Landscape Archaeology of the Western Nile Delta

by Joshua R. Trampier

Wilbour Studies

Brown University

Department of Egyptology and Ancient Western Asian Studies

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For my parents

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ABBREVIATIONS

AOI	archaeological Area of Interest
AfRSW	African Red Slip Ware
CU	Collection Unit
CypRSW	Cypriot Red Slip Ware
DEM	Digital Elevation Model
EAIS	Egyptian Antiquities Information Service
EAO	Egypt Antiquities Organization
EES	Egypt Exploration Society
EGSA	Egyptian General Survey Authority
EPto	Early Ptolemaic
ERo	Early Roman
ETM+	Enhanced Thematic Mapper
GIS	Geographic Information Systems
GPMP	Giza Plateau Mapping Project
K.	*kom* (EES Delta Survey notation)
KABA	Kom Abu Ali
KABQ	Kom el-Abqa'in
KATU	Kom Abu el-Tubul
KBAR	Kom el-Barud
KGHZ	Kom el-Ghuzz
KHMR	Kom Hamrit
KHSN	Kom el-Hisn
KSHM	Kom el-Shimuli
KSSA	Kom Sheikh Said Ahmed
LDyn	Late Dynastic
LRA	Late Roman Amphora
LPto	Late Ptolemaic
LRo	Late Roman
masl	meters above sea level
mbs	meters belows surface
mbsl	meters below sea level
MSA	Ministry of State for Antiquities

MSS	Multispectral Scanner
NK	New Kingdom
OSL	optically stimulated luminescence
Φ	diameter in cm
Pto	Ptolemaic
QMHA	Kom Qamha
Ro	Roman
SCA	Supreme Council of Antiquities
SEGY	Survey of Egypt
SRTM	Shuttle Radar Topography Mission
TIP	Third Intermediate Period
TM	Thematic Mapper
UTM	Universal Transverse Mercator
VES	Vertical Electrical Sounding
WB	Erman, A., and H. Grapow, eds. *Wörterbuch der Ägyptische Sprache*. Leipzig: Hinrichs, 1926–1963.
WDLP	Western Delta Landscape Project

APPENDIX 1

List of *koms* and archaeological lands identified by the EES Delta Survey,[1] EAIS,[2] and CultNat Atlas[3] illustrated in figures 3.1 and 3.2. Places are labeled with the toponym given in the original source, with the EES *kom* number, EAIS name, or CultNat number listed as appropriate.

Name	Source	Alt. ID
Abu el-Zarazier	CultNat Atlas	100201
Abu el-Tubul	CultNat Atlas	100202
el Shahedi	CultNat Atlas	100204
el Kom el-Ahmer (iv)	CultNat Atlas	100206
el Magadieb, Khaniezeh	CultNat Atlas	100208
Tell el-Abqa'ien	CultNat Atlas	100216
Tell Saadya	CultNat Atlas	100220
Tell Umm el-Laben	CultNat Atlas	100224
Tell Khatmii	CultNat Atlas	100225
Kadweh el-Zahab	CultNat Atlas	100229
Kom Abu Ali	CultNat Atlas	100232
Kom el-Barod	CultNat Atlas	100233
Kom el-Baqareh	CultNat Atlas	100234
Kom el-Gebel	CultNat Atlas	100236
Kom el-Hasin	CultNat Atlas	100237
Kom el-Haeh	CultNat Atlas	100239
Kom el-Rekawyeh	CultNat Atlas	100240
Kom el-Zalat	CultNat Atlas	100241
Kom el-Shamalii	CultNat Atlas	100243
Kom el-Sheikh Said Ahmed	CultNat Atlas	100244
Kom el-'ashrien	CultNat Atlas	100246
Kom el-Ghez	CultNat Atlas	100247
Kom Ga'if	CultNat Atlas	100253
Kom Hamrit	CultNat Atlas	100254
Kom Delingeh, Zalikheh	CultNat Atlas	100256
Kom Zekrii	CultNat Atlas	100257
Kom Ferien	CultNat Atlas	100260
Kom Qarttas	CultNat Atlas	100262
Kom Qamheh	CultNat Atlas	100263
Kom el-Bikawiyyah	EAIS	Ezbet el-Jamal
Kom Haeh	EAIS	
Kom Zileiha	EAIS	Kom Zilikhah
Kortas, K.	EES Delta Survey	16
Geif, K.	EES Delta Survey	17
Sidi Hineish	EES Delta Survey	18
Dilingat, K.	EES Delta Survey	21
Abiad, El K. el-	EES Delta Survey	22
Kharaz	EES Delta Survey	23
Hisn, K. el-	EES Delta Survey	24
Zarqa, K. ez-	EES Delta Survey	25
Ibqa, T	EES Delta Survey	26
Waqidi, K. el-	EES Delta Survey	27
Zuweida, K.	EES Delta Survey	28
Sidi Ambar	EES Delta Survey	29
Ahmar, El K. el-	EES Delta Survey	30
Hamada, K.	EES Delta Survey	31
Maqadis, K. el-	EES Delta Survey	32
Sheikh Ibeid, K. el-	EES Delta Survey	36

