Supplemental online material

SOM 1

Amino acid racemization and radiocarbon data used to create AAR calibration curves.

SOM 2

Specimen data used in analyses.

SOM 3

Recalibrated radiocarbon data used to determine half-life estimates.

SOM 1. Amino acid racemization and radiocarbon data used to create AAR calibration curves.

Data table columns:

Specimen data:

- taxon name (genus)
- specimen number (MAK's personal database specimen number)

Amino acid racemization data:

- UAL ID (University of Northern Arizona Amino Acid Geochronology Laboratory specimen number)
- Asp D/L ([D-Asp]/[L-Asp])
- Glu D/L ([D-Glu]/[L-Glu])

Radiocarbon data:

- ANSTO ID (Australian Nuclear Science and Technology Organisation specimen number)
- $\delta\ ^{13}C$ per mil
- Conv. ^{14}C age (conventional carbon-14 age)
  - age (age in uncalibrated carbon years)
  - 1σ unc. (1σ uncertainty in uncalibrated carbon years)
- Calibrated radiocarbon data
  - age (median probability age BP)
  - 2σ yng (2σ youngest possible age BP)
  - 2σ old (2σ oldest possible age BP)
  - ΔR (ΔR used during calibration)
  - calCurve (calibration curve used during calibration)

Supplemental Data 1 - Amino acid racemization and radiocarbon data used to create AAR calibration curves

Specimen		Amino acid data			Radiocarbon data								
					ANSTO	$\delta^{13}C$	Conv. ^{14}C Age		Calibrated Age (before AD 1950)				
Taxon	number	UAL ID	Asp D/L	Glu D/L	ID	per mil	age	1σ unc.	age	2σ Yng	2σ Old	ΔR	calCurve
Ethalia	12039	5575 A	0.620	0.265	ozj024	2.8	3280	60	3112	2912	3316	4+40	Marine04
		5575 B	0.636	0.275									
	12049	5585 A	0.518	0.196	ozj025	3.1	2030	50	1593	1416	1758	4+40	Marine04
		5585 B	0.514	0.190									
	12066	5602 A	0.616	0.257	ozj026	2.6	3210	60	3019	2821	3227	4+40	Marine04
		5602 B	0.600	0.251									
	12079	5615 A	0.378	0.113	ozj027	2.5	770	50	400	284	500	4+40	Marine04
		5615 B	0.334	0.095									
	12085	5621 A	0.553	0.209	ozj028	1.6	2290	60	1899	1716	2086	4+40	Marine04
		5621 B	0.540	0.207									
	12089	5625 A	0.483	0.174	ozj029	2.7	1520	50	1070	929	1217	4+40	Marine04
		5625 B	0.487	0.167									
	11868	5686 A	0.031	0.014						-56			Live collected
		5686 B	0.031	0.014									
		5686 C	0.032	0.015									
		5686 D	0.034	0.013									
	12091	5627 A	0.042	0.016						-56			Live collected
		5627 B	0.037	0.016									
	12092	5684 A	0.032	0.014						-56			Live collected
		5684 B	0.033	0.014									
		5684 C	0.033	0.014									
		5684 D	0.036	0.015									
	12093	5685 A	0.032	0.015						-56			Live collected
		5685 B	0.034	0.014									
		5685 C	0.036	0.015									
		5685 D	0.036	0.014									
Natica	11314	5265 A	0.458	0.192	ozj012	2.6	1560	60	1112	954	1259	4+40	Marine04
		5265 B	0.426	0.178									
	11588	5272 A	0.355	0.131	ozj019	3.5	1140	60	694	551	846	4+40	Marine04
		5272 B	0.343	0.137									
	11598	5282 A	0.476	0.207	ozj020	2.5	1975	45	1527	1378	1684	4+40	Marine04
		5282 B	0.492	0.213									
	11606	5300 A	0.620	0.309	ozj021	3.0	3810	70	3753	3541	3973	4+40	Marine04
		5300 B	0.626	0.295									
	11609	5297 A	0.373	0.144	ozj022	3.3	995	50	579	489	668	4+40	Marine04
		5297 B	0.372	0.149									
	11614	5291 A	0.486	0.208	ozj023	3.0	1630	50	1184	1037	1303	4+40	Marine04
		5291 B	0.438	0.190									
	12259	5993	0.028	0.014						-56			Live collected
	12260	5994	0.029	0.016						-56			Live collected
	12264	5995	0.033	0.023						-56			Live collected
	12266	5996	0.028	0.014						-56			Live collected
	12267	5997	0.029	0.015						-56			Live collected

Supplemental Data 1 - Amino acid racemization and radiocarbon data used to create AAR calibration curves

Specimen		Amino acid data			Radiocarbon data								
					ANSTO	$\delta^{13}C$	Conv. ^{14}C Age		Calibrated Age (before AD 1950)				
Taxon	number	UAL ID	Asp D/L	Glu D/L	ID	per mil	age	1σ unc.	age	2σ Yng	2σ Old	ΔR	calCurve
Tellina	11092	4743 A	0.229	0.084	ozi199	2.1	795	45	424	299	511	4+40	Marine04
		4743 B	0.255	0.079									
	11094	4745 A	0.164	0.054	ozi200	3.3	535	40	161	38	274	0+0	Abraham
		4745 B	0.156	0.057									
	11095	4746 A	0.099	0.030	ozi201	1.3	475	45	89	-7	235	0+0	Abraham
		4746 B	0.089	0.032									
	11107	4837 A	0.241	0.101	ozi202	2.4	840	45	463	316	548	4+40	Marine04
		4837 B	0.221	0.087									
	11112	4842 A	0.113	0.034	ozi203	2.2	440	50	59	-9	194	0+0	Abraham
		4842 B	0.112	0.030									
	11129	4823 A	0.265	0.115	ozi204	2.6	1415	50	961	801	1114	4+40	Marine04
		4823 B	0.263	0.131									
	11148	4757 A	0.129	0.044	ozi205	1.8	450	60	74	-9	236	0+0	Abraham
		4757 B	0.145	0.046									
	11162	4786 A	0.287	0.110	ozi206	3.7	1570	45	1123	979	1254	4+40	Marine04
		4786 B	0.273	0.102									
	11189	4775 A	0.209	0.079	ozi207	2.4	545	40	170	74	274	0+0	Abraham
		4775 B	0.177	0.061									
	11421	5427 A	0.479	0.259	ozj013	3.1	4180	60	4257	4045	4468	4+40	Marine04
		5427 B	0.474	0.255									
	11430	5436 A	0.284	0.128	ozj014	2.1	1640	35	1196	1065	1289	4+40	Marine04
		5436 B	0.309	0.134									
	11431	5437 A	0.427	0.229	ozj015	2.3	3820	50	3764	3591	3943	4+40	Marine04
		5437 B	0.414	0.217									
	11436	5442 A	0.338	0.156	ozj016	3.0	2265	50	1868	1703	2031	4+40	Marine04
		5442 B	0.325	0.155									
	11077	4727 A	0.040	0.016						-55			Live collected
		4727 B	0.043	0.016									
	11199	4989 A	0.035	0.015						-55			Live collected
		4989 B	0.038	0.015									
	11200	4993 A	0.035	0.016						-55			Live collected
		4993 B	0.035	0.015									
	11201	4994 A	0.043	0.014						-55			Live collected
		4994 B	0.041	0.015									
	11202	4995 A	0.040	0.014						-55			Live collected
		4995 B	0.039	0.014									
	11203	4996 A	0.045	0.015						-55			Live collected
		4996 B	0.043	0.015									

Supplemental Data 1 - Amino acid racemization and radiocarbon data used to create AAR calibration curves

Specimen		Amino acid data			Radiocarbon data								
					ANSTO	$\delta^{13}C$	Conv. ^{14}C Age		Calibrated Age (before AD 1950)				
Taxon	number	UAL ID	Asp D/L	Glu D/L	ID	per mil	age	1σ unc.	age	2σ Yng	2σ Old	ΔR	calCurve
Turbo	11021	4684 A	0.521	0.134	ozi190	4.3	1225	40	767	664	891	4+40	Marine04
		4684 B	0.524	0.139									
	11027	4688 A	0.352	0.093	ozi191	2.0	810	45	437	305	521	4+40	Marine04
		4688 B	0.352	0.076									
	11035	4695 A	0.176	0.040	ozi192	2.2	Modern						
		4695 B	0.170	0.037									
	11046	4703 A	0.590	0.176	ozi193	2.5	1970	70	1521	1331	1713	4+40	Marine04
		4703 B	0.597	0.189									
	11052	4706 A	0.595	0.220	ozi194	2.9	2640	60	2324	2116	2557	4+40	Marine04
		4706 B	0.620	0.246									
	11054	4708 A	0.408	0.116	ozi195	0.3	790	45	419	297	508	4+40	Marine04
		4708 B	0.407	0.107									
	11056	4710 A	0.268	0.059	ozi196	3.7	480	40	92	-7	235	0+0	Abraham
		4710 B	0.314	0.073									
	11071	4721 A	0.471	0.135	ozi197	2.1	1350	45	887	747	1030	4+40	Marine04
		4721 B	0.479	0.156									
	11076	4726 A	0.632	0.291	ozi198	3.3	2970	50	2744	2560	2905	4+40	Marine04
		4726 B	0.691	0.288									
	11560	5330 A	0.649	0.267	ozj017	4.1	4430	80	4599	4379	4823	4+40	Marine04
		5330 B	0.637	0.256									
	11562	5332 A	0.551	0.187	ozj018	3.5	2665	40	2358	2168	2543	4+40	Marine04
		5332 B	0.547	0.183									
	11197	4990 A	0.042	0.015					-55			Live collected	
		4990 B	0.043	0.015									
	11198	4992 A	0.041	0.015					-55			Live collected	
		4992 B	0.043	0.015									

SOM 2. Specimen data used in analyses.

