with a compact surface and shell valves. Its color is dark gray (10YR-4/1). The floor has a slope to the northwest. It has a semi--compact consistency, composed by granular clay with shell fragments (mainly *Choromytilus chorus* and *Mesodesma donacium*), ichthyologic material, crustaceans, sea cucumber, and charred botanical material (*achupalla*, cotton and guava seeds). It is 1 to 3 cm thick.

S.U. 6.156 (Burn area)

It is located in the central part of the sub-unit 18. It is an oval burn area (0.74 x 0.82 m) on the surface of the S.U. 6.155. Its irregular surface has a slope to the central part; there are charred malacological and botanical materials. Its color is dark gray (5YR-4/1). During the excavation was identified a central part where there is a great concentration of ash; its outer edge is very compact and is composed by ash with botanical remains. This compaction is because of the salinization of the burning remains.

S.U. 6.157 (Floor)

It is located in the south of the unit. It is a floor of clay that has three complete fragmented gourds (6.158, 6.162, and 6.163) and four holes (6.159, 6.160, 6.161, and 6.164) and shell remains on the surface. It has semi--compact consistency from 1 to 2 cm thick. It has a lot of malacological and ichthyologic materials, botanical material (cotton seeds, guava and other species), crustaceans and echinoderms.

S.U. 6.158 (Gourd)

It is located in the west side of the sub-unit 16, at 2 cm northeast of the S.U. 6.159 beside to the wall 6.130. It is a complete fragmented gourd (0.16 x 0.10 m) on the surface of the floor (S.U. 6.157). It has a sandy fill, with loose consistency, in grayish brown color (2.5Y-5/1), with shell fragments on the surface. Inside it contains abundant ichthyologic materials, shell fragments, botanical material, and two round fire cracked stones.

S.U. 6.159 (Accumulation of shells)

It is located in the west side of the sub-unit 16, 2cm southeast of the S.U. 6.158. It is an accumulation of shells with small fire cracked stones, apparently wrapped with a piece of textile in poorly preserved. The identified shells are *Argopecten purpuratus*, *Choromytilus chorus* and *Mesodesma donacium*. The fill is composed of loose sand in brown color (10YR-4/3), with abundant ichthyologic materials. Also, two valves of scallop were found.

S.U. 6.160 (Posthole)

It is located between the sub-units 17 and 18. It is a circular hole (0.15 x 0.14 m) on the surface of the floor (S.U. 6.157). On the surface in very dark grayish brown color (10YR-3/2) there are shell fragments. The fill is composed of loose sand with malacological and ichthyologic materials.

S.U. 6.161 (Posthole)

It is located in the southwest corner of the sub-unit 23, 4cm of the wall 6.21. It is a semi--circular hole (0.15 x 0.17 m) on the surface of the floor (S.U. 6.157). On the surface in dark olive brown

color (2.5Y-5/3) there are shell fragments. Its filling is composed of loose sand with ichthyologic material and shell fragments. At a height of -0.58 cm (0.09 cm from the surface) two valves of *Mesodesma donacium* were found. After that more complete shell valves mixed with sand were found.

S.U. 6.162 (Gourd)

It is located in sub-units 18 and 19. It is a complete fragmented gourd (0.11 x 0.12 m) on the surface of the floor (S.U. 6.157). The fill is composed by fine loose sand in light olive brown color (2.5Y-5/3). The gourd corresponds to a flat-bottomed bowl without incision or decoration. Inside, there is sand with shell pieces and ichthyologic material.

S.U. 6.163 (Posthole)

It is located between the sub-units 24 and 25. It is a semi--circular hole (0.18 x 0.17 m) on the surface of the floor (S.U. 6.157). Inside, there is a very fragmented and complete gourd. It is filled of loose sand in light olive brown color (2.5Y - 5/3), with ichthyologic material, shell fragments and few botanical materials.

S.U. 6.164 (Posthole)

It is located between the sub-units 16 and 21. It is a semi--circular hole (0.20 x 0.25m) on the surface of the floor (S.U. 6.157). On the surface in dark grayish brown color (10YR - 4/3) there are shell fragments with a fire cracked stone at the center. Inside, there is loose sand with malacological and ichthyologic materials and fire cracked stones.

S.U. 6.165 (Floor)

It is located in almost all the unit, except in the sub-units 1, 2, 3 and 4. It is a clay floor that has a surface in grayish brown color (10YR-5/2), where there are shells (*Choromytilus chorus*) and post holes registered as the S.U. 6.166 to 6.175 which define a semi- circular pattern. In the south side of the unit was left a witness of 3 x 3m. From this S.U. was done the excavation in the north and west side of the unit, in an area of 2 x 5m.

S.U. 6.166 (Hole)

It is located between the sub-units 1, 2, 6 and 7. It is a circular hole (0.14 m of diameter) on the surface of the floor (S.U. 6.165). The surface, in dark olive brown color (2.5Y-4/2), is composed of loose sand. Inside, it contains shell pieces and ichthyologic material.

S.U. 6.167 (Hole)

It is located in the west side of the sub-unit 7. It is a semi--circular hole (0.14 x 0.16 m) on the surface of the floor (S.U. 6.165). On the surface, in grayish brown color (2.5Y-5/2), there is fine loose sand with shell pieces. The hole contains sand with abundant ichthyologic, malacological and botanical materials (willow remains, *junco* and other species). Four reeds wrapped with a twined textile were also found. These reeds were associated to valves of *Mesodesma donacium*, located around the reeds and partially covered by a twined textile.

S.U. 6.168 (Hole)

It is located between the sub-units 11 and 12. It is a semi--circular hole (0.18 x 0.21m) on the surface of the floor (S.U. 6.165). On the surface in grayish brown color (2.5Y - 5/2) there is fine

loose sand with very fragmented botanical remains. Inside, there is sand with ichthyologic material, few shell fragments and botanical material.

S.U. 6.169 (Hole)

It is located in the northwest side of the sub-unit 12, between the S.U. 6.168 and 6.170. It is a circular hole (0.19 m of diameter) on the surface of the floor (S.U. 6.165). It contains loose consistency sand, in grayish brown color (2.5Y - 5/2), without cultural remains on the surface. Inside, there is loose sand with malacological and ichthyologic materials and fragmented plant remains. It has a conical shape, being oriented to the northwest, it was of 31cm depth.

S.U. 6.170 (Hole)

It is located in the center of the sub-unit 12, 21cm south of the S.U. 6.169. It is a hole (0.21 x 0.20 m) on the surface of the floor (S.U. 6.165). On the surface in dark grayish brown color (10YR - 5/1) there is loose sand with shell fragments. Inside it contains sand with malacological and ichthyologic materials, finding at 20cm below surface, a mat of willow and *junco*.

S.U. 6.171 (Hole)

It is located in the central part of the sub-unit 24. It is a circular hole (0.22 m of diameter) on the surface of the floor (S.U. 6.165). On the surface in grayish brown color (2.5Y - 5/2) there is loose sand. Inside, it contains loose sand with abundant ichthyologic materials and shell fragments. At 15cm below the surface and surrounding the inner wall of the hole, the remains of a mat of *junco* was found.

S.U. 6.172 (Hole)

It is located in the north side of the sub-unit 13, between the S.U. 6.173 and 6.174. It is a semi-circular hole (0.26 x 0.28 m) on the surface of the floor (S.U. 6.165). On the surface in dark grayish brown color (10YR - 4/2) there are small angled fire cracked stones with some valves of *Choromytilus chorus*. Inside it contains loose sand with ichthyologic material, shell fragments, fire cracked stones, fragmented gourds and botanical material. In the west side of the hole a round cobble vertically placed was found.

S.U. 6.173 (Hole)

It is located in the northwest corner of the sub-unit 14, northern the S.U. 6.172. It is an oval hole (0.30 x 0.14 m) on the surface of the floor (S.U. 6.165). On the surface in grayish brown color (2.5Y-5/2) there is sand with straw and shell pieces. Inside loose sand with ichthyologic material, whole and fragmented shells, crustaceans and botanical material.

S.U. 6.174 (Hole)

It is located in the southeast corner of the sub-unit 13. It is a semi-circular hole (0.18 x 0.16 m) on the surface of the floor (S.U. 6.165). On the surface in dark gray color (2.5Y - 4/1) there is loose sand. Inside it contains loose sand, malacological and ichthyologic material.

S.U. 6.175 (Hole)

It is located between the sub-units 9 and 10. It is an oval hole (0.21 x 0.13 m) on the surface of the floor (S.U. 6.165). On the surface in grayish brown color (2.5Y-5/2) there is loose sand with

straw. Inside it contains a sandy matrix with malacological and ichthyologic remains. A complete skeleton of a bird was found. It was not possible to identify the specie.

S.U. 6.176 (Ash layer)

It is located in the south side of the unit, in the sub-units 12, 16, 17, 21 and 22. It is an irregular sand layer: its surface has a slope to the north. Its color is very dark gray (2.5Y - 3/1) with botanical material and charred fragmented shells. It has semi--compact consistency; it is 1 to 2 cm thick. It is composed of malacological material (mainly *Choromytilus chorus*), ichthyologic (fish bones) and botanical materials (cotton and guava seeds).

S.U. 6.177 (Floor)

It is located in the south side of the unit, in the sub-units 12, 16, 17, 21 and 22. It is a clay floor with a surface in dark grayish brown color (10YR - 4/2) and fragmentes shells (mainly *Choromytilus chorus*), being the south side the higher. It has semi--compact consistency with malacological, ichthyologic and botanical materials (charred *achupalla* and guava seeds).

S.U. 6.178 (Floor)

It is located in almost all the unit, going to the east of the unit. It has a homogeneous surface with a mild slope to the north. On the surface in very dark grayish color (10YR-3/1) there are shell fragments. It has holes recorded as S.U. 6.179 to 6.194; most of them are in the north side. It is composed by malacological material (mainly *Mesodesma donacium*), ichthyologic material, crustaceans, sea cucumber, gourd fragment, botanical material (cotton seeds, guava, and charred *achupalla*), fragmented ornithological material, lithic artifacts and textile remains.

S.U. 6.179 (Hole)

It is located in the northwest corner of the sub-unit 22. It is a circular hole (0.12 x 0.19 m) on the surface in grayish brown color (2.5Y - 4/2), where there is loose sand with shell fragments. It has loose consistency with malacological and ichthyologic materials. At 18 cm from its surface six reeds wrapped with textiles and surrounded by valves of clams (*Mesodesma donacium*) were found. The reeds are about 0.16 x 0.03m.

S.U. 6.180 (Hole)

It is located in the south side of the sub-unit 17, 17cm east of the S.U. 6.181. It is a semi--circular hole (0.18 x 0.14 m) on the surface of the floor (S.U. 6.178). On the surface in grayish brown color (2.5Y - 4/2) there are small round fire cracked stones with loose sand and shell fragments. Inside, it is composed of fine loose sand with ichthyologic material and whole and fragmented shells.

S.U. 6.181 (Hole)

It is located in the south corner of the sub-units 16 and 17. It is a semi--circular hole (0.18 x 0.15 m) on the surface of the floor (S.U. 6.178). On the surface in dark grayish brown color (2.5Y - 4/2) there are botanical material (straw) and shell fragments. Inside it contains sand with loose consistency. It has malacological and ichthyologic materials, small round fire cracked stones and botanical material (wood, willow and very fragmented *junco*).

S.U. 6.182 (Clay)

It is located between the S.U. 6.179, 6.180, 6.181 and 6.183, in the center of sub-unit 18. It is an oval compaction (0.44 x 0.50 m) on the surface of the floor S.U. 6.178. It has an irregular surface with a slope to the west; it is pale yellow (5Y - 7/3) with charcoal remains and shell fragments. It is composed of compact granular clay. It contains gravel, malacological, ichthyologic and charred botanical materials (mainly *Tillandsia sp.*).

S.U. 6.183 (Hole)

It is located in the south side of sub-unit 11. It is a semi--circular hole (0.15 x 0.14 m) on the surface of the floor (S.U. 6.178). On the surface in grayish brown color (2.5Y-5/2) there is sand with shell fragments. Inside, it has a sandy landfill with loose consistency. It has ichthyologic and botanical materials (cotton seeds, guava, *junco* remains and willow).

S.U. 6.184 (Hole)

It is located in the west side of the sub-unit 11. It is a semi--circular hole (0.15 x 0.14 m) on the surface of the floor (S.U. 6.178). On the surface in grayish brown color (10YR – 5/2) there are shell fragments. Inside, it contains loose sand with ichthyologic and malacological materials.

S.U. 6.185 (Hole)

It is located between the sub-units 1 and 2, northward. It is a semi--circular hole (0.21 x 0.23 m) on the surface of the floor (S.U. 6.178). On the surface in dark gray color (10YR-3/1) there are few plant remains. Inside, it contains loose sand with ichthyologic and malacological materials, straw remains and other botanical materials.

S.U. 6.186 (Hole)

It is located in the west side of the sub-unit 2, 9cm of the S.U. 6.185. It is a semi-- circular hole (0.21 x 0.23 m) on the surface of the floor (S.U. 6.178). On the surface in dark gray color (7.5YR - 4/1) there is sand with few plant remains. Inside, it contains loose sand with ichthyologic, malacological and botanical materials.

S.U. 6.187 (Hole)

It is located in the south side of the sub-unit 2. It is a circular hole (0.12 m of diameter) on the surface of the floor (S.U. 6.178). On the surface in dark gray color (2.5Y - 4/1) there is a fire cracked stone with valves of *Mesodesma donacium*. Inside, it has loose sand with ichthyologic material and shell fragments. On the other hand, 3cm from the surface was found an oval stone (0.13 x 0.18 x 0.22m) that was photographed.

S.U. 6.188 (Hole)

It is located between the sub-units 2 and 3. It is a semi- circular hole (0.12 x 0.11 m) on the surface of the floor (S.U. 6.178). On the surface in dark grayish brown color (2.5Y – 3/2) there are two angled fire cracked stones vertically deposited. Inside, it is composed by ichthyologic and botanical materials and shell fragments.

S.U. 6.189 (Hole)

It is located in the center of the sub-unit 3. It is a semi- circular hole (0.23 x 0.20 m) on the surface of the floor (S.U. 6.178). On the surface in black color (10YR-2/1) there is a round fire

cracked stone. Inside, it is composed by loose sand with ichthyologic and botanical materials (straw) and shell fragments.

S.U. 6.190 (Hole)

It is located in the south side of the sub-unit 4, 10cm east of the S.U. 6.192. It is an oval hole (0.34 x 0.26 m) on the surface of the floor (S.U. 6.178). On the surface in very dark gray color (2.5Y – 3/1) there are valves of *Mesodesma donacium*. Inside, contains loose sand with malacological and ichthyologic materials. It is 9 cm depth, showing a compact base as the other excavated holes.

S.U. 6.191 (Hole)

It is located in the northeast corner of the sub-unit 4, 30 cm north of the S.U. 6.192. It is associated to the base of wall 6.20. It is a circular hole (0.14 m of diameter) on the surface of the floor (S.U. 6.178). On the surface in dark gray color (10YR-4/1) there is sand with straw. Inside, it contains loose sand with malacological and ichthyologic materials, *junco* remains and other botanical materials.

S.U. 6.192 (Hole)

It is located in the east side of the sub-unit 4, at 30 cm from S.U. 6.191 and 20 cm west of the S.U. 6.190. It is associated to the base of wall 6.20. It is a circular hole (0.14 m of diameter) on the surface of the floor (S.U. 6.178). On the surface in dark gray color (10YR-4/1) there is sand with straw. Inside, it is composed by loose sand with malacological and ichthyologic materials and *junco* remains.

S.U. 6.193 (Hole)

It is located in the north side of the sub-unit 6. It is a semi--circular hole (0.15 x 0.11 m) on the surface of the floor (S.U. 6.178). On the surface in brown color (10YR-5/3) there are shell fragments. Inside, it contains loose sand with malacological, ichthyologic and botanical materials. It is 6cm depth.

S.U. 6.194 (Hole)

It is located in the east side of the sub-unit 12. It is an oval hole (0.12 x 0.10 m) on the surface of the floor (S.U. 6.178). On the surface in gray color (7.5YR-5/1) there is sand with straw. Inside, it is composed by loose sand with malacological and ichthyologic materials, small angled fire cracked stones and botanical material (mainly cotton seeds).

S.U. 6.195 (Floor)

It is located in the sub-units 6, 7, 8, 11, 12, 17 and 22. It has a clay fragments in a dark brown color (10YR-3/2) surface with undulations, being the south side the highest. It has compact consistency with malacological and ichthyologic materials (mainly *Mesodesma donacium*). Also, charred botanical materials (cotton seeds, guava seeds, *achupalla*, *junco* remains and other species), crustaceans and sea cucumber remains were found.

S.U. 6.196 (Sand layer)

It is located in almost all the unit, except in the sub-units 1, 2, 3 and 4 from east to west. It is composed of loose sand in brown color (10YR-5/3). The surface has a gentle slope to the west, finding shell fragments, *junco* and reed remains. Within it malacological, botanical materials

(*achupalla*, cotton seeds, guava, *junco*, willow, large reed and other species), ichthyologic material, crustaceans, and echinoderms remains were found.

S.U. 6.197 (Ash layer)

It is located in the north and west sides of the unit, in the sub-units 1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 16 and 21. It is composed of ash and sand, finding on the surface in dark gray color (10YR-4/1) shell fragments with straw remains and holes associated to the upper levels. It has a slope to the west. It has a semi--compact consistency and is 1 to 7 cm thick (in the west side). This layer goes under the wall 6.130. It contains malacological and ichthyologic materials.

S.U. 6.198 (Compact surface)

It is located in the north side of the unit, in the sub-units 1, 2, 3 and 4. It has a compact surface composed of ash, showing an inclination to the west. Its surface is color dark gray (10YR- 4/1). The excavations were done in an area of 1x1 m to define the continuation of the floor (S.U. 6.228) that extends to the west and north sides of the unit. It has semi--compact consistency and medium texture, with malacological and botanical materials (guava seeds, *achupalla* and other charred remains). Mainly were found clams (*Mesodesma donacium*). Also, were found ichthyologic material, crustaceans and echinoderms.

S.U. 6.199 (Floor)

It is located in the sub-units 12, 16, 17, 21 and 22, going to the east and south under the wall (6.21). It is composed of clay color pale yellow (5Y-7/4). The surface is deteriorated with cracks and depressions in the central part it also has a slope to the north. On the surface it contains shell

fragments and three associated elements (S.U. 6.200, 6.201, 6.202). It is 2 to 4 cm thick and has compact consistency and medium texture. It presents whole and fragmented shells (mainly *Mesodesma donacium*), ichthyologic and botanical materials (*achupalla*, cotton seeds, guava), crustaceans and echinoderms.

S.U. 6.200 (Hole)

It is located between the sub-units 11 and 12. It is a semi--circular hole (0.24x0.22 m) that has a *junco* mat. First cleaning was done to identify any type of twined element. Unfortunately, it could not be possible any identification. The *junco* mat was removed and the hole excavated.

S.U. 6.201 (Mat)

It is located in the sub-unit 21, 25 cm southeast of the S.U.6.202. It is a *junco* mat with reed and large reed remains beside it; it is located over the floor (S.U. 6.199) with an area of 0.33 x 0.34 m. The mat is poorly preserved and is completely salinized. Under the mat were found two complete fragmented gourds and wrapped *junco*.

S.U. 6.202 (Gourd)

It is located in the west side of the sub-unit 21 near wall (6.130). It is composed by a fragmented gourd in which valves of *Mesodesma donacium* were found; under it a willow mat and fragmented *junco* mat with bone remains of a rodent were also found.

S.U. 6.203 (Ash layer)

It is located in the sub-units 11, 12, 16, 17, 21 and 22, going out of the unit to the east, south and west sides. It is an ash deposition with a surface in very dark gray color (10YR-3/1), where there are shells and charred botanical material. It has an irregular shape, being incomplete in the west side. It is 1 to 5 cm thick. It has semi--compact consistency with malacological and charred botanical materials; it also contains angled fire cracked stones, crustaceans and charred echinoderms.

S.U. 6.204 (Sand layer)

It is located in the west and east sides of the unit, excavating an area of 2 x 3 m, in the sub-units 11, 12, 16, 17, 21 and 22. It is a sandy layer with a surface in olive brown color (2.5Y-4/4), where the S.U. 6.205 to 6.209 area located. It has loose consistency and fine texture, with malacological material (mainly *Choromytilus chorus* and *Mesodesma donacium*), ichthyologic and botanical materials (cotton seeds, guava, willow and *junco*), crustaceans, echinoderms and bone remains.

S.U. 6.205 (Concentration of stones)

It is located in the south side of the sub-unit 4. It has a semi--circular shape (0.22 x 0.25 m), it is on the surface of the S.U. 6.204. It is composed by a concentration of round fire cracked stones wrapped with a twined textile made of cotton; also there are shells (*Fisurella* sp., *Concholepa concholepa*, *Mesodesma donacium* and other species). Inside it contains loose sand color dark brown (7.5YR-3/3). It has shell fragments and ichthyologic remains. Also, a fragmented gourd with two fire cracked stones was found.

S.U. 6.206 (Concentration of shells)

It is located between the sub-units 6, 7, 11 and 12. It is an accumulation shells surrounding a big round cobble. It is on the surface of S.U. 6.204 occupying in an area of 0.28 x 0.22 m, with valves of *Mesodesma donacium*, willow leaves and branches and a fragmented gourd. These elements were partially covered by sand of color light olive brown (2.5Y - 5/4), with small angled fire cracked stone. Under this sand a medium round cobble (0.14x0.15x0.25 m) was found.

S.U. 6.207 (Concentration of stones)

It is located in the central part of the sub-unit 11. It is a semi- circular concentration of fire cracked stones (0.30 x 0.37 m). It is covered by sand and ash in dark olive brown color (2.5Y- 3/3). It was excavated in blocks.

S.U. 6.208 (Concentration of shells)

It is located in the northwest of the sub-unit 17. It is a concentration of shells (*Mesodesma donacium*) with fire cracked stones and *juncos* remains surrounding the shells.

S.U. 6.209 (Gourd)

It is located in the sub-unit 22. It is a complete fragmented gourd (0.18 x 0.10 m) on the surface of the S.U. 6.204. It has cotton fibers on the surface. The gourd was deposited facing down, covered by sandy accumulations containing malacological and ichthyologic remains.

S.U. 6.210 (Compact surface – No excavated)

It is located in almost all the 2x3 m survey. It is a compact surface composed by ash; on its surface there are holes with midden remains and possible post holes (S.U. 6.211 to 6.227). This S.U. goes out the excavation unit.

S.U. 6.211 (Willow mat)

It is located in the sub-units 12 and 17. It is a circular willow mat (0.68 cm of diameter) on the surface of floor S.U. 6.210. It is covered by sand color dark gray (10YR-4/1), mixed with ash, abundant charred fragmented shells, ichthyologic remains and some fire cracked stones. The sand is 3 cm thick. The willow matted was tied with *junco* divided in 6 pieces, placed one above the other.

UNIT 6B

Location:

UTM Coordinates: NW Corner: 8'761,769N / 217,598E

Datum: PSAD56 NE Corner: 8'761,796N / 217,603E


SW Corner: 8'761,791N / 217,598E

SE Corner: 8'761,791N / 217,603E

Unit Description:

The Unit 6B is the northern expansion of Unit 6A and has an area of 25 m² (5 x 5 m). For recording purposes the unit was divided in 1 x 1 m sub-units numbered from 1 to 25. The unit presents a homogenous surface with the presence of a cobble alignment located on its E side. The entire surface is covered with modern debris.

The excavation was done in two field seasons the first one from November 2005 to June 2006 and the second one from January 2007 to July 2007. A total of 139 stratigraphic units were recorded.



1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Sub-units of Unit 6B

Description of the Stratigraphic Units:

S.U. 6.1: Surface

Composed of loose sand and fine gravel extends over the entire unit. Its color is 2.5Y 4/2 grayish dark brown. The surface presents modern debris product of the activities of the modern population mixed with archaeological remains, mainly fragmented shell.

The excavation of the surface took place in two moments, first 2 x 5 m was excavated and second a 3 x 5 m was excavated uncovering the 5 x 5 m unit. In the 3 x 5 m areas was heavily disturbed by modern occupation, apparently a modern shack and stall was built on that area. The excavation removed all the disturbed material until undisturbed layers were found.

S.U. 6.2: Ash layer

Elongated layer of ash located in the sub-units 14, 19, 22, 23 and 24 with a descendant surface in its north side that is associated with the stone wall E (S.U. 6.5). The ash layer contains abundant burned shell fragments. Other cultural remains present are burned fish bones and plant remains. In sub-unit 24 the ash deepens but in this area the layer is disturbed by modern occupation, a modern eucalyptus post affected the layer and the south stone wall (6.3).

S.U. 6.3: Stone wall

The wall is located in the south side of the unit within the sub-units 21, 22, and 23 and presents a S 15° W orientation. The wall has 3.72 m long, 0.40 m wide and 0.10 m high; its E and W corners are much deteriorated. The west side of this wall attaches to the wall 6.5. No evidence of its base were found but it was sealed by a clay surface recorded as S.U. 6.33. The wall itself presents a regular double face with and an irregular masonry composed of a double line of

cobbles. The mortar is composed mainly of clay color 5Y 7/4 (pale yellow) with inclusions of salt grass and *junco*.

S.U. 6.4: Floor

Located in sub-units 15, 20 and 25 is a compact clay floor. The floor presents an evenly salt crust on its surface. The floor color is 2.5Y 4/2 (dark grayish brown), no cultural remains are present in its surface. This floor is associated with the upper edge of the east stone wall (6.5).