1. Spencer 2006.
2. EAIS 2007b.
3. Center for Documentation of Cultural and Natural Heritage 2002.

Name	Source	Alt. ID	Name	Source	Alt. ID
Abu el Humar el Kebir, K.	EES Delta Survey	292	Kalabt Shafiq	EES Delta Survey	457
Abu el Humar es Saghir, K.	EES Delta Survey	293	Silvagou	EES Delta Survey	459
Firin, K.	EES Delta Survey	294	Dahab, K.	EES Delta Survey	591
Barud, K. el-	EES Delta Survey	295	Khatimi, K. el-	EES Delta Survey	602
Abqaein, T el-	EES Delta Survey	297	Umm el Laban, K.	EES Delta Survey	608
Baqar, K. el-	EES Delta Survey	298	Ghuzz, K. el-	EES Delta Survey	609
Ahmar, El K. el-	EES Delta Survey	440	Abu Ali	EES Delta Survey	629
Shimuli, K. el-	EES Delta Survey	442	Gebel, K. (Gilla?)	EES Delta Survey	630
Ahmar, K. el-	EES Delta Survey	443	Zalat, K. el-	EES Delta Survey	631
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Ityai el Barud	EES Delta Survey	456			

APPENDIX 2

AOIs visited during the Fall 2007 cultural inventory (fig. 3.16). Preliminary dating of unsystematically collected surface sherds after Simony n.d. Recommendations for future work are coded as follows: CO = Core, CC = Ceramic Collection, TP = Topographic Survey, GP = Geophysical Survey, EX = Excavation. Y=Yes, N=No, P=Possible.

Name	EES No.	Size (m)	Condition	Threats	Archaeology	CO	CC	TP	GP	EX
Kalabt Shafiq	457	210 x 345	Destroyed. Naukratis survey found EAO records of Ptolemaic cemetery here, but now this is a series of rice fields surrounding a marshy depression.	Irrelevant. Agricultural fields and groundwater have eliminated all traces of surface remains.	No visible archaeological remains.	Y	P	N	N	N
Kom Dahab	591	123 x 140	Small tell of 1 m height, leveled surface. Covered by halfa stands on west and south, central area open ground.	Moderate to high. Animal pens on north and east cutting into exposed mud-brick walls, possibly recently.	Visible mud-brick wall exposed on north face, extensive Ro sherds over visible mound despite systematic collection by Naukratis survey. Isolated pottery slag.	Y	N	Y	Y	Y
Kom Firin	294	Not measured	Extensive *kom* under current exploration by Neal Spencer, British Museum.	Low. Erosion of standing mud-brick architecture.	West and east areas enclosed by mud-brick walls up to 5 m+ in height. Extensive lower town to north. Thick sherd carpet.	Y	Y	Y	Y	Y
Ruzzafa	n/a	400 x 130	1-m-high mound covered by modern cemetery with concrete superstructures.	n/a	No visible archaeological remains.	N	N	N	N	N
Silvagou	459	175 x 123	Nearly destroyed, modern cemetery covers most of 2–3 m high sandy mound. Open sandy depression enclosed on all sides by housing, animal pens, and cemetery.	High. Modern concrete cemetery visibly migrating south has covered over three-quarters of visible mound. Looting and/or excavation have left a series of broken pottery coffins and ceramics over the surface.	Fragmentary pottery coffins on surface.	P	N	N	P	Y
Biban	n/a	n/a	Visited the west edge of town, no visible ceramics, though town has old center and shows some mounding.	n/a	No visible archaeological remains.	Y	N	N	N	N