Data table columns:

- Taxon (genus name)
- specimen number (MAK's personal database specimen number)
- UAL ID (University of Northern Arizona Amino Acid Geochronology Laboratory specimen number)
- n (the number of subsamples averaged to generate specimen average, duplicate subsamples were run for all specimens, but subsamples with inferred age differences > 200 yr or 20% were excluded leaving some samples with only one subsample)
- Inferred age (BP, calibration cure using live-collected specimens as a origin through which calibration curves were forced)
    - Asp inferred age (years before A.D. 1950)
    - Glu inferred age (years before A.D. 1950)
    - Mean inferred age (years before A.D. 1950)
- Age difference
    - years (Asp age - Glu age)
    - % ((Asp age - Glu age)/Mean age)
- Shell
    - x (longest dimension in mm)
    - y (second longest dimension perpendicular to x in mm)
    - z (dimension perpendicular to x & y in mm)
    - thick (shell thickness in mm)
    - mass (shell mass in mg)
- Core
    - No. (core number)
    - Layer (core layer, depth in cm to the top of the sample layer)

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Ethalia	12081	5617	2	28	124	76	-97	-1.28	6.20	5.29	4.39	0.16	33.46	2	15
Ethalia	12080	5616	2	0	16	8	-16	-2.00	9.75	8.38	7.46	0.26	187.53	2	15
Ethalia	12070	5606	2	2	28	15	-26	-1.67	9.71	8.37	7.31	0.31	206.08	2	30
Ethalia	12069	5605	2	716	626	671	91	0.14	11.69	9.73	8.41	0.30	404.56	2	30
Ethalia	12076	5612	1	1508	1158	1333	350	0.26	6.88	5.62	4.38	0.14	49.35	2	30
Ethalia	12079	5615	2	404	422	413	-18	-0.04	6.00	4.87	3.97	--	35.88	2	30
Ethalia	12074	5610	2	2206	1930	2068	276	0.13	5.49	4.66	3.76	0.14	23.21	2	30
Ethalia	12071	5607	2	1191	972	1082	218	0.20	8.31	7.19	5.75	0.22	100.96	2	30
Ethalia	12075	5611	2	1	30	16	-29	-1.87	6.38	5.40	4.70	0.15	46.66	2	30
Ethalia	12077	5613	2	4	39	21	-36	-1.67	6.02	5.04	4.19	0.16	36.21	2	30
Ethalia	12078	5614	2	2128	2298	2213	-169	-0.08	6.41	5.46	4.80	0.16	44.51	2	30
Ethalia	12073	5609	2	2	33	18	-30	-1.72	6.48	5.30	4.46	0.17	42.67	2	30
Ethalia	12067	5603	2	12	54	34	-42	-1.25	7.07	6.05	5.29	0.17	65.73	2	45
Ethalia	12068	5604	2	2594	2437	2515	156	0.06	7.98	6.58	5.17	0.19	77.20	2	45
Ethalia	12065	5601	2	10	61	36	-51	-1.44	10.34	9.18	7.68	0.30	233.18	2	45
Ethalia	12066	5602	2	2896	2896	2896	0	0.00	7.44	6.27	5.18	--	90.83	2	45
Ethalia	12060	5596	2	3	33	18	-30	-1.67	8.49	7.32	6.42	0.24	118.18	2	60
Ethalia	12062	5598	2	658	784	721	-127	-0.18	7.22	6.08	5.03	0.17	62.61	2	60
Ethalia	12059	5595	1	1774	2120	1947	-346	-0.18	7.66	6.49	5.12	0.18	68.03	2	60
Ethalia	12064	5600	2	878	815	847	64	0.07	6.60	5.42	4.66	0.17	63.19	2	60
Ethalia	12061	5597	2	16	60	38	-44	-1.17	6.91	5.74	5.09	0.15	46.49	2	60
Ethalia	12063	5599	2	1924	1705	1814	219	0.12	6.23	5.18	4.43	0.16	37.74	2	60
Ethalia	12058	5594	2	2320	2217	2268	102	0.05	6.53	5.60	4.43	0.17	39.73	2	75
Ethalia	12054	5590	2	1640	1648	1644	-8	-0.01	7.20	6.15	5.49	0.23	88.53	2	75
Ethalia	12048	5584	2	1024	849	936	175	0.19	11.52	9.58	7.77	0.31	282.00	2	75
Ethalia	12056	5592	2	1516	1516	1516	0	0.00	7.46	6.27	4.95	0.21	69.58	2	75
Ethalia	12052	5588	2	1443	1490	1466	-46	-0.03	7.02	5.90	5.14	0.16	61.92	2	75
Ethalia	12057	5593	2	2610	2654	2632	-45	-0.02	6.61	5.52	4.11	0.16	38.62	2	75
Ethalia	12051	5587	2	2117	2266	2191	-148	-0.07	8.52	7.10	6.11	0.22	115.91	2	75
Ethalia	12050	5586	2	1475	1408	1442	67	0.05	8.80	7.38	6.23	0.18	111.12	2	75
Ethalia	12049	5585	2	1586	1621	1603	-36	-0.02	9.94	8.33	7.53	--	199.43	2	75
Ethalia	12053	5589	2	890	724	807	166	0.21	7.51	6.51	4.82	0.25	76.99	2	75
Ethalia	12090	5626	2	1552	1786	1669	-234	-0.14	6.72	5.61	4.69	0.16	52.02	2	90
Ethalia	12087	5623	2	1618	1716	1667	-98	-0.06	6.55	5.57	4.66	0.16	52.29	2	90
Ethalia	12045	5581	2	1350	1244	1297	107	0.08	8.10	7.02	6.01	0.23	104.32	2	90
Ethalia	12089	5625	2	1261	1243	1252	18	0.01	6.90	5.62	4.73	--	52.41	2	90
Ethalia	12046	5582	2	1767	1739	1753	28	0.02	8.22	7.21	6.33	0.22	111.52	2	90
Ethalia	12086	5622	1	1186	862	1024	324	0.32	4.40	3.90	3.20	0.15	10.50	2	105
Ethalia	12043	5579	2	934	754	844	180	0.21	6.34	5.45	4.38	0.23	49.52	2	105
Ethalia	12041	5577	2	2142	2022	2082	120	0.06	7.58	6.45	5.29	0.16	64.29	2	105
Ethalia	12042	5578	2	1868	1999	1933	-132	-0.07	6.66	5.54	4.44	0.17	49.97	2	105
Ethalia	12082	5618	2	1202	1380	1291	-178	-0.14	6.40	5.50	4.65	0.18	40.33	2	105
Ethalia	12037	5573	2	2577	2192	2384	386	0.16	10.00	8.58	6.80	0.22	165.74	2	105
Ethalia	12035	5571	2	1498	1390	1444	108	0.07	11.02	9.29	7.58	0.35	301.25	2	105
Ethalia	12038	5574	1	1563	1413	1488	150	0.10	8.75	7.32	6.20	0.20	120.78	2	105
Ethalia	12040	5576	2	1459	1516	1487	-56	-0.04	7.27	6.12	4.69	0.16	51.35	2	105
Ethalia	12083	5619	2	506	654	580	-148	-0.26	5.88	4.70	3.97	0.18	33.40	2	105