S.U. 6.5: Stone wall

This wall is located in the E side of the unit in sub-units 15, 20 and 25; measures 2.88 m long, 0.50 m wide and 0.30 m high and have an orientation of N 10° W. This wall is the continuation of the wall excavated at the Unit 6A (S.U. 6.20) belonging to contention wall of the platform excavated in this unit. The wall has an irregular masonry of cobbles and angular stone. No evidence of plaster was found. The platform corner within the Unit is a big angular stone placed vertically. The mortar is composed of clay color 5Y 7/4 (pale yellow) with inclusions of salt grass, *junco* and fragmented shell.

S.U. 6.6: Ash and sand layer

Semi--compact layer composed of ash and sand that extent through the sub-units 5, 10, 15, and 20. The layer contains fragmented shell, charcoal and botanical remains. The layer color is 10YR 8/3 (very dark gray).

S.U. 6.7: Ash layer

A semi--compact layer composed of ash of irregular surface with a decreasing slope to the N. The layer extends over almost all the Unit and concentrates in sub-units 11, 16, 17, 21, 22 and 23. The layer contains mainly fish bones and mollusks shell mainly *Crepidatella sp.*, *Aulacomya ater* and *Choromytilus chorus*. During the sieve of the layer a fragment of a bone flute was recovered. The flute of bird bone is 7 cm long and presents two holes.

S.U. 6.8: Ash

Semi--compact layer composed of ash, charcoal and sand of regular surface and irregular shape that extends into the sub-units 11, 12, 16, 17, 21, and 22. The color is 5YR 2.5/1 black. The layer contains carbonized fragmented shell, fish bones and plants. Fire cracked stones were also identified within the layer.

S.U. 6.9: Lens

Semi--circular lens composed of semi- compact ash; it is located in sub-units 16 and 21. Their dimensions are 41 x 24 cm and presents a surface color 7.5YR 4/1 dark gray. The lens contains fragmented carbonize cultural materials as the previous S.U.; two small angular stones were recovered. Because of its small size and extension could be considered as part of the S.U. 8 as the only difference is its color.

S.U. 6.10: Hearth

An ellipsoid shaped hearth located in the SE side of the sub-unit 21. The hearth is very near the south edge of the Unit. The hearth surface is color 10YR 3/2 very dark brown and is composed

of compact ash. Within the ash small fragments of shell are present. This hearth is associated to the S.U. 6.62 of the Unit 6A.

S.U. 6.11: Pit

Circular pit of 26 x 24 cm located in the SW side of the sub-unit 16. Its surface is color 7.5YR 4/3 brown and is composed of loose sand that contains very fragmented shell and few botanical remains, mainly *Tillandsia sp.* and *Psidium guayaba* seeds. The pit cut across the S.U. 6.8.

S.U. 6.12: Pit

Semi--circular pit of 62 x 44 cm located in the south side of the sub-unit 21. The pit presents an irregular surface composed of sand color 7YR 3/2 dark brown. The pit contains very fragmented shell and few fragmented plant remains.

S.U. 6.13: Sand layer

Loose layer composed of sand located in the SW corner of the Unit in sub-units 16,17, 21, and 22. The layer present an homogenous surface color 2.5YR 6/4 light yellowish brown with two big stones on its surface (sub-unit 21). The layer contains fragmented shell, remains of willow (*Salix sp.*), cotton seed, *guayaba* seed, and fish bones.

S.U. 6.14: Offering?

Six small wood sticks placed over fragmented twined cotton textiles, appears the sticks were tied with a fine cotton thread. The offering is located the east side of the Unit in the central part of the sub-unit 20. The wood and the textiles are in regular preservation.

S.U. 6.15: Offering?

In the same sub-unit 20 at 30 cm N of the S.U. 6.14 we found a similar offering composed of eight small wood sticks over fragmented twined cotton textiles. Fine cotton thread joins together the sticks. The sticks and the textiles are in very bad preservation and disintegrated in contact.

S.U. 6.16: Construction filling

It is composed of small and medium angular fire cracked stones mixed with ash presenting a color 2.5Y 3/1 very dark gray. It is located in the E side of the unit and is related to the stone wall 6.5 and was not excavated.

S.U. 6.17: Lens

The lens contains semi-compact sand and silt and is located in the sub-unit 25. The lens color is 10YR 4/4 dark yellowish brown. The lens contains fragmented shell and plants. It was not excavated.

S.U. 6.18: Floor

Clay floor of irregular shape located in the sub-units 2 and 3 has an irregular surface containing fragmented shell and a small cobble. Its color is 2.5Y 5/2 grayish brown. The floor has a thickness of 2 cm and only a small portion is preserved as it has been disturbed by later occupations.

S.U. 6.19: Floor

This clay floor is located in the northern side of the Unit in sub-units 1, 2 and 3. Has an irregular shape with carbonized fragmented shell, fish bones, charcoal and dispersed plant remains in its surface. Its color is 10YR 3/1 very dark gray. The floor is only present in this part of the unit being affected by later occupations.

S.U. 6.20: Floor

This floor is composed of clay and sand and is found in sub-units 1, 2, 3, 6 and 7. Its color is 2.5Y 5/2 grayish brown and present in its surface fragmented shell and plant remains. It present similar characteristics as the two previous floors described.

S.U. 6.21: Floor

Clay floor located in the NW part of the unit in the sub-units 1, 2, 3, 4, 6, 7, 8, 11, 12 and 13. The floor presents a regular surface with fragmented *Mesodesma* shell and a color 5Y 4/1 dark gray. During excavation a circular shell bead was found. The bead had a diameter of 0.5 cm and disintegrated in contact.

S.U. 6.22: Floor

This floor is located in the north central area of the Unit in sub-units 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, and 13. It is composed of clay and sand and its surface shell fragments of *Mesodesma donacium*, *Crepipatella sp.* and *Choromytilus chorus* were found; its color is 5Y 3/1 very dark gray. Two small stone beads were recovered during excavation of the floor. The first one has a

quadrangular shape with round corners; color light green of lustrous surface, appear to be turquoise. The second one has a round shape and has a light brown color.

S.U. 6.23: Concentration of animal bones

Several animal bones concentrated in the NW side of the unit in the sub-units 1 and 6. The bones belong to Otariidae (sea lions) and are within a silt layer color 5Y 3/2 dark olive gray. To the south of these bones a big circular stones appears to be part of the context. Excavation found floor 6.22 beneath the context.

S.U. 6.24: Lens

Semi-compact lens composed of ash and sand located in the center of the Unit. Present an elongated shape; containing carbonized fragmented shell (mainly *Mesodesma donacium* and *Choromytilus chorus*). Its color is 7.5R 3/1 very dark gray.

S.U. 6.25: Sand layer

The layer composed of semi-compact sand is located in the sub-units 2, 3, 7, 8, 12, 13, 14, 17, 18, 22 and 23. Its color is 2.5Y 4/2 very dark grayish brown. The layer is deposited irregularly in the central part of the unit; in its south side it deepens while in the north side it becomes more compact. A lithic artifact, a biface point, a fragment of twined cotton textile and a fragment of *junco* mat were recovered from this layer during excavation.

S.U. 6.26: Ash layer

Semi-compact layer of ash that extends in the sub-units 1, 2, 6, 7, 11, 12, 16, 17, 21 and 22. The layer extends in an irregular way containing very fragmented shell, fragments of *junco*, and fish bones, some of them with burning marks. Its color is 10YR 3/1 very dark gray.

S.U. 6.27: Ash layer

Very dense layer of ash and charcoal located in the sub-units 2, 3, 4, 5, 7, 8, 9 and 10 of the Unit. This semi-compact ash layer presents a surface with an inclination towards the W; its color is 2.5Y 2.5/1 black. The layer contains abundant cultural remains fragmented carbonized shell, fish bones, animal bones, birds feathers, plant remains (cotton seeds, *guayaba* seeds, *aji* seeds, fragments of *Tillandsia sp.* among others). During excavation stone artifacts and weights were recovered from this layer.

From the deposition of this ash layer it appears to be filling the platform external remodeling. The same layer extends outside the unit to the stone platform extends.

S.U. 6.28: Lens

Irregular shaped lens composed of loose sand located in the south side of the Unit in the sub-units 22, 23, 17, 18, 19 and 13. Its surface is color 10YR 5/4 yellowish brown and presents a decreasing northern inclination. Two big stones were found one of them located in sub-unit 19 is over smaller fire cracked stones. The lens contains dispersed fragments of shell and *junco*. Within this lens two fragments of unbaked clay were found.

S.U. 6.29: Lens

An oblong semi-compact sand and ash lens located in the SW side of the unit in the sub-units 17 and 22. Its color is 2.5Y 4/1 dark gray. The lens contains complete and fragmented shell, botanical remains and small angular stones. The lens is associated to the covering of the south stone wall (6.3) and the floor 6.30.

S.U. 6.30: Floor

Clay floor located in the SE side of the Unit in the sub-units 17, 18, 19, 21 and 22. The floor presents an homogenous surface with irregular borders, complete and fragmented shell mainly of *Mesodesma d.* and *Choromytilus ch.* Its color is 2.5Y 6/2 light grayish brown. During excavation a bone and three wood small artifacts were recovered.

S.U. 6.31: Lens

Lens of irregular texture composed of an accumulation of fire cracked stones located in the sub-units 1 and 6. Its color is 2.5Y 3/2 dark grayish brown. The rocks appear to be placed in a circular shape; the lens also contains fragmented shell, fish bones and cotton threads within the stones.

S.U. 6.32: Pit

Pit of circular shape with a diameter of 22 cm, located in the SW side of the Unit in the sub-unit 16. In its surface we found 2 fire cracked stones. The pit contains loose sand and few cultural remains (burned fragmented shell and plants); the color is 2.5Y 4/2 grayish brown.

S.U. 6.33: Floor

Compact clay floor with an homogenous surface that extends to the entire Unit. The floor presents a slightly decreasing slope to the north. The floor surface color varies from 2.5Y 5/2 grayish brown to 10YR 4/1 dark gray. Concentrations of mollusk shells, mainly *Choromytilus ch.*, were found over the floor in particularly towards its W side. During excavation the floor contained abundant fragmented *Choromytilus ch.* shells and plant seeds (cotton and *guayaba*).

This floor is related to the closure of the wall 6.3 sealing the wall related occupation and appears to be the latest of a series of clay floors associated to the stone wall located in sub-units 2, 7, 12 and 17, and the W side of the unit. A 1 x 5 m area of this floor was left unexcavated.

S.U. 6.34: Ash lens

Compact lens composed of ash of irregular shape and an inclined surface. It is located in sub-units 2 and 7. The color of the surface is 10YR 3/1 dark gray. During excavation shell fragments, plant remains and cotton threads were recovered. This lens is located immediately below floor 6.33 and over floor 6.35.

S.U. 6.35: Floor

Compact clay floor located in sub-units 2, 7, 12 and 19; presents an homogenous inclined surface with shell inclusions and a possible posthole in the sub-unit 7. The floor is color 10YR 3/2 grayish brown. During excavation fragmented shell, fish bones and plants remains were recovered from the floor.

S.U. 6.36: Posthole?

Circular hole of 12 x 14 cm located in the SW corner of the sub-unit 7. The hole is filled with small angular stones and sand containing fragmented shell, plant remains and fire cracked stones. The filling is color 2.5Y 5/3 light olive brown. It presented a depth of 13 cm.

S.U. 6.37: Charcoal concentration

Circular shaped charcoal concentration mixed with sand located in the E side of the sub-unit 2. Its color is 10YR 5/1 gray. It is a superficial element that contains few fish bones and plant remains.

S.U. 6.38: Floor

A compact clay floor located in the south center of the Unit; this floor as the previous ones has a slight inclination towards the N. It has a regular surface with shell inclusions mainly, *Mesodesma d.*, its surface is color 10YR 3/1 very dark gray. Cultural remains found during excavation were fish bones, fragmented crustaceans, rounded lumps of clay and cotton threads. Immediately below this floor we uncovered another floor related to a previous construction phase.

S.U. 6.39: Floor

This is a compact clay floor that extends from sub-unit 10 to the W side of the wall 6.5. The floor presents an irregular surface inclined to the W. Its surface presented fragmented shell as inclusions its color is 10YR 4/1 dark gray. This floor is plastered with the wall E and W sides. Excavation of the floor recovered abundant fragmented shell (mainly *Choromytilus ch.*) some of them carbonized. Few fish bone, fragmented crustaceans and plant remains were also found.

S.U. 6.40: Pit (Upper level)

Semi-circular pit located in the sub-units 2, 3, 7 and 12. It contains semi- compact sand of an irregular surface of color 7.5YR 5/3 brown. Cultural remains found were fragmented cotton textiles, fragmented shell, plant remains and an obsidian flake. This pit intrudes the S.U. 6.27 and because of its characteristics was divided in three levels; this is probably reflecting 3 different depositions episodes.

S.U. 6.41: Pit (Mid level)

The pit reduces its dimensions extending only in sub-units 2 and 7. Presents an irregular surface of ash and sand with fire cracked stones and carbonized shells. The color of this level is 2.5Y 4/2 dark grayish brown. The cultural remains founds are very similar to the upper level.

S.U. 6.42: Bones concentration

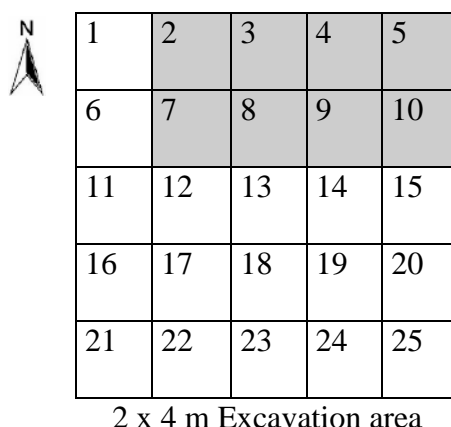
Various bird bones with fragmented crustacean and fish bones located in sub-unit 7. The bones are within a superficial and semi- compact sand circular matrix of 18 cm of diameter.

S.U. 6.43: Pit (Lower level)

Lower level of the 6.40 pit located in sub-units 2 and 7. It contains loose sand color 10YR 4/4 light yellowish brown. The cultural remains recovered is mainly shell (complete and fragmented *Mesodesma*), fish and plant remains, animal bones, some of them carbonized. At the bottom of the pit, 2 cobbles were found.

S.U. 6.44: Floor

This compact clay floor extends to the sub-units 10, 12, 13 and 14. Its surface color is 10YR 4/1 dark gray presents fragmented shell remains (mainly *Choromytilus*). During excavation mainly carbonized shell fragments and some fish and plant remains were recovered. A rectangular stone was found in sub-unit 10 related to the corner of the E wall. After the S.U. 6.44 the excavation area was reduced into 2 x 4 m, containing sub-units 2, 3, 4, 5, 7, 8, 9 and 10.



S.U. 6.45: Floor

Semi-compact clay floor located in sub-units 8, 9 and 10. Its surface is color 2.5Y 4/1 dark gray with complete shells inclusion, it have a smooth descent to the west. It is broken between sub-units 9 and 10. During excavation *guayaba* seeds, fish bones and a regular amount of fragmented shell were recovered. This floor attaches to north face of the wall 6.5.

S.U. 6.46: Floor

Semi-compact clay floor located in sub-units 8, 9 and 10. It presents ash concentrations in its surface and a color 10YR 5/1 very dark gray. It presents an inclination to the W like the previous floor. It is best preserved in the sub-units 9 and 10. During excavation fragmented shell was recovered (mainly *Mesodesma*), fragmented crustacean, and some cotton seeds.

S.U. 6.47: Floor

Compact clay floor located in sub-units 9 and 10. Its surface is color 10YR 4/1 with ash crusts and fragmented shell inclusions. During excavation abundant shell (mainly *Mesodesma*), fragmented crustaceans and fish bones were recovered. This floor is broken next to the door where we found a concentration of ash and cultural materials. Apparently this floor was attached to the stone wall and is one of the occupational phases identified.

S.U. 6.48: Floor

Semi-compact clay floor located in sub-units 9 and 10 with two central cracks. Its surface contains complete shell, it is color 10YR 4/1 dark gray. It presents an inclination to the W like the floor 6.46. It contained remains of fish, plants (mainly *guayaba* seeds), fragmented and complete *Mulina edulis* shell, and cotton threads.

S.U. 6.49: Floor

Compact clay floor located in sub-units 8, 9 and 10. Its surface is color 10YR 4/1 dark gray. In the area near to the wall presents a concentration of shells (mainly clams) and some botanical

remains. During excavation *guayaba* seeds, fish bones, fragmented crustaceans and cotton threads were recovered.

S.U. 6.50: Floor

Compact clay floor located in sub-units 8, 9 and 10. Its surface is color 10YR 4/1 dark gray. It is another floor with an inclination to the W like the floor 6.48. It contained remains of fish, plants (mainly *guayaba* seeds), and fragmented and complete *Mulina edulis* and *Mesodesma* shell.

S.U. 6.51: Ash

Semi-compact ash layer located in sub-units 8, 9 and 10. It presents an irregular surface of color 10YR 3/1 very dark gray. Like the previous floor this layer presents an inclination to the W. The layer contains mainly carbonized remains like fish bones, fragmented shell, and plant remains. When removing this layer immediately below it appeared a new clay floor. The east wall 6.5 was built over this layer.

S.U. 6.52: Floor

Semi-compact clay floor located in the sub-units 8, 9 and 10. It presents an irregular surface of color 10YR 3/1 very dark gray probably because of the contact of the upper ash layer. It contains fish bones, some small cobbles and few fragmented shell and plant remains. Its northern portion a salt crust covers it partially.

S.U. 6.53: Floor

Semi-compact clay floor located in the sub-units 8, 9 and 10. It presents a surface of color 10YR 3/1 dark grayish brown and like the previous floors it presents an inclination to the W. It contains fish bones, some small angular stones, carbonized shell (complete and fragmented *Mesodesma*), fragmented crustaceans and echinoderms, and plant remains like cotton and *guayaba* seeds.

S.U. 6.54: Ash layer

Compact ash layer very similar to the S.U. 6.51 which is located in sub-units 8, 9, and 10. Presents an irregular surface and contains abundant very fragmented shell. In its north portion animal bones (sea lion) were recovered and in its west portion a cotton textile fragment.

S.U. 6.55: Floor

Semi-compact clay floor located in sub-units 3, 4, 5, 8, 9 and 10 of the unit. Its surface has a slightly NW inclination surface and a color 10YR 4/2 dark grayish brown. This floor contains abundant fish bones and plant remains as well as fragmented shell of various species. Crustaceans and echinoderms fragment also were recovered. This floor was excavated in a 2 x 4 m area and it goes beneath the platform wall.

S.U. 6.56: Floor

Compact clay floor with ash inclusions located in sub-units 2-5 and 7-10. Presents an irregular surface with its SE side more elevated. The surface is color 2.5Y 3/1 dark gray with small and medium cobbles and mollusks shells randomly dispersed over it. Abundant cultural remains, mainly carbonized, were recovered: fragmented shell, *guayaba* and cotton seeds, *junco* and *Tillandsia sp.* A broken shell fishhook with burned marks was recovered.

S.U. 6.57: Hole

Shallow oval hole of 26 x 12 x 1 cm located in the central part of sub-unit 10 intruding the floor 6.56. It contains loose sand color 5Y 4/2 olive gray. Few cultural remains were recovered fish bones and fragmented shell.

S.U. 6.58: Ash layer

Semi-compact layer composed of sand, ash, and small angular stones. It is located within the sub-units 2-5 and 7-10. It presents an irregular surface with depressions and elevations in various parts with a color 2.5Y 4/1 dark gray. The layer contains abundant cultural remains many of them with burned mark and carbonized, most common is fragmented shell, complete and fragmented fish bones, plant remains (cotton seeds and fibers, *guayaba* seeds, *junco*, *totorá*, willow, etc.), fragmented crustacean, echinoderm, cotton threads, unbaked clay. Artifacts recovered were 3 stone weights, a bead, and a fragment of an unbaked clay figurine.

This layer appears to be midden brought to the area, within it the S.U. 6.59, 6.60 and 6.61 were found.

S.U. 6.59: Stones accumulation

A group of 14 fire cracked angular stones located in sub-unit 3 at 41 cm from the S.U. 6.60. The stones form a semi-circular shape measuring 38 x 40 cm. The S.U. 6.58 surrounds the stones, but within the stones burned and carbonized *Tillandsia* was found, product of an *in situ* fire.

S.U. 6.60: Stones accumulation

A group of fire cracked stones located in sub-units 3, 4, 8 and 9, placed similar as the previous S.U. 6.59 in an oval shape of 57 x 50 cm. As the previous S.U. burned and carbonized *Tillandsia*

was found in within the stones. Both stones concentration appear to be part of the same burning episode.

S.U. 6.61: Lens

Lens composed of loose sand of irregular shape located in sub-unit 5. The sand is color 2.5Y 4/2 dark grayish brown and contains mainly fish remains, also fragmented shell and plant remains (especially *guayaba* seeds and *junco*) but in lesser numbers.

S.U. 6.62: Lens

Lens composed of loose sand of oval shape located in sub-unit 10. The sand is color 2.5Y 4/2 dark grayish brown and contains fragmented and complete shell, fish bones, plant remains (gourd, cotton, willow, *guayaba*), fragmented echinoderms and cotton threads.

S.U. 6.63: Lens

Lens composed of compact clay of circular shape and irregular borders located in sub-units 8 and 9. The lens color is 10Y 3/2 very dark grayish brown and contains some small angular stones and some fragmented shell.

S.U. 6.64: Lens

Lens composed of compact clay and ash of semi-circular shape and irregular borders located in sub-units 8 and 9. Presents an irregular surface with depressions and have a color 2.5Y 4/2 dark gray and it contains regular amount of fish and plants remains. It also contains some fragmented shell (mainly *Mesodesma*), fragmented crustacean and echinoderm, and cotton threads.

S.U. 6.65: Ash layer

Semi- compact layer composed of ash and sand located in the sub-units 2-5 and 7-10. Presents the same characteristics as the ash layer 6.58 defined as a fill. Its surface is color 10YR 2/1 black observing complete and fragmented mollusk shell and fire cracked cobbles. During excavation abundant cultural materials were recovered, mollusk shells are the main component of this layer, complete and fragmented shell mostly carbonized. Also in lower proportions and mainly carbonized and fragmented fish and bird bones, crustaceans, echinoderms, fragments of gourd and cotton threads were recovered. In sub-units 2 and 4 this layer deepens. Associated with this layer S.U. 67, 68, 69, 71 and 72 were recorded.

S.U. 6.66: Sand layer

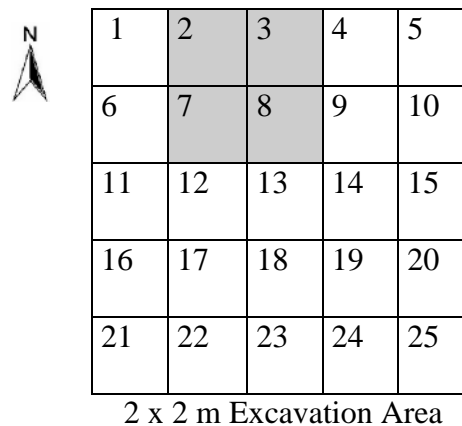
Loose layer composed of fine sand located in the sub-units 2-5 and 7-10. Presents an irregular surface inclined towards the W and its color is 2.5Y 4/2 olive brown. Some big cobbles were found in sub-unit 8 and 9, and a big angular stone in sub-unit 7. This layer is intruded partially by the S.U. 6.65. The layer is composed by fragmented and complete shell (mainly *Mesodesma* and *Choromytilus*), plant remains (*Tillandsia*, willow, cotton and *guayaba* seeds among others), fragmented crustaceans and echinoderms, and textile remains. Artifacts found are stone weights, beads, cotton net fragments, bone artifacts and 2 pieces of unbaked clay figurines.

S.U. 6.67: Stone accumulation

Accumulation of angular stones and cobbles of small and medium size located in sub-unit 4, 5 and 9. The stones are mixed with loose sand color 10YR 4/2 grayish brown. It contains abundant

fragmented and complete shell, fragmented plant remains, a fragment of a mat, animal bones (sea lion).

After this S.U. the excavation area is reduced into 2 x 2 m containing sub-units 2, 3, 7, and 8.



S.U. 6.68: Ash Lens

Lens composed of semi-compact sand and ash of a convex shape and sinuous borders located in the W side of the sub-unit 2 and 7. It presents a color 2.5Y 3/2 dark grayish brown and contains mainly botanical remains some of them carbonized (mainly carbonized *Tillandsia*), complete and fragmented shell, fish bones, and fragments of crustaceans and echinoderms. During excavation we found a *Mesodesma* shell wrapped in cotton twined textile.

S.U. 6.69: Plant accumulation

An accumulation of plant remains mixed with loose sand located in the sub-units 3 and 8. They present a semi-circular shape with irregular borders. It has an irregular surface color 10YR 5/3 brown. The main elements identified are abundant remains of carbonized *Tillandsia*, fragmented

junco and *totorá* distributed homogeneously over the entire context. Also cotton and *guayaba* seeds, fragmented shell and crustaceans were recovered in lesser proportions.

S.U. 6.70: Ash layer

Semi-compact layer composed of ash located in sub-units 2, 3, 7 and 8. Presents an irregular surface with fire cracked stones, its color is 10YR 3/1 very dark gray. The layer contains abundant cultural remains mainly fragmented and complete shell many of them carbonized or with burn marks; also botanical remains were found also carbonized and fish bones and fragmented crustaceans in lower proportions.