Name	EES No.	Size (m)	Condition	Threats	Archaeology	CO	CC	TP	GP	EX
Damatyuh	n/a	n/a	Modern town with no clear older surfaces. Old center, near possible channel.	n/a	No visible archaeological remains.	Y	N	N	N	N
Kom el-Dilingat	n/a	n/a	Open area which turned out to be trash dump.	n/a	No visible archaeological remains, though el-Dilingat would benefit from coring to determine depth of occupation.	Y	N	N	N	N
'Ezbet el-Jizawi (el Awamir)	n/a	105 x >10	Open level area adjacent to dried up fish pond. Few halfa and reed stands.	n/a	LRo ceramics, including AfRSW and LRA 1, found in material cast up from 1.5 m deep canal. Scattered non-diagnostic ceramics to northeast of canal in dried up fish pond.	Y	P	N	P	P
'Ezbet el-Naggar	n/a	166 x 181	*Kom* covered by modern cemetery. Walls and pottery protruding from east and west flanks. Little accessible because of cemetery	Moderate to High. Cemetery covers most and is expanding. Trash heaps on south migrating to cemetery boundaries. Soccer field to northwest.	Pto and/or Ro and later ceramics. Redbrick wall on east face of *kom*, and limestone and sandy mud-brick wall on west face.	Y	P	N	N	N
'Ezbet el-Wafa'iyya	n/a	n/a	Modern cemetery	n/a	No visible archaeological remains.	N	N	N	N	N
Kafr Ziyada	n/a	n/a	Modern town with no clear older surfaces.	n/a	No visible archaeological remains.	N	N	N	N	N
Khirbeta	n/a	700 x 590	Central mound completely covered by modern housing, eastern mound (Tell Kurum) covered by modern graves.	n/a	Wastewater canal ditch in southeast of town cast up Gascoigne (n.d.) found Pto, ERo, LRo ceramics. Granite and marble columns reused around Abu Hol mosque. Basalt statue fragment found in south side of town.	Y	Y	N	N	N

Name	EES No.	Size (m)	Condition	Threats	Archaeology	CO	CC	TP	GP	EX
Kom Abu Ali	629	125 x 130	Sandy tell shows some signs of extensive leveling.	Moderate. Tractor tracks across most of tell, may be actively leveled. Animal pens and field cutting on west. Eroding cut section on northwest.	Ro amphorae, AfRSW sherd. Limestone wall oriented east–west with some red pigment on one face.	Y	Y	N	Y	Y
Kom Abu el-Tubul	446	240 x 190	Decently preserved sandy tell 1–2 m in height with mostly open ground and halfa stands.	Moderate to High. Active pitting in site on north, southeast, and west—looting? Extensive animal pens on north, west, and southeast. Active field cutting in southwest.	Extensive Ro ceramics, could be earlier material. Some degraded mud brick in northeast. Some bone.	Y	Y	Y	Y	Y
Kom el-Ahmar #1	30	175 x 70	Modern cemetery and level fields with scattered ceramics throughout and around it.	Cemetery and modern fields are removing ceramics.	Numerous Ro–LRo (incl. LRA 1) amphora spikes visible in drainage ditch to south of cemetery and in spoil cast up from graves.	Y	Y	N	N	N
Kom el-Ahmar #2	443	40 x 140	Leveled potato field with thick ceramics. Halfa field to west and fields to north and east show no signs of sherds.	Irrelevant. Mound is gone and ceramics highly localized. Could be dump for sherds removed from sebakh.	Numerous sherds in salty field, Ro–LRo (LRA 4).	Y	N	N	N	N
Kom el-Barud	295	>600 x 305	Moderate mound of 2–3 m height covered in thick camelthorn and halfa. Visible variation in topography, some robbed-out walls leaving water-filled depressions.	Little to Moderate. Previous field cutting on north. No visible threats to main mound, although cemetery on southwest may migrate westward in coming years.	Extensive Ro sherds on main mound (263 x 400 m) but also to northwest to main NW-SE road. Redbrick, worked stone, some shell and degraded mud-brick buildings on main mound.	Y	Y	Y	Y	Y

Name	EES No.	Size (m)	Condition	Threats	Archaeology	CO	CC	TP	GP	EX
Kom el-Ghuzz	609	340 x 250 (est.)	Formerly moderate-sized tell now only a 80 x 30 m section preserved in northeast. Potato fields cover leveled main area of tell to SW.	High. Remaining bit of tell will likely be soon plowed under.	Ro sherds and CypRSW in preserved tell in northeast. Area of leveled tell to the southwest. Limestone fieldstone wall embedded in preserved portion of tell.	Y	N	N	Y	Y
Kom el-Gill (a.k.a Kom el-Gebel)	639	>228 x 301	Destroyed. Ceramic remains scattered across level open field.	Irrelevant. Agricultural fields have destroyed tell.	Few LRo sherds, including LRA 1 handles.	Y	P	N	N	N
Kom el-Hasil	n/a	320 x 350	Tell is entirely under modern settlement	n/a	No visible archaeological remains, though Ro (?) jar fragment	Y	N	N	N	N
Kom el-Hisn	24	631 x 578	Extensive tell, mostly open ground with sparse halfa in central area and several pools on the north and in center.	Moderate. Trash and animal pens encroaching on all sides. Town on south has built over exposed mud-brick walls in section.	Visible low topography of mud-brick walls in south.	Y	N	N	Y	Y
Kom el-Maqadis (Kom Kheniza)	32	236 x 280	Moderate sandy mound of 2–3 m height, mostly open ground with some modern tombs. East and northern faces show mud-brick (enclosure?) walls.	Moderate to High. Cemetery confined mostly to southern half, not dense but could fill out a great deal. Field cutting on north and east.	SCA "Greek" and "Predynastic" excavations visible in northwest (acc. to Ashraf Abdulrahman). Ro ceramics visible. Fallen redbrick chapel and several mud-brick structures visible, as is 70 cm diameter circular white-plastered structure.	Y	Y	Y	Y	Y
Kom el-Zarqa	25	n/a	Modern town with no clear older surfaces.	n/a	Few premodern sherds, nothing visibly older.	Y	N	N	N	N
Kom Haeh	n/a	162 x 83	1–2 m high mound covered by thick halfa grass and mud-brick/concrete tombs	n/a	No visible archaeological remains.	Y	N	N	N	N