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Ethalia	12085	5621	2	1960	1900	1930	59	0.03	6.22	5.23	4.18	--	35.79	2	105
Ethalia	12036	5572	2	1524	1355	1440	170	0.12	9.50	8.39	7.15	0.21	153.71	2	105
Ethalia	12039	5575	2	3259	3292	3276	-33	-0.01	8.29	7.10	5.40	--	103.36	2	105
Ethalia	12084	5620	2	1432	1246	1338	186	0.14	5.96	5.16	4.34	0.18	33.55	2	105
Natica	11589	5273	2	81	71	76	10	0.13	6.05	4.69	3.66	0.33	69.63	2	30
Natica	11591	5275	2	504	493	499	12	0.02	6.43	4.79	3.73	0.35	74.54	2	30
Natica	11588	5272	2	516	522	519	-6	-0.01	7.65	6.10	4.41	--	113.42	2	30
Natica	11587	5311	2	160	290	225	-130	-0.58	6.34	4.46	3.69	0.34	73.61	2	30
Natica	11342	5271	2	634	494	564	140	0.25	7.16	4.91	4.31	--	90.56	2	30
Natica	11592	5276	2	508	582	545	-74	-0.13	5.12	4.28	3.49	0.31	49.19	2	30
Natica	11341	5270	1	1049	1246	1148	-197	-0.17	7.82	5.48	4.77	0.31	112.83	2	30
Natica	11340	5269	2	652	578	615	74	0.12	6.69	4.93	4.04	0.40	87.78	2	30
Natica	11590	5274	2	582	582	582	-1	0.00	5.13	3.93	3.33	0.22	41.50	2	30
Natica	11616	5286	1	2202	2153	2178	49	0.02	6.05	4.21	3.75	0.28	60.91	2	45
Natica	11618	5288	2	4	8	6	-4	-0.62	7.94	5.50	4.76	0.33	139.35	2	45
Natica	11617	5287	2	558	355	457	204	0.45	7.14	5.73	4.48	0.28	104.39	2	45
Natica	11332	5266	2	1217	1294	1256	-77	-0.06	8.22	6.09	5.08	--	197.55	2	45
Natica	11615	5290	1	1625	1946	1786	-321	-0.18	5.85	4.66	3.61	0.22	52.24	2	45
Natica	11335	5268	3	1688	1722	1705	-33	-0.02	5.98	4.36	3.83	--	58.30	2	45
Natica	11334	5267	2	972	953	962	19	0.02	7.65	5.45	4.71	--	121.44	2	45
Natica	11619	5289	3	162	185	173	-23	-0.13	5.44	3.93	3.39	0.30	54.23	2	45
Natica	11611	5295	2	799	744	771	56	0.07	5.63	4.79	3.42	0.23	37.61	2	60
Natica	11614	5291	2	1364	1380	1372	-16	-0.01	7.08	4.96	4.32	--	90.14	2	60
Natica	11610	5296	2	679	680	679	0	0.00	5.21	3.67	3.20	0.22	34.90	2	60
Natica	11609	5297	2	646	652	649	-6	-0.01	7.96	5.85	4.85	--	148.82	2	60
Natica	11612	5294	2	662	466	564	196	0.35	6.55	4.71	4.01	0.28	82.20	2	60
Natica	11582	5306	2	1020	1139	1080	-119	-0.11	7.56	5.58	4.50	0.50	133.28	2	75
Natica	11584	5308	2	344	298	321	46	0.14	5.57	4.76	3.61	0.32	52.11	2	75
Natica	11314	5265	2	1167	1156	1162	11	0.01	6.95	5.89	4.31	--	88.94	2	75
Natica	11581	5305	2	900	788	844	112	0.13	6.64	5.13	4.37	0.36	101.01	2	75
Natica	11313	5264	2	556	452	504	105	0.21	7.94	5.81	4.92	0.36	124.38	2	75
Natica	11583	5307	2	129	98	114	30	0.27	6.35	5.03	4.09	0.32	83.18	2	75
Natica	11621	5293	1	2402	2822	2612	-420	-0.16	7.21	5.22	4.19	0.32	119.22	2	75
Natica	11586	5310	2	812	761	787	52	0.07	5.91	4.52	3.71	0.31	57.27	2	75
Natica	11312	5263	2	1227	1071	1149	156	0.14	7.39	6.20	4.78	--	146.89	2	75
Natica	11585	5309	2	1468	1434	1452	34	0.02	5.70	4.22	3.41	0.35	53.39	2	75
Natica	11601	5285	2	1446	1252	1348	194	0.14	5.84	4.32	3.62	0.31	57.70	2	90
Natica	11602	5304	2	400	318	359	83	0.23	6.53	5.16	3.97	0.48	104.79	2	90
Natica	11603	5303	1	381	465	423	-84	-0.20	8.57	6.36	4.97	0.45	181.63	2	90
Natica	11606	5300	2	3691	3709	3700	-18	0.00	9.50	6.76	5.41	--	219.18	2	90
Natica	11607	5299	2	84	68	76	16	0.20	6.02	4.74	3.78	0.34	73.82	2	90
Natica	11605	5301	1	1625	1359	1492	266	0.18	6.13	4.47	3.68	0.35	70.31	2	90
Natica	11608	5298	6	178	132	155	46	0.30	5.50	4.51	3.42	0.38	69.23	2	90
Natica	11604	5302	2	2067	2370	2218	-302	-0.14	6.18	4.87	3.99	0.39	85.30	2	90
Natica	11302	5262	6	74	144	109	-70	-0.64	10.96	8.38	6.37	--	428.51	2	90
Natica	11622	5292	2	1636	1679	1658	-43	-0.03	5.89	4.37	3.66	0.26	71.13	2	90

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Natica	11600	5284	2	422	360	392	62	0.16	8.72	6.38	5.19	0.51	185.89	2	105
Natica	11596	5280	2	1499	1473	1486	26	0.02	6.09	4.43	3.57	0.28	66.00	2	105
Natica	11594	5278	2	130	146	138	-16	-0.12	5.50	4.18	3.38	0.37	53.65	2	105
Natica	11292	5261	2	390	481	436	-91	-0.21	7.02	5.40	4.30	0.34	89.71	2	105
Natica	11599	5283	2	1740	1620	1680	121	0.07	8.63	6.68	5.33	0.48	207.23	2	105
Natica	11291	5260	2	1508	1565	1536	-58	-0.04	5.75	4.45	3.54	0.24	35.06	2	105
Natica	11598	5282	2	1582	1566	1574	16	0.01	6.96	5.14	4.38	--	85.89	2	105
Natica	11597	5281	2	77	70	74	7	0.10	5.47	4.39	3.68	0.35	58.56	2	105
Natica	11593	5277	2	112	144	128	-32	-0.25	6.31	4.33	3.62	0.34	67.98	2	105
Tellina	11149	4758	2	6	11	8	-6	-0.67	9.91	7.91	1.98	0.33	44.86	1	5
Tellina	11143	4813	2	3	8	6	-6	-0.96	13.79	11.06	3.21	0.55	149.18	1	5
Tellina	11157	4781	2	2	8	5	-6	-1.05	6.85	5.42	1.45	0.24	16.67	1	5
Tellina	11147	4817	2	3	7	5	-4	-0.80	10.81	8.55	2.50	0.41	75.73	1	5
Tellina	11155	4764	2	3	13	8	-10	-1.25	6.91	5.53	1.35	0.23	15.20	1	5
Tellina	11148	4757	2	118	138	128	-20	-0.16	10.07	8.03	2.33	--	69.08	1	5
Tellina	11153	4762	2	49	67	58	-18	-0.31	9.24	7.58	2.01	0.32	41.46	1	5
Tellina	11151	4760	2	4	16	10	-12	-1.18	9.24	7.58	1.95	0.29	37.27	1	5
Tellina	11156	4765	2	10	38	24	-28	-1.20	6.48	5.19	1.33	--	13.40	1	5
Tellina	11152	4761	4	2	5	4	-4	-1.00	9.23	7.52	1.91	0.29	36.66	1	5
Tellina	11078	4728	2	1	4	2	-3	-1.20	7.03	5.53	1.31	0.25	15.55	1	5
Tellina	11150	4759	2	2	8	6	-6	-1.09	9.14	7.41	2.01	0.33	37.51	1	5
Tellina	11146	4816	2	4	14	9	-10	-1.03	11.41	9.45	2.61	0.39	84.44	1	5
Tellina	11158	4782	2	2	7	5	-4	-0.95	6.29	4.98	1.25	0.24	12.67	1	5
Tellina	11077	4727	2	1	6	4	-5	-1.43	9.49	7.67	2.07	0.38	47.44	1	5
Tellina	11154	4763	2	2	8	5	-6	-1.20	6.78	5.42	1.34	--	14.81	1	5
Tellina	11142	4812	2	3	12	7	-8	-1.17	14.02	11.25	3.16	0.48	137.77	1	5
Tellina	11141	4811	2	4	10	7	-6	-0.90	14.42	11.94	3.26	0.51	164.09	1	5
Tellina	11144	4814	2	2	10	6	-8	-1.20	10.57	8.26	2.36	0.35	62.53	1	5
Tellina	11145	4815	2	2	6	4	-4	-0.93	10.78	8.66	2.24	0.40	70.84	1	5
Tellina	11182	4768	2	17	33	25	-16	-0.64	7.46	5.90	1.50	0.28	23.02	1	15
Tellina	11179	4803	2	40	67	54	-27	-0.50	6.59	5.15	1.39	0.30	17.24	1	15
Tellina	11190	4776	2	6	16	10	-10	-0.95	9.59	7.74	2.10	0.31	48.14	1	15
Tellina	11187	4773	2	55	70	62	-14	-0.23	10.09	8.23	2.25	0.37	58.91	1	15
Tellina	11194	4780	2	6	16	10	-10	-0.95	12.07	9.99	2.70	0.36	87.60	1	15
Tellina	11180	4766	2	48	72	60	-24	-0.39	6.36	5.19	1.38	--	17.24	1	15
Tellina	11181	4767	2	66	86	76	-20	-0.26	7.46	6.03	1.64	0.28	25.71	1	15
Tellina	11183	4769	2	2	12	8	-10	-1.33	7.25	5.71	1.49	--	19.68	1	15
Tellina	11079	4729	2	1	2	2	-2	-0.86	7.51	6.02	1.54	0.31	23.90	1	15
Tellina	11178	4802	2	216	272	244	-56	-0.23	6.62	5.01	1.33	0.27	17.24	1	15
Tellina	11191	4777	2	144	154	149	-11	-0.07	11.69	9.46	2.76	--	102.40	1	15
Tellina	11196	4805	2	4	11	7	-8	-1.03	10.47	8.52	2.38	0.39	64.06	1	15
Tellina	11189	4775	2	357	370	364	-14	-0.04	11.14	9.01	2.50	--	84.39	1	15
Tellina	11185	4771	2	14	31	23	-16	-0.73	8.34	6.75	1.79	--	32.45	1	15
Tellina	11186	4772	2	37	54	46	-18	-0.38	8.58	6.88	1.80	--	38.29	1	15
Tellina	11195	4804	2	10	18	14	-8	-0.57	9.98	8.23	2.29	0.38	63.27	1	15
Tellina	11184	4770	2	5	11	8	-6	-0.75	8.59	6.77	1.96	--	44.24	1	15