S.U. 6.71: Hole

Semi-circular hole of 35 x 30 cm located in sub-unit 7 and containing loose sand mix with plant remains. The matrix is color 10YR 3/2 very dark grayish brown. The cultural remains are mainly fragmented *junco* and willow and fragmented and complete shell, some dry anchovies heads were recovered during excavation.

S.U. 6.72: Sand layer

Loose sand layer with irregular surface located in the W side of sub-units 2 and 7. The layer is color 5Y 4/2 olive gray and contains fragmented plant remains (*junco*, willow, *guayaba* and cotton seeds, carbonized *Tillandsia sp.*), shell (complete and fragmented *Mesodesma*, *Choromytilus*, *Polinices*, *Perumytilus*, among others), fish bones and fragmented echinoderms and crustaceans.

S.U. 6.73: Anchovies heads

A concentration of well preserved dry 11 anchovies located in sub-units 2 and 7. The anchovies are placed disorderly in a 45 cm diameter depression on S.U. 6.70. The anchovies have their heads well preserved as well as some bodies. They are within a sandy matrix color 10YR 3/2 very dark grayish brown. Within the sand other cultural remains recovered were fragmented shell, cotton threads, and sparse charcoal. Due to fragility of the anchovies some of them fragmented during their recovering.

S.U. 6.74: Hearth

Semi-circular hearth located in sub-units 2 and 7 going into the E profile. The hearth is 35 cm long and 10 wide, it presents a compact surface containing burned stones and ash. Cultural material recovered was mainly carbonized very fragmented shell and plant remains.

S.U. 6.75: Accumulation of shell

This particular concentration of mollusk shell is located in the sub-unit 8 bordering the south end of sub-unit 7, presents an oval shape and an irregular surface as it contains small angular stones and ash mixed with the mollusks remains. The contexts present a color 2.5Y 4/1 due to the high ash content. During excavation 24 fire cracked stones and other carbonized remains (like *Tillandsia*, *guayaba* and cotton seeds, and *junco*) were recovered from this context. Abundant complete and fragmented shells were recovered from *Mulinia edulis* and *Mesodesma donacium* the burned and carbonized plant remains is mixed with the shell remains.

S.U. 6.76: Hearth

Burning area of irregular shape and borders, of 52 x 62 cm located in the sub-unit 3 bordering the north side of sub-unit 2. Contains compact remains of charcoal, ash and carbonized cultural remains (shell, fish bones and plant remains) it is color 5Y 2.5/1 black by its sides and GLEY2 8/2 white in its center.

S.U. 6.77: Ash layer

Semi-compact layer composed of ash, sand and small angular stones. It presents an irregular surface color 2.5YR 3/1 very dark gray. It contains abundant carbonized shell, mainly *Mesodesma donacium*, *Mulinia edulis* and *Argopecten purpuratus*, carbonized plant remains and carbonized fish bones.

S.U. 6.79: Floor

Compact floor composed of clay color 2.5Y 7/4 pale yellow that presents a regular surface with complete *Mesodesma* shell on it. The floor also presents 2 possible postholes on its surface. During excavation fragmented and complete shell, fish bones and plant remains were recovered.

S.U. 6.80: Lens

An irregular shaped lens of sand and ash of winding borders located in the northern part of the sub-unit 3. Its surface is color 7.5YR 3/2 dark brown and contains mainly fragmented and complete shell, fish bone, and plant remains (mainly *guayaba* seeds).

S.U. 6.81: Posthole

Circular posthole of 26 cm diameter located in the sub-unit 2 at 75 cm NW of S.U. 6.83 (another posthole). It contains loose sand of color 2.5Y 4/3 olive brown that presents fragmented shell, fish bones and few plant remains.

S.U. 6.82: Pit

Rectangular pit located at the W side of the sub-unit 2 that extends out of the excavation area. It contains loose sand color 10YR 4/2 dark grayish brown. The sand contains inclusions of cultural remains mainly very fragmented shell and fish bones, plant remain and few small charcoal fragments.

S.U. 6.83: Posthole

Circular posthole of 36 cm diameter located between sub-units 3 and 8. It contains compact sand due to salts of color 10YR 3/3 dark brown. Cultural remains identified are mainly fragmented shell and plant remains.

S.U. 6.84: Ash Lens

Oval shaped lens composed of ash located in the NE corner of sub-unit 2 over the floor 6.85. The lens content is color 2.5Y 4/3 olive brown and presents abundant fish remains, some charcoal and very fragmented *Mesodesma* and *Mulinia* shells.

After the excavation of S.U. 6.84 the excavation area is reduced into 1 x 2 m containing sub-units 2 and 7.



1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

1 x 2 m Excavation Area

S.U. 6.85: Floor

Semi-compact clay floor of irregular surface color 2.5Y 7/3 pale yellow that extends to all the excavation area. It presents cracks and intrusion of later occupations. Excavation recovered mainly fragmented shell and few plant remains.

S.U. 6.86: Lens

Lens of irregular shape composed of semi-compact sand color 10YR 4/2 dark grayish brown. The lens extends to all the sub-unit 2. The sand contained fragmented and complete shell, charcoal and plant remains (gourd fragments, seeds, fiber and carbonized *Tillandsia*).

S.U. 6.87: Floor

Compact clay floor that extends all over the excavation area with a regular surface do not present cultural remains. The floor is color 2.5Y 7/3 pale yellow and is 2 to 4 cm thick. On its surface a series of post holes (S.U. 6.90 to 6.98) define a circular structure.

S.U. 6.88: Ash layer

Semi-compact ash layer located in all the excavation area presents an irregular surface of color 10YR 2/1 black. The layer is mainly composed of charcoal and ash, carbonized fragmented shell, as well of carbonized fish bones and plant remains.

S.U. 6.89: Ash Lens

Semi-compact ash lens located in sub-unit 7 over floor 6.87 surface presents an irregular shape of color 10YR 3/1 very dark gray. It contains abundant fragments of carbonized *Tillandsia* and some small cobbles mix with fragmented carbonized shell fragments.

S.U. 6.90: Pit

A semi-circular shaped pit containing two postholes (6.97 and 6.98), located in sub-units 2 and 7. Its dimensions are: length: 67 cm, width 1: 32 cm, width 2: 27 cm; it contains loose sand with a surface color 10YR 3/2 very dark grayish brown. It contains fragmented shell, fish bones, and plant remains. A piece of junco mat very bad preserved was also found within the pit.

S.U. 6.91: Post hole

An oval post hole of 17 x 13 cm located in sub-unit 7 cut through the floor 6.87. The post hole contains loose sand color 10YR 3/2 very dark gray. During excavation of the post hole contains 10 fire cracked angular stones and small cobbles were recovered with remains of carbonized *Tillandsia*.

S.U. 6.92: Post hole

An oval post hole of 24 x 20 cm located in sub-unit 7 cut through the floor 6.87. The post hole contains loose sand color 10YR 4/3 brown. During excavation of the post hole contains fragmented shell, fish bones and plant remains. Also inside the post hole a fragment of mat *junc*o (16 x 11 cm) in bad preservation was recovered.

S.U. 6.93: Post hole

Circular post hole of 15 cm of diameter located in sub-unit 2 that contains loose sand and ash color 10YR 4/1 dark gray. Cultural remains recovered were small fragments of charcoal and shell fragments.

S.U. 6.94: Post hole

Semi-circular post hole located in the NW corner of sub-unit 2 with a diameter of 17 cm that contains loose sand color 10YR 3/2 dark grayish brown. Cultural remains recovered were small fragments of charcoal, shell fragments and pieces of broken floor.

S.U. 6.95: Post hole

Oval post hole located in the middle of sub-unit 2, its dimensions are length 22 cm and width 15 cm. The hole contains loose sand color 10YR 3/2 dark grayish brown with few cultural remains, mainly shell fragments and charcoal fragments.

S.U. 6.96: Pit

Circular pit located in sub-unit 7 at 10 cm S of S.U. 6.97 with a diameter of 30 cm. It contains loose ash color 2.5Y 2.5/1 black containing abundant fragments of carbonized *Tillandsia* and a fire cracked stone. Other cultural remains recovered were carbonized shell fragments, fish bones and plant remains. The pit walls were covered with a thin layer of clay and ash color 10YR 6/1 gray.

S.U. 6.97: Pit

Circular pit of 32 cm of diameter located between sub-units 2 and 7 containing loose sand and small pieces of charcoal where two levels were identified. The color of the pit contents is 2.5Y 4/7 very dark grayish brown.

S.U. 6.98: Pit

Circular pit of 30 cm of diameter located in sub-unit 7 at 10 cm S of 6.97 within the 2 x 1 m excavation. Its surface is color 2.5Y 2.5/1 black with the presence of carbonized *Tillandsia sp.* And a fire cracked stone. Within the pit it presents loose ash with small fragments of charcoal. Abundant remains of mollusks, fish bones and plants are also identified. Finally a fine layer of hard clay color 10YR 6/1 gray covers the pit walls.

S.U. 6.99: Floor

Semi-compact clay floor of homogenous surface color 10YR 7/6 that extends all over the excavation area. It presents a posthole in sub-unit 7 NW corner. Some areas of the floor present

stains color 10R 3/6 dark red, probably of organic material decomposition. During excavation few amounts of fragmented shell, fish bones and plants remains were recovered.

S.U. 6.100: Post hole

Oval posthole of 13 cm long and 12 wide located in the W side of sub-unit 7. It contains loose sand color 2.5Y 3/2 that contains fragmented shell and fish bone. The bottom of the post hole presented a compact concentration of clay and shell.

S.U. 6.101: Floor

Compact clay floor located in sub-units 2 and 7 with an average thick of 1-2 cm. Its surface presents some cracks and is color 10YR 7/3 very pale brown. During excavation fragmented shell was recovered, mainly mussels.

S.U. 6.102: Floor

Compact clay floor that covers all sub-unit 7 and part of sub-unit 2 it presents an irregular surface and a decreasing slope towards the W. The floor is color 10YR 7/1 light gray and 1 to 3 cm thick. During excavation complete and fragmented shell, fish bones was mainly recovered. Small pieces of charcoal and plant remains were also recovered but in less proportions.

S.U. 6.103: Sand layer

Loose sand layer located in sub-units 2 and 7. The color of the layer is 10YR 3/2 very grayish brown and presents a variable thickness from 1 cm in its south side to 8 cm in its north side. The layer contains shell, animal bone fragments and charcoal fragments.

S.U. 6.104: Floor

Fragmented clay floor located in the south side of sub-unit 7, it presents a regular surface color 2.5Y 4/1 dark gray with inclusions of complete *Mulinia edulis* shell over it. The floor thickness is from 1 to 2 cm with presence of fragmented and complete shell and lower proportions of carbonized plant remains.

S.U. 6.105: Pit

Oval shaped pit of 34 cm long and 36 cm wide located in sub-unit 2. It contains sand and 3 levels were identified. The first level is color 2.5Y 6/1 very dark grayish brown and contains loose sand, a cotton textile fragment, burned wood and fish bones were recovered from this level. The first level is 5 cm thick. The second level is an accumulation of plant remains with compact sand, basket fragments and burned fragments of *Tillandsia* were recovered from this level. The third level located. The second level is 10 cm thick. The third level contains loose sand and ash and is color 2.5Y 6/1 gray. During excavation abundant carbonized *Tillandsia*, fish bones (mainly vertebrae) and burned plant remains were recovered.

S.U. 6.106: Pit

A circular pit of 38 cm of diameter located in the sub-unit 2 at 80 cm from the S.U. 6.105 that contains loose sand color 2.5Y 3/2 very dark grayish brown. During the excavation abundant cultural remains were recovered like complete shell, fire cracked stones and carbonized plant remains. Two contexts, possible offerings were found: a torch partially covered by a mat was recovered from the pit and complete *Choromytilus* and *Mulinia* shells wrapped in a piece of cotton twined textile were found.

S.U. 6.107: Ash layer

Semi-compact layer of ash located in all the excavation area, it presents a surface color 5YR 2.5/1 black and a thickness of 1 to 8 cm towards the north side of the excavation. Three pits recorded previously (6.105, 6.106 and 6.108) intrude it. The layer contains abundant carbonized cultural remains, mainly shell.

S.U. 6.108: Post hole

Oval post hole of 19 cm long and 20 wide, located in sub-unit 7, containing loose sand color 10YR 4/1 grayish brown. During excavations 2 small stones and fragmented shell and fish bones were recovered.

S.U. 6.109: Sand layer

Semi-compact sand layer located all over the excavation area (sub-units 2 and 7) of color 10YR 4/3 brown. The layer presents an irregular surface containing a posthole (6.111) in its south side. The layer contains abundant carbonized shell fragments (*Mesodesma donacium*, *Mulinia edulis* and *Choromytilus chorus*) and fish bones. In lower proportions carbonized plant remains, fragmented crustacean and fragmented echinoderms were also recovered.

S.U. 6.110: Gourd

A fragmented gourd located in the south profile of the excavation area. The gourd measures approximately 17 x 9 cm. Its interior contains loose fine sand mix with fish bone. A small stone wrapped with a fragment of cotton textile also was found. Five fire cracked stones were also recovered from this context.

S.U. 6.111: Pit

Circular pit of 13 cm of diameter located in sub-unit 7 and containing loose sand color 2.5Y 3/2 very dark grayish brown. Cultural remains recovered were very fragmented shell (mainly *Mesodesma donacium*), fish bones, plant remains and charcoal.

S.U. 6.112: Floor

Semi-compact floor composed of sand and silt located in all the excavation area. It presents a regular surface with a northern inclination; its color is 10YR 3/1 very dark grayish brown. During excavation shell fragments, fish bones and a poor preserved cotton textile was recovered.

S.U. 6.113: Ash layer

Semi-compact layer of ash and sand that occupies all the excavation area, it presents an irregular surface with a southern inclination. Its color is 2.5YR 3/1 very dark gray and the layer contains regular proportions of carbonized shell fragments and fish bones.

S.U. 6.114: Torch

A wood stick with wrapped carbonized cotton textiles in one edge located in the SE corner of the sub-unit 7. The torch was placed vertically in the S.U. 6.113. Around the base of the torch complete *Mesodesma donacium* shell and small fire cracked stones were placed to serve as support. The torch has the same features as the previously found in S.U. 6.106.

S.U. 6.115: Sand layer

Semi-compact sand layer located in sub-unit 2 and 7 with an irregular surface color 2.5Y 4/4. It presents a thickness of 18 to 20 cm and contains mainly fish bones, fragmented shell and plants also present but in lesser amounts.

S.U. 6.116: Sand Lens

Irregular shaped lens of semi-compact sand located in the east side of sub-units 2 and 7. Its color is 10YR 4/4 yellowish brown presenting an irregular surface. During excavation fish remains, very fragmented shell and few fire cracked stones were recovered. Its maximum thickness was 9 cm.

S.U. 6.117: Sand lens

Small lens composed of loose sand located in the SE corner of the excavation area. Its color is 2.5Y 4/4 olive brown. It was not excavated.

S.U. 6.118: Pit

A small pit partially exposed in sub-unit 2 as it continues into the N and W profile of the excavation unit. It contains loose sand with small fragments of charcoal color 10YR 3/2 very dark grayish brown. It is related to the surface of S.U. 6.119.

S.U. 6.119: Sand layer

Compact sand layer located all the excavation area with a surface containing very fragmented shell and some fire cracked stones. Its color is 2.5Y 5/6 light olive brown and presents a

thickness of 2 to 5 cm. During excavation very fragmented shell was recovered (mainly *Mesodesma donacium* and *Concholepas concholepas*) as well as plant remains (carbonized cotton and *guayaba* seeds), and lesser proportions of crustacean remains.

S.U. 6.120: Sand layer

Semi-compact layer composed of sand and ash located in sub-units 4 and 9, outside the 2 x 1 m excavation unit. This layer is color 10 YR 4/1 dark gray and contains abundant small fragments of charcoal. Fragmented shell, animal bones were also recovered but in lesser amounts.

S.U. 6.121: Floor

Very compact clay floor located in the entire 2 x 1 m excavation unit this floor presents an irregular surface with a slight southern inclination. Its color is 2.5Y 5/3 light olive brown and have a thickness of 3 to 5 cm. During excavations abundant fragmented shell was recovered (mainly *Mesodesma donacium*, *Concholepa concholepa* and *Choromytilus chorus*). Fish and birds bones and fragmented crustaceans and echinoderms were recovered but in lesser amounts.

S.U. 6.122: Floor

Very compact clay floor located in the entire 2 x 1 m excavation unit this floor presents an irregular surface with a slight southern inclination like the previous floor. Its color is 2.5Y 5/3 light olive brown. During excavations abundant fragmented shell was recovered (mainly *Mesodesma donacium*), also fish bones and birds bones and fragmented crustaceans and echinoderms were recovered but in fewer quantities.

S.U. 6.123: Sand layer

Loose sand layer located in sub-units 2 and 7 of color 2.5Y 4/3 olive brown. It presents a thickness of 2 to 4 cm and contains mainly shell (fragmented and complete *Mesodesma donacium*) and few carbonized plant remains.

S.U. 6.124: Ash layer

Semi-compact layer composed of sand and ash located in the entire excavation area of color 2.5Y 3/2 very dark grayish brown. It presents a regular surface with the presence of a posthole (6.125) and a concentration of fire cracked stones (6.126). The layer had a thickness of 10 to 14 cm. During excavations mainly *Mesodesma donacium* (complete and fragmented) was recovered, also carbonized plant remains (fragmented *Tillandsia*, cotton and *guayaba* seeds).

S.U. 6.125: Hole

A circular depression of 25 cm of diameter located in the central area of the sub-unit 2 containing loose sand color 10YR 4/4 dark yellowish brown. Fragmented shell and fish bones were recovered during excavations.

S.U. 6.126: Accumulation of fire cracked stones

Nine small fire cracked stones placed in a circular shape of 22 cm of diameter located in the north central area of the sub-unit 7. Within the stones carbonized fragmented shell and ash was recovered.

S.U. 6.127: Floor

Very compact floor composed of clay and sand located in sub-units 3 and 8, outside the 2 x 1 m excavation area. Its surface is color 2.5Y 3/1 dark gray and presents salt crusts and charcoal inclusion. During excavation very fragmented plant remains, fragmented shell and cotton thread were recovered.

S.U. 6.128: Sand layer

Loose sand layer located in sub-units 2 and 7 and slightly inclined towards the south. It presents an irregular surface and a color 2.5Y 5/6 light olive brown. During excavation few cultural remains were recovered mainly fragmented shell.

S.U. 6.129: Sand layer

Loose sand layer located in sub-unit 2 and 7 with a SW inclination. It presents a thickness 4 to 5 cm and a color 10YR 3/2 very dark grayish brown. During excavation fragmented shell, fish bones and cotton seeds were recovered. Also small fire cracked stones were recovered.

S.U. 6.130: Hole

Shallow hole of semi-circular hole located in the SE corner of the excavation unit extending outside it containing loose sand color 2.5YR 2.5/3 dark reddish brown. During excavation carbonized shell fragments, fish bones and carbonized plant remains were recovered. This S.U. is associated to the surface of the S.U. 6.129.

S.U. 6.131: Sand layer

Loose sand layer located in sub-units 2 and 7 with a homogenous surface with big crack in its W side that reaches the S.U. 6.132. Also in its surface very fragmented shell and a cobble in the NE corner of the sub-unit 2 were identified. Its color is 10YR 6/6 brownish yellow. During excavation fragmented and complete *Mesodesma donacium* was mainly recovered, also carbonized plant remains and fish bones were recovered.

S.U. 6.132: Hearth

Irregular shaped hearth located in the south side of the excavation area. Its surface is color 10YR 3/1 very dark gray with an elevated southern portion. In its surface carbonized fragments of shell and *Tillandsia* were identified. During excavation the core of the hearth was defined, is composed of semi-compact ash color 10YR 7/1 light gray containing carbonized shell and plant. The hearth is 24 cm deep. This S.U. is associated to the surface of the S.U. 6.134.

S.U. 6.133: Burned area

A concentration of carbonized fish bones and plants 3 cm thick of oval shape (35 x 25 cm) located in the central area of the sub-unit 2. Its color is 10YR 3/2 very dark grayish brown. This S.U. is associated to the surface of the S.U. 6.134.

S.U. 6.134: Fine gravel layer

Semi-compact layer of fine gravel located in sub-units 2 and 7. It is color 10YR 6/6 yellowish brown. Its surface presents a hearth (6.132), a burned area (6.133) and an accumulation of fire

cracked stones in a basket (6.135). During excavation few cultural remains were recovered mainly shell fragments of *Mesodesma donacium*.

S.U. 6.135: Basket

A *junco* basket located in the south side of sub-unit 2 of 30 x 24 cm. The basket contains loose sand and fragmented shell color 10YR 5/4 yellowish brown. During excavation 32 fire cracked stones were recovered. Some of the stones appeared to be wrapped with *junco*.

S.U. 6.136: Fine gravel layer

A layer of fine gravel only 1 cm thick of irregular shape and winding borders located in the south side of the excavation area. Its color is 5Y 7/6 yellow. During excavation only 1 fragment of *Mesodesma donacium* was recovered.

S.U. 6.137: Sand layer

Loose fine sand located in sub-units 2 and 7 of the excavation unit in its edge the next S.U. 6.138 can be observed. The layer is color 5Y 6/2 light olive gray. It contains very few cultural remains, mainly fragmented shell of *Mesodesma donacium* and *Choromytilus chorus*.

S.U. 6.138: Natural layer

Loose layer of fine sand located in the excavation unit of color 2.5Y 6/4 light yellowish brown. The layer does not present cultural remains and belongs to the natural or sterile basal level of the site.

S.U. 6.139: Human burial

Within the S.U. 6.138 towards the west side of the sub-unit 2, an oval matrix was identified with 4 big cobbles in its surface. When excavated a human burial was discovered. The burial follows the burial pattern identified for the site; the cobbles covered the funerary bundle composed of a *juncos* mat. The individual was a sub adult oriented S15°W semi- flexed with its head towards the north. Offerings found within the burial are: at its right side a gourd bowl (about 8 cm diameter) very bad preserved, beside its right arm a necklaces was found. The necklace is composed by beads made of bird bones, 4 snails *Oliva peruviana* and a whorl. The burial was excavated completely and with its removal the excavations at the unit 6B ended.

UNIT 8

Location:

UTM Coordinates: NW Corner: 8'761,882N / 217,618E


Datum: PSAD56 NE Corner: 8'761,882N / 217,613E

SW Corner: 8'761,877N / 217,613E

SE Corner: 8'761,877N / 217,618E

Unit Description:

Excavations at the Unit 8 began in September 2005 with a 2 x 2 excavation unit. The excavation lasted until august 2006 extending the 2 x 2 unit up to a 4 x 4 m excavation unit. In 2007 excavations began in a 5 x 5 m area and during this excavation season a series of extensions were done reaching a 10 x 10 m excavation unit. Each 5 x 5 m unit was named with a letter suffix, the original unit 8 was renamed unit 8A, and the other units were named units 8B, 8C and 8D. As it was possible to track stratigraphic units across the excavation units, the same numeration was used through all the unit 8A, 8B, 8C and 8D.



1	2	3	4	5	1	2	3	4	5
6	7	8	9	10	6	7	8	9	10
11	12	13	14	15	11	12	13	14	15
16	17	18	19	20	16	17	18	19	20
21	22	23	24	25	21	22	23	24	25

Sub-units of Unit 8A Sub-units of Unit 8B

Description of the Stratigraphic Units of Unit 8 (A and B):

S.U. 8.1: Surface

Surface of the archaeological site, is composed of loose sand with small fragmented fragments of shell. It present a regular texture and its color is 10YR 5/1 grayish brown. The surface of the excavation unit presents evidence of human, animal and vehicle transit.

S.U. 8.2: Sand layer

Located in the sub-units 1, 6, 11, 16, 21, 22, 23 and 24 is a compact sandy layer with evidence of fine gravel. It presents an irregular texture and is partially broken towards its northern edge. It color is 2.5Y 4/4 olive brown. It contains mainly broken *Mesodesma donacium* and fire cracked stones. This layer is 1.5 cm thick.

S.U. 8.3: Sand and ash layer

Located in the west side of the unit has been located in sub-units 1, 6 and 23. This layer is composed of fine semi-loose sand and ash. Its color is 10YR 3/1 very dark gray. It contains fragmented mollusks and plant remains, an accumulation of fire cracked stones were located in its west edge. The mean thick of this layer is 2 cm.

S.U. 8.4: Sand Layer

This layer is located in the sub-units 1, 6, 11, 16 and 21 in discontinuous way. The layer is composed of semi-compact sand color 10YR 5/3 of regular texture. The cultural materials within this layer are fragmented mollusks and plant remains. The layer is 3 cm thick.

S.U. 8.5: Gourd

Located in sub-unit 3 this S.U. is the remains of a gourd bowl. The gourd has bad preservation and is fragmented spreading in a 16 x 12 cm semi-circular area.

S.U. 8.6: Hole

This S.U. is a circular hole of 12 cm of diameter located in sub-unit 3. It composed of loose sand color 7.5YR 6/8 reddish yellow and no evidence of cultural remains. It is 10 cm deep.

S.U. 8.7: Hole

Circular hole located on the north east side of sub-unit 2, present a diameter of 20 cm. It was covered with loose sand. No cultural remains were found.