Name	EES No.	Size (m)	Condition	Threats	Archaeology	CO	CC	TP	GP	EX
Kom Hamrit	638	173 x 110	Small mound of 1–2 m height, mostly halfa covered. Shallow occupation of 0.5 m noted in section.	Moderate. Badly cut by fields especially on west side, animal pens on west too.	Stratified sherds in east section and visible on surface.	Y	Y	Y	Y	Y
Kom ʿIshrin	633	n/a	Leveled. Scant ceramic remains around edges of level rice field.	Irrelevant. Agricultural fields have destroyed mound and preserved ceramics only in field boundaries.	Large Nile Silt C basin, Ro.	Y	N	N	N	N
Kom Kharaz	23	250 x 250?	Completely level lemon orchards within sandy fields.	n/a	Numerous sherds in fields and drainage ditches. LPto–LRo sherds. Noted as cemetery by Hamada and Farid.	Y	Y	N	N	N
Kom Kortas	16	260 x 200	Surface has been systematically trenched by series of SCA 1.5 x 1.5 x 1 m units. Mostly covered with camelthorn and halfa.	High. Will be leased/deeded to el-Dilingat government to build a market according to Ashraf Abdulrahman. Trash dumps along north side next to canal.	LPto–LRo sherds. Standing mud-brick and redbrick walls visible in SCA sections. Frequent bone, some worked limestone. SCA 2002–03 report shows brick kilns and a well.	Y	Y	N	Y	Y
Kom Qamha	n/a	210 x 210	2–3 m high small mound covered with halfa and camelthorn. Notable variation in topography.	Moderate. Notable trash dumps on west and in middle, animal pens on east side. Road and field cutting on north and west.	Mostly Ro amphora spikes. Some bits of worked limestone in northeast. Stratified section in cut on west side.	Y	Y	Y	Y	Y
Kom Sheikh Said Ahmed	632	130 x 143	1–2 m high, sandy, mostly level mound with visible stratified remains, 50 percent covered with halfa.	Moderate to high. Trash mounds extensive in center south, encroachment by field cut sections along all edges. Animal pens on east.	Thick Ro ceramics in cut section and canal on north. Sherds and former mound probably extend west.	Y	Y	N	Y	Y

Name	EES No.	Size (m)	Condition	Threats	Archaeology	CO	CC	TP	GP	EX
Kom el-Shimuli	442	105 x 91	Small tell of 1 m height nearly destroyed by fields. Thin halfa stands, undulating surface.	High. Extensive pens on east, west, south. Fields on west have already destroyed west half of tell, actively cutting into south.	Redbrick eroding out of section. Lump of pottery slag on west side, fist sized worked limestone fragments.	Y	Y	Y	Y	Y
Kom Zimran	n/a	un-measured	3 m high mound entirely built over by modern cemetery.	n/a	Two limestone tombstones found on west face of cemetery, elaborate raised relief inscription. Mud brick eroding from west profile. Pottery thick, possibly Ro.	Y	Y	N	N	N
Kom Zuweida	28	n/a	Modern fields. Might merit coring for its place name.	n/a	No visible archaeological remains.	Y	N	N	N	N
Magadieb	32	n/a	Level sandy peanut fields.	n/a	No visible archaeological remains.	N	N	N	N	N
Saft el-'Inab	n/a	n/a	Modern town with no clear older surfaces.	n/a	No visible archaeological remains. Picked up two sherds, Ro–LRo (LRA?)	N	N	N	N	N
Sidi Ambar	29	n/a	Small mud-brick shrine in clearing by tree in middle of fields.	None visible.	Mud-brick shrine is ~1.8 m tall and 75 cm in diameter, base tapering to top. White plastered.	N	N	N	N	N
Sidi 'Isa	n/a	n/a	Modern cemetery	n/a	No visible archaeological remains.	N	N	N	N	N
Tell Ibqa	n/a	n/a	Modern town with no clear older surfaces.	n/a	No visible archaeological remains.	N	N	N	N	N
Zawiyet Furaj	n/a	n/a	Modern town with no clear older surfaces.	n/a	No visible archaeological remains.	N	N	N	N	N
Zawiyet Hamour	n/a	n/a	Modern cemetery	n/a	No visible archaeological remains.	N	N	N	N	N

APPENDIX 3

List of collection units (CUs) identified by CU ID. Information on AOI, visibility (expressed as % visible), main ground cover, surface salinity, count of sherds collected, weight of sherds collected, and density by count and weight is provided.