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Tellina	11192	4778	2	4	11	8	-7	-0.93	11.21	9.12	2.21	0.33	62.33	1	15
Tellina	11193	4779	2	5	17	11	-12	-1.09	13.23	10.84	2.98	0.45	119.26	1	15
Tellina	11188	4774	2	12	22	17	-10	-0.55	10.48	8.49	2.24	--	65.47	1	15
Tellina	11125	4819	2	56	112	84	-56	-0.67	10.75	8.73	2.54	0.38	77.72	1	50
Tellina	11123	4853	2	188	172	180	17	0.09	11.86	9.79	2.75	0.48	121.22	1	50
Tellina	11134	4828	2	16	24	20	-8	-0.37	8.62	6.95	1.97	0.37	41.00	1	50
Tellina	11127	4821	2	126	146	136	-20	-0.15	12.81	10.29	2.93	0.47	125.06	1	50
Tellina	11136	4806	2	2	8	5	-6	-1.20	8.96	7.31	1.96	0.33	40.64	1	50
Tellina	11126	4820	2	48	83	65	-36	-0.54	12.89	10.47	3.00	0.43	123.90	1	50
Tellina	11129	4823	2	897	1141	1019	-244	-0.24	13.28	11.38	2.98	--	124.28	1	50
Tellina	11131	4825	2	240	312	276	-72	-0.26	6.74	5.25	1.54	0.26	22.06	1	50
Tellina	11132	4826	2	168	192	180	-24	-0.13	8.06	6.41	1.71	0.35	35.21	1	50
Tellina	11133	4827	2	16	35	26	-19	-0.75	8.29	6.33	1.53	0.28	24.32	1	50
Tellina	11135	4829	2	30	46	38	-16	-0.43	8.66	6.83	1.82	0.31	33.00	1	50
Tellina	11138	4808	4	67	87	77	-20	-0.26	9.62	7.68	2.16	0.37	57.96	1	50
Tellina	11121	4851	2	166	175	171	-8	-0.05	11.09	9.29	2.48	0.44	88.53	1	50
Tellina	11124	4818	2	46	57	51	-12	-0.22	10.59	8.79	2.34	0.39	65.46	1	50
Tellina	11140	4810	2	37	50	44	-13	-0.30	10.04	7.87	2.06	0.38	56.15	1	50
Tellina	11122	4852	2	95	104	100	-9	-0.09	10.18	8.22	2.27	0.43	74.16	1	50
Tellina	11130	4824	2	504	350	427	155	0.36	13.09	10.73	2.99	0.36	142.23	1	50
Tellina	11128	4822	2	140	142	140	-2	-0.01	11.77	9.70	2.88	0.51	133.09	1	50
Tellina	11137	4807	2	47	70	58	-22	-0.39	8.93	7.29	1.91	0.39	50.82	1	50
Tellina	11139	4809	2	113	149	131	-36	-0.27	9.03	7.31	1.78	0.33	39.33	1	50
Tellina	11106	4836	2	106	145	126	-39	-0.31	8.80	7.04	1.93	0.36	42.63	1	80
Tellina	11107	4837	2	608	672	640	-64	-0.10	9.32	7.44	1.98	--	39.10	1	80
Tellina	11108	4838	2	315	394	354	-78	-0.22	8.53	6.80	1.89	0.33	36.94	1	80
Tellina	11109	4839	2	122	145	134	-23	-0.17	9.26	7.29	1.95	0.33	43.51	1	80
Tellina	11111	4841	2	862	850	856	12	0.01	12.45	9.87	2.65	0.42	93.56	1	80
Tellina	11105	4835	2	172	278	225	-106	-0.47	7.60	5.98	1.62	0.30	27.31	1	80
Tellina	11114	4844	2	86	104	95	-18	-0.19	12.64	9.93	3.01	0.49	128.89	1	80
Tellina	11101	4831	2	42	54	48	-12	-0.25	7.14	5.78	1.45	0.31	24.47	1	80
Tellina	11104	4834	2	230	280	255	-49	-0.19	8.19	6.67	1.74	0.35	39.50	1	80
Tellina	11103	4833	2	154	236	195	-82	-0.42	6.40	5.16	1.34	0.36	19.92	1	80
Tellina	11118	4848	2	77	98	88	-21	-0.24	10.53	8.56	2.35	0.42	76.66	1	80
Tellina	11120	4850	2	56	80	68	-25	-0.37	10.73	8.58	2.40	0.46	83.39	1	80
Tellina	11119	4849	2	311	314	312	-3	-0.01	10.91	8.91	2.35	0.37	74.17	1	80
Tellina	11102	4832	2	29	42	35	-12	-0.35	6.86	5.47	1.38	--	15.26	1	80
Tellina	11110	4840	2	50	80	65	-30	-0.47	9.58	7.67	1.99	0.35	50.55	1	80
Tellina	11115	4845	2	84	128	106	-44	-0.42	13.07	10.55	2.96	0.44	130.39	1	80
Tellina	11113	4843	2	559	482	521	76	0.15	12.17	9.83	2.71	0.39	109.47	1	80
Tellina	11117	4847	2	140	180	160	-40	-0.25	11.39	9.37	2.57	0.36	87.20	1	80
Tellina	11112	4842	2	58	60	59	-2	-0.03	12.38	10.36	2.73	--	112.09	1	80
Tellina	11116	4846	2	81	86	84	-6	-0.07	11.56	9.35	2.75	0.42	99.02	1	80
Tellina	11172	4796	2	190	235	213	-44	-0.21	8.01	6.52	1.52	0.25	24.89	1	110
Tellina	11166	4790	2	78	92	85	-14	-0.16	11.80	9.59	2.41	0.46	96.55	1	110
Tellina	11162	4786	2	1066	850	958	216	0.22	14.53	11.62	3.21	--	179.81	1	110
Tellina	11167	4791	2	150	200	175	-50	-0.28	11.48	9.69	2.69	0.43	102.84	1	110

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Tellina	11173	4797	2	391	422	406	-30	-0.08	8.69	7.20	1.94	0.32	40.07	1	110
Tellina	11160	4784	2	139	175	157	-36	-0.23	13.37	10.65	3.15	0.45	143.88	1	110
Tellina	11164	4788	2	86	122	104	-36	-0.35	11.63	9.40	2.91	0.43	110.82	1	110
Tellina	11165	4789	2	338	376	357	-38	-0.11	11.18	9.05	2.63	0.45	96.35	1	110
Tellina	11177	4801	2	56	105	81	-48	-0.60	7.03	5.61	1.21	0.19	13.93	1	110
Tellina	11168	4792	2	80	104	92	-24	-0.26	11.55	9.27	2.42	0.44	88.42	1	110
Tellina	11161	4785	2	88	102	95	-14	-0.14	14.33	11.55	3.47	0.49	167.76	1	110
Tellina	11170	4794	2	100	118	109	-18	-0.16	8.70	7.08	1.81	0.35	39.19	1	110
Tellina	11159	4783	2	128	128	128	0	0.00	12.99	10.70	2.81	0.49	148.38	1	110
Tellina	11163	4787	2	159	158	158	1	0.01	13.11	10.51	2.87	0.53	149.89	1	110
Tellina	11176	4800	2	62	101	82	-39	-0.48	7.55	6.16	1.66	0.30	28.20	1	110
Tellina	11080	4730	2	168	208	188	-40	-0.22	6.62	5.21	1.18	0.24	14.16	1	110
Tellina	11174	4798	2	168	196	182	-28	-0.16	7.29	5.85	1.63	0.33	27.54	1	110
Tellina	11169	4793	2	70	86	78	-16	-0.20	9.92	8.20	2.23	0.42	70.84	1	110
Tellina	11171	4795	2	70	95	82	-25	-0.30	9.44	7.68	2.03	0.31	49.27	1	110
Tellina	11175	4799	2	179	263	221	-84	-0.38	7.71	6.09	1.62	0.35	30.36	1	110
Tellina	11084	4735	2	280	248	264	31	0.12	11.51	9.31	2.57	0.45	101.51	1	120
Tellina	11100	4830	2	170	244	207	-74	-0.36	5.88	4.68	1.26	0.26	13.11	1	120
Tellina	11097	4748	2	97	128	112	-30	-0.27	7.23	5.80	1.56	0.35	27.53	1	120
Tellina	11082	4732	4	178	202	190	-23	-0.12	11.62	9.59	2.84	0.53	114.11	1	120
Tellina	11086	4737	2	192	172	182	20	0.11	10.99	9.28	2.75	0.51	107.46	1	120
Tellina	11085	4736	3	178	197	187	-19	-0.10	11.06	9.35	2.59	0.49	96.48	1	120
Tellina	11087	4738	4	126	161	143	-35	-0.25	10.37	8.27	2.26	0.48	82.70	1	120
Tellina	11098	4749	2	166	214	190	-47	-0.25	8.10	6.52	1.54	0.28	26.94	1	120
Tellina	11090	4741	2	202	250	226	-48	-0.21	9.78	8.04	2.04	0.29	53.92	1	120
Tellina	11081	4731	2	118	118	118	0	0.00	11.80	9.45	2.62	0.39	98.32	1	120
Tellina	11083	4734	2	68	78	73	-10	-0.13	11.46	8.95	2.57	0.41	97.54	1	120
Tellina	11092	4743	2	700	500	600	199	0.33	9.02	7.18	1.98	--	47.03	1	120
Tellina	11093	4744	2	65	74	70	-10	-0.14	9.39	7.56	2.04	0.37	50.75	1	120
Tellina	11096	4747	1	56	75	66	-19	-0.29	7.83	6.14	1.64	0.32	27.95	1	120
Tellina	11099	4750	1	87	131	109	-44	-0.40	7.18	5.60	1.56	0.33	26.33	1	120
Tellina	11095	4746	2	30	54	42	-24	-0.58	8.81	7.05	1.81	--	40.68	1	120
Tellina	11088	4739	2	41	54	48	-14	-0.28	10.01	7.81	2.12	0.35	52.04	1	120
Tellina	11089	4740	2	142	160	151	-18	-0.12	10.62	8.41	2.19	0.31	64.91	1	120
Tellina	11091	4742	2	301	392	347	-92	-0.26	9.48	7.55	2.07	0.35	49.12	1	120
Tellina	11094	4745	2	194	222	208	-27	-0.13	8.79	7.13	2.02	--	145.64	1	120
Tellina	11406	5407	2	1	6	4	-5	-1.43	11.62	9.49	2.56	0.39	80.06	2	0
Tellina	11404	5405	2	2	12	7	-10	-1.45	12.18	9.91	2.61	0.41	79.72	2	0
Tellina	11403	5404	2	2	8	5	-6	-1.37	12.06	9.80	2.70	0.42	89.72	2	0
Tellina	11405	5406	2	1	6	4	-5	-1.43	11.66	9.24	2.43	0.38	77.15	2	0
Tellina	11407	5408	2	2	10	6	-8	-1.20	10.37	8.20	2.46	0.45	69.20	2	0
Tellina	11408	5409	2	2	8	5	-6	-1.20	10.96	8.70	2.51	--	66.63	2	0
Tellina	11488	5457	2	8	31	20	-22	-1.14	6.04	4.84	1.18	--	12.30	2	15
Tellina	11489	5458	2	284	382	333	-97	-0.29	5.95	4.62	1.18	--	12.52	2	15
Tellina	11411	5412	2	4	14	9	-10	-1.20	11.37	9.48	2.69	0.39	81.43	2	15
Tellina	11494	5463	2	24	52	38	-28	-0.75	6.44	5.17	1.27	--	15.85	2	15