S.U. 8.8: Lens

Located between sub-units 1 and 2 this lens has an oblong shape (36 x 38 cm) and a regular texture. It is composed of semi- compact fine sand color 10YR 5/3 brown. Cultural materials this lens contains are fragmented plants and shell. Some fish bones also were identified.

S.U. 8.9: Lens

Located between sub-units 19 and 20 on the south east edge of the unit this lens has an irregular shape covering an area of 40 x 50 cm with a regular sandy surface. It is composed of loose fine sand color 10YR 5/3 brown. Cultural materials this lens contains are abundant fragmented plants and shell.

S.U. 8.10: Sand and ash layer

This layer is located in the center of the unit within the sub-units 13 and 14. The layer is composed of semi- loose sand and ash of a regular texture. Its color is 10YR 4/2 dark brownish gray. It contains fragmented mollusks and plant remains. The thick of this layer is 2 cm in its thinner side and 3 cm in its thicker side.

S.U. 8.11: Sand and ash layer

This layer is located in the north east side of the unit within the sub-units 10 and 15. The layer is composed of compact sand and ash of an irregular texture. Its color is 5YR 2.5/1 black. It contains fragmented fragments of charcoal and fragmented mollusks, some of them with burned marks and carbonized plant remains. The thick of this layer is 2 cm approximately.

S.U. 8.12: Post Hole

Circular hole located on the north east side of the unit in sub-unit 5, presents a diameter of 15 cm. It was covered with loose sand color 7.5YR 6/8 reddish yellow. During excavation fragmented twined textile were recovered and fragments of wood probably of a fragmented post.

S.U. 8.13: Hole

Circular hole located on the center of the unit at sub-unit 8, present a diameter of 22 cm. It contains loose sand of regular texture color 10YR 3/4 dark yellowish brown. Cultural remains recovered are mainly fragmented plants remains and fish bones.

S.U. 8.14: Fine gravel layer

This layer extends to almost all the excavation unit. The layer is composed of semi- loose fine gravel of irregular texture. Its color is 5Y 4/1 dark gray. It contains fragmented mollusks and plant remains.

S.U. 8.15: Hole

Circular hole located on the east side of sub-unit 3, presents a diameter of 18 cm with irregular edges. It contains loose sand color 10YR 3/2 grayish brown and fragmented mollusk and sparse plant remains.

S.U. 8.16: Hole

Circular hole located on the north side of sub-unit 3, presents a diameter of 22 cm with irregular edges. It contains loose sand color 7.5YR 5/3 brown and abundant fragmented mollusk and plant remains.

S.U. 8.17: Hole

Circular hole located on sub-unit 3, presents a diameter of 15 cm with regular edges. It contains loose sand color 10YR 5/3 brown and fragmented sparse fragmented mollusk and plant remains.

S.U. 8.18: Hole

Circular hole located on the south side of sub-unit 1, presents a diameter of 30 cm with irregular edges. It contains loose sand color 10YR 5/3 brown and very fragmented mollusk and plant remains.

S.U. 8.19: Hole

Circular hole located on the north corner of sub-unit 3, presents a diameter of 24 cm with irregular edges. It contains loose sand color 5YR 4/6 reddish yellow and abundant fragmented mollusk and plant remains.

S.U. 8.20: Fine gravel layer

This layer is located in the northern side of the unit. The layer is composed of semi- loose fine gravel color is 5Y 3/2 olive dark gray. It contains few fragmented mollusks and fish bones. The thick of this layer is approximately 4 cm.

S.U. 8.21: Layer

This layer is located in the north west side of the unit within the sub-units 2, 3, 7 and 8. The layer present a compact transited surface is composed of sand and ash of irregular texture and fragmented edges. Its color is 2.5Y 4/2 dark brownish gray. It contains fragmented mollusks and plant remains.

S.U. 8.22: Hole

Circular hole located on the sub-unit 3, cutting through S.U. 8.21. Presents a diameter of 69 cm with regular edges containing loose sand color 10YR 3/4 dark yellowish brown with abundant amounts of mollusk and plant remains. The hole presents a depth of 35 cm.

S.U. 8.23: Sand Layer

This layer is located in the center of the unit within the sub-units 13 and 14. The layer is composed of compact sand of irregular texture and with broken edges. Its surface presents several cracks and small stones. Its color is 2.5Y 4/2 dark grayish brown. It contains fragmented mollusks, plant remains and fish bones. Its surface appears to present transit evidence. Intruding this layer a series of holes (8.25, 8.26, 8.27, and 8.28) have been located.

S.U. 8.24: Lens

Located in the north side of sub-unit 13 is a lens composed of ash and charcoal of circular shape with a diameter of 20 cm. The color of the lens is GLEY 7/1 10B light grayish blue, it contains carbonized shell and fish bones.

S.U. 8.25: Hole

Located in the west side of sub-unit 13 is a circular hole of 20 cm of diameter. It contains loose sand and gravel color 2.5Y 4/4 olive brown with small angular stones. Cultural remains recovered are mainly fragmented shell and charcoal.

S.U. 8.26: Hole

Located at the northeast side of sub-unit 14 is an oblong depression 30 cm long and 20 cm wide. It contains loose sand and gravel color 7.5Y 4/4 brown with a regular texture and small and medium stones. The few cultural remains recovered are mainly very fragmented shell and botanical materials.

S.U. 8.27: Hole

Located at the west side of the sub-unit 14 is a circular hole of 22 cm of diameter that contains loose fine sand color 2.5Y 4/4 olive brown with dos medium stones at its surface. Cultural remains observed area few quantities of fragmented shell and plants.

S.U. 8.28: Hole

Located at the south side of sub-unit 17 is a circular hole of 18 cm of diameter that contains loose fine sand color 2.5Y 4/2 grayish brown with small angular stones. Cultural remains recovered from this hole were fragments of *juncto* and fragmented shell.

S.U. 8.29: Layer

Semi-compact layer that extends almost over all the excavation area, it is composed of sand and gravel color 2.5Y 4/2 dark grayish brown of regular texture. Cultural remains recovered from this layer were very fragmented shell and plant remains.

S.U. 8.30: Layer

Compact layer located on the north side of the excavation area, it presents an irregular surface with shell inclusions color 10YR 4/2 grayish brown. The layer is composed of sand and cultural remains recovered were regular amount of plant and shell fragments.

S.U. 8.31: Layer

Loose layer that extends almost over all the excavation area, it is composed of sand, gravel and ash color 2.5YR 3/2 dark brown. Cultural remains found were plant remains mainly.

S.U. 8.32: Floor

Clay floor that extends over the entire excavation unit, it presents a regular surface color 2.5Y 8/4 pale yellow with cracks and broken edges in some areas. Cultural remains in the floor are mainly shell inclusions and fragmented fish bones.

S.U. 8.33: Lens

Located at the north of sub-unit 18 is a circular lens composed of compact sand color 2.5YR 3/2 dark brown containing fish bones and fragmented shell.

S.U. 8.34: Lens

Located at the south side of sub-unit 18 is an irregular lens composed of compact ash color 10YR 5/1 gray of regular texture. It presents inclusions of fragmented shell and fish bones in higher proportions and lesser amounts of plant remains.

S.U. 8.35: Hole

Located in the south west side of the sub-unit 21 is a circular hole of 10 cm of diameter containing loose fine sand color 2.5YR 4/3 olive brown and few small angular stones. Cultural remains recovered are mainly fragmented shell and plants.

S.U. 8.36: Floor

Located in sub-units 6, 11, 16, 21, 22, 23 and 24 in a discontinuous way is a compact clay floor color 5Y 4/1 dark gray. In some areas the floor is very fragile presenting a series of cracks. This floor is associated to a series of holes and burning areas. Cultural materials found are mainly fragmented shell, fish bones and plant remains embedded in its surface.

S.U. 8.37: Hole

Located in sub-unit 16 in the east side of the unit is a semi-circular hole of 14 cm containing semi-compact ash and sand color 10YR 3/2 very dark grayish brown. It is 5 cm deep and during excavation fragmented shell was recovered.

S.U. 8.38: Basket

Located in sub-units 6 and 11 are the remains of a circular *junco* basket of 40 cm of diameter. It is within loose sand and ash matrix color 10YR 3/2 very dark grayish brown. On the surface of the basket fragmented shell and *junco* fiber could be recovered. The basket was 27 cm buried from the surface it was identified.

S.U. 8.39: Basket

Second basket found in sub-unit 23, it is a smaller basket 20 cm of diameter in poor conservation located within the same ash and sand matrix color 10YR 3/2 very dark grayish brown. The basket contained small cobbles recovered during excavation. It presented a height of 15 cm.

S.U. 8.40: Hole

Located in sub-unit 6 is an oval hole with a length of 15 cm that presents in its interior fine loose sand and small fire cracked stones. The matrix is color 10YR 3/2 very dark grayish brown.

No cultural materials were found during excavation. The hole presented a deep of 23 cm.

S.U. 8.41: Hole

Located in the southeast side of sub-unit 21 is a circular hole 14 cm of diameter filled with sand and clay color 2.5Y 4/4 olive brown. During excavation 5 small stones were recovered, cultural material found were fragmented shell and plants remains.

S.U. 8.42: Hearth

Located in sub-unit 23 is a circular hearth of 36 cm of diameter that is filled with compact ash and charcoal color 2.5Y 4/1 dark gray. No cultural remains were found within the compact ash and charcoal. It was partially excavated.

S.U. 8.43: Hole

Located on the northwest side of sub-unit 23 is a circular hole 11 cm of diameter filled with a loose sandy matrix color 2.5Y 4/2 dark grayish brown. On its surface 2 fire cracked stones were identified, after excavation it presented a depth of 20 cm. No cultural remains were found.

S.U. 8.44: Accumulation of fire cracked stones

Located within sub-units 1 and 6 is a concentration of 15 fire cracked stones of different sizes. Within the stones abundant loose ash mixed with sand color 5Y 3/2 dark olive gray. Within the stones abundant burned material was recovered like *Tillandsia sp.* stems, shells (mainly *Mesodesma donacium*) and fragmented crustaceans.

S.U. 8.45: Hole

Located in the intersection of 4 sub-units (6, 7, 11 and 12) is an oval hole of a length of 20 cm that is filled with the remains of twined junco. The hole is filled of loose sand color grayish brown 10YR 5/2. Cultural remains recovered during excavation were fragmented mollusks and crustaceans.

S.U. 8.46: Hearth

Located in sub-unit 22 is an oval hearth covered with compact ash with fragmented and burned shell and plants remains of color black. The hearth cuts through the floor 8.32 causing a red coloration on the edges of the floor of color 7.5YR 5/4 brown. The excavation revealed this hearth is 15 cm deep.

S.U. 8.47: Layer

Located in sub-units 16, 17, 21, and 22 in a continuous way is a semi- compact fine sand layer located immediately below floor 8.32. It is color 2.5Y 6/2 grayish brown. During excavation abundant cultural materials were recovered specially shells (mainly *Mesodesma donacium*) and small fire cracked stones. The layer presented a thickness of 1 cm.

S.U. 8.48: Layer

Located in sub-unit 16, 17, 21 and 22 discontinuously is a compact layer of sand and ash of color 2.5Y 3/2 very dark grayish brown. Its surface present abundant shell fragments particularly the snail *Oliva Peruviana*. The layer presents a thickness of about 8 to 14 cm. During excavation abundant remains of mollusks, plant and fish bones were recovered. In some areas this layer is directly above the floor 8.57.

S.U. 8.49: Hole

Located in sub-unit 17 is an irregular hole defined by 4 thermo fractures stones filled with loose sand and ash color 2.5Y 3/2 dark grayish brown. The no cultural remains were found during excavation and presented a deep of 10 cm. These holes are on the surface of 8.48 and appear to be a posthole with the other holes described next.

S.U. 8.50: Hole

Located in sub-unit 17 is a circular hole of 15 cm of diameter and 11 cm deep, it is filled with loose sand color 2.5Y 3/2 dark grayish brown. During excavation no cultural remains where recovered.

S.U. 8.51: Hole

Located in sub-unit 17 is a hole defined by 5 fire cracked stones with a diameter of 17 cm and a deep of 12 cm. It contains loose sand and ash color 2.5Y 3/2 very dark grayish brown and during excavation fragmented shell fragments were recovered.

S.U. 8.52: Hole

Located in the southwest side of sub-unit 22 is a semi-circular hole 28 cm long containing fine sand color 2.5Y 3/2 very dark grayish brown. In its surface three fire cracked stones on 4 and 5 cm long where found. During excavation vegetal fibers of *junco* and fragmented shell was recovered. The excavation defined a depth of 10 cm for this hole.

S.U. 8.53: Hole

Located in the southwest side of sub-unit 22 is a semi-circular hole of 17 cm long that presents in its surface 3 small fire cracked stones in a matrix of loose fine sand color 2.5Y 3/2 very dark grayish brown. During excavations no significant cultural materials were recovered, presenting 10 cm of depth.

S.U. 8.54: Hole

Located in the southwest side of sub-unit 22 is a circular hole 10 cm of diameter containing loose fine sand color 2.5Y 3/2 very dark grayish brown. Excavation recovered fragmented shell, mainly *Mesodesma d.* and determined it is 5 cm deep.

S.U. 8.55: Hole

Located in the west side of sub-unit 22 is a circular hole 18 cm of diameter containing sand and ash color 2.5Y 3/3 very dark grayish brown. During excavation fragmented shell, junco and crustacean were recovered. The excavation reached a deep of only 5 cm.

S.U. 8.56: Hole

Located in the southeast side of the sub-unit 21 is a circular hole 10 cm of diameter that contains 7 small fire cracked stones in its surface within a loose sandy matrix color .5Y 3/2 very dark grayish brown. Cultural remains found were fragmented shell and fragmented *junco*.

S.U. 8.57: Floor

Located in sub-units 16, 16 and 22 of the excavation unit it is a compact clay floor with a coloration 10YR 7/3 very pale brown and 10YR 4/2 dark grayish brown product of its contact with ash and burning activities. The floor has a mean thickness of 1.5 cm.

S.U. 8.58: Hole

Located in the north east corner of sub-unit 17 is a semi-circular hole 12 cm long that contains sand and ash color 2.5Y 3/2 very dark grayish brown no cultural materials where recovered during excavation. The hole presented a depth of 17 cm.

S.U. 8.59: Hole

Located in the northeast corner of sub-unit 16 is a circular hole 20 cm of diameter that contains loose sand and ash color 2.5Y 3/2 very dark grayish brown. During excavation several small fire

cracked stones and fragmented botanical remains were recovered. The hole presents a depth of 20 cm.

S.U. 8.60: Hole

Located in sub-unit 16 is a semi- circular hole 12 cm long covered with loose sand and ash color 2.5Y 3/2 very dark grayish brown. During excavation no significant cultural remains were found, the depth of this hole was 12 cm.

S.U. 8.61: Basket

Located in the southwest corner of sub-unit 22 are the remains of a basket poorly preserved within a loose sandy with ash matrix color 2.5Y 3/2 very dark grayish brown. The basket is composed of twined *juncos* and among its fragments of wood were found. The basket remains also contained fragmented shell and plant remains.

S.U. 8.62: Hearth

Located in the southeast corner of sub-unit 17 it is an irregular shaped hearth 14 cm long containing compact ash and charcoal color 2.5Y 4/1 dark gray. The ash and charcoal is covered by a salt crust making difficult its excavation.

S.U. 8.63: Hole

Located between sub-units 21 and 22 is a semi-circular hole 9 cm of diameter that contains fine sand with ash color 2.5Y 3/2 very dark grayish brown. During excavation small fragmented shell fragments were recovered. It was 9 cm deep.

S.U. 8.64: Floor

Located in sub-units 16, 17, 21 and 22 in a continuous way is a compact clay floor 10YR 7/3 very pale brown. It is the third floor found in this unit (after floor 8.57 and 8.32) and has a mean thickness of 1.5 cm. A series of holes, possible postholes have been identified in its surface.

S.U. 8.65: Sand Layer

Located below floor 8.64 it extends continuously below it, is a layer composed of semi- compact sand and ash color 5Y 3/2 very dark grayish brown, it contains abundant cultural remains mainly fragmented shell and plants.

S.U. 8.66: Mat

Located in sub-units 12, 13, 14, 15 and 19 is a fragmented junco mat that is color 7.5Y 4/4 brown. The mat is fragmented in 6 pieces all of them regularly preserved.

S.U. 8.67: Hole

Located in sub-unit 12 is a circular hole of 18 cm of diameter and 11 cm deep, the hole contains sand color 2.5Y 3/2 very dark grayish brown and during excavation small fire cracked stones and fragmented cultural remains were recovered. This hole is located very near and probably is related to the mat 8.66.

S.U. 8.68: Hole

Located in sub-unit 18 is a semi-circular hole of 13 cm long with a depth of 12 cm containing loose sand and ash color 2.5Y 3/2 very dark grayish brown. During excavation fragmented pieces of *junco* were recovered.

S.U. 8.69: Hole

Located in sub-unit 12 is a semi-circular hole of 29 cm long that contains loose sand and ash color 2.5Y 3/2 very dark grayish brown. During excavation small fire cracked stones were recovered as well as plant and shell fragments.

S.U. 8.70: Hole

Located in sub-unit 12 is a circular hole of 15 cm of diameter with fire cracked stones in its surface. The hole is filled with loose sand and ash color 2.5Y 3/2 very dark grayish brown that contains fragmented shell, plants and fish bones.

S.U. 8.71: Hole

Located in sub-unit 13 is a circular hole that presents a diameter of 15 cm. In its borders presents fire cracked stones and contains loose sand and ash color 2.5Y 3/2 very dark grayish brown that contains fragmented shell, plants and fish bones.

S.U. 8.72: Hole

Located in sub-unit 13 is a circular hole of 18 cm of diameter with fire cracked stones in it edge.

The hole contains loose sand and ash color 2.5Y 3/2 very dark grayish brown that contains fragmented shell, plants and fish bones.

S.U. 6.73: Layer of sand and ash

Located in sub-units 16, 17 and 21 is a layer of about 1 cm thick composed of loose sand and ash color loose sand and ash color 2.5Y 3/2 very dark grayish brown that contains fragmented shell, plants and fish bones.

S.U. 8.74 (Hearth)

It is located in the sub-units 9 and 10, in the northeast of the unit. The hearth contains fine sand. It is an oval hearth; its orientation is from west to east. Its color is olive brown (2.5Y-4/3). It has *Tillandsia sp.*, botanical material (leaves and branches) and shell fragments. Inside, it is composed by ash with charred organic material like crustaceans and a piece of mammalian jaw.

S.U. 8.75 (Hole)

It is located between the sub-units 7 and 12, in the west of the unit. It contains fine sand and ash. It is an oval hole (from north to south) that has shell fragments on its surface (*Mesodesma donacium*). It is 11 cm depth. Possibly, it is an archaeological garbage deposit. Its color is dark grayish brown color (2.5Y-3/2).

S.U. 8.76 (Hole)

It is located in the sub-unit 8. It contains fine sand and ash. It is an oval hole on which surface there are few shell fragments as *Mesodesma donacium*. It is 10 cm depth. Maybe, it is an archaeological garbage deposit. Its color is dark grayish brown (2.5Y-3/2).

S.U. 8.77 (Hearth)

It is located in the center of the unit, in the sub-unit 18. It is an oval hole of color grayish brown (2.5Y-5/2). The ash color is very dark gray (2.5Y-5/2). In both sides and in the north there are two small circular holes. They are 4cm depth. On the surface there are charred fragments of crustaceans and *Mesodesma donacium*. The base of the hearth is composed by the floor S.U. 8.64, which color is from light yellowish brown (2.5Y-6/3) to dark grayish brown (2.5Y 3/2).

S.U. 8.78 (Hole)

It is located in the sub-unit 6. It is an oval hole that has several fire cracked stones on its surface and fine sand and ash. Its color is very dark grayish brown (10YR-3/2). It is 15 cm depth and it has 17 of diameter.

S.U. 8.79 (Hole)

It is located in the southwest corner of the sub-unit 17, south of hole 8.80 and west of hole 8.75. It is a semi- circular hole that has fire cracked stones on its surface that contains sand color dark grayish brown (2.5Y-4/2). It is 14 cm depth.

S.U. 8.80 (Hole)

It is located in the southwest of the sub-unit 7, north of 8.79 and northwest of hole 8.75. It is a semi-circular hole that has small fire cracked stones on its surface (each one is 3 cm width). It is 8 cm depth.

S.U. 8.81 (Hole)

It is located in the sub-unit 7. This small hole has a semi-circular shape with a fire-cracked stones on its surface. It contains fine sand and ash color dark grayish brown (10YR-3/2). It is 8 cm depth and has 8 cm of diameter).

S.U. 8.82 (Hole)

It is located in the sub-unit 3. It is a small hole that contains sand and ash. It has a semi-circular shape. Its color is very dark gray (2.5Y- 3/1). It is 14 cm depth.

S.U. 8.83 (Hole)

It is located in the sub-unit 14. It is a semi- circular hole that has some fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-3/2). It is 13 cm depth and 11 cm of diameter.

S.U. 8.84 (Hole)

It is located in the northwest corner of the sub-unit 14, toward the east of the unit. It is a circular hole filled with sand that has five small fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-4/2). It is 9 cm depth.

S.U. 8.85 (Hole)

It is located in the northwest of the sub-unit 14, toward the east of the unit. It is a semi- circular hole filled with fine sand that has four fire cracked stones and a valve of *Mesodesma donacium*. Its color is dark grayish brown (2.5Y-4/2). It is 6 cm depth.

S.U. 8.86 (Hole)

It is located between the sub-units 13 and 14 in the center of the unit. It is an oval hole (35 cm of diameter) filled with sand that has twenty eight fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-4/2). It is 7cm depth. In the center of this hole a complete *Concholepa choncholepa* valve was found.

S.U. 8.87 (Hole)

It is located in the sub-unit 19. It is an oval hole that has few fire cracked stones on its surface of color is very dark grayish brown (2.5Y-3/2). It is 12 cm depth and has 2 cm of diameter.

S.U. 8.88 (Hole)

It is located in the sub-unit 19. It is an oval hole that contains fine sand and ash with fire cracked stones on its surface. Its color is very dark grayish brown (2.5Y-3/2). It is 6 cm depth and has 17 cm of diameter.

S.U. 8.89 (Hole)

It is located in the sub-units 18 and 19. It is a circular hole containing fine sand that has three fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-4/2). It is 11 cm depth.

S.U. 8.90 (Hole)

This hole is associated with the ones described above. It is located in the sub-unit 12. It contains fine sand and ash.

S.U. 8.91 (Hole)

It is located in the north of the sub-unit 19. It is a circular hole filled with sand that has fire cracked stones and an incomplete valve of *Mesodesma donacium* on its surface. Its color is dark grayish brown (2.5Y-4/2). It is 11 cm depth.

S.U. 8.92 (Hole)

It is located in the center of the sub-unit 19. It is an oval hole that has fire cracked stones on its surface and sand. Its color is brown (10YR-5/3). It is 10 cm depth and has 15 cm of diameter.

S.U. 8.93 (Hole)

It is located in the sub-unit 19. It is a semi-circular hole containing fine sand with six fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-4/2).

S.U. 8.94 (Hole)

It is located between the sub-units 18 and 19 southeast of the unit. It is a semi-oval hole containing sand, with six fire cracked stones, valves of *Choromytilus chorus* and cotton on its surface. Its color is dark grayish brown (2.5Y-4/2). It is 8 cm depth.

S.U. 8.95 (Hole)

It is located in the center of the sub-unit 18, toward the south of the unit and in the northeast of the hearth 8.87. It is a circular hole filled with sand that has a fire cracked stone in the center. Its color is dark grayish brown (2.5Y-4/2).

S.U. 8.96 (Hole)

It is located in the sub-unit 18. It is an irregular hole filled with sand and ash that has two fire cracked stones on its surface. Its color is very dark grayish brown (2.5Y-3/2). It is 8 cm depth and has 13 cm of diameter.

S.U. 8.97 (Hole)

It is located between the sub-units 18 and 19. It is an oval hole filled with ash and sand that has a lot of fire cracked stones on its surface. Its color is very dark grayish brown (2.5Y-3/2). It is 14 cm depth and has 15 cm of diameter.

S.U. 8.98 (Hole)

It is located in the sub-unit 23. It is a semi- circular hole that has some fire cracked stones on its edges and contains sand and ash. Its color is very dark grayish brown (2.5Y-3/2). It is 20 cm depth and has 19 cm of diameter.

S.U. 8.99 (Hole)

It is located in the sub-unit 19. It is a semi-circular holes containing ash and sand that has fire cracked stones on its surface. Its color is very dark grayish brown (2.5Y-3/2). It is 5 cm depth and has 17 cm of diameter.

S.U. 8.100 (Hole)

It is located in the sub-unit 24. It is an oval hole filled with sand and ash, that has fire cracked stones and big pieces of gourd on its surface. Its color is very dark grayish brown (10YR-3/2). It is 15 cm depth and has 22 cm of diameter.

S.U. 8.101 (Hole)

It is located in the sub-unit 24. It is composed by sand and ash. It is a semi- circular hole that has four fire cracked stones on its surface. Its color is very dark grayish brown (10YR-3/2). It is 12 cm depth and has 13 cm of diameter.

S.U. 8.102 (Hole)

It is located between the sub-units 19 and 24, toward the southeast of the unit. It is composed by sand. It is a circular hole that has five fire cracked stones and a valve of *Mesodesma donacium*

on its surface. Its color is dark grayish brown (2.5Y-4/2). It is 12 cm depth and has 13 cm of diameter.