CU	AOI	Vis.	Ground Cover	Salinity	Count	Weight (kg)	Count/ 100 m²	Kg/ 100 m²
100	KHMR	30	Straw	little	58	1.4	18	0.4
101	KHMR	20	Halfa grass	some	22	0.4	7	0.1
102	KHMR	90	Plowed earth	none	143	2.4	46	0.8
103	KHMR	70	Clover	none	37	0.7	12	0.2
104	KHMR	50	Straw	none	77	1.7	25	0.5
105	KHMR	75			0	0	0	0.0
106	KHMR	50	Weeds	some	4	0.1	1	0.0
107	KHMR	25	Clover	none	0	0	0	0.0
108	KHMR	25	Halfa grass	some	0	0	0	0.0
109	KHMR	75	Halfa grass	little	41	0.5	13	0.2
110	KHMR	50	Unknown crop	none	25	0.3	8	0.1
111	KSHM	50	Clover	none	115	3.8	37	1.2
112	KSHM	50	Clover	none	56	2.5	18	0.8
113	KSHM	50	Clover	none	19	1	6	0.3
114	KSHM	75	Weeds	some	17	1	5	0.3
115	KSHM	75	Weeds	some	34	3.5	11	1.1
116	KSHM	50	Weeds	some	38	2	12	0.6
117	KSHM	75	Weeds	some	58	4.5	18	1.4
118	KSHM	100	Plowed earth	none	44	1.7	14	0.5
119	KSHM	100	Plowed earth	none	17	3.2	5	1.0
120	KSHM	75	Clover	none	226	7.7	72	2.5
121	KSHM	95	Plowed earth	none	52	1.3	17	0.4
122	KSHM	70	Clover	none	53	1.5	17	0.5
123	KSHM	50	Clover	little	46	2.8	15	0.9
124	KSHM	50	Halfa grass	some	36	2.2	11	0.7
125	KATU	75	Halfa grass	none	2	0.2	1	0.1
126	KATU	100	Plowed earth	none	89	1.8	28	0.6
127	KATU	50	Halfa grass	some	26	1.9	8	0.6

CU	AOI	Vis.	Ground Cover	Salinity	Count	Weight (kg)	Count/ 100 m²	Kg/ 100 m²
128	KATU	75	Halfa grass	little	7	0.2	2	0.1
129	KATU	50	Halfa grass		2	0.1	1	0.0
130	KATU	75	Straw		34	1.4	11	0.4
131	KATU	90	Straw	none	175	6.6	56	2.1
132	KATU	75	Straw	some	8	0.2	3	0.1
133	KATU	50	Straw	little	18	1	6	0.3
134	KATU	75	Straw	little	21	0.9	7	0.3
135	KATU	50	Straw	much	35	1.8	11	0.6
136	KABA	100	Straw	little	400	11.1	127	3.5
137	KABA	75	Straw	little	125	4.2	40	1.3
138	KABA	75	Straw	little	94	3.4	30	1.1
139	KABA	100	Straw		39	0.8	12	0.3
140	KABA	100	Straw	little	75	3.5	24	1.1
141	KABA	100	Straw		120	3.5	38	1.1
142	KABA	100	Plowed earth	none	22	1	7	0.3
143	KABA	25	Clover	none	0	0	0	0.0
144	KABA	100	None	none	134	3.5	43	1.1
145	KABA	100	Clover	none	110	2.5	35	0.8
146	KABA	100	None	none	62	1.1	20	0.4
147	KABA	100	None	none	138	3	44	1.0
148	KSSA	75	Straw	some	155	5	49	1.6
149	KSSA	75	Straw	some	45	1	14	0.3
150	KSSA	75	Clover	some	377	11.6	120	3.7
151	KSSA	50	Plastic	none	108	8	108	8.0
152	KSSA	75	Plowed earth	none	500	11.5	159	3.7
153	KSSA	75	Plowed earth	none	349	7	111	2.2
154	KSSA	75	Plowed earth	none	954	22.4	304	7.1
155	KSSA	75	Plowed earth	little	1209	33.1	385	10.5
156	KGHZ	50	Straw	little	320	18	102	5.7
157	KGHZ	75	Straw	little	306	6.5	97	2.1
158	KGHZ	75	Plowed earth	none	150	6	48	1.9
159	KGHZ	75	Plowed earth	none	343	15	109	4.8
160	KGHZ	100	None	none	248	9	79	2.9
161	KGHZ	100	None	none	86	1.5	27	0.5
162	KGHZ	100	None	none	299	8	95	2.5
163	KGHZ	100	None	none	459	7	146	2.2
164	KGHZ	75	Weeds	none	465	8.5	148	2.7
165	KGHZ	50	Unknown crop	little	29	0.5	9	0.2
166	KGHZ	50	Salt	some	61	2	19	0.6