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Tellina	11497	5466	2	2070	2226	2148	-156	-0.07	6.00	4.95	1.16	--	13.45	2	15
Tellina	11492	5461	2	2	19	10	-17	-1.62	5.48	4.46	1.09	--	9.16	2	15
Tellina	11490	5459	2	3	20	12	-18	-1.49	5.69	4.22	1.04	--	7.90	2	15
Tellina	11496	5465	2	10	28	18	-18	-0.97	6.11	4.95	1.14	--	13.03	2	15
Tellina	11493	5462	2	6	22	14	-16	-1.20	6.49	5.08	1.20	--	15.84	2	15
Tellina	11416	5422	2	10	24	17	-14	-0.82	8.94	7.01	2.08	0.36	46.42	2	15
Tellina	11413	5414	2	5	17	11	-12	-1.09	10.19	8.18	2.24	0.40	59.04	2	15
Tellina	11409	5410	2	6	17	12	-11	-0.96	13.00	10.85	3.08	0.49	122.90	2	15
Tellina	11417	5423	2	11	28	19	-16	-0.86	9.85	7.83	2.01	0.36	51.61	2	15
Tellina	11410	5411	2	10	30	20	-20	-0.99	11.48	9.15	2.41	0.39	77.46	2	15
Tellina	11412	5413	2	5	20	12	-14	-1.18	10.00	8.06	2.36	0.37	60.55	2	15
Tellina	11495	5464	2	3	17	10	-14	-1.40	6.25	5.00	1.27	--	12.84	2	15
Tellina	11491	5460	2	156	235	195	-80	-0.41	6.24	4.83	1.19	--	14.25	2	15
Tellina	11414	5420	2	15	33	24	-18	-0.75	9.44	7.84	2.15	0.38	52.06	2	15
Tellina	11415	5421	2	32	54	43	-22	-0.51	9.39	7.54	2.03	0.41	51.63	2	15
Tellina	11429	5435	2	1116	1050	1082	66	0.06	12.61	10.12	2.76	0.44	110.78	2	30
Tellina	11426	5432	2	942	899	920	43	0.05	10.92	9.04	2.63	0.52	106.49	2	30
Tellina	11425	5431	2	706	698	702	8	0.01	11.25	8.98	2.33	0.33	63.08	2	30
Tellina	11424	5430	2	10	20	15	-11	-0.73	11.77	9.64	2.63	0.45	91.05	2	30
Tellina	11419	5425	2	2476	2266	2371	210	0.09	10.55	8.60	2.49	0.41	79.32	2	30
Tellina	11428	5434	2	39	62	50	-22	-0.45	12.05	9.99	2.82	0.49	103.88	2	30
Tellina	11427	5433	2	54	83	68	-30	-0.43	11.86	9.49	2.67	0.44	97.72	2	30
Tellina	11421	5427	2	4739	4600	4670	138	0.03	11.33	9.44	2.56	--	86.40	2	30
Tellina	11420	5426	2	1981	1982	1982	-1	0.00	11.60	9.36	2.42	0.36	85.18	2	30
Tellina	11418	5424	2	1244	1402	1323	-159	-0.12	11.22	9.20	2.32	0.40	75.81	2	30
Tellina	11423	5429	2	11	20	16	-10	-0.60	11.13	8.81	2.52	0.42	77.81	2	30
Tellina	11422	5428	2	2532	2492	2512	39	0.02	10.81	8.87	2.21	0.36	63.12	2	30
Tellina	11500	5469	2	422	578	500	-156	-0.31	6.62	5.19	1.30	--	16.27	2	45
Tellina	11501	5470	2	194	292	243	-98	-0.40	6.22	5.00	1.21	--	16.18	2	45
Tellina	11437	5443	2	39	69	54	-30	-0.56	12.14	9.77	2.72	0.44	99.54	2	45
Tellina	11438	5444	2	184	263	224	-79	-0.35	10.23	8.16	2.33	0.49	74.24	2	45
Tellina	11498	5467	2	101	164	132	-63	-0.48	6.75	5.29	1.29	--	17.98	2	45
Tellina	11431	5437	2	3362	3534	3448	-172	-0.05	11.81	9.51	2.40	--	88.72	2	45
Tellina	11506	5475	2	22	50	36	-28	-0.76	6.21	4.81	1.31	--	15.10	2	45
Tellina	11435	5441	2	863	849	856	14	0.02	10.59	8.70	2.31	0.38	72.23	2	45
Tellina	11502	5471	2	236	360	298	-124	-0.42	6.39	5.03	1.19	--	15.53	2	45
Tellina	11504	5473	2	932	997	964	-65	-0.07	6.74	5.37	1.36	--	21.66	2	45
Tellina	11507	5476	2	45	86	66	-41	-0.63	6.31	5.04	1.30	--	16.54	2	45
Tellina	11433	5439	2	170	212	191	-43	-0.23	10.55	8.62	2.46	0.41	81.14	2	45
Tellina	11434	5440	2	480	620	550	-139	-0.25	12.73	10.55	2.96	0.45	110.13	2	45
Tellina	11430	5436	2	1261	1286	1274	-25	-0.02	10.54	8.78	2.30	--	60.68	2	45
Tellina	11432	5438	2	46	74	60	-28	-0.47	11.21	8.96	2.51	0.39	78.10	2	45
Tellina	11499	5468	2	2380	2706	2543	-326	-0.13	6.58	5.10	1.20	--	14.69	2	45
Tellina	11505	5474	2	200	302	251	-102	-0.41	6.51	5.08	1.29	--	16.40	2	45
Tellina	11436	5442	2	1728	1788	1758	-60	-0.03	11.23	9.33	2.68	--	82.31	2	45
Tellina	11439	5445	2	2097	2051	2074	46	0.02	10.70	8.64	2.35	0.43	75.96	2	45
Tellina	11503	5472	2	284	376	330	-92	-0.28	6.55	5.31	1.35	--	19.97	2	45

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Tellina	11443	5449	2	251	322	286	-71	-0.25	11.75	9.35	2.67	0.44	97.53	2	60
Tellina	11445	5451	2	971	1058	1014	-87	-0.09	11.75	9.58	2.65	0.39	87.86	2	60
Tellina	11446	5452	2	1316	1316	1316	0	0.00	12.34	9.77	2.84	0.45	110.74	2	60
Tellina	11444	5450	2	1314	1228	1271	86	0.07	12.28	9.88	2.84	0.51	111.48	2	60
Tellina	11450	5364	2	316	365	340	-49	-0.14	11.87	9.60	3.02	0.39	103.16	2	60
Tellina	11441	5447	2	3756	3568	3662	188	0.05	11.72	9.44	2.45	0.43	91.72	2	60
Tellina	11451	5365	2	56	95	76	-38	-0.51	12.58	10.50	2.95	0.44	111.89	2	60
Tellina	11449	5455	2	49	224	136	-174	-1.28	11.72	9.50	2.76	0.38	83.16	2	60
Tellina	11440	5446	1	2554	2563	2558	-9	0.00	11.11	9.29	2.61	0.39	78.69	2	60
Tellina	11448	5454	2	937	1048	993	-112	-0.11	11.26	9.23	2.59	0.41	90.93	2	60
Tellina	11442	5448	2	60	89	74	-29	-0.39	12.03	9.71	2.60	0.45	91.56	2	60
Tellina	11447	5453	2	206	258	232	-52	-0.23	12.43	10.34	2.86	0.51	131.58	2	60
Tellina	11453	5367	2	1078	1059	1069	20	0.02	12.46	10.14	2.81	0.43	117.78	2	75
Tellina	11513	5518	2	526	585	556	-59	-0.11	6.84	5.49	1.35	--	20.92	2	75
Tellina	11460	5374	2	88	149	119	-60	-0.51	12.58	10.38	2.81	0.47	114.33	2	75
Tellina	11461	5375	2	73	104	89	-32	-0.35	12.05	9.86	2.66	0.47	107.52	2	75
Tellina	11516	5521	2	320	398	359	-78	-0.22	6.87	5.32	1.28	--	16.66	2	75
Tellina	11509	5478	2	66	117	92	-51	-0.56	6.81	5.49	1.32	--	18.45	2	75
Tellina	11455	5369	2	796	712	754	85	0.11	11.15	9.02	2.57	0.46	86.26	2	75
Tellina	11462	5376	2	640	626	633	14	0.02	12.28	9.80	2.71	0.46	111.23	2	75
Tellina	11508	5477	2	316	421	368	-106	-0.29	6.29	5.08	1.20	--	14.76	2	75
Tellina	11511	5480	2	1368	1523	1446	-155	-0.11	6.26	4.88	1.27	--	13.66	2	75
Tellina	11512	5517	2	96	152	124	-56	-0.45	6.75	5.54	1.33	--	22.88	2	75
Tellina	11510	5479	2	1625	1911	1768	-286	-0.16	7.05	5.60	1.40	--	21.73	2	75
Tellina	11517	5522	2	249	344	296	-94	-0.32	6.07	4.87	1.22	--	14.93	2	75
Tellina	11459	5373	2	133	188	160	-54	-0.34	11.41	8.93	2.49	0.43	89.95	2	75
Tellina	11514	5519	2	44	86	65	-42	-0.65	6.85	5.48	1.23	--	19.34	2	75
Tellina	11454	5368	1	1466	1363	1414	103	0.07	12.27	9.86	2.75	0.49	116.11	2	75
Tellina	11463	5377	2	1930	2088	2010	-158	-0.08	12.07	9.96	2.75	0.52	120.93	2	75
Tellina	11452	5366	2	395	398	397	-4	-0.01	11.70	9.86	2.83	0.50	125.54	2	75
Tellina	11515	5520	2	26	57	42	-30	-0.73	6.30	5.16	1.36	--	16.03	2	75
Tellina	11456	5370	2	41	80	61	-40	-0.65	11.53	9.29	2.60	0.46	92.02	2	75
Tellina	11458	5372	2	870	956	912	-86	-0.09	12.69	10.56	2.97	0.49	133.86	2	75
Tellina	11457	5371	2	78	117	98	-39	-0.40	12.10	9.70	2.64	0.44	98.50	2	75
Tellina	11467	5381	2	636	712	674	-75	-0.11	12.06	9.38	2.58	0.42	94.20	2	90
Tellina	11474	5391	2	1136	1138	1137	-2	0.00	13.46	11.04	3.18	0.54	152.30	2	90
Tellina	11473	5387	2	78	107	92	-29	-0.31	12.74	10.16	2.86	0.50	131.83	2	90
Tellina	11475	5392	2	149	214	181	-64	-0.36	12.18	9.87	2.73	0.48	111.22	2	90
Tellina	11464	5378	2	519	572	545	-52	-0.10	12.41	9.94	2.89	0.47	121.19	2	90
Tellina	11472	5386	2	120	134	128	-14	-0.11	13.17	10.85	3.14	0.57	166.02	2	90
Tellina	11468	5382	2	940	900	920	40	0.04	13.20	10.66	3.03	0.54	148.51	2	90
Tellina	11469	5383	2	2129	2014	2071	116	0.06	13.15	10.59	3.01	0.50	132.11	2	90
Tellina	11470	5384	2	82	108	95	-26	-0.28	13.67	10.98	3.19	0.52	149.86	2	90
Tellina	11465	5379	2	280	324	302	-44	-0.14	13.12	11.01	3.03	0.55	146.45	2	90
Tellina	11466	5380	2	530	520	525	10	0.02	13.39	11.15	3.14	0.53	165.33	2	90
Tellina	11471	5385	2	470	507	489	-36	-0.07	13.52	10.54	3.22	0.51	156.98	2	90
Tellina	11486	5403	2	3260	3512	3386	-252	-0.07	13.57	10.96	3.09	0.55	155.97	2	105