S.U. 8.103 (Hole)

It is located between the sub-units 19 and 20, toward the southeast of the unit. It is a circular hole that has ten fire cracked stones and valves of *Mesodesma donacium* and *Choromytilus chorus* on its surface. Its color is dark grayish brown (2.5Y-4/2). It is 12 cm depth and has 17 cm of diameter.

S.U. 8.104 (Hole)

It is located in the sub-unit 12. It is composed by sand and ash. It is a semi-circular hole that has no fire cracked stones on its surface. Its color is very dark grayish brown (10YR-3/2). It is 11 cm depth and has 8 cm of diameter.

S.U. 8.105 (Hole)

It is located in the sub-unit 12. It is composed by sand and ash. It is a small semi- circular hole that has no fire cracked stones on its surface. Its color is very dark grayish brown (10YR-3/2). It is 6 cm depth and has 7 cm of diameter.

S.U. 8.106 (Hole)

It is located in the sub-unit 12. It is composed by sand and ash. It is a small semi- circular hole that has no fire cracked stones on its surface. Its color is very dark grayish brown (10YR-3/2). It is 8 cm depth and has 7 cm of diameter.

S.U. 8.114 (Wood)

It is located in the southwest of the unit, in the south-center of the sub-unit 9. It is a wooden trunk on the floor (S.U. 8.36); its color is strong brown (7.5YR-5/8). It is composed by several small trunks. It has 4.5 cm of diameter.

During the excavation were identified six small trunks, one of them was separated to date. These trunks were deposited in a hole with 10 cm of diameter.

S.U. 8.115 (Wood)

It is located in the east of the unit, in the northeast of the sub-unit 6. It is a wooden trunk on the floor (S.U. 8.36); its color is strong brown (7.5YR-5/8). It has 3.5 cm of diameter.

During the excavation were identified seven small trunks. These trunks were deposited in a hole (21 x 13 cm) surrounded by a textile.

S.U. 8.116 (Hearth)

It is located in the northwest of the unit, in the sub-units 1 and 3. It is a hearth or a burning area containing ash color is dark grayish brown (2.5Y-3/2). It has a semi-circular shape. On its surface there are several fire cracked stones (from 4 to 9 cm of diameter), shell fragments and crustaceans.

During the excavation, it could be possible to know that under the hearth there were two elements: a post hole that had *Mesodesma donacium* as wedges (it is located toward the west of the S.U. 8.116) and an oval hole located toward the north of the S.U. 8.116 (these two elements are the following S.U. 8.117 and 8.118)

S.U. 8.117 (Hole)

It is located in the southeast of the unit, in the north-central part of the sub-unit 10. It is associated to the floor 8.36. It is circular (10 cm of diameter) and has six fire cracked stones surrounding the hole. Its color is dark grayish brown (2.5YR-4/2). During the excavation were found two big stones and its size changed, occupying part of the sub-unit 8.

S.U. 8.118 (Hole)

It is located in the southeast of the unit, in the southwest of the sub-unit 8. It is associated to the floor 8.36 and has a circular shape. There are five fire cracked stones on its surface. Its color is dark grayish brown (2.5YR-4/2). Inside it is composed by loose sand and fire cracked stones.

S.U. 8.119 (Hole)

It is located in the east of the unit in the sub-units 6 and 8. It is a circular hole. There are three fire cracked stones at the center of it. Its color is dark grayish brown (2.5Y-4/2). It is composed by loose sand. It contains has fire cracked stones, shell fragments, ichthyologic and botanical remains.

S.U. 8.120 (Hole)

It is located in the center of the unit in the north-central part of the sub-unit 6. It is a circular hole that has four fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-4/2). It is composed by fine sand. Inside it has six fire cracked stones. It has 0.13 m of diameter.

S.U. 8.121 (Hole)

It is located in the south of the unit in the central part of the sub-unit 7. It is a circular hole that has three fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-4/2). Inside it has a fire cracked stone.

S.U. 8.122 (Hole)

It is located in the southeast of the unit in the northwest side of the sub-unit 4. It is a circular hole that has two fire cracked stones on its surface. Its color is dark grayish brown (2.5Y-4/2). It is composed by sand and ash. It has 0.10 m of diameter.

S.U. 8.123 (Hole)

It is located in the south of the unit in the north side of the sub-unit 9. It is a circular hole that has a fire cracked stone on its surface. Its color is dark grayish brown (2.5Y-4/2). Inside it has angled fire cracked stones and its walls are covered by compact mud. It has 0.14 m of diameter.

S.U. 8.124 (Hole)

It is located in the northwest of the unit, in the northwest corner of the sub-unit 1. It is a circular hole (0.30 m of diameter). Its color is dark grayish brown (2.5Y-3/2). It is associated to the floor 8.36.

S.U. 8.36 (Floor)

It is located in the entire unit. It is an irregular clay floor on which surface there are fire cracked stones (they have 4 or 8 cm of diameter). This floor is associated with fourteen postholes (three

of them had wood remains). On its surface there are fragmented valves of *Mesodesma donacium* as traces of use. Its color is grayish brown (2.5Y-5/2).

S.U. 8.125 (Hole)

It is located in the west of the unit, in the northwest side of the sub-unit 6. It is a circular hole that is associated to the floor 8.36. On its surface there are fire cracked stones. Its color is brown (10YR-4/3). Inside, there were fourteen fire cracked stones. It has 0.14 m of diameter.

S.U. 8.126 (Hole)

It is located in the east of the unit, in the center of the sub-unit 14. It is a circular post hole (16 cm of diameter) which surface is traced by six angled fire cracked stones (from 3 to 7 cm length). It is composed by fine sand in color brown (10YR-4/3). It is 0.25 m depth.

S.U. 8.127 (Floor)

It is located in the north of the unit, in the sub-units 1, 2, 3, 4, 5 and 6. On its surface there are valves of *Mesodesma donacium* as traces of use. It does not have associated holes. Its color is dark yellowish brown (10YR-4/4). In the south of the unit, there is another floor (S.U. 8.32) that goes under the S.U. 8.127. This new floor was registered as the S.U. 8.127A. The floor located in the north zone of the unit (sub-units 1, 2, 3, 4 and 5) was registered as the S.U. 8.127B. It has compact consistency. Its color is light olive brown (2.5Y-5/4). In some parts it darkens because of an ash layer that covered it.

S.U. 8.4 (Sand layer)

It is uniformly located in the north-central part of the unit, in the sub-units 1, 2, 3, 4, 5 and 6. It is composed by sand and is the previous deposition of the floor 8.32. In the south there is a concentration of clams (1 m of diameter).

S.U. 8.128 (Hole)

It is located in the southeast of the unit, in the southeast corner of the sub-unit 8. It is a circular post hole that has seven fire cracked stones surrounding its surface its color is dark grayish brown (2.5Y-4/2). It has 0.10 m of diameter and is 28 cm depth.

S.U. 8.129 (Hole)

It is located in the south of the unit, in the center of the sub-unit 10. It is an elliptical hole that has four fire cracked stones and fragments of compact saltpeter its color is dark grayish brown (2.5Y-4/2). Inside it is composed by botanical and malacological materials. It has 0.20 m of diameter.

S.U. 8.130 (Hole)

It is located in the center of the unit, in the north-central part of the sub-unit 13. On its surface it has four fire cracked stones and botanical material. Its color is dark redish brown (2.5YR-3/4), turning gray. Inside it has twelve fire cracked stones. It has 0.20 m of diameter.

S.U. 8.131 (Hole)

It is located in the south-central part of the unit, in the north-central part of the sub-unit 18. It is an irregular hole that has six fire cracked stones and botanical and malacological materials on its surface. Its color is dark reddish brown (2.5YR-3/4). Inside it has five fire cracked stones. It has 0.15 m of diameter.

S.U. 8.132 (Hole)

It is located in the north-central part of the unit, in the center of the sub-unit 8. On its surface there is botanical material. Its color is dark reddish brown (2.5YR-3/4). It has an oval shape and 0.26 m of diameter.

S.U. 8.133 (Hole)

It is located in the south of the unit, in the sub-unit 9. It is a circular hole that has two angled stones (0.05 m width each one) and botanical material on its surface. Its color is dark grayish brown (2.5Y-4/2). It has 0.13 m of diameter.

S.U. 8.134 (Hole)

It is located in the northwest of the unit, in the sub-units 2 and 7. On its surface there are five angled fire cracked stones. Its color is dark grayish brown (2.5Y-4/2). It is composed by loose sand and angled fire cracked stones. It has 0.16 m of diameter.

S.U. 8.135 (Hole)

It is located in the north of the unit, in the north-central part of the sub-unit 7. It is a circular hole that has two angled stones (4 and 5 cm length), botanical and malacological materials on its surface. Inside it has human hair tied with junco ropes (was taken a sample for analyses). It has 0.13 m of diameter.

S.U. 8.136 (Hole)

It is located in the west of the unit, in the south-central part of the sub-unit 6. On its surface it has small angled stones, botanical and malacological materials. Its color is very dark grayish brown (2.5Y-3/2). Inside it has angled fire cracked stones. It has 0.12 m of diameter and is 0.13 m depth.

S.U. 8.137 (Hole)

It is located in the west of the unit, in the south-central part of the sub-unit 6. It is a circular hole that has fragments of gourd and organic material on its surface. Its color is very dark grayish brown (2.5Y-3/2). It has 0.14 m of diameter. No fire cracked stones were found.

S.U. 8.138 (Hole)

It is located in the west of the unit, in the southwest of the sub-unit 7. It is a circular hole that has four angled stones (from 4 to 5 cm x 3 cm) and shell fragments on its surface. Its color is dark grayish brown (2.5Y-4/2). It has 0.12 m of diameter and is 0.10 m depth.

S.U. 8.139 (Hole)

It is located in the west of the unit, in the southwest part of the sub-unit 7. It is a circular hole that has six angled stones (from 4 to 5 cm width) and shell fragments (*Mesodesma donacium*) on its surface. Its color is dark grayish brown (2.5Y-4/2). It has 0.10 m of diameter and is 0.07 m depth.

S.U. 8.140 (Hole)

It is located in the center of the unit, in the center of the sub-unit 12. It is an oval hole (0.24 x 0.14 m) that has three angled stones (0.05 m width), a round cobble (0.05 m of diameter) and few botanical materials on its surface. Its color is dark grayish brown (2.5Y-3/2). It is 9 cm depth.

S.U. 8.141 (Hole)

It is located in the west of the unit, between the sub-units 11 and 12. It is a circular hole that has four angled stones on its surface. Its color is dark grayish brown (2.5Y-3/3). Inside it has nine fire cracked stones, organic and botanical materials. It has 0.14 m of diameter.

S.U. 8.142 (Hole)

It is located in the west of the unit, in the center of the sub-unit 11. It is an oval hole that has angled stones, botanical and malacological materials on its surface. Its color is dark grayish brown (2.5Y-3/3). Inside, it has eight small fire cracked stones, organic and botanical materials. It has 0.20 m of diameter.

S.U. 8.143 (Hole)

It is located in the west of the unit, in the northwest side of the sub-unit 11. It is a circular hole that has botanical material on its surface. Its color is dark grayish brown (2.5Y-3/3). It has 0.14 m of diameter. No fire cracked stones were found.

S.U. 8.144 (Hole)

It is located in the west of the unit and of the sub-unit 11. It is a circular hole that has four angled stones (0.03 m width) on its surface. Its color is dark grayish brown (2.5Y-4/2). It has 0.12 m of diameter and is 0.13 m depth.

S.U. 8.145 (Hole)

It is located in the west of the unit, between the sub-unit 11 and 16. It is a circular hole that has four angled stones (3 cm width) on its surface. Its color is dark grayish brown (2.5Y-4/2). It has 0.10 m of diameter and is 0.09 m depth.

S.U. 8.146 (Hole)

It is located in the southwest of the unit, in the north of the sub-unit 16. It is a circular hole that has two angled stones (4 cm width) on its surface. Its color is dark grayish brown (2.5Y-4/2). It has 0.13 m of diameter and is 0.07 m depth.

S.U. 8.147 (Hole)

It is located in the west-central part of the unit, between the sub-units 11, 12, 16 and 17. It is an oval hole that has stones and *juncos* remains on its surface. Its color is grayish brown (2.5Y-4/2). Inside, it has four angled fire cracked stones.

S.U. 8.148 (Hole)

It is located in the southwest of the unit, in the southwest corner of the sub-unit 17. It is an oval hole that has an angled stone (0.07 m width) on its surface. Its color is grayish brown (2.5Y-4/2). Inside, it has a fire cracked stones.

S.U. 8.149 (Hole)

It is located in the southwest of the unit, in the southwest corner of the sub-unit 21. It is a circular hole that has five angled stones (6 cm width) on its surface. Its color is grayish brown (2.5Y-4/2). It is 0.09 m depth.

S.U. 8.150 (Hole)

It is located in the southwest of the unit, in the northwest part of the sub-unit 22. It is a circular hole that has two rounded and one angled stones. Its color is very dark grayish brown (2.5Y-3/2). It has 0.17 m of diameter and is 0.10 m depth.

S.U. 8.151 (Hole)

It is located in the south of the unit, between the sub-units 22 and 23. It is an oval hole that has a stone on its surface. Its color is dark grayish brown (2.5Y-4/2). Inside, it has three angled fire cracked stones.

S.U. 8.152 (Hole)

It is located in the south of the unit, in the southwest corner of the sub-unit 18. On its surface it has two angled fire cracked stones and cotton yarns. Its color is dark grayish brown (2.5Y-4/2). Inside it has two angled stones.

S.U. 8.153 (Hole)

It is located in the southwest part of the sub-unit 13. It is a circular hole (0.10 m of diameter) that has charred botanical material on its surface. It contains ash and sand color very dark grayish brown (2.5Y-3/2).

S.U. 8.154 (Hearth)

It is located in the northwest of the unit, in the center of the sub-unit 6. It is an oval hearth (0.30 x 0.25 m) that has an external lining composed by cooked clay in light yellowish brown color (2.5Y-3/1). It is 0.20m depth. No organic material was found on its surface.

S.U. 8.155 (Hearth)

It is located in the west of the unit, in the west of the sub-unit 12. It is an oval hearth (0.46 x 0.27 m) that has an external lining composed by cooked clay in olive yellow color (2.5Y-6/6). It

contains sand and ash color very dark grayish brown (2.5Y-3/2). It is 0.30 m depth. During the excavation were found two burning levels: the first one is 0.04m thick and its color is gray; the second one is 0.05 m thick and its color is dark gray. In the west it is intruded by a hole.

S.U. 8.156 (Hole)

It is located in the south of the unit and of the sub-unit 17. It is an oval hole (0.36 x 0.24 m) that has malacological material on its surface. Its color is grayish brown (2.5Y-5/2). It is 0.09 m depth.

S.U. 8.157 (Hole)

It is located in the southwest of the unit and of the sub-unit 16. It is a circular hole that has four angled stones and a fragment of saltpeter on its surface. Its color is dark grayish brown (2.5Y-4/2). Inside it has fifteen small angled stones (0.06 m thick). It has 0.20 m of diameter.

S.U. 8.158 (Hole)

It is located in the southwest corner of the unit, in the southeast side of the sub-unit 21. It is a circular hole that has three stones on its surface. Its color is dark grayish brown (2.5Y-4/2). Inside, it has three small angled stones (from 3 to 4 cm width). It has 0.19 cm of diameter. The base of the hole is composed by another floor.

S.U. 8.159 (Hole)

It is located in the south of the unit, in the center of the sub-unit 23. It is a circular hole that has four angled stones, a fragment of saltpeter and shell fragments on its surface. Its color is dark

grayish brown (2.5Y-4/2). It has 0.19 m of diameter and is 0.12m depth. Inside, it has thirteen angled fire cracked stones and a fragment of saltpeter.

S.U. 8.160 (Hole)

It is located in the southeast of the unit, in the north-central part of the sub-unit 19. It is a circular hole whose contents are color very dark grayish brown (2.5Y-3/2). It has 0.14 m of diameter.

S.U. 8.161 (Hole)

It is located in the southeast corner of the unit, in the northeast side of the sub-unit 10 (previous Unit 8B). This hole has no materials on its surface. It has 0.13 m of diameter. Its color is reddish brown (2.5Y-4/4) possibly the base of the hole is composed by another floor.

S.U. 8.162 (Hole)

It is located in the southeast of the unit, in the southwest of the sub-unit 8 (previous Unit 8B). This hole has no materials on its surface. Its color is reddish brown (2.5Y-4/4). Inside, it has three medium angled stones (0.06 x 0.03 m). It has 0.15 m of diameter and is 0.24 m depth.

S.U. 8.163 (Hole)

It is located in the southeast of the unit, in the south-central part of the sub-unit 8 (previous Unit 8B). It is a circular hole (0.08 m of diameter) with no material on its surface. Its color is reddish brown (2.5Y-4/4). Possibly, the base of the hole is composed by another floor.

S.U. 8.163 (Hole)

It is located in the southeast of the unit, in the center of the sub-unit 8 (previous Unit 8B). It is an elliptical hole (0.20 m of diameter) that has no material on its surface. Its color is redish brown (2.5Y-4/4). It has two levels at the base (two floors).

S.U. 8.165 (Hole)

It is located in the southeast of the unit, in the center of the sub-unit 7 (previous Unit 8B). It is a circular hole (0.14 m of diameter) that has no material on its surface. Its color is redish brown (2.5Y-4/4). It is composed by sand and ash. The base of the hole is composed by a floor (the same color of the S.U. 8.64)

S.U. 8.166 (Hole)

It is located in the southeast of the unit, in the southwest of the sub-unit 7 (previous Unit 8B). It is a circular hole (0.13 m of diameter) that has no material on its surface. Its color is reddish brown (2.5Y-4/4). The base of the hole is composed by a floor as the other holes.

S.U. 8.167 (Hole)

It is located in the southeast of the unit, in the southwest corner of the sub-unit 7 (previous Unit 8B). It is an oval hole (0.16 x 0.12 m) that has no material on its surface. Its color is reddish brown (2.5Y-4/4).

S.U. 8.168 (Hole)

It is located in the southeast of the unit, in the west-central part of the sub-unit 20. It is a circular hole (0.12 m of diameter) that has no material on its surface. Its color is reddish brown (2.5Y-4/4). Inside it has two small angled stones. The base of the hole is composed by a floor as the other holes.

S.U. 8.169 (Hole)

It is located in the southeast of the unit, in the center of the sub-unit 20. It is a circular hole (0.13 m of diameter) that has four angled stones on its surface (0.05 m thick). Its color is reddish brown (2.5Y-4/4). Inside it has four small angled fire cracked stones (from 5 to 6 cm thick).

S.U. 8.170 (Hole)

It is located in the southeast of the unit, in the sub-unit 20. It is an elliptical hole (0.19 m of diameter) that has no material on its surface. Its color is reddish brown (2.5Y-4/4). Inside, it has sixteen angled fire cracked stones and a cobble with ash remains.

S.U. 8.174 (Hole)

It is located in the southeast corner of the unit and of the sub-unit 25. It is a circular hole (0.20 m of diameter) that has four angled stones on its surface (6 x 3cm). Its color is reddish brown (2.5Y-4/4). Inside it has seventeen small fire cracked stones and its base is composed by compact saltpeter.

S.U. 8.176 a (Hole)

It is located in the northeast of the unit and of the sub-unit 9. It is a circular hole that has no stones on its surface. Its color is dark reddish brown (2.5YR- 3/3). Inside, it has a small angled stone surrounded by malacological, ichthyologic and botanical materials.

S.U. 8.176 b (Hole)

It is located in the southeast of the unit, in the northeast of the sub-unit 21. It is a circular hole that has a stone on its surface (5 x 2 x 12 cm). Its color is dark reddish brown (2.5YR-3/3). Inside it has three angled fire cracked stones, malacological and botanical materials. In the base it has two stones. It is 0.10 m depth.

S.U. 8.177 (Hole)

It is located in the southwest of the unit, in the southeast corner of the sub-unit 21. It is a circular hole (0.10 m of diameter) with shell fragments on its surface. Its color is dark redish brown (2.5YR-3/3). Inside, it has malacological and botanical materials. It is 8 cm depth.

S.U. 8.178 (Hole)

It is located in the southwest corner of the unit, in the southeast corner of the sub-unit 21. It is a circular hole (0.12 m of diameter) that has four small angled stones on its surface. Its color is dark reddish brown (2.5YR-3/4). Inside, it has fourteen small angled fire cracked stones (from 3 to 5 cm thick), malacological, botanical and lithic materials. It is 0.16 m depth.

S.U. 8.179 (Hole)

It is located in the southwest of the unit and of the sub-unit 16. It is an oval hole (15 to 25 cm) that has an angled stone on its surface (6 x 6 x 20 cm). Its color is dark reddish brown (2.5YR-3/3). Inside it has malacological and botanical materials, and an angled stone. It is 9 cm depth.

S.U. 8.180 (Hole)

It is located in the west-central part of the unit, in the northeast corner of the sub-unit 16. It is a circular hole (0.16 m of diameter) that has two angled stones and shell fragments on its surface. Its color is reddish brown (2.5YR-4/3). Inside it has six small angled stones (from 4 to 6 cm thick), malacological and botanical materials. The base of the hole is composed by a floor (S.U. 8.32). It is 0.12 m depth.

S.U. 8.181 (Hole)

It is located in the southwest of the unit, in the northwest corner of the sub-unit 16. It is a circular hole (0.10 m of diameter) that has malacological, botanical and ichthyologic materials inside. Its color is dark reddish brown (2.5YR-3/3). It is 5 cm depth.

S.U. 8.182 (Hole)

It is located in the west of the unit, in the northeast corner of the sub-unit 11. It is a circular hole (0.14 m of diameter) that has two angled stones and shell fragments on its surface. Its color is reddish brown (2.5YR-4/3). Inside, it has five small angled stones (from 4 to 6 cm thick). It is 0.18 m depth.

S.U. 8.183 (Hole)

It is located in the west of the unit, in the north corner of the sub-unit 11. It is a circular hole (0.12 m of diameter) that has a medium angled stone, malacological, botanical and ichthyologic materials inside. Its color is dark reddish brown (2.5YR-3/3). It is 13 cm depth.

S.U. 8.184 (Hole)

It is located in the west of the unit, in the east-central part of the sub-unit 11. It is a circular hole (0.16 m of diameter) that has no material on its surface. Its color is reddish brown (2.5YR-4/3). Inside, it has seven angled stones (from 5 to 9 x 5 cm) and shell fragments. It is 0.20 m depth.

S.U. 8.185 (Hole)

It is located in the northwest side of the unit, in the southeast corner of the sub-unit 6. It is a circular hole (5 x 10 cm of diameter) that has a medium angled stone, malacological, ichthyologic and botanical materials inside. Its color is dark reddish brown (2.5YR-3/3). It is 17 cm depth.

S.U. 8.186 (Hole)

It is located in the southwest side of the unit, in the north-central part of the sub-unit 21. It is an oval hole (26 x 20 cm) that has three angled stones on its surface. Its color is dark gray (10YR-4/1). Inside it has sixteen medium fire cracked stones, malacological and botanical materials. It is 14 cm depth.

S.U. 8.187 (Hole)

It is located in the west of the unit, in the west-central part of the sub-unit 11. It is an oval hole (18 cm of diameter) that has malacological and botanical materials on its surface. Its color is dark reddish brown (2.5YR-3/3). Inside it has malacological and botanical materials. It is 15 cm depth.

S.U. 8.188 (Hole)

It is located in the west of the unit, in the west-central part of the sub-unit 11. It is a circular hole (0.19 m of diameter) that has four angled stones on its surface. Its color is dark reddish brown (2.5YR-3/4). Inside, it has forty three angled fire cracked stones (sizes from 3 to 7 cm long), malacological and botanical materials. It is 0.22 m depth.

S.U. 8.189 (Burn area)

It is located in the southwest of the unit, in the northeast corner of the sub-unit 16. It is a small burn area associated to the floor 8.57 and close to one of the holes. On its surface there are shell fragments and botanical material. It has 0.55 m of diameter. Its color is very dark red (2.5YR-2.5/2). A controlled sample of 1 mm was taken.

S.U. 8.190 (Basket)

It is located in the west side of the unit, in the south-central part of the sub-unit 21. This basket (18 cm of diameter) is made of reed that has inside reed, malacological, botanical and ichthyologic materials, animal bones, cotton threads. It was impossible to identify the elaboration technique because of its poor preservation.

S.U. 8.191 (Hole)

It is located in the west side of the unit, in the southeast side of the sub-unit 1. It is a circular hole (0.20 m of diameter) that has four fire cracked stones, malacological and botanical materials on its surface. Its color is dark gray (2.5YR-4/1). Inside it has nine fire cracked stones, malacological and ichthyologic materials. It is 12cm depth.

S.U. 8.192 (Hole)

It is located in the west side of the unit, in the south-central part of the sub-unit 1. On its surface it has two angled stones. Its color is dark reddish gray (2.5YR-4/1). Inside, it has malaocological and botanical materials. It has 0.20 m of diameter.

S.U. 8.193 (Hole)

It is located in the west side of the unit, in the southeast of the sub-unit 6. It is a circular hole (14 x 17cm of diameter) that has two angled stones (4 x 4 cm) on its surface. Its color is very dark grayish brown (10YR-3/2). Inside, it has six fire cracked stones, malacological, botanical and ichthyologic materials. It is 18cm depth.

S.U. 8.194 (Hole)

It is located in the west side of the unit, in the north-central part of the sub-unit 11. It is a circular hole (12 x 15cm of diameter) that has three stones (2 x 7 cm) on its surface. Its color is dark reddish gray (10R-3/1). Inside, it has five fire cracked stones (4 x 7 cm), malacological, botanical and ichthyologic materials and crustaceans. It is 12 cm depth.