CU	AOI	Vis.	Ground Cover	Salinity	Count	Weight (kg)	Count/ 100 m²	Kg/ 100 m²
167	KHMR	75	Plowed earth	none	118	2	38	0.6
168	KHMR	75	Plowed earth	little	65	1	21	0.3
169	KHMR	75	Plowed earth	some	52	0.5	17	0.2
170	KHMR	50	Onion	none	89	1	28	0.3
171	KHMR	75	Plowed earth	some	91	1	29	0.3
172	KHMR	75	Plowed earth	none	21	0.5	7	0.2
173	KSHM	75	Plowed earth	little	88	2	28	0.6
174	KSHM	25	Clover	none	3	0.1	1	0.0
175	KSHM	50	Onion	none	38	0.5	12	0.2
176	KSHM	75	Plowed earth	none	59	0.8	19	0.3
177	KSHM	75	Onion	little	44	0.5	14	0.2
178	KSHM	75	Plowed earth	none	85	1	27	0.3
179	KSHM	75	Plowed earth	none	1447	36.3	461	11.6
180	QMHA	75	Halfa grass	none	506	11.5	161	3.7
181	QMHA	50	Halfa grass	none	404	9	129	2.9
182	QMHA	75	Plowed earth	none	99	1	32	0.3
183	QMHA	50	Plastic	none	31	0.5	31	0.5
184	QMHA	50	Plastic	none	354	8	354	8.0
185	QMHA	25	Clover	none	0	0	0	0.0
186	QMHA	50	Plastic	none	204	2.5	204	2.5
187	QMHA	50	Plastic	none	9	0.1	3	0.0
188	QMHA	50	Plastic	none	33	0.5	33	0.5
189	QMHA	50	Plastic	none	70	1	70	1.0
190	QMHA	50	Plastic	none	84	1	84	1.0
191	QMHA	50	Plastic	none	14	0.5	14	0.5
192	QMHA	50	Plastic	none	17	0.5	17	0.5
193	QMHA	50	Halfa grass	some	198	8	63	2.5
194	QMHA	50	Plastic	none	56	0.5	56	0.5
195	KBAR	50	Halfa grass	none	13	0.2	4	0.1
196	KBAR	50	Halfa grass	little	456	16.5	145	5.3
197	KBAR	75	Halfa grass	little	771	24.5	246	7.8
198	KBAR	75	Halfa grass	some	1264	46	403	14.6
199	KBAR	75	Plowed earth	none	353	7	112	2.2
200	KBAR	75	Plowed earth	none	690	19.5	220	6.2
201	KBAR	75	Salt	much	43	0.3	14	0.1
202	KBAR	75	Plowed earth	little	193	4.5	61	1.4
203	KBAR	75	Plowed earth	little	134	2	43	0.6
204	KABQ_	75	Animal dung	much	423	8	135	2.5

CU	AOI	Vis.	Ground Cover	Salinity	Count	Weight (kg)	Count/ 100 m²	Kg/ 100 m²
205	KABQ_	75	Plowed earth	none	36	0.5	11	0.2
206	KABQ_	75	Weeds	none	47	1	15	0.3
207	KABQ_	50	Halfa grass	some	67	3	21	1.0
208	KABQ_	50	Halfa grass	some	41	0.5	13	0.2
209	KABQ_	50	Plowed earth	some	162	4	52	1.3
210	KBAR	75	Plowed earth	little	317	3.5	101	1.1
211	KBAR	75	Plowed earth	little	178	1.5	57	0.5
212	KBAR	75	Plowed earth	none	98	1.5	31	0.5
213	KABQ_	50	Leaves	none	75	1	24	0.3
214	KABQ_	75	Weeds	some	355	13	113	4.1
215	KABQ_	50	Salt	much	0	0	0	0.0

APPENDIX 4

Sums of period indices for each CU. The period index value is calculated by adding the (fractional) counts of diagnostics for each period. The total number of datable diagnostics in the CU is noted (Diag Count), as is the number of tentatively dated diagnostics (Tent Count) and diagnostics that overlap more than one period (Multi Count).