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Tellina	11526	5529	2	254	365	309	-112	-0.36	5.86	4.83	1.10	--	10.77	2	105
Tellina	11520	5524	2	156	222	188	-66	-0.35	6.39	5.10	1.28	--	18.49	2	105
Tellina	11519	5523	2	412	526	469	-113	-0.24	6.63	5.29	1.41	--	19.54	2	105
Tellina	11476	5393	2	1989	1982	1986	6	0.00	11.99	9.87	2.79	0.46	106.19	2	105
Tellina	11480	5397	2	700	802	751	-102	-0.14	12.06	9.96	2.63	0.35	82.99	2	105
Tellina	11521	5525	2	208	312	260	-104	-0.40	6.90	5.68	1.45	--	23.54	2	105
Tellina	11482	5399	2	2008	1940	1974	68	0.03	13.00	10.55	3.05	0.50	134.88	2	105
Tellina	11524	5527	2	33	66	50	-34	-0.67	6.56	5.20	1.33	--	17.82	2	105
Tellina	11477	5394	2	888	1120	1004	-232	-0.23	12.39	9.63	2.96	0.47	116.35	2	105
Tellina	11487	5456	2	448	494	471	-46	-0.10	13.28	10.65	3.06	0.60	158.21	2	105
Tellina	11522	5526	2	1016	1110	1063	-95	-0.09	6.47	5.19	1.41	--	18.42	2	105
Tellina	11479	5396	2	96	160	128	-64	-0.50	13.26	11.23	3.12	0.63	189.48	2	105
Tellina	11525	5528	2	234	292	263	-59	-0.22	5.97	4.86	1.32	--	16.04	2	105
Tellina	11527	5530	2	559	662	610	-102	-0.17	6.24	4.90	1.17	--	14.93	2	105
Tellina	11481	5398	2	3850	4179	4014	-329	-0.08	12.59	9.98	2.87	0.42	104.55	2	105
Tellina	11666	5532	2	105	184	144	-78	-0.54	7.18	5.76	1.56	--	25.79	2	105
Tellina	11483	5400	2	686	700	693	-14	-0.02	12.78	9.96	2.79	0.46	124.28	2	105
Tellina	11485	5402	2	120	148	134	-29	-0.22	12.18	9.51	2.80	0.44	102.09	2	105
Tellina	11484	5401	2	186	244	215	-58	-0.27	12.13	10.11	2.79	0.53	128.96	2	105
Tellina	11478	5395	2	491	626	558	-135	-0.24	13.67	11.22	3.06	0.48	154.56	2	105
Tellina	11665	5531	2	540	704	622	-164	-0.26	7.02	5.54	1.49	--	22.13	2	105
Turbo	11016	4753	2	281	440	360	-158	-0.44	7.18	6.45	2.89	2.89	158.82	1	5
Turbo	11014	4751	2	860	822	840	38	0.05	9.20	8.27	3.71	3.71	334.81	1	5
Turbo	11015	4752	2	45	171	108	-126	-1.17	8.60	7.77	3.28	3.28	267.55	1	5
Turbo	11019	4756	2	736	538	637	198	0.31	7.32	6.53	2.80	2.80	156.78	1	15
Turbo	11024	4686	2	794	752	773	42	0.05	8.97	8.07	3.49	3.49	317.27	1	15
Turbo	11018	4755	1	1419	1161	1290	258	0.20	7.54	6.67	2.95	2.95	176.68	1	15
Turbo	11023	4685	2	2015	1864	1939	152	0.08	7.14	6.34	2.63	2.63	143.95	1	15
Turbo	11021	4684	2	1326	969	1147	356	0.31	8.12	7.27	3.11	3.11	217.37	1	15
Turbo	11017	4754	2	78	230	154	-152	-0.99	5.54	4.97	2.12	2.12	73.28	1	15
Turbo	11073	4723	2	340	405	372	-65	-0.17	9.09	8.21	3.46	3.46	324.59	1	50
Turbo	11034	4694	2	340	430	385	-90	-0.23	9.55	8.56	3.77	3.77	379.51	1	50
Turbo	11026	4687	2	293	432	363	-140	-0.38	5.76	5.15	2.14	2.14	77.33	1	50
Turbo	11030	4691	2	355	536	445	-180	-0.41	7.25	6.38	2.85	2.85	164.87	1	50
Turbo	11027	4688	2	287	398	343	-112	-0.33	6.05	5.31	2.18	2.18	83.90	1	50
Turbo	11032	4693	2	394	536	465	-142	-0.30	8.83	7.83	3.59	3.59	286.38	1	50
Turbo	11035	4695	2	15	70	42	-55	-1.29	10.84	9.66	4.46	4.46	560.89	1	50
Turbo	11029	4690	2	348	470	409	-122	-0.30	7.47	6.57	2.88	2.88	174.10	1	50
Turbo	11031	4692	2	870	678	774	191	0.25	8.22	7.34	2.95	2.95	220.70	1	50
Turbo	11040	4698	2	962	990	976	-28	-0.03	7.16	6.52	2.88	2.88	164.45	1	80
Turbo	11042	4700	2	966	1170	1068	-204	-0.19	7.45	6.74	3.18	3.18	199.49	1	80
Turbo	11044	4701	2	126	281	204	-155	-0.76	7.99	7.18	3.17	3.17	225.14	1	80
Turbo	11075	4725	2	1524	1546	1536	-22	-0.01	8.75	7.80	3.61	3.61	285.62	1	80
Turbo	11074	4724	2	1192	1186	1190	6	0.01	6.54	6.04	2.48	2.48	116.19	1	80
Turbo	11041	4699	2	174	417	296	-242	-0.82	7.53	6.90	3.40	3.40	210.72	1	80
Turbo	11039	4697	2	1490	1720	1604	-230	-0.14	7.24	6.51	3.06	3.06	181.22	1	80