S.U. 8.195 (Hole)

It is located in the west side of the unit, in the north-east side of the sub-unit 11. It is a circular hole (0.16m of diameter) that has a stone (3 x 4cm) on its surface. Its color is dark reddish gray (10R-3/1). Inside, it has twelve medium fire cracked stones (4 x 7 cm), malacological and botanical materials. It is 19 cm depth.

S.U. 8.196 (Hole)

It is located in the west of the unit, in the northeast corner of the sub-unit 16. It is a circular hole (0.14 m of diameter) that has shell fragments, botanical material and a round stone on its surface. Its color is reddish brown (2.5YR-4/3). Inside, it has four small angled stones. It is 0.10 m depth.

S.U. 8.197 (Hole)

It is located in the west of the unit, in the west-central part of the sub-unit 16. It is a circular hole that has seven stones on its surface. Its color is dark reddish brown (2.5YR-3/4). Inside, it has twenty eight small angled fire cracked stones (0.12 m of diameter each one).

S.U. 8.198 (Hole)

It is located in the west of the unit, in the southwest corner of the sub-unit 16. It is a circular hole (0.15 m of diameter) that has three medium stones on its surface. Its color is reddish brown (2.5YR-4/3).

S.U. 8.199 (Hole)

It is located in the west of the unit, in the southeast corner of the sub-unit 16. It is a circular hole (0.19 m of diameter) that has a stone, shell fragments and botanical material on its surface. Its color is dark reddish brown (2.5YR-3/4). Inside it has fifteen small angled fire cracked stones (from 4 to 6cm). It is 0.28 m depth.

S.U. 8.200 (Hole)

It is located in the southwest corner of the unit and of the sub-unit 21. It is a circular hole (0.14 m of diameter) that has four small stones on its surface. Its color is reddish brown (2.5 YR-4/3). Inside, it has four small angled fire cracked stones and wood remains (possibly it is a basket).

S.U. 8.201 (Hole)

It is located in the west side of the unit, in the northwest side of the sub-unit 21. It is a circular hole (0.20 m of diameter) that has eleven medium fire cracked stones and shell fragments inside. Its color is reddish brown (2.5 YR-4/3). It is 0.16 m depth.

S.U. 8.202 (Hole)

It is located in the west-central part of the unit, in the southeast corner of the sub-unit 14. It is a circular hole (0.11 m of diameter) that has no material on its surface. Its color is reddish brown (2.5 YR-4/3). Possibly, the base of the hole is the floor 8.32.

S.U. 8.203 (Hole)

It is located in the west of the unit, in the southeast corner of the sub-unit 14. On its surface there are stones. Its color is reddish brown (2.5 YR-4/3). Inside, it has four angled stones. Possibly, the base of the hole is the floor 8.32. It has 0.14 m of diameter and is 0.09 m depth.

S.U. 8.204 (Hole)

It is located in the west-central part of the unit, in the northwest corner of the sub-unit 19. It is a circular hole (0.12 m of diameter) that has shell fragments on its surface. Its color is reddish brown (2.5YR-4/4). The base is composed by saltpeter.

S.U. 8.205 (Hole)

It is located in the northeast corner of the unit, in the southeast corner of the sub-unit 14. On its surface there is a medium angled stone. Its color is reddish brown (2.5YR-4/4). Inside, it has an angled stone (0.1 0m length) and saltpeter.

S.U. 8.206 (Hole)

It is located in the east of the unit, in the east-central part of the sub-unit 20. It is a circular hole (0.18 m of diameter) that has botanical material and a stone on its surface. Its color is reddish brown (2.5YR-4/4). Inside, it has two small angled stones (from 3 to 5cm thick) and saltpeter. It is 0.18 m depth.

S.U. 8.207 (Hole)

It is located in the east of the unit, in the north-central part of the sub-unit 15. It is a circular hole (20 x 16 cm of diameter) that has two medium stones on its surface. Its color is dark grayish brown (10YR-4/2). Inside, it has eight medium fire cracked stones (7 x 8 cm), malacological and ichthyologic materials, and saltpeter. It is 0.16 m depth.

S.U. 8.208 (Hole)

It is located in the east of the unit, in the northeast corner of the sub-unit 15. It is a circular hole (0.16 m of diameter) that has a wooden trunk (12cm length) and medium stones on its surface. Inside it has two medium fire cracked stones (10 x 6cm), malacological and ichthyologic materials. It is 10cm depth.

S.U. 8.209 (Sand layer)

It is located in the east side of the unit, in the sub-units 19, 20, and 24. It has regular texture; on its surface there are few shell fragments, cotton threads and saltpeter. Its color is strong brown (7.5YR-4/6).

S.U. 8.210 (Hole)

It is located in the southeast of the unit, in the southeast of the sub-unit 16. It is a circular hole (0.16m of diameter) that has no material on its surface. Its color is grayish brown (2.5YR-5/2). Inside, it has three small fire cracked stones, malacological and ichthyologic materials. It is 14cm depth.

S.U. 8.211 (Hole)

It is located in the northeast corner of the unit, in the southeast corner of the sub-unit 5. It is a circular hole (0.18 m of diameter) that has four angled stones (5 cm length), malaocological and botanical materials on its surface. Its color is dark reddish brown (2.5 YR-3/3). Inside, it has eleven angled fire cracked stones and a piece of animal bone. It is 0.14 m depth.

S.U. 8.212 (Hole)

It is located in the east-central part of the unit, in the south-central part of the sub-unit 15. It is a small circular hole (0.2 m of diameter) that has botanical material on its surface. Its color is dark grayish brown (10YR-4/2). It has two levels: the first one is composed by two fire cracked stones, botanical material and pieces of basketry. It is 28 cm depth.

S.U. 8.213 (Burn area)

It is located in the northeast corner of the unit, in the east of the sub-units 5 and 10. This burn area (0.80 x 0.44 m) has shell fragments, botanical material and small angled stones. Its color is very dark grayish brown (2.5YR-3/2). A controlled simple of 1mm was recovered.

S.U. 8.214 (Hole)

It is located in the northeast corner of the unit, in the center of the sub-unit 5. It is a circular hole (0.17 cm of diameter) that has five angled stones (5 cm length), malacological and botanical materials on its surface. Its color is reddish brown (2.5YR-4/3). Inside, it has six angled stones (6 x 4 cm). It is 0.14 m depth.

S.U. 8.215 (Hearth)

It is located in the east of the unit, in the north-central part of the sub-unit 14. On its surface there are stones, saltpeter, malacological and botanical materials. It has 45 cm of diameter. Its color is dark gray (10YR-4/1). Inside, it has twelve fire cracked stones, whole and fragmented shells. Also, it presents two holes (one in the northwest and the other in the south-central side) and a gourd.

S.U. 8.216 (Hole)

It is located in the east side of the unit, in the center of the sub-unit 14, within the hearth (S.U. 8.215). It is a circular hole (0.18 m of diameter) that has pieces of gourd on its surface. Its color is dark brown (10YR-3/3). Inside, it has a small piece of wood that divided the hole in two: 216 A and 216 B. In 216 A there are three fire cracked stones. It is 0.15 m depth and has 0.36 m of diameter. In 216 B there is a small basket, under the basket there are eight fire cracked stones and under them there is a textile (10 x 12 cm). It is 0.14 m depth. These two holes are inserted in the hearth S.U. 8.215.

S.U. 8.217 (Hole)

It is located in the east side of the unit, in the northwest side of the sub-unit 10. It is a circular hole (0.20 m of diameter) that has three medium angled stones and a complete shell (*Fissurella* sp.) on its surface. Its color is grayish brown (2.5YR-5/2). Inside, it has twenty two fire cracked stones, saltpeter, whole and fragmented shells and botanical material. It is 23 cm depth.

S.U. 8.218 (Hole)

It is located in the east side of the unit, in the center of the sub-units 9 and 10. It is a circular hole (0.23 m of diameter) that has four small angled stones and a piece of textile on its surface. Its color is grayish brown (2.5 YR-5/2). Inside, it has thirteen fire cracked stones, saltpeter, shell fragments, botanical material and a textile (7 x 10 cm). It is 9 cm depth.

S.U. 8.219 (Hole)

It is located in the north-central part of the unit, in the southwest corner of the sub-unit 9. It is a circular hole (0.15 m of diameter) that has four medium angled stones and shell fragments on its surface. Its color is light olive brown (2.5YR-5/4).

S.U. 8.220 (Hole)

It is located in the east-central part of the unit, in the southwest corner of the sub-unit 15. It is a circular hole (0.14 m of diameter) that has two angled stones on its surface. Its color is dark reddish brown (2.5YR-3/3). Inside, it has eleven angled fire cracked stones. It is 0.16 m depth.

S.U. 8.221 (Hole)

It is located in the east of the unit, in the east-central part of the sub-unit 9. It is a circular hole (0.14 m of diameter) that has shell fragments and botanical material on its surface. Its color is reddish brown (2.5YR-4/3). Inside, it has three small angled stones. It is 0.15 m depth.

S.U. 8.222 (Hole)

It is located in the southeast corner of the unit, in the center of the sub-units 24 and 25. It is a circular hole (0.19 m of diameter) that has an angled stone (0.04 m thick) and saltpeter. Its color is dark reddish brown (2.5YR-3/4). Inside, it has sixteen angled fire cracked stones and three pieces of saltpeter. It is 0.26 m depth.

S.U. 8.223 (Hole)

It is located in the southeast corner of the unit, in the southeast corner of the sub-unit 25. On its surface there is a round stone. Its color is dark reddish brown (2.5YR-4/4). Inside, it has thirteen medium angled fire cracked stones (from 4 to 6 cm thick). It is 18 cm depth.

UNIT 9

Location:

UTM Coordinates: NW Corner: 8'761,769N / 217,598E

Datum: PSAD56 NE Corner: 8'761,796N / 217,603E

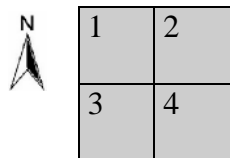
SW Corner: 8'761,791N / 217,598E

SE Corner: 8'761,791N / 217,603E

Unit Description:

The Unit 6A is a northern expansion of Unit 6A and has an area of 25 m² (5 x 5 m). For recording purposes the unit was divided in 1 x 1 m sub-units numbered from 1 to 25. The unit presents a homogenous surface with the presence of a cobble alignment located on its E side. The entire surface is covered with modern debris.

The excavation was done in two field seasons the first one from November 2005 to June 2006 and the second one from January 2007 to July 2007. A total of 211 stratigraphic units were recorded.



Description of the Stratigraphic Units:

S.U. 9.01 (Surface)

It is composed by loose sand and small stones. Its color is dark gray (2.5Y-4/1). It has a lot of shell fragments and modern *junco* remains.

S.U. 9.02 (Sand and ash layer)

It is located in the south and in the northwest of the unit. It is composed by fine sand and ash with irregular texture and semi-compact consistency. Its color is dark gray (2.5Y-3/1). It has small shell fragments with traces of burning and medium fire cracked stones.

S.U. 9.03 (Sand layer)

It is located in the north of the unit, in the sub-units 1 and 2. It is as semi-compact layer with irregular texture, composed by fine sand and small stones. Its color is olive brown (2.5Y-4/3). It is composed by small shell fragments.

S.U. 9.04 (Pit)

It is located in the sub-unit 4. It has 30 cm of diameter. It contains fine loose sand and small stones. Its color is gray (2.5Y-5/1). It has shell fragments.

S.U. 9.05 (Pit)

It is located in the center of the unit, in the sub-units 1, 2, 3 and 4. It contains semi- compact fine sand and medium and big stones, some of them have traces of burning and are fire cracked. Its

color is gray (2.5Y-6/1). On its surface there are whole and fragmented shells, and botanical remains.

S.U. 9.06 (Posthole)

It is located in the east of the unit. It is a post hole that has inside fine loose sand with small stones. On its surface it has some botanical remains and shell fragments. Its color is dark olive brown (2.5Y-3/3).

S.U. 9.07 (Sand layer)

It is located in the sub-unit 1. It is composed by fine loose sand and very small stones. Its color is very dark grayish brown (2.5Y-3/2). It has shell fragments, botanical remains and ichthyologic material that have traces of burning.

S.U. 9.08 (Sand and ash layer)

It is located in the northeast corner of the unit, in the sub-unit 2. It is composed by fine sand, ash and charcoal with semi- regular texture. Its color is black (5Y-2.5/1). It has charred shell fragments and botanical material.

S.U. 9.09 (Sand lens)

It is located in the sub-unit 3. It has an irregular shape. It is composed by loose sand in color light olive brown (2.5Y-5/3). It has few shell fragments, botanical and ichthyologic materials.

S.U. 9.10 (Sand layer)

It is located in the north-central part of the unit, in the sub-units 1 and 2. It is composed by loose sand with semi- regular texture. Its color is dark grayish brown (2.5Y-3/2). It has fire cracked stones, whole and fragmented shells, ichthyologic and botanical materials.

S.U. 9.11 (Sand and ash layer)

It is located in the entire unit. It is composed by sand and ash in dark gray color (5Y-4/1). It has regular texture. It has gravel, a lot of charred fragmented shells, small and medium fire cracked stones, charcoal and ichthyologic materials.

S.U. 9.12 (Saltpeter layer)

It is located in the southwest corner of the sub-units 1, 3 and 4. It has irregular edges and semi-compact consistency because of the saltpeter. On its irregular surface there are medium stones with traces of burning. It has *Mesodesma donacium*. Its color is grayish brown (2.5Y-5/2).

S.U. 9.13 (Sand, ash and silt layer)

It is located in the southwest corner of the unit, in the sub-units 1, 3 and 4. It is a very compact layer in dark gray color (2.5Y-4/1). It is composed by sand, silt and ash. It has angled stones, some small and medium round cobbles with traces of burning and a lot of shells (*Mesodesma donacium*).

S.U. 9.14 (Sand layer)

It is located in the sub-unit 1, 2 and 4. It is composed by fine loose sand in light yellowish brown (2.5Y-6/3). It has botanical remains (saltgrass), whole and fragmented shells.

S.U. 9.15 (Sand and ash layer)

It occupies 75% of the unit. It is a compact layer composed by sand and ash in light gray color (5Y-7/1). It has an irregular surface with whole and fragmented shells (some of them with traces of burning).

S.U. 9.16 (Sand and silt layer)

It is located in almost all the unit. It is a compact layer composed by fine sand and silt; it has an irregular surface in dark reddish gray color (5YR-4/2). It has a slope from south to north. In the north it is intruded by the S.U. 9.14. It presents whole and fragmented shells and medium angled stones. Possibly, it is a floor or a surface of use. The base of the S.U. 9.15 is attached to the surface of the S.U. 9.16.

S.U. 9.17 (Sand layer)

It is located in the north of the unit, in the sub-units 1 and 2. It is composed by loose sand in dark grayish brown color (10YR-4/2). It has botanical remains and shell fragments.

S.U. 9.18 (Sand and silt layer)

It is located in the sub-units 3 and 4. It is a semi- compact irregular layer composed by sand and silt with ash in very dark gray color (2.5Y-3/1). It has a lot of shell fragments with traces of

burning, botanical remains and fish bones. It has a slope from south to north. On its surface there are three circular depressions like post holes.

S.U. 9.19 (Hole)

It is located in the center of the unit, associated with the S.U. 9.18. It is a circular hole (0.20 m of diameter) that contains sand and ash in dark grayish brown (10YR-4/2). Also, it has a textile in poor preservation wrapping several rectangular sticks, also in poor preservation.

S.U. 9.20 (Sand layer)

It is located in the northwest of the unit, in the north of the sub-unit 1. It is composed by semi-loose sand in dark grayish brown (2.5Y-4/2). It has botanical material (*junco*), charcoal and shell fragments.

S.U. 9.21 (Sand layer)

It is located in the south side of the unit, in the sub-units 3 and 4. It is composed by loose sand in light olive brown color (2.5Y-5/4). It has few shell fragments and some botanical remains.

S.U. 9.22 (Sand layer)

It is located in the south side of the unit, in the sub-units 3 and 4. It is composed by semi-loose sand in brown color (7.5.YR-4/2). It has an irregular surface, with malacological, botanical, ichthyologic materials and charcoal.

S.U. 9.23 (Sand and saltpeter layer)

It is located in the central part of the unit, in the corners of all the sub-units. In the north, it is broken by the S.U. 9.20. It is a compact layer with an irregular surface composed by sand and salty concretions. It has shell fragments and botanical material. Its color is brown (7.5Y-5/2).

S.U. 9.24 (Sand, silt and saltpeter layer)

It is located in almost all the unit and is broken by the S.U. 9.20 and 9.22. It is an irregular and semi-compact layer composed by silt, sand and salty concretions with fine and medium granules. It has ash, shells fragments and botanical remains. Its color is dark gray (2.5Y-4/1).

S.U. 9.25 (Sand layer)

It is located in the entire unit as the S.U. 9.24 and it is broken by the S.U. 9.20. It is an irregular semi- compact sand layer in light grayish brown color (2.5Y-6/3). It is composed by shell fragments and botanical material.

S.U. 9.26 (Sand layer)

It is located in almost all the unit and is broken by the S.U. 9.20 and 9.27. It is composed by semi- compact sand with an irregular surface. It has two colors: olive (5Y-5/3) in almost all the S.U. and very dark gray (2.5Y-3/1) in the east-central part of the unit. It has whole and fragmented shells (clam and mussel), most of them are charred. The whole shells were found in the southwest part of the unit. Also, it has botanical material, salty concretions with ash.

S.U. 9.27 (Accumulation of botanical material)

It is located in the south-central part of the unit, in the sub-units 2 and 3. It is a semi- compact layer composed by organic material like botanical remains. Its color is grayish brown (2.5Y-5/2).

It is associated with the S.U. 9.22.

S.U. 9.28 (Landfill)

It is located under the S.U. 9.26, deposited on a mud floor. It has the same features of the S.U. 9.26 and is associated with the floor 9.29. It has the same archaeological materials of the superior level. In some parts it has salty concretions.

S.U. 9.29 (Floor)

It is located in almost all the unit, and is intruded by the S.U. 9.20 in the north side and by the S.U. 9.22 and 9.27 in the south-center part. It is a compact floor in grayish brown color (10YR-5/2). It is composed by clay and sand; it has a regular surface, but in some parts it is broken by the subsequent occupations. In some parts it has saltpeter. There is no cultural material on its surface.

S.U. 9.30 (Sand and silt layer)

It is located in the east side of the unit, in the sub-unit 2. It is a semi- compact layer in dark grayish brown color (2.5Y-4/2). It is composed by sand and silt of small granules. It has an irregular surface with few shell fragments and botanical remains. From this moment, the excavations will be done in the sub-unit 4.

S.U. 9.31 (Floor)

It is located in the entire sub-unit 4. It is composed by sand and silt in dark grayish brown color (2.5Y-4/2). On its compact regular surface there are few shell fragments and angled stones.

S.U. 9.32 (Sand and silt layer)

It is located in the entire sub-unit 4. It is composed by sand and silt with fine granules, shell fragments and small angled stones. Its color is olive brown (2.5Y-4/3). It has irregular texture.

S.U. 9.33 (Posthole)

It is located in the south side of the sub-unit 4. This hole (8 cm of diameter) is filled with fine loose sand and gravel, with regular texture. It is composed by small pieces of charcoal, botanical remains and shell fragments.

S.U. 9.34 (Posthole)

It is located in the east side of the sub-unit 4. It is a circular hole filled with loose sand in olive brown color (2.5Y-4/3). It has irregular texture. It is composed by botanical material.

S.U. 9.35 (Sand layer)

It is located in the entire sub-unit 4. It is composed by fine loose sand, with regular texture, in light olive brown color (2.5Y 5/3). It is composed by small angled stones, shell fragments, botanical remains, and a fragment of twined textile and cotton threads on the surface.

S.U. 9.36 (Floor)

It is a compact floor with a smooth surface, composed by calcium carbonate of white color (7.5YR-8/1). It has a slope toward the west. On its surface it has botanical remains and presents six holes.

S.U. 9.37 (Hole)

It is located in the north side of the sub-unit 4. It is an irregular hole (10 cm of diameter) composed by fine loose sand in light olive brown color (2.5Y-5/4). It has regular texture. It presents botanical material and shell fragments.

S.U. 9.38 (Hole)

It is located in the northwest side of the sub-unit 4. It is an irregular hole (12 cm of diameter) containing fine loose sand in yellowish brown (10YR-5/4). It has botanical remains and shell fragments.

S.U. 9.39 (Hole)

This hole intrudes the S.U. 9.45 and it is associated with the S.U. 9.36. It is 32 cm depth and has 9cm of diameter. It is composed by loose sand in light olive brown (2.5Y-5/4). It has botanical material (leaves and stems), shell fragments and ichthyologic material.

S.U. 9.40 (Posthole)

It is a circular hole composed by loose sand in light olive brown color (2.5Y-5/3). It is 22 cm depth and intrudes the S.U. 9.36 and 9.45. Inside, it has botanical material, fish vertebrae and few shell fragments.

S.U. 9.41 (Pit)

It is located in the west-central part of the sub-unit 4. This hole is the biggest one (25 cm of diameter). It is composed by loose sand in very dark olive brown (2.5Y-3/3). Inside, it has charred *achupallas* (*Tillandsia sp.*), shell fragments and ichthyologic material.

S.U. 9.42 (Posthole)

It is an irregular hole (15 cm of diameter) that is composed by fine sand in light yellowish brown (2.5Y-6/4). Inside, it has few cultural materials like botanical remains, some cotton threads and fish bones.

S.U. 9.43 (Posthole)

It is an irregular hole (10 cm of diameter) that is composed by fine sand in light yellowish brown (2.5Y-6/4). It has few cultural materials like fish bones, botanical remains, shell fragments and cotton threads.

S.U. 9.44 (Floor breaking)

It was considered as a hole, but it was a breaking of the floor 9.36.

S.U. 9.45 (Sand layer)

It is located in the entire sub-unit 4. It is composed by loose sand in light yellowish brown color (2.5Y-6/3). It has regular texture. On its surface it has a round cobble and a *junco* rope associated with botanical remains.

S.U. 9.46 (Funeral Context)

Under the S.U. 9.45 a Funeral Context was found, composed by the following elements: under four stones were found textile remains in poor preservation. Under these, a human individual (5-6 years) was placed flexed (fetal position), right dorsal decubitus, oriented to the southwest, with the face toward the south. The bones had a regular preservation, with presence of salts.

S.U. 9.47 (Sterile layer)

It is located in the entire sub-unit 4. It is composed of fine semi-compact clay and silt. Its color is (10YR-6/4). Under this layer, a compact sand layer without cultural material was found. It was excavated 50 cm depth and no archaeological material was found, then the excavation unit was closed.

APPENDIX C: ARTIFACT DISTRIBUTION

Table 41. Artifact distribution from Unit 6B, Total Counts

C.2. Artifact distribution Unit 6B												
Total Counts by Stratigraphic Units												
	PHASE III b											
	6.06	6.07	6.12	6.13	6.21	6.22	6.24	6.25	6.26	6.27	6.28	6.30
Beads			1	1		1				1		
<i>Lithic artifacts:</i>												
Flakes				1								
Bifacial tools								1				
Stone weights												
Quartz crystals	1			7	2		1	1	2	6	1	11
<i>Bone artifacts:</i>												
Tablets												
Tubes												
Neddle												
Flute		1										
<i>Shell artifacts:</i>												
Fishhooks												
<i>Wood artifacts:</i>												
Worked stick												
<i>Unbaked clay:</i>												
Figurines												
<i>Other</i>												
Total	1	1	1	9	2	1	1	2	2	7	1	11

Table 42. Artifact distribution from Unit 8. Total Counts.

C.3. Artifact distribution Unit 8													
Total Counts by Stratigraphic Units													
	PHASE II					PHASE I E					PHASE I D		
	8.01	8.02	8.05	8.30	8.36	8.39	8.44	8.03	8.117	8.183	8.127	8.04	
Beads	2	1	1		1			1			2		
Lithic artifacts:													
Flakes													
Bifacial tools													
Stone weights				1		1							
Quartz crystals	10	3			4		1	7	1	1	2	3	
Bone artifacts:													
Tablets								2					
Tubes													
Neddle													
Flute													
Shell artifacts:													
Fishhooks				1	1								
Wood artifacts:													
Worked sticks								6					
Unbaked clay:													
Figurines													
Other													
Total	12	4	1	2	6	1	1	16	1	1	4	3	

APPENDIX D: SKELETAL MATERIAL

By: Karen H. Coutts, M.A.

Burial 1: Center Profile

Primarily complete remains of a female age ~60+ years based on pubic symphysis and auricular surface. Metopic suture is present, supraorbital foramen on left side, right orbit has a supraorbital notch. There is an infraorbital foramen on the left, but none on the right. Only anterior teeth are present and badly worn with alveolar resorption, osteoporosis and abscess in the mandible. Arthritic lipping in the joints of the proximal and distal humeri, ulna, radius, femora and tibia and in the tarsal bones, especially the naviculars, metatarsals and pedal phalanges. Left lateral femoral condyle has eburnation and exposed trabecular bone (Fig. 161). Moderate osteoarthritis and osteophytic activity is present in the vertebral column and is especially pronounced in the cervical and lumbar (lordosis) regions.