CU	AOI	NK	TIP	LDyn	Pto	EPto	LPto	Ro	ERo	LRo	Diag Count	Tent Count	Multi Count
100	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
101	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
102	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
103	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
104	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
105	KHMR	0	0	0	0	0	0	6	3	1	6	1	0
106	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
107	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
108	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
109	KHMR	0	0	0	0	0	0	1	0	1	1	0	0
110	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
111	KSHM	0	0	0	2	0	1	3	2	1	5	0	2
112	KSHM	0	0	0	0	0	0	2	1	1	2	0	0
113	KSHM	0	0	0	0	0	0	2	1	1	2	0	0
114	KSHM	0	0	0	0	0	0	1	0	1	1	0	0
115	KSHM	0	0	0	0	0	0	3	3	0	3	3	0
116	KSHM	0	0	0	0	0	0	1	1	0	1	0	0
117	KSHM	0	0	0	0	0	0	4	1	3	4	0	0
118	KSHM	0	0	0	0.5	0	0.5	0.5	0.5	0	1	0	1
119	KSHM	0	0	0	0	0	0	0	0	0	0	0	0
120	KSHM	0	0	0	0.5	0	0	8.5	6	1	9	2	1
121	KSHM	0	0	0	0	0	0	1	0	0	1	0	0
122	KSHM	0	0	0	0	0	0	3	0	3	3	0	0
123	KSHM	0	0	0	2	0	1	3	1	2	5	0	2
124	KSHM	0	0	0	1	0	0	1	0	1	2	0	0
125	KATU	0	0	0	0	0	0	1	0	0	1	1	0
126	KATU	0	0	0.5	1.5	0	1	1	1	0	3	0	3
127	KATU	0	0	0.5	0.5	1	0	1	0	1	2	0	1
128	KATU	0	0	0	0	0	0	0	0	0	0	0	0
129	KATU	0	0	0	0	0	0	0	0	0	0	0	0
130	KATU	0	0	0	1.5	0	0.5	1	0.5	1	3	1	2
131	KATU	0	0	0	0	0	0	5	0	2	5	1	0

CU	AOI	NK	TIP	LDyn	Pto	EPto	LPto	Ro	ERo	LRo	Diag Count	Tent Count	Multi Count
132	KATU	0	0	0	0	0	0	0	0	0	0	0	0
133	KATU	0	0	0	0	0	0	3	2	0	3	1	0
134	KATU	0	0	0	0	0	0	1	1	0	1	0	0
135	KATU	0	0	1	3	1	1	3	1	1	7	1	2
136	KABA	0	0	0	0	0	0	17	0	17	17	0	0
137	KABA	0	0	0	0	0	0	9.5	1	8	10	3	1
138	KABA	0	0	0	0	0	0	5	0	5	6	1	2
139	KABA	0	0	0	0	0	0	3	0	3	3	0	0
140	KABA	0	0	0	0	0	0	19	1	15	19	3	0
141	KABA	0	0	0	0	0	0	6.5	0	7	7	1	1
142	KABA	0	0	0	0	0	0	5	0	5	5	0	0
143	KABA	0	0	0	0	0	0	0	0	0	0	0	0
144	KABA	0	0	0	1	0	0	6	0	6	7	1	0
145	KABA	0	0	0	0	0	0	6	0	6	6	1	0
146	KABA	0	0	0	0	0	0	2	0	2	2	1	0
147	KABA	0	0	0	0	0	0	10	0	9	10	0	0
148	KSSA	0	0	0	0	0	0	6	2	4	6	1	0
149	KSSA	0	0	0	0	0	0	1	0	1	1	0	0
150	KSSA	0	0	0	2	0	1	9	0	5	11	4	0
151	KSSA	0	0	0	1.5	0	1.5	16.5	3.5	7	18	4	3
152	KSSA	0	0	0	1.5	0	0.5	17.5	4.5	12	19	0	1
153	KSSA	0	0	0	2	0	2	7	1	5	9	0	2
154	KSSA	0	0	0	7	3.5	1.5	20	2	11	27	3	3
155	KSSA	0	0	0	0	0	0	18	8	5	18	2	0
156	KGHZ	0	0	0	15	0.5	8.5	11	5	2	26	4	7
157	KGHZ	0	0	0	2.5	0	1.5	2.5	2.5	0	5	0	3
158	KGHZ	0	0	0	4	0	1	4	1	1	8	4	2
159	KGHZ	1	0	0	11	3	5	11	6	4	23	4	8
160	KGHZ	0	0	1	10.5	4	2.5	3.5	2.5	0	16	1	6
161	KGHZ	0	0	0	0	0	0	2	0	0	2	1	0
162	KGHZ	0	0	2	1	1	0	2.5	1	2	6	0	1
163	KGHZ	0	0	1	1.5	1	0.5	3.5	1.5	0	6	1	1
164	KGHZ	0	0	1.5	3.5	1	1	6.5	3	1	12	2	4
165	KGHZ	0	0	0	1	0	0	0	0	0	1	0	0
166	KGHZ	0	0	0	0.5	0	0.5	2.5	0.5	0	3	1	1
167	KHMR	0	0	0	0.5	0	0.5	3	1	2	4	0	2
168	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
169	KHMR	2	0	0	0	0	0	1	0	1	3	0	0
170	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
171	KHMR	0	0	0	0	0	0	0	0	0	0	0	0
172	KHMR	0	0	0	1	0	1	1	1	0	2	1	2
173	KSHM	0	0	0	1.5	1	0.5	5.5	1.5	4	7	0	1
174	KSHM	0	0	0	0	0	0	0	0	0	0	0	0
175	KSHM	0	0	0	0	0	0	0	0	0	0	0	0
176	KSHM	0	0	0	0.5	0	0.5	8.5	2.5	5	9	0	1