Supplemental Online Material 2 - Specimen data used in analyses

Taxon	Specimen number	UAL ID	n	Inferred Age (BP) Asp	Glu	Mean	Age difference years	%	Shell x	y	z	Thick	Mass	Core No.	Layer
Turbo	11045	4702	2	520	473	496	46	0.09	8.76	7.96	3.47	3.47	287.77	1	80
Turbo	11037	4696	1	943	1080	1012	-137	-0.14	5.66	5.05	2.06	2.06	71.26	1	80
Turbo	11052	4706	2	2350	2484	2416	-134	-0.06	7.18	6.38	2.70	2.70	150.44	1	110
Turbo	11054	4708	2	510	670	590	-160	-0.27	7.87	7.05	3.13	3.13	203.46	1	110
Turbo	11050	4704	2	384	531	458	-147	-0.32	6.17	5.49	2.25	2.25	93.40	1	110
Turbo	11056	4710	2	139	243	191	-104	-0.54	8.68	7.86	3.79	3.79	312.80	1	110
Turbo	11059	4713	2	204	260	232	-56	-0.24	11.79	11.61	5.00	5.00	741.83	1	110
Turbo	11051	4705	2	323	340	331	-16	-0.05	6.18	5.54	2.29	2.29	95.63	1	110
Turbo	11072	4722	4	1124	1086	1105	38	0.03	11.50	10.51	4.57	4.57	699.90	1	120
Turbo	11071	4721	2	921	1090	1006	-170	-0.17	10.78	9.70	4.76	4.76	608.22	1	120
Turbo	11069	4719	2	155	356	256	-202	-0.79	8.30	7.46	3.38	3.38	247.65	1	120
Turbo	11070	4720	2	705	719	712	-14	-0.02	10.62	9.47	4.20	4.20	494.62	1	120
Turbo	11076	4726	1	3797	3559	3678	238	0.06	8.47	7.65	3.66	3.66	283.11	1	120
Turbo	11066	4716	2	1569	1332	1451	236	0.16	7.43	6.66	2.72	2.72	173.30	1	120
Turbo	11067	4717	2	392	610	501	-219	-0.44	8.16	7.30	3.39	3.39	243.18	1	120
Turbo	11064	4715	1	1667	1774	1720	-107	-0.06	7.60	6.80	2.79	2.79	171.01	1	120
Turbo	11068	4718	2	244	429	336	-186	-0.55	8.18	7.31	3.44	3.44	249.31	1	120
Turbo	11063	4714	2	246	285	265	-40	-0.15	6.05	5.35	2.32	2.32	90.13	1	120
Turbo	11629	5352	2	1143	933	1038	210	0.20	6.45	5.82	2.36	--	109.46	2	30
Turbo	11628	5351	2	1264	1253	1258	11	0.01	6.23	5.48	2.12	--	85.67	2	30
Turbo	11575	5345	2	751	609	680	142	0.21	8.06	7.23	3.31	--	225.38	2	60
Turbo	11574	5344	1	2884	3250	3067	-366	-0.12	8.55	7.57	3.56	--	269.74	2	60
Turbo	11576	5346	2	2796	3282	3039	-485	-0.16	9.15	8.22	4.21	--	387.33	2	60
Turbo	11573	5343	2	2822	2956	2889	-134	-0.05	9.14	8.24	4.00	--	368.59	2	60
Turbo	11578	5348	2	602	796	699	-194	-0.28	5.81	5.24	2.35	--	89.18	2	60
Turbo	11572	5342	2	1470	1431	1451	40	0.03	10.49	9.19	4.44	--	524.69	2	60
Turbo	11577	5347	2	2410	2658	2534	-248	-0.10	7.06	6.27	3.02	--	156.20	2	60
Turbo	11580	5350	2	1478	1281	1379	196	0.14	6.14	5.49	2.15	--	85.43	2	60
Turbo	11579	5349	2	866	798	832	68	0.08	5.71	5.17	2.12	--	71.33	2	60
Turbo	11551	5321	2	2372	2264	2318	108	0.05	6.97	6.24	3.18	--	165.28	2	75
Turbo	11536	5313	1	3272	3901	3586	-629	-0.18	8.37	7.57	3.46	--	270.18	2	75
Turbo	11546	5316	1	821	720	770	101	0.13	7.19	6.42	2.66	--	149.49	2	75
Turbo	11547	5317	2	2608	2720	2664	-112	-0.04	7.74	6.80	3.20	--	204.10	2	75
Turbo	11548	5318	2	1632	1428	1530	204	0.13	5.86	5.22	2.08	--	77.73	2	75
Turbo	11545	5315	1	1771	1478	1624	293	0.18	7.58	6.80	3.23	--	186.63	2	75
Turbo	11549	5319	2	1040	1044	1042	-4	0.00	5.93	5.28	2.00	--	79.56	2	75
Turbo	11550	5320	2	832	858	845	-26	-0.03	6.06	5.57	2.46	--	102.66	2	75
Turbo	11566	5336	2	1464	1418	1441	46	0.03	6.56	5.87	2.41	--	108.91	2	90
Turbo	11570	5340	2	1496	1404	1450	92	0.06	5.88	5.32	2.17	--	85.67	2	90
Turbo	11568	5338	2	1995	1800	1898	195	0.10	8.24	7.32	3.13	--	235.30	2	90
Turbo	11569	5339	2	1708	1655	1682	53	0.03	5.84	5.16	2.14	--	79.02	2	90
Turbo	11567	5337	2	1594	1366	1480	227	0.15	6.23	5.54	2.36	--	94.72	2	90
Turbo	11562	5332	2	1599	1662	1631	-64	-0.04	8.18	7.27	3.38	--	230.78	2	90
Turbo	11565	5335	2	1454	1398	1426	56	0.04	7.31	6.56	3.10	--	189.04	2	90
Turbo	11563	5333	2	2961	3270	3116	-310	-0.10	9.06	8.15	4.07	--	371.20	2	90
Turbo	11367	5312	2	840	854	847	-14	-0.02	5.67	5.08	2.21	--	75.59	2	90

Supplemental Online Material 2 - Specimen data used in analyses

	Specimen	UAL		Inferred Age (BP)			Age difference		Shell					Core	
Taxon	number	ID	n	Asp	Glu	Mean	years	%	x	y	z	Thick	Mass	No.	Layer
Turbo	11564	5334	2	3470	3602	3536	-132	-0.04	7.75	6.98	3.39	--	220.10	2	90
Turbo	11559	5329	2	2554	2656	2605	-101	-0.04	8.15	7.36	3.46	--	239.84	2	105
Turbo	11560	5330	2	2902	3022	2962	-119	-0.04	6.57	5.96	2.75	--	123.08	2	105
Turbo	11554	5324	2	2324	2256	2290	68	0.03	6.81	6.09	2.99	--	143.53	2	105
Turbo	11555	5325	2	1026	1001	1013	24	0.02	6.60	5.90	2.40	--	118.55	2	105
Turbo	11557	5327	2	1766	1542	1654	225	0.14	5.77	5.12	2.16	--	75.99	2	105
Turbo	11553	5323	1	2719	2498	2608	221	0.08	5.61	4.99	2.26	--	68.73	2	105
Turbo	11556	5326	2	300	308	304	-8	-0.03	5.97	5.25	2.19	--	82.13	2	105
Turbo	11561	5331	1	1236	1433	1334	-197	-0.15	8.26	7.37	3.29	--	242.37	2	105
Turbo	11552	5322	2	942	820	881	122	0.14	5.73	5.16	2.22	--	78.32	2	105

SOM 3. Recalibrated radiocarbon data used to determine half-life estimates.

Ages are listed in the same order as presented in the original reference. All of the available raw data and the original calibration are presented along with the results of our recalibration. All ages were recalibrated using the Marine04 curve. The delta-R determination for each study area is explained in footnotes, but are based on values obtained from the Marine Reservoir Database (http://radiocarbon.pa.qub.ac.uk/marine) as of September 2007.

Data table columns:

- Study (references listed in paper literature cited)
- Lab ID (from original paper)
- $\delta\ ^{13}C$ per mil
- Conv. ^{14}C age (conventional carbon-14 age)
  - age (age in uncalibrated carbon years)
  - 1σ unc. (1σ uncertainty in uncalibrated carbon years)
- Original calibration
  - age
  - 2σ yng
  - 2σ old
  - R
  - ΔR
- Revised calibration
  - age (median probability age BP)
  - 2σ yng (2σ youngest possible age BP)
  - 2σ old (2σ oldest possible age BP)
  - ΔR (ΔR used during calibration, from Marine Reservoir Database (http://radiocarbon.pa.qub.ac.uk/marine)

Notes:

(A) Flessa et al. 1993, Table 2, Martin et al. 1996
This ΔR is an average value of 4 individual ΔR (Map No. 279-282) for Puerto Penasco and Cholla Bay (lat. 31.30 to 31.50N, long. 113.58 to 113.67W).

(B) Meldahl et al. 1997, Appendix
This ΔR is an average value of 3 individual ΔR (Map No. 265, 266 & 272) for Santa Inez Bay and Carmen Is. (lat. 26 to 28N, long. 111 to 112W).

(C) Flessa 1998, Table 1
This ΔR is an average value of 3 individual ΔR (Map No. 73-75) for German Bight (lat. 6N, long. 54E). No ΔR value is available for Dogger Bank, so the above ΔR of German Bight was used for all data of Flessa 1998

(D) Wehmiller et al. 1995
This ΔR is an average value of 2 individual ΔR (Map No. 774-775) for New Jersey (lat. 39.35 to 40N, long. 74 to 74.35W). No ΔR value is available for Southern NJ, which has lat >30N, so the above ΔR of NJ was used. for all data of Wehmiller et al. 1995.