Burial 2: Exposed western cut

Mostly complete burial of a female age ~24 years based on pubic symphysis and auricular changes. Medial clavicles are unfused, but the first and second sacral vertebrae exhibit complete fusion. Bilateral infraorbital foramina are present with supraorbital notches. Metopic suture present. Dentition is all present with moderate wear. Large muscle attachments for the trapezius muscles on the superior clavicles, and both infraglenoid tubercles of the scapulae are very well developed. Both humeri have well developed deltoid tuberosities and have distal septal apertures.



Figure 162. Arthritic changes with eburnation on the left distal femur lateral condyle. Image A inferior view. Image B is posterior view.

Some minor arthritic or periostitis in the bone is present in the right foot and a pseudo-arthritis is present in the right 4th metatarsal. No other pathology was noted.

Burial 3: Exposed western cut

Partial fragmentary remains of a child age 6-8 based on dental eruption. Sex is indeterminate. Moderate linear enamel hypoplasia. Remains have poor preservation.

Burial 4: Exposed western cut

Poorly preserved remains of a child age 8-9 years based on dental eruption. Mild linear enamel hypoplasia. No other pathology noted.

Burial 5: Unit 2, S.U. 2.45

Highly fragmented remains of a child age ~6 based on dental eruption. No discernable pathology, but preservation is very poor.

Burial 6: Unit 2, S.U. 2.67

Fragmentary partial remains of a child age ~3 based on dental eruption. Infraorbital foramina present with bilateral divided hypoglossal canals. Bone is heavily mineralized, likely from post-depositional processes. Child exhibits *cribra orbitale*.

Burial 7:

Fragmentary poorly preserved remains of a child age 6-8 based on dental eruption. Dentition in occlusion is heavily worn. Bilateral *cribra orbitale* and linear enamel hypoplasia.

Burial 8: Unit 6A, S.U. 6.135

Complete but fragmentary remains of a child age ~2.5 years based on dental eruption. Child has bilateral supernumerary maxillary canines. Bilateral evidence of *cribra orbitale*.

Burial 9: Unit 6B, S.U. 6.139

Complete remains of a child age ~18 months based on dental eruption. Slight periostitis in proximal femora, and proximal anterior humeri.

Burial 10: Unit 6C, S.U. 6.9

Poorly preserved, vertebrae, rib, some hand and foot bones of an adult of an undertermined age.

Burial 11: Unit 6C, S.U. 6.8

Poorly preserved cranial and vertebrae bones. Based on teeth remains age determination of the remains was of approximately 6-9 months old. Bones not fully ossified.

Burial 12:

Complete undisturbed remains of an infant who died at or near the time of birth based on dentition. No pathology noted.

Burial 13:

Semi--complete burial of a child age 6-7 based on dental eruption. Extremely mild linear enamel hypoplasia, no other pathology noted.

Burial 14:

Mostly complete remains of a female age 20-25 based on pubic symphysis and auricular. Bilateral supra and infraorbital foramina and mastodial, condylar, and zygomaticofacial foramina present. Single apical bone present. Well developed linea aspera, and septal aperture on the left humerus only. There is average occlusal dental wear. Maxillary dentition has bilateral peg M3s (Fig 162), while mandibular M3s are congenitally absent. No pathology noted.



Figure 163. Inferior view of cranium of Burial 14 showing left maxillary third molar peg in occlusion. (Left one lost post-mortem)

Burial 15:

Burial of a child age 9-10 years based on dental development. Burial is flexed on the left side and body is positioned facing west with the head to the south though face is unnaturally positioned to the east. Cranium has supraorbital foramen on the left, a supraorbital notch on the right and bilateral condylar foramina. The sternal body is perforated. Mild linear enamel hypoplasia was noted on mandibular canines, and both orbits exhibit cribra orbitale.

Burial 16:

Highly fragmented remains of an adult post-cranial skeleton excavated from the same strata as the remains of a child. Sex determination was not possible. No clear pathology was visible. Requires complete reconstruction of bone fragments.

Burial 17:

Fragments of one infant. Could be associated with Burial 16.

Burial 18:

Intrusive secondary burial of remains from an adult dug through trash layer and filled with clean yellow sand. Bones have evidence of prolonged exposure and include some bones of the right hand and foot, several vertebrae, two left ribs, 1 intermediate and 1 distal phalanx, and the coccyx. No sex or age determination can be made, and no clear evidence of pathology noted.



Figure 164. Burial 19 in situ covered large rocks in unit 5A. Photo taken facing north.

Burial 19:

Complete burial of a child age ~4 based on dental eruption. Burial found 170cm from surface in the northern edge of unit 5A beneath 3 large rocks but without junco or textile (Fig. 163), though a large amount of hand-twined cotton was placed between two of the large rocks placed over the burial (Fig. 164). Mild enamel hypoplasia was noted on maxillary permanent incisors and on developing first molars. No other pathologies or non-metric traits noted.



Figure 165. Hand-twined cotton fibers found between rocks placed over burial Contexto Funerario 39.

Burial 20:

Highly fragmented, exposed and scattered remains of a child <6 years of age based on epiphyseal fusion (no teeth present). Surpaorbital foramina present. No pathology noted.

Burial 21:

Mainly complete remains of a female age 20-24 based on pubic symphysis, auricular and epiphyseal fusion. Humeri exhibit bilateral septal apertures. There are well developed infraglenoid tubercles on both scapulae, and a perforated sternal body. Cribra orbitale in the left orbit, but no other pathology was noted.

This burial was flexed on the right side with the head toward the southwest facing the east and the feet had fallen out of the profile and were not recovered.

Burial 22:

Complete burial of a male age 15-17 based on dental development, epiphyseal closure and pubic symphysis. Cranium exhibits bilateral stylomastoid, condylar, mastoidal and infraorbital foramina, and supraorbital notches. Slight evidence of cribra orbitale in both orbits. Individual is young, but had spondylolysis of the fifth lumbar vertebra with no evidence of spondylolysis or other vertebral pathology. Due to the age of the individual, spondylolysis here may be congenital and not activity induced. This burial was buried flexed on the right side with the head to the north and facing west.

Burial 23:

Mostly complete remains of a female age 18-24 based in pubic symphysis, epiphyseal fusion and dental eruption. Individual was buried in a flexed position on the right side with head towards to the south and facing east. Evidence of sun exposure on the left (superior side) and on the feet and right hand which likely were sticking out of the profile at some point. Cranium has a double

hypoglossal canal on the right side, and a supraorbital foramen on the right side. No pathology was noted.

Burial 24:

Scattered remains of a sub-adult age ~12 collected over an area of 1 meter horizontally and 1 meter vertically within the eastern profile. Cranium was deformed due to post-depositional compression and exhibited two infraorbital foramina on the left side, one on the right. Cribra orbitale was present bilaterally but was more severe in the right eye. Shovel shaped permanent incisors.

Burial 25:

Fragments of an infant burial, age about 6-9 months based on dental eruption eroded out of the profile. Only left side of cranium available and has 2 infraorbital foramina. No pathology is noted, but bones are small, thin and fragmentary.

Burial 26:

Mostly complete burial of a female age ~60+ years based on pubic symphysis. Burial was rescued from profile, but appears to have been buried under trash layer in clean sand and was flexed on the right side with the head to the south with the body and face towards the east. Several gourd offerings were found near the burial, but it is unclear if they are associated or if they shifted downhill. Some shell fragments were likely associated with the burial. The cranium has possible intentional cranial deformation and is brachycephalic. The sagittal suture is off-center to the left, but it does not appear to be prematurely fused as in craniosynostosis (Fig. 165).

There are 2 large apical bones in lambda and many wormian (extrasutural) bones in the lambdoidal suture (Fig 165.). The metopic suture is still observable. The cranium includes bilateral supra and infraorbital foramina, zygomatico-facial and mastoidal foramina and a condylar foramen on the right side.

Present dentition has extreme attrition and both mandible and maxilla have endentulism and alveolar resorption. The mandible is missing all molars with active abscess near right premolar number 4 (P4) which is still in occlusion. Right mandibular third molar (M3) was lost perimortem and also has an active abscess. Both maxilla and mandible show evidence of severe periodontal disease. Maxillary molar dentition also missing, with evidence of active lesions near the left first molar (M1), and right P4. Extremely large genial spines noted in the mandible (Fig. 166).

The post cranial bones of this individual show severe osteophytic activity in the vertebral column from 9th thoracic to the 5th lumbar vertebrae (T9-L5), with extremely large spurs on the 11th and 12th thoracic (T11-T12) and 1st and 2nd lumbar vertebrae (L1-L2). There are compression fractures in the vertebral bodies of T11, T12 and L1 with the most severe is in L1. And all 3 have Schmorl's nodes (Fig 167). The left 10th rib (R10) has a healed fracture (Fig 168). Moderate lipping of the joints was seen in the glenoid fossae of the scapula and humeral heads though it was slightly more pronounced on the right side, and in the femur and acetabular joint.



Figure 166. Images of cranium from Burial 26, brachycephalic female with possible cranial modification. A. Anterior view of CF 35 on right compare with another individual from Bandurria. B. Left lateral view of same crania, CF35 on right. C. Posterior view of CF35 showing occipital bones at lambda and wormian bones in lambdoidal suture. D. Superior view of CF35 showing offset sagittal suture to the left.



Figure 167. Superior view of mandible from Burial 26 showing endentulism, alveolar resorption, tooth wear and large genial spines.



Figure 168. Vertebrae from Contexto Funerio 35 showing compression fractures, osteophytic activity and Schmorl's nodes. Top Row: Thoracic vertebrae 10-12 from left to right. Bottom Row: Lumbar vertebrae 1-5 from left to right.



Figure 169. Healed fracture in the left 10th rib from Burial 26.

Burial 27:

Mostly complete burial of a male age 45-50 based on pubic symphysis and auricular. Burial appears to have been dug through the trash into the clean sand below, but is difficult to discern due to the shifting of the profile. Cranium has 2 right and 1 left infraorbital foramina and bilateral supraorbital, mastoidal and condylar foramina. Metopic suture is present, and sagittal suture is completely fused. Severe dental attrition noted in the dentition with alveolar resorption in the mandible and maxilla and periodontal disease. There are active dental abscesses in the mandibular right M1 and M3 which were lost ante-mortem and loss of M3. Also in the mandible there is a cavity in the right canine and loss of right P4, 1st and 2nd incisors (I1 and I2) and left I2. Left mandibular dentition has caries in M3. Maxillary M3s are congenitally absent.

In the post-cranial skeleton, the vertebral column exhibits pathology associated with age and arthritic changes including osteophytic activity in the 10th thoracic vertebra – the 5th lumbar vertebra with the most severity in T11 and T12 with a compression fracture of the vertebral body of T11. There is marked lipping in the knee and hip joints and slight lipping in the shoulder joint. The femur has well developed linea aspera and gluteal lines.

Burial 28:

Burial of a child age 9-10 years based on dental development. Burial is flexed on the left side and body is positioned facing west with the head to the south though face is unnaturally positioned to the east. Cranium has supraorbital foramen on the left, a supraorbital notch on the right and bilateral condylar foramina. The sternal body is perforated. Mild linear enamel hypoplasia was noted on mandibular canines, and both orbits exhibit cribra orbitale.

Burial 29:

Partial remains from a disturbed burial; partial pelvis, ribs, left humerus, radius and ulna and naturally mummified left hand. Male individual, age ~35 based on pubic symphysis and auricular.

APPENDIX E: SUBSISTENCE ANALYSIS DATA

FISH

PLANTS

U.E. 6.101	U.E. 6.102	U.E. 6.103	U.E. 6.104	U.E. 6.105	U.E. 6.106	U.E. 6.107	U.E. 6.108	U.E. 6.110	U.E. 6.111	U.E. 6.113	U.E. 6.114	U.E. 6.115	U.E. 6.116	U.E. 6.117	U.E. 6.118	U.E. 6.119	U.E. 6.120	U.E. 6.121	U.E. 6.122	U.E. 6.123	U.E. 6.124	U.E. 6.125	U.E. 6.126	U.E. 6.127																									
NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI																								
	1	1														1	1			1	1																												
32	1	9	1	24	1	10	1	17	1																																								
270	6		157	3	84	2	145	4	14	1	69	2	126	5	244	5	117	5	205	6																													
1	1																																																
		1	1																																														
1	1	2	1																																														
304	9	13	4	182	5	105	6	170	7	14	1	83	3	130	7	275	9	131	6	229	8	8	5	7	5	29	2	7	4	5	2	7	3	1	1	37	8	7	3	4	3	71	2	4	2	53	21	16	5

U.E. 162	U.E. 163	U.E. 164	U.E. 165	U.E. 166	U.E. 167	U.E. 168	U.E. 169	U.E. 170	U.E. 171	U.E. 172	U.E. 173	U.E. 174	U.E. 175	U.E. 176	U.E. 177	U.E. 178	U.E. 179	U.E. 180	U.E. 181	U.E. 182	U.E. 183	U.E. 184	U.E. 185	U.E. 186	U.E. 187	U.E. 188	U.E. 189	U.E. 190	U.E. 191	U.E. 192	U.E. 193	U.E. 194	U.E. 195	U.E. 196			
INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI	INSPI		
					7	4		2	1																												
6	1		5	1	16	1								14	1					1	1	13	9	8	1					8	-						
		30	2		12	1				30	1		25	1	21	1		9	1		1	1		8	1	1	1	24	1	4	1	55	3	30	1	30	1
							7	1	4	1												2	1								1	1					
			4	2	5	5							4	3		2	1	4	3	2	1	7	4	3	2	2	1				3	2					
																1	1																				

[illegible]

[illegible]

[illegible]

CONT. FISH UNIT 6B		U.E. 6.129		U.E. 6.130		U.E. 6.131		U.E. 6.132		U.E. 6.133		U.E. 6.134		U.E. 6.135		U.E. 6.136		U.E. 6.137		U.E. 6.139	
NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI	NSPI	MNI
																1	1				
3	1	22	1	4	1	10	1	4	1	9	1	7	1	11	2	1	1	4	2	1	1
632	18	426	20	33	2	585	21	642	20	321	9	316	11	47	2	11	2	103	4	101	7
		2	1												1	1					
		3	1			1	1														
4	-	4	-															7	-		
639	19	457	23	37	3	596	23	646	21	330	10	323	12	58	4	13		115	7	102	8

Table 45. Fish NSPI and MNI from Unit 8. Controlled Sample.

[illegible]

[illegible]

[illegible]

Table 47. Plants NSPI from Unit 6A. Controlled Sample.

BOTANICAL UNIT 6A		Controlled Sample		U.E. 6.2	U.E. 6.4	U.E. 6.6	U.E. 6.8	U.E. 6.9	U.E. 6.11	U.E. 6.12	U.E. 6.14	U.E. 6.16	U.E. 6.18	U.E. 6.19	U.E. 6.20	U.E. 6.23	U.E. 6.24	U.E. 6.28	U.E. 6.29	U.E. 6.30	U.E. 6.31	U.E. 6.32	U.E. 6.33	U.E. 6.35
FAMILY	GENUS SPECIES	Common name	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI
CUCURBITACEAE	<i>Cucurbita</i> sp.	Calabaza																						
POACEAE	<i>Distichlis spicata</i>	Gramma salada	1	14				2	1	2							2		2	2	2	1	3	6
MALVACEAE	<i>Gossypium barbadense</i>	Algodón							8	3	3		2		4				16	6				9
CUCURBITACEAE	<i>Lagenaria siceraria</i>	Mate				1																		
POACEAE	<i>Phragmites communis</i>	Carizo																						
POACEAE		Gramma																1						1
POACEAE	<i>Anthephora hermaphrodita</i>	Calaberita								1														
MYRTACEAE	<i>Psidium guajava</i>	Guayaba		14	1317				21	7		4					68		5	18	90	16	42	34
BROMELIACEAE	<i>Tillandsia</i> sp.	Achupalla			4									29										
TYPHACEAE	<i>Typha</i> sp.	Totora enea										1												
CYPERACEAE	<i>Schoenoplectus</i> sp.	Junco												1									5	
CYPERACEAE	<i>Scirpus</i> sp.	Totora	1													14							1	
LEGUMINOSAE	<i>Inga feuillei</i>	Pacae																						
Dicotyledonia n.i.										123	3	5	3	32	4	14	73	1				1		1
	TOTAL		2	28	1321	1	2	2	30	147	3	5	3	32	4	14	73	1	7	38	98	18	57	45

[illegible]

CONT. BOTANICAL UNIT 6A		U.E. 6.170	U.E. 6.172	U.E. 6.173	U.E. 6.174	U.E. 6.175	U.E. 6.176	U.E. 6.177	U.E. 6.178	U.E. 6.179	U.E. 6.180	U.E. 6.181	U.E. 6.182	U.E. 6.183	U.E. 6.184	U.E. 6.185	U.E. 6.186	U.E. 6.187	U.E. 6.188	U.E. 6.189	U.E. 6.190	U.E. 6.191	U.E. 6.192	U.E. 6.193	U.E. 6.194	U.E. 6.195
NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI
1							1				1			1					2	2						
3		3					2	3			2			10	1	4	7		2	2						1
11	2	7	2				3	4	2	3	3	19						14			1			3		4
								2																		
																1		2						2		
1									6	6																
1	17	27	3				3	7	18	111	35	5		6	1	20		11		31	16	24		11	3	41
2	1	6	3					3	12	8					9			2			1			4		
33	10	2						8	14	8	8	4	13	4	2	4	1					1				1
52	30	45	8			4	4	22	57	136	49	28	13	21	13	29	8	30	2	42	18	25	87	10	36	62

Table 48. Plants NSPI from Unit 6B, Controlled Sample.

BOTANICAL UNIT 6B		Controlled Sample																							
FAMILY	GENUS SPECIES	Common Name	U.E. 6.2 NSPI	U.E. 6.4 NSPI	U.E. 6.6 NSPI	U.E. 6.7 NSPI	U.E. 6.8 NSPI	U.E. 6.9 NSPI	U.E. 6.10 NSPI	U.E. 6.11 NSPI	U.E. 6.12 NSPI	U.E. 6.13 NSPI	U.E. 6.18 NSPI	U.E. 6.19 NSPI	U.E. 6.20 NSPI	U.E. 6.21 NSPI	U.E. 6.22 NSPI	U.E. 6.23 NSPI	U.E. 6.24 NSPI	U.E. 6.25 NSPI	U.E. 6.26 NSPI	U.E. 6.27 NSPI	U.E. 6.28 NSPI	U.E. 6.29 NSPI	U.E. 6.30 NSPI
BROMELIACEAE	<i>Tillandsia</i> sp.	Achupalla	9	2	8	4	30	4	7	1	2	8													
CUCURBITACEAE	<i>Cucurbita</i> sp.	Calabaza				2	4																		
CUCURBITACEAE	<i>Lagenaria siceraria</i>	Mate				2	4						2												
CYPERACEAE	<i>Schoenoplectus</i> sp.	Juncó		6		3	22		5																
CYPERACEAE	<i>Scleropus</i> sp.	Totora	1	4	7	4	3				3			1				1	2		35		17	28	3
LEGUMINOSAE	<i>Inga feuillei</i>	Pacae																							
LEGUMINOSAE	<i>Arachis hypogaea</i>	Mani																							
MALVACEAE	<i>Gossypium barbadense</i>	Algodón	2			2	54					130													
MYRTACEAE	<i>Psidium guajava</i>	Guayaba	50			11	33				33														
POACEAE	<i>Distichlis spicata</i>	Grana salada	8				46						8	8											
POACEAE	<i>Phragmites communis</i>	Canzo					2																		
POACEAE	<i>Grana</i>	Grana	2		4	7	17																		
POACEAE	<i>Calabritia</i>	Calabritia	4			1	2			3	1														
SOLANACEAE	<i>Antephora hermaphrodita</i>	Alí					16																		
CAPSAICACEAE	<i>Capsicum</i> sp.	Totora enea					2			374															
TYPHACEAE	<i>Typha</i> sp.		3		6		28																		
Dicotyledonia n.i.																									
TOTAL			79	12	25	34	259	4	12	378	39	138	10	43	0	2	3	66	39	56	623	101	416	333	2112

CONT. BOTANICAL UNIT 08																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
U.E. 6.61		U.E. 6.62		U.E. 6.63		U.E. 6.64		U.E. 6.65		U.E. 6.66		U.E. 6.67		U.E. 6.68		U.E. 6.69		U.E. 6.70		U.E. 6.71		U.E. 6.72		U.E. 6.73		U.E. 6.74		U.E. 6.75		U.E. 6.76		U.E. 6.77		U.E. 6.78		U.E. 6.79		U.E. 6.80		U.E. 6.81		U.E. 6.82		U.E. 6.83		U.E. 6.84		U.E. 6.86		U.E. 6.87		U.E. 6.88		U.E. 6.89		U.E. 6.90		U.E. 6.91		U.E. 6.92																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.	NSPI	U.E.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
23	35	1	16	12	257	6	7	31	28	54	15	13	1	38	46	17	16	3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											

[illegible]

CONT: BOTANICAL UNIT 8		U.E. 8.26		U.E. 8.27		U.E. 8.28		U.E. 8.29		U.E. 8.30		U.E. 8.31		U.E. 8.32		U.E. 8.33		U.E. 8.34		U.E. 8.36		U.E. 8.37		U.E. 8.38		U.E. 8.39		U.E. 8.40		U.E. 8.41		U.E. 8.42		U.E. 8.43		U.E. 8.44		U.E. 8.45		U.E. 8.46		U.E. 8.47		U.E. 8.48		U.E. 8.49		U.E. 8.50			
NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI		NSPI					
1						1				10		421		7		19		20				73		2		5								1		14		3				4		16							
1										1		1						2				2																													
2										1								2				19				6																									
																						11																													
																						1																													
41	152	25				38	14	27	382	46		2418		162		9		53		1		211		1		10																									
						1002	247									214		1904		53		1377		78		234																									
1						15	3	13		9		12		6		2		3		2		63				12																									
3	2					7	3	4		10						2		4				57		11		6																									
49	155	32				1074	277			2908				175		246		1986		56		1814		92		273		15		28		160		322		107		600		230		13		42							

CONT. BOTANICAL UNIT 8																											
U.E. 8.51	U.E. 8.52	U.E. 8.53	U.E. 8.54	U.E. 8.55	U.E. 8.56	U.E. 8.57	U.E. 8.58	U.E. 8.59	U.E. 8.60	U.E. 8.61	U.E. 8.62	U.E. 8.63	U.E. 8.66	U.E. 8.67	U.E. 8.68	U.E. 8.69	U.E. 8.70	U.E. 8.71	U.E. 8.72	U.E. 8.73	U.E. 8.74	U.E. 8.75	U.E. 8.76	U.E. 8.77	U.E. 8.78	U.E. 8.79	U.E. 8.80
NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI
3	1			2	19	19	12	1	1	16	7	112	1	1	8	8		7	2	59	86	3	3				
		1	1							1		1		1	1					3							
		10			2	11	23					1093			4			10	24								
					2							127	14					18	1	5						2	2
51	47	10	16	7	2	8	11			14	4	115	2	12	20			3	2	115	54	2	7		3	4	1
			17	142	133	87	401	81		63	195	260	148	64	91		16	84	1	1657	282	139	105	123	71	79	
1			3	3	29	24	18	7		22	7	8	264	9	7	7		29	1	22		1	1	6	4	1	
			1	3	4								38	2	1	2	1	1				19	2		5		
4	1																										
			1	1	3		3	3		27	20	83		2				2	2	11		4		11	4	2	
56	51	23	37	156	141	1869	468	92	113	253	279	4037	176	99	128		17	154	33	1872	422	168	118	63	90	85	

CONT. BOTANICAL UNIT 8		U.E. 8.106		U.E. 8.107		U.E. 8.108		U.E. 8.109		U.E. 8.110		U.E. 8.111		U.E. 8.112		U.E. 8.113		U.E. 8.114		U.E. 8.115		U.E. 8.116		U.E. 8.117		U.E. 8.118		U.E. 8.119		U.E. 8.120		U.E. 8.121		U.E. 8.122		U.E. 8.123		U.E. 8.124		U.E. 8.125		
NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	
	1							4								19																										
																		1																								
4	8	66	176							6	52			7	100			121		13		33	245	4	51		9	270		111		150		260		80					70	
4	75		176					4		6	52			107		19		122		13		278		55		9	270		111		150		260		80		240				70	

CONT. BOTANICAL UNIT 8				U.E. 8.151		U.E. 8.152		U.E. 8.153		U.E. 8.154		U.E. 8.155		U.E. 8.156		U.E. 8.157		U.E. 8.159		U.E. 8.160		U.E. 8.161		U.E. 8.162		U.E. 8.163		U.E. 8.164		U.E. 8.165		U.E. 8.166		U.E. 8.168		U.E. 8.169		U.E. 8.170		U.E. 8.171		U.E. 8.172		U.E. 8.173		U.E. 8.174		U.E. 8.175		U.E. 8.176	
NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI			

Table 50. Plants NSPI from Unit 9. Controlled Sample.

[illegible]

CONT. BOTANICAL UNIT 9				U.E. 9.23		U.E. 9.24		U.E. 9.25		U.E. 9.26		U.E. 9.27		U.E. 9.28		U.E. 9.30		U.E. 9.31		U.E. 9.32		U.E. 9.33		U.E. 9.34		U.E. 9.35		U.E. 9.37		U.E. 9.38		U.E. 9.39		U.E. 9.40		U.E. 9.41		U.E. 9.42		U.E. 9.43		U.E. 9.45		U.E. 9.46																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI	NSPI																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
11	8	11	6					8	9			8		12		43					1				1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
3									3							2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
5	6								4					7		5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
11	3	12	17					27	11					4		6			1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
223	82	460	80					115	322				80		51			31																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
1								6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
1	2												3		2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

BIBLIOGRAPHY

Aldenderfer, M. S. (editor)

- 1993 *Domestic Architecture, Ethnicity, and Complementarity in the South-Central Andes*. University of Iowa, Iowa City.