CU	AOI	NK	TIP	LDyn	Pto	EPto	LPto	Ro	ERo	LRo	Diag Count	Tent Count	Multi Count
177	KSHM	0	0	0	0	0	0	0	0	0	0	0	0
178	KSHM	0	0	0	0	0	0	3	1	2	3	0	0
179	KSHM	0	0	0	3.5	0	3.5	27.5	10.5	13	31	6	5
180	QMHA	0	0	0	2.5	1.5	1	22.5	5.5	11	25	4	2
181	QMHA	0	0	0	14.5	6	2.5	13.5	5.5	4	28	8	3
182	QMHA	0	0	0	2	0	0	1	0	1	3	0	0
183	QMHA	0	0	0	0	0	0	0	0	0	1	1	0
184	QMHA	0	0	0	8	0	3	3	3	0	11	3	4
185	QMHA	0	0	0	0	0	0	0	0	0	0	0	0
186	QMHA	0	0	0	1	0	1	5	3	0	6	2	2
187	QMHA	0	0	0	0	0	0	0	0	0	0	0	0
188	QMHA	0	0	0	0	0	0	0	0	0	0	0	0
189	QMHA	0	0	0	0	0	0	0	0	0	0	0	0
190	QMHA	0	0	0	0	0	0	1	0	0	1	0	0
191	QMHA	0	0	0	0	0	0	0	0	0	0	0	0
192	QMHA	0	0	0	0	0	0	0	0	0	0	0	0
193	QMHA	0	0	0	3	0	2	10	5	3	13	5	2
194	QMHA	0	0	0	0	0	0	0	0	0	0	0	0
195	KBAR	0	0	0	0	0	0	1	0	1	1	1	0
196	KBAR	0	0	0	1.5	0	0.5	20.5	9.5	5	22	4	1
197	KBAR	0	0	0	5.5	2	2.5	38.5	12.5	23	44	4	5
198	KBAR	0	0	0	8.5	1	6.5	57	22.5	18.5	66	8	11
199	KBAR	0	0	0	1	0	1	8	5	2	9	0	0
200	KBAR	0	0	0	5.5	1.5	3	20	5	10	26	4	6
201	KBAR	0	0	0	0	0	0	1	0	1	1	0	0
202	KBAR	0	0	0	1	0	0	6	3	2	7	2	0
203	KBAR	0	0	0	0	0	0	2	0	1	2	1	0
204	KABQ	1	0	0	2	0	2	5	2	2	8	0	4
205	KABQ	0	0	0	0	0	0	0	0	0	0	0	0
206	KABQ	0	0	0	0	0	0	1	0	1	1	0	0
207	KABQ	2	0	1	0	0	0	1	0	1	4	0	0
208	KABQ	0	0	0	0	0	0	3	0	1	3	0	0
209	KABQ	7	0	0	0	0	0	1	1	0	8	0	0
210	KBAR	0	0	0	1	0	1	8	1	4	9	4	2
211	KBAR	0	0	0	0.5	0	0.5	3.5	0.5	0	4	0	1
212	KBAR	0	0	0	0	0	0	1	0	1	1	0	0
213	KABQ	0	0	0	0.5	0	0.5	1.5	0.5	1	2	0	1
214	KABQ	13	0	0	3.5	1	0.5	9	0.5	3	26	3	2
215	KABQ	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX 5

Sums of period indices for all AOIs. Total counts by AOI of datable diagnostics, tentatively dated diagnostics, and multiple period diagnostics are shown.

AOI	NK	TIP	LDyn	Pto	EPto	LPto
KABA	0	0	0	1	0	0
KABQ	23	0	1	6	1	3
KATU	0	0	2	7.5	2	2.5
KBAR	0	0	0	24.5	4.5	15
KGHZ	1	0	5.5	50.5	10.5	20.5
KHMR	2	0	0	1.5	0	1.5
KSHM	0	0	0	11.5	1	7
KSSA	0	0	0	14	3.5	6.5
QMHA	0	0	0	31	7.5	9.5

AOI	Ro	ERo	LRo	Diag Count	Tent Count	Multi Count
KABA	89	2	83	92	11	4
KABQ	21.5	4	9	52	3	7
KATU	15	4.5	5	25	5	8
KBAR	166.5	59	68.5	192	28	26
KGHZ	49	23	10	108	18	33
KHMR	12	5	5	16	2	4
KSHM	77.5	32	38	89	11	13
KSSA	95	21	50	109	14	9
QMHA	56	22	19	88	23	13