Aldenderfer, M. S. and C. Stanish

- 1993 Domestic Architecture, Household Archaeology, and the Past in the South-Central Andes. In: *Domestic Architecture, Ethnicity, and Complementarity in the South-Central Andes*, edited by M. S. Aldenderfer, pp. 1-12. University of Iowa, Iowa City.

Adler, M.

- 1993 Why is a Kiva? New Interpretations of Prehistoric Social Integrative Architecture in the Northern Rio Grande Region of New Mexico. *Journal of Anthropological Research* 49: 391-346.

Alva, I.

- 2008 Las Excavaciones en Huaca Ventarrón y el complejo Collud – Zarpán: del Arcaico al Formativo en el valle de Lambayeque. <http://museosipan.blogspot.com/2008/07/ventarrn.html> (accessed September 8, 2008)

Andrus, F. T., D. E. Crowe, D. H. Sandweiss, E. J. Reitz; and C. S. Romerak

- 2000 Otolith δ^{18} Record of Mid-Holocene Sea Surface Temperatures in Peru. *Science* 295: 1508-1511.

Ashmore, W. and R. R. Wilk

- 1988 Household and community in the Mesoamerican past. In: *Household and Community in the Mesoamerican Past*, edited by R. R. Wilk and W. Ashmore, pp. 1-27. University of New Mexico, Albuquerque.

Barker, P.

- 1995 *Techniques of Archaeological Excavation*. 3rd Ed. Batsford, London.

Béarez, P. and L. Miranda

- 2000 Análisis Arqueo-Ictiológico del Sector Residencial del Sitio Arqueológico de Caral-Supe, Costa Central del Perú. *Arqueología y Sociedad* 13: 67-77.

Bender, Donald

1967 "A Redefinement of the Concept of Household: Families, Coresidence, and Domestic Functions". *American Anthropologist* 69: 493-504.

Bird, J. B., J. Hyslop and M. D. Skinner

1985 *The Preceramic Excavations at the Huaca Prieta, Chicama Valley, Peru*. American Museum of Natural History, New York.

Boas, F.

1913 Archaeological Investigations in the Valley of México by the International School, 1911-1912. *Proceedings of the 18th International Congress of Americanists* pp. 176-179, London.

Bogucki, P.

1999 *The Origins of Human Society*. Blackwell, Malden.

Bonavia, D.

1982 *Los Gavilanes. Mar, Desierto y Oasis en la Historia del Hombre*. COFIDE and Instituto Arqueológico Alemán, Lima.

Bonnier, E.

1983 Piruru: Nuevas Evidencias de Ocupación Temprana en Tantamayo, Perú. *Gaceta Arqueológica Andina* 2 (8): 8-9.

1988 Arquitectura Precerámica en la Cordillera de los Andes, Piruru frente a la Diversidad de los Datos. *Antropológica* VI (6): 335-361.

Brown, B. McC.

1987 Population Estimation from Floor Area: A Restudy of "Naroll's Constant". *Behavior Science Research* 21: 1-49.

Burger, R. L.

1992 *Chavin and the Origins of Andean Civilization*. Thames and Hudson, New York.

Burger, R. L., and L. Salazar-Burger

1985 The Early Ceremonial Center of Huaricoto. In: *Early Ceremonial Architecture in the Andes*, edited by C. B. Donnan, pp. 111-138. Dumbarton Oaks, Washington D.C.

Cano, A., M. I. La Torre, B. León, K. Young, J. Roque, and M. Arakaki

1998 Estudio Comparativo de la Flora Vascular de los Principales Humedales de la Zona Costera del Departamento de Lima, Perú. In: *Los Pantanos de Villa. Biología y Conservación*, edited by A. Cano and K. Young. Museo de Historia Natural, Lima.

Cardenas, M.

1977 *Informe Preliminar del Trabajo de Campo en el valle de Huaura, Departamento de Lima*. Seminario de Arqueología, Instituto Riva-Aguero, Pontificia Universidad Católica del Perú, Lima.

1977-1978 Sitios arqueológicos en la Playa Chica - Huacho (valle de Huaura). *Boletín del Seminario de Arqueología* 19-20:111-126.

Casselberry, S. E.

1974 Further Refinement of Formulae for Determining Population from Floor Area. *World Archaeology* 6(1): 117-122.

Cohen, M. N.

1977 Population Pressure and the Origins of Agriculture: An Archaeological Example from the Coast of Peru. In: *World Archaeology. Origins of Agriculture*, edited by C. Reed, pp. 135-177. Mouton Publishers, Paris.

1984 *La Crisis Alimentaria de la Prehistoria*. Alianza Editorial, Madrid.

Cook, S. F. and R. F. Heizer

1968 Relationships among Houses, Settlement Areas, and Population in Aboriginal California. In: *Settlement Archaeology*. Edited by K.C. Chang, Palo Alto: National Press Books, pp. 79-116.

Costin, C. and T. Earle

1989 Status distinction and legitimation of power as reflected in changing patterns of consumption in Late Prehispanic Peru. *American Antiquity* 54: 691-714.

Day, J.W., J.D. Gunn, W.J. Folan, A. Yáñez-Arancibia and B.P. Horton

2007 Emergence of Complex Societies after Sea Level Stabilized. *EOS* 88(15): 169-176.

De Medina, F.

1920 [1650] Información sobre Idolatrías en Huacho. *Colección de libros y documentos referentes a la Historia del Perú*. Tomo III (2da Serie).

Dillehay, T. D., P. J. Netherly and J. Rossen

1989 Middle Preceramic public and residential sites on the forested slopes of the western Andes, northern Peru. *American Antiquity* 54: 733-759.

Dillehay, T. D., J. Rossen and P. J. Netherly

1999 Middle Preceramic household, ritual and technology in Northern Peru. *Chungara* 30(2): 111-124.

Dillehay, T. D., J. Rossen, G. Maggard, K. Stackelbeck and P. J. Netherly

2003 Localization and possible social aggregation in the Late Pleistocene and Early Holocene on the North Coast of Peru. *Quaternary International* 109-110: 3-11.

Dillehay, T. D., J. Rossen, T. C. Andres and D. E. Williams

2007 Preceramic Adoption of Peanut, Squash and Cotton in Northern Peru. *Science* 316: 1890-1893.

Engel, F.

- 1957a Early Sites on the Peruvian Coast. *Southwestern Journal of Anthropology* 13(1): 54-68.
- 1957b Sites et établissements sans céramique de la côte péruvienne. *Journal de la Société des Américanistes* XLVI: 67-155.
- 1958 Algunos Datos con Referencia a los Sitios Precerámicos de la Costa Peruana. *Arqueológicas* 3: 1-54.
- 1963 A Preceramic Settlement on the Central Coast of Peru: Asia Unit 1. *Transactions of the American Philosophical Society* 53 (3).
- 1966a Le Complexe Précéramique d'El Paraiso (Perou). *Journal de la Société des Américanistes* LV(1): 43-95.
- 1966b *Geografía Humana Prehistorica y Agricultura Precolombina de la Quebrada de Chilca*. Universidad Nacional Agraria, Lima.
- 1970 Exploration of the Chilca Canyon, Perú. *Current Anthropology* 11: 55-58.
- 1984 *Prehistoric Andean Ecology. Man Settlement and Ecology at the Andes*. Volume 4: Chilca. Humanities Press, New York.

Feldman, R. A.

- 1980 *Aspero, Peru: Architecture, Subsistence, Economy and Other Artifacts of a Preceramic Maritime Chiefdom*. Unpublished Ph.D. Dissertation, Department of Anthropology, Harvard University, Cambridge.
- 1985 Preceramic Corporate Architecture: Evidence for the Development of Non-Egalitarian Social Systems in Peru. In: *Early Ceremonial Architecture in the Andes*, edited by C. B. Donnan, pp. 71-92. Dumbarton Oaks, Washington D.C.
- 1987 Architectural Evidence for the Development of Nonegalitarian Social Systems in Coastal Peru. In: *The Origins and Development of the Andean State*, edited by J. Haas, S. Pozorski, and T. Pozorski, pp. 9-14. Cambridge University Press, Cambridge.
- 1992 Preceramic Architecture and Subsistence Traditions. *Andean Past* 3: 67-86.

Flannery, K. V.

- 1972 The Origins of the Village as a Settlement Type in Mesoamerica and the Near East: a Comparative Study. In: *Man, Settlement and Urbanism*, edited by P. Ucko, R. Tringham, and G. W. Dimbleby, pp. 23-53, Duckworth Press, Londres.
- 2002 The Origins of the Village Revisited: From Nuclear to Extended Households. *American Antiquity* 67(3): 417-433.

Ford, J.

- 1954 The History of a Peruvian Valley. *Scientific American* 191(22): 28-34.

Fung, R.

- 1972 El Temprano Surgimiento en el Perú de los Sistemas Socio-políticos complejos: Planteamiento de una hipótesis de desarrollo original. *Apuntes Arqueológicos* 2:10-32.
- 1988 Late Preceramic and Initial Period. In: *Peruvian Prehistory*, edited by R. W. Keatinge, pp. 67-96. Cambridge University Press, Cambridge.
- 1991 El Precerámico Tardío en la Costa. In: *Los Incas y el Antiguo Perú*, pp. 152-167. Serie Catálogos, Colección Encuentros Quinto Centenario. Vol. 1. Madrid.

- 1999 El Proceso de Neolitización en los Andes Tropicales. In: *Historia de América Andina, Vol. 1: Las Sociedades Aborígenes*, edited by L. G. Lumbreras, pp. 141-196. Universidad Andina Simón Bolívar, Quito.
- 2004 Reseña del Salvamento Arqueológico en Bandurria. Período Precerámico Tardío. In: *Quehaceres de la Arqueología Peruana. Compilación de Escritos*, Museo de Antropología y Arqueología de la Universidad Nacional Mayor de San Marcos, Lima.
- Grieder, T., A. Bueno, E. Smith, and R. Malina
- 1988 *La Galgada, Peru: A Preceramic Culture in Transition*. University of Texas Press, Austin.
- Haas, J. and W. Creamer
- 2006 Crucible of Andean Civilization. *Current Anthropology* 45(5): 745-775
- Harris, E. H.
- 1991 *Principios de Estratigrafía Arqueológica*. Editorial Crítica, Barcelona.
- Hayden, B.
- 1995 Pathways to Power: Principles for Creating Socioeconomic Inequalities. In: *Foundations of Social Inequality*, edited by T. D. Price and G. M. Feinman, pp. 15-86. Plenum Press, New York.
- 1996 Thresholds of power in emergent complex societies. In: *Emergent complexity: The evolution of intermediate societies*, edited by J. Arnold, pp. 50-58. International Monographs in Prehistory, Ann Arbor.
- 2001 Richman, Poorman, Beggarman, Chief: The Dynamics of Social Inequality." In: *Archaeology at the Millenium: A sourcebook*. G. Feinman, and T. Price (eds.), pp. 231-272. Kluwer Academic/Plenum Publishers, New York.
- Hayden, B. and A. Cannon
- 1982 The corporate group as an archaeological unit. *Journal of Anthropological Archaeology* 1:132-158.
- 1983 Where the garbage goes: refuse disposal in the Maya highlands. *Journal of Anthropological Archaeology* 2:117-163.
- Hegmon, M.
- 1991 The Risks of Sharing and Sharing as Risk Reduction: Interhousehold Food Sharing in Egalitarian Societies. In: *Between Bands and States*, edited by S. Gregg, pp. 309-332. Center for Archaeological Investigations, Southern Illinois University at Carbondale, Carbondale.
- Hendon, J.
- 1991 Status and Power in Classic Maya Society: An Archaeological Study. *American Anthropologist* 93(4): 894-918.

Hirth, K.

- 1993 Identifying Rank and Socioeconomic Status in Domestic Contexts: An Example from Central Mexico. In: *Prehispanic Domestic Units in Western Mesoamerica*, edited by R. S. Santley and K. Hirth, pp. 121-146. CRC, Boca Raton.

Holdridge, L. R.

- 1967 *Life Zone Ecology*. Tropical Science Center. San José, Costa Rica.

Killion, T. W. (editor)

- 1991 *Gardens of Prehistory: The Archaeology of Settlement Agriculture in Greater Mesoamerica*. University of Alabama Press, Tuscaloosa.

Koepcke, H., and M. Koepcke

- 1967 *Las Aves Silvestres de Importancia Económica del Perú*. Ministerio de Agricultura, Lima.

Kramer, C.

- 1979 An Archaeological View of a Contemporary Kurdish village: Domestic Architecture, Household Size and Wealth. In: *Ethnoarchaeology: Implications of Ethnography for Archaeology*, edited by C. Kramer, pp. 139-163. Cambridge University Press, New York.
- 1982 *Village Ethnoarchaeology: Rural Iran in Archaeological Perspective*. Academic Press, New York.

Lanning, E. P.

- 1963 A Pre-Agricultural Occupation on the Central Coast of Peru. *American Antiquity* 28(3): 360-371.
- 1965 Early Man in Peru. *Scientific American* 213(4): 68-76.
- 1967 *Peru Before the Incas*. Prentice-Hall, Englewood Cliffs.

LeBlanc, S.

- 1971 An addition to Naroll's Suggested Floor Area and Settlement Population Relationship. *American Antiquity* 36: 210-211.

Libby, W. F., E.C. Anderson, and J.R. Arnold

- 1949 Age Determination of Radiocarbon Content: World-wide assay of Natural Radiocarbon. *Science* 109: 227-228.

Lumbreras, L. G.

- 1969 *De los Pueblos, las Culturas y las Artes del Antiguo Peru*. Moncloa-Campodónico, Editores Asociados, Lima.

Luyo, M. E.

- 2008 *Lineamientos Preliminares para el Manejo y Gestión de la Puesta en Valor de Bandurria*. Final Report. Proyecto Arqueológico Bandurria, Huacho.

Maasch, K. A.

- 2008 El Niño and Interannual Variability of Climate in the Western Hemisphere. In: *El Niño, Catastrophism, and Culture Change in Ancient America*, edited by D.H. Sandweiss and J. Quilter, pp. 33-55. Dumbarton Oaks, Washington D.C.

Malpass, M. A. and K. E. Stothert

- 1992 Evidence for Preceramic Houses and Household Organization in Western South America. *Andean Past* 3: 137-164.

Manzanilla, Linda

- 1986 *Unidades Habitacionales Mesoamericanas y sus Areas de Actividad*. Universidad Nacional Autonoma de Mexico, Mexico D.F.

Means, P.

- 1931 *Ancient Civilization of the Andes*. Charles Scribner's Sons. New York.

Moseley, M. E.

- 1975 The Maritime Foundations of Andean Civilization. Cummings Pub. Co., Menlo Park.
1992 Maritime Foundations and Multilinear Evolution: Retrospect and Prospect. *Andean Past* 3: 5-42.

Muelle, J. C., and R. Ravines

- 1973 Los Estratos Precerámicos de Ancón. *Revista del Museo Nacional* XXXIX: 49-70.

Nelson, C., and A. Ruiz

- 2004 *Proyecto de Investigación Arqueológica: Valle de Huaura, Perú*. Final Report submitted to the Instituto Nacional de Cultura, Lima.

Netting, R. McC. and R. R. Wilk

- 1984 Households: Changing Forms and Functions. In: *Households. Comparative and Historical Studies of the Domestic Group*, edited by R. McC. Netting, R. R. Wilk and E. J. Arnould, pp. 1-28. University of California Press, Berkeley.

Naroll, R.

- 1962 Floor area and settlement population. *American Antiquity* 27:587-588.

Noller, J. S.

- 1993 Later Cenozoic stratigraphy and soil geomorphology of the Peruvian desert, 3 degrees – 18 degrees S: a long-term record of hyperaridity and el Niño. Unpublished Ph.D. Dissertation, University of Colorado, Boulder.

ONERN

- 1975 *Mapa ecológico del Perú. Guía explicativa*. Oficina Nacional de Evaluación de Recursos Naturales, Lima.

- Proulx, D.
1973 *Archaeological Investigations in the Nepeña Valley, Perú*. Research Report 13, Department of Anthropology, University of Massachusetts, Amherst.
- Pulgar Vidal, J.
1987 *Geografía del Perú*. Editorial PEISA, Lima.
- Quilter, J.
1985 Architecture and Chronology at El Paraiso, Peru. *Journal of Field Archaeology* 12(3): 279-297.
1989 *Life and Death at Paloma*. University of Iowa Press, Iowa City.
1991 Late Preceramic Perú. *Journal of World Prehistory* 5(4): 387-438.
- Redman, C. L.
1983 Regularity and change in the architecture of an early village. In: *The Hilly Flanks and Beyond: Essays on the Prehistory of Southwestern Asia*, Studies in Ancient Oriental Civilization 36, edited by T.C. Young, P. Smith, and P. Mortenson, pp. 189-196. Oriental Institute, Chicago.
- Reynolds, P. J.
1995 The Life and Death of a Post-hole. *Interpreting Stratigraphy* 5: 21-25.
- Rick, J. W.
1980 *Prehistoric Hunters of the high Andes*. Academic Press. New York.
- Rose, C.
2001 *Household and Community organization of a Formative Period, Bolivian Settlement*. Unpublished Ph.D. Dissertation. University of Pittsburgh, Department of Anthropology, Pittsburgh.
- Richardson, J. B.
1998 Looking in the Right Places: Pre-5,000 B.P. Maritime Adaptations in Peru and the Changing Environment. *Revista de Arqueología Americana* 15: 33-56.
- Richardson, J. B., and D. H. Sandweiss
2008 Climate Change, El Niño and the Rise of Complex Society on the Peruvian Coast During the Middle Holocene. In: *El Niño, Catastrophism, and Culture Change in Ancient America*, edited by D.H. Sandweiss and J. Quilter, pp. 59-76. Dumbarton Oaks, Washington D.C.
- Robbins, M.C.
1966 House types and settlement patterns: an application of ethnology to archaeological interpretation. *Minnesota Archaeologist* 28:3-26.

Rowe, J. H.

1962 Stages and Periods in Archaeological Interpretation. *Southwestern Journal of Anthropology* 18(1): 40-54.

Sandweiss, D.H., D. K. Keefer and J. B. Richardson

1999 First Americans and the Sea. *Discovering Archaeology* 1(1): 59-65.

Sandweiss, D. H., K. A. Maasch, H. B. Rollins, and A. Clement

2001 Variation in Holocene El Niño Frequencies: Climate Records and Cultural Consequences in Ancient Peru. *Geology* 29: 603-606.

Sandweiss, D. H., H. McInnis, R. L. Burger, A. Cano, B. Ojeda, R. Paredes, M. del C. Sandweiss and M. Glascock

1998 Quebrada Jaguay: Early Maritime Adaptations in South America. *Science* 281: 1830-1832.

Sandweiss, D. H., D. K. Keefer and J. B. Richardson, III.

1999 First Americans and the Sea. *Discovering Archaeology* 1(1): 59-65.

Shady, R.

1993 Del Arcaico al Formativo en los Andes Centrales. *Revista Andina* 11(1): 103-132.

1995 La Neolitización en los Andes Centrales y los Orígenes del Sedentarismo, la Domesticación y la Distinción Social. *Saguntum* 28: 49-61.

1997 La Ciudad Sagrada de Caral, Supe en los Albores de la Civilización en el Perú. Universidad Nacional Mayor de San Marcos, Fondo Editorial, Lima.

1999a El Sustento Económico del Surgimiento de la Civilización en el Perú. *Boletín del Museo de Arqueología y Antropología UNMSM* 2: 2-4.

1999b Los Orígenes de la Civilización y la Formación del Estado en el Perú: Las Evidencias Arqueológicas de Caral, Supe. *Boletín del Museo de Arqueología y Antropología UNMSM* 2:2-4.

2000a Los Orígenes de la Civilización y la Formación del Estado en el Perú (Segunda Parte). *Boletín del Museo de Arqueología y Antropología UNMSM* 3: 2-7.

2000b Sustento Socioeconómico del Estado prístino de Supe-Perú: Las Evidencias de Caral-Supe. *Arqueología y Sociedad* 13: 49-66.

2004 Caral. La Ciudad del Fuego Sagrado. Interbank, Lima.

2005 La Civilización de Caral-Supe: 5,000 años de Identidad Cultural en el Perú. PEACS – INC, Lima.

2009 Caral – Supe y su entorno natural y social. In: *Andean Civilization. A tribute to Michael E. Moseley*, edited by J. Marcus and P. Ryan Williams, pp. 99-120, Cotsen Institute of Archaeology Press, Los Angeles.

Shady, R., J. Haas, and W. Creamer

2001 Dating Caral, a Preceramic Site in the Supe Valley on the Central Coast of Peru. *Science* 292: 723-726.

Shady, R. and C. Leyva (eds.)

2003 *La Ciudad Sagrada de Caral – Supe*. Instituto Nacional de Cultura, Proyecto Especial Arqueológico Caral – Supe, Lima.

Shady, R., C. Dolorier, F. Montesinos, and L. Casas

2000 Los Orígenes de la Civilización en el Perú: el Área Norcentral y el valle de Supe durante el Arcaico Tardío. *Arqueología y Sociedad* 13: 13-48.

Simmons, R. and N. Ahsian

2005 *The Book of Stones*. Heaven and Earth publishing. Berkeley.

Smith, M. E.

1987 Household Possessions and Wealth in Agrarian States: Implications for Archaeology. *Journal of Anthropological Archaeology* 6: 297-335.

Spinden, H. J.

1928 *Ancient Civilizations of Mexico and Central America*. Memoirs of the Peabody Museum, Vol. 6. Cambridge.

Stark, B and B. Miller

1993 Hierarchical Social Differentiation among Late to Terminal Classic Residential Locations in La Mixtequilla, Veracruz, Mexico. In: *Prehispanic Domestic Units in Western Mesoamerica*, edited by R. S. Santley and K. Hirth, pp. 249-273. CRC, Boca Raton.

Stuiver, M. and Reimer, P.J.

1993 Extended ^{14}C data base and revised CALIB 3.0 ^{14}C age calibration program. *Radiocarbon* 35: 215-230.

Tello, A., P. Merino, N. Moya, O. Gonzales, G. Chávez, I. Chang, and G. Engblom

2006 Informe Técnico: Albuferas del Paraíso, Huaura, Perú. Proyecto Refugios del Desierto, Lima.

Tosso, W.

2008 Proyecto de Investigación Arqueológica Las Shicras: Evidencias de la ocupación Precerámica en el valle de Chancay. Paper presented at the: I Ciclo de Conferencias de la Universidad Nacional Federico Villarreal: "Arqueología en el Peru", Lima.

Tourtellot, G.

1989 Developmental cycles of households and houses at Seibal. In: *Household and Community in the Mesoamerican Past*, edited by R. Wilk and W. Ashmore, pp. 97-120. University of New Mexico, Albuquerque.

Uhle, M.

1920 Los Principios de las Antiguas Civilizaciones Peruanas. *Boletín de la Sociedad Ecuatoriana de Estudios Históricos Americanos* 4: 448-458.

Vallejos, F.

2008 Hallan la edificación más antigua del Perú: 5.500 años. <http://www.elcomercio.com.pe/ediciononline/HTML/2008-02-24/hallan-edificacion-mas-antigua-peru-5500-anos.html> (accessed September 8, 2008).

Vreeland, J. M.

1985 Algodón 'del país'; una Tecnología Tradicional para la Agricultura del Desierto. *Revista Alternativa* 2: 10-24.

Wendt, W. E.

1964 Die Präkeramische Siedlung am Rio Seco, Peru. *Baessler Archiv* IX(XXXV): 225-275.

Wiessner, P.

1974 A functional estimation of population from Floor Area. *American Antiquity* 39: 343-350.

1979 Reply to Casteel. *American Antiquity* 44: 808-809.

1982 Beyond Willow Smoke and Dogs' Tails: A Comment on Binford's Analysis of Hunter-gatherer Settlement Systems. *American Antiquity* 47:171-178.

Wilk, R. R. and W. Rathje

1982 Household Archaeology. *American Behavioral Scientist* 25: 617-640.

Wiley, G. R.

1974 The Virú Valley Settlement Pattern Study. In: *Archaeological Researches in Retrospect*, pp. 149-175. Winthrop Publications, Cambridge.

Wiley, G. R. and P. Phillips

1957 *Method and Theory in American Archaeology*. University of Chicago Press, Chicago.

Williams, C.

1980a Arquitectura y Urbanismo en el Perú Antiguo. In: *Historia del Perú* VIII, edited by J. Mejia Baca. Editorial Juan Mejia Baca, Lima.

1980b Complejos de pirámides con planta en U, patron arquitectónico de la costa central. *Revista del Museo Nacional* 44: 95-110.

1985 A Scheme for the Early Monumental Architecture of the Central Coast of Peru. In: *Early Ceremonial Architecture in the Andes*, edited by C. Donnan. Dumbarton Oaks, Washington D.C.

Wills, W. H.

1991 Organizational Strategies and the Emergence of Prehistoric villages in the American Southwest. In: *Between Bands and States*, edited by S. Gregg. pp. 161-180. Center for Archaeological Investigations, Southern Illinois University at Carbondale, Carbondale.

Ziólkowski, M. S., M. F. Pazdur, A. Kranowski, and A. Michczynski

1994 *Andes. Radiocarbon Database for Bolivia, Ecuador and Peru*. Institute of Archaeology, Warsaw University y Institute of Physics, Silesian Technical University, Varsovia.