Supplemental Online Material 3 - Recalibrated radiocarbon data used to determine half-life estimates

Study	Radiocarbon data				Original calibration					Recalibrated				
	Lab ID	δ ^{13}C per mil	Conv. ^{14}C Age		Calibrated Age (before AD 1950)					Calibrated Age (before AD 1950)				
			age	1σ unc.	age	2σ Yng	2σ Old	R	ΔR	age	2σ Yng	2σ Old	ΔR	
Flessa et al. 1993, Table 2 – Inner flats:														
	A-5781	+0.7	2650	±60	1886	1690	2109		360 ± 65	1770	1519	2019	471 ± 84	**a**
	A-5782	+0.6	1300	±50	525	420	660		360 ± 65	448	280	616	471 ± 84	
	A-5838	+0.4	102	±1	<0					out of the range of Marine04				
	A-5839	+1.1	1085	±45	335	230	500		360 ± 65	247	0	434	471 ± 84	
	A-5840	+0.1	1110	±50	401	250	510		360 ± 65	277	0	467	471 ± 84	
	A-5841	+1.3	1000	±40	276	0	440		360 ± 65	161	0	330	471 ± 84	
	A-5842	+0.6	1220	±60	483	300	620		360 ± 65	380	143	544	471 ± 84	
	A-5843	-0.1	970	±40	261	0	410		360 ± 65	139	0	289	471 ± 84	
	A-5844	+1.0	1305	±35	528	440	650		360 ± 65	454	290	610	471 ± 84	
	A-5845	+1.1	4025	±80	3569	3339	3829		360 ± 65	3451	3159	3749	471 ± 84	
	A-5846	+1.1	955	±65	252	0	430		360 ± 65	137	0	305	471 ± 84	
	A-5847	-0.2	1160	±55	442	270	540		360 ± 65	331	91	505	471 ± 84	
	A-5848	+1.8	1560	±65	717	590	920		360 ± 65	657	498	867	471 ± 84	
	A-5849	+1.0	1250	±55	499	330	630		360 ± 65	405	235	608	471 ± 84	
	A-5850	+1.5	1330	±60	542	440	680		360 ± 65	475	291	637	471 ± 84	
	A-6548	+1.3	2785	±40	2050	1870	2279		360 ± 65	1934	1692	2166	471 ± 84	
	A-6549	+1.5	3055	±50	2347	2179	2679		360 ± 65	2254	1985	2540	471 ± 84	
Flessa et al. 1993, Table 2 – Tidal channel:														
	A-6253	+1.3	1025	±50	228	30	400		360 ± 65	182	0	373	471 ± 84	
	A-6254	+0.5	1140	±45	427	270	520		360 ± 65	312	80	490	471 ± 84	
	A-6255	+0.7	1055	±45	306	140	480		360 ± 65	209	0	397	471 ± 84	
	A-6256	+0.9	905	±40	143	0	313		360 ± 65	out of the range of Marine04				
	A-6257	+1.7	1325	±55	539	440	670		360 ± 65	471	292	631	471 ± 84	
	A-6259	+1.4	1155	±50	438	270	540		360 ± 65	327	92	501	471 ± 84	
	A-6260	+0.2	1175	±30	454	0	540		360 ± 65	348	140	499	471 ± 84	
	A-6261	+0.5	2530	±60	1752	1530	1959		360 ± 65	1632	1385	1869	471 ± 84	
	A-6262	+1.1	1425	±70	638	490	780		360 ± 65	554	335	725	471 ± 84	
	A-6263	+1.5	1315	±65	533	420	670		360 ± 65	461	279	634	471 ± 84	
	A-6264	+1.0	1015	±40	283	90	450		360 ± 65	172	0	357	471 ± 84	
	A-6265	+1.0	1045	±30	299	140	460		360 ± 65	198	0	380	471 ± 84	
	A-6266	+0.3	1005	±55	278	0	450		360 ± 65	167	0	358	471 ± 84	
Flessa et al. 1993, Table 3 – Inner flats (core):														
	A-5773	+1.0	1890	±45	1060	910	1250		360 ± 65	971	751	1178	471 ± 84	
	A-5774	+1.0	3720	±50	3221	2979	3399		360 ± 65	3075	2828	3327	471 ± 84	
	A-5775	+1.2	2170	±40	1330	1220	1510		360 ± 65	1249	1045	1450	471 ± 84	
	A-5776	+0.8	2510	±50	1722	1530	1920		360 ± 65	1609	1377	1840	471 ± 84	
	A-5777	+1.6	2410	±45	1602	1410	1810		360 ± 65	1493	1289	1709	471 ± 84	
	A-5780	+1.1	2415	±60	1607	1400	1830		360 ± 65	1500	1283	1736	471 ± 84	
	A-5778	+0.2	2550	±65	1787	1550	1989		360 ± 65	1655	1395	1897	471 ± 84	
	A-5779	+0.8	2750	±60	2013	1810	2269		360 ± 65	1892	1622	2144	471 ± 84	
Flessa et al. 1993, Table 3 – Tidal channel (core):														
	A-6247	+1.4	2515	±65	1729	1520	1940		360 ± 65	1615	1367	1861	471 ± 84	
	A-6248	+1.5	2005	±55	1199	1000	1512		360 ± 65	1088	894	1284	471 ± 84	
	A-6249	+1.2	1605	±65	767	640	950		360 ± 65	699	524	897	471 ± 84	
	A-6250	+1.7	1885	±55	1056	898	1250		360 ± 65	965	736	1179	471 ± 84	
	A-6251	+1.1	1790	±55	953	780	1150		360 ± 65	861	663	1066	471 ± 84	
	A-6252	+1.3	2045	±60	1245	1040	1390		360 ± 65	1125	915	1312	471 ± 84	
	A-6242	+1.1	1690	±55	887	680	1040		360 ± 65	774	597	968	471 ± 84	
	A-6246	+1.1	2480	±40	1696	1510	1870		360 ± 65	1574	1358	1801	471 ± 84	
	A-6243	+1.6	3710	±55	3212	2959	3389		360 ± 65	3063	2810	3320	471 ± 84	

Supplemental Online Material 3 - Recalibrated radiocarbon data used to determine half-life estimates

Study	Radiocarbon data				Original calibration					Recalibrated				
	Lab ID	δ ^{13}C per mil	Conv. ^{14}C Age	1σ unc.	Calibrated Age (before AD 1950) age	2σ Yng	2σ Old	R	ΔR	Calibrated Age (before AD 1950) age	2σ Yng	2σ Old	ΔR	
Meldahl et al. 1997, Appendix – Eastern Fan delta:														
	AA-14463	+1.9	15	±60	≤0			814	53				448 ± 115	**b**
	AA-14464	+3.0	-		≤0			814	53				448 ± 115	
	AA-14465	+3.4	1035	±65		0	470	814	53	221	0	438	448 ± 115	
	AA-14499	+1.1	-		≤0			814	53				448 ± 115	
	AA-14500	+1.6	35	±45	≤0			814	53				448 ± 115	
	AA-14501	+1.7	-		≤0			814	53				448 ± 115	
	AA-14466	+2.0	-		≤0			814	53				448 ± 115	
	AA-14467	+1.8	55	±45	≤0			814	53				448 ± 115	
	AA-14468	+2.5	345	±60	≤0			814	53				448 ± 115	
	AA-14502	+1.6	85	±50	≤0			814	53				448 ± 115	
	AA-14503	+1.6	915	±50		0	290	814	53	139	0	350	448 ± 115	
	AA-14504	+1.5	-		≤0			814	53				448 ± 115	
	AA-14469	+2.2	240	±45	≤0			814	53				448 ± 115	
	AA-14470	+1.3	45	±45	≤0			814	53				448 ± 115	
	AA-14471	+1.4	100	±55	≤0			814	53				448 ± 115	
	AA-14505	+2.9	880	±45		0	280	814	53	out of the range of Marine04				
	AA-14506	+0.8	205	±50	≤0			814	53				448 ± 115	
	AA-14507	+2.3	910	±50		0	290	814	53	137	0	333	448 ± 115	
	AA-14472	+4.8	1235	±50		300	540	814	53	407	145	627	448 ± 115	
	AA-14473	+2.5	1905	±50		800	1170	814	53	1011	751	1261	448 ± 115	
	AA-14474	+2.4	340	±45	≤0			814	53				448 ± 115	
	AA-14508	+2.7	1255	±55		300	620	814	53	424	147	647	448 ± 115	
	AA-14509	+1.6	1155	±50		0	520	814	53	339	0	536	448 ± 115	
	AA-14510	+2.4	820	±50	≤0			814	53				448 ± 115	
Meldahl et al. 1997, Appendix – Western Fan delta:														
	AA-14487	+0.7	220	±45	≤0			814	53				448 ± 115	
	AA-14488	+2.5	920	±50		0	300	814	53	142	0	354	448 ± 115	
	AA-14523	+1.5	610	±45	≤0			814	53				448 ± 115	
	AA-14524	+1.0	-		≤0			814	53				448 ± 115	
	AA-14525	+0.6	-		≤0			814	53				448 ± 115	
	AA-14489	+1.0	-		≤0			814	53				448 ± 115	
	AA-14490	+2.4	995	±65		0	430	814	53	190	0	412	448 ± 115	
	AA-14491	+1.0	60	±45	≤0			814	53				448 ± 115	
	AA-14526	+2.2	965	±50		0	310	814	53	167	0	384	448 ± 115	
	AA-14527	+2.2	40	±45	≤0			814	53				448 ± 115	
	AA-14528	+1.1	160	±60	≤0			814	53				448 ± 115	
	AA-14492	+2.2	1120	±65		0	510	814	53	305	0	504	448 ± 115	
	AA-14493	+2.4	860	±45		0	280	814	53	out of the range of Marine04				
	AA-14494	+1.5	90	±45	≤0			814	53				448 ± 115	
	AA-14529	+0.6	1125	±50		0	510	814	53	311	0	507	448 ± 115	
	AA-14530	+0.8	890	±50		0	280	814	53	out of the range of Marine04				
	AA-14531	+1.8	160	±60	≤0			814	53				448 ± 115	
	AA-14495	+2.1	1120	±45		0	510	814	53	306	0	503	448 ± 115	
	AA-14496	+1.4	815	±45		0	260	814	53	out of the range of Marine04				
	AA-14497	+1.9	965	±60		0	310	814	53	169	0	390	448 ± 115	
	AA-14498	+1.1	230	±55	≤0			814	53				448 ± 115	
	AA-14532	+2.2	1940	±50		920	1260	814	53	1045	780	1283	448 ± 115	
	AA-14533	+1.3	1365	±55		470	660	814	53	522	286	717	448 ± 115	
	AA-14534	-0.1	5	±45	≤0			814	53				448 ± 115	

Supplemental Online Material 3 - Recalibrated radiocarbon data used to determine half-life estimates

Study	Radiocarbon data: Lab ID	δ ^{13}C per mil	Conv. ^{14}C Age: age	1σ unc.	Original calibration: Calibrated Age (before AD 1950): age	2σ Yng	2σ Old	R	ΔR	Recalibrated: Calibrated Age (before AD 1950): age	2σ Yng	2σ Old	ΔR
Meldahl et al. 1997, Appendix – Pocket bays:													
	AA-14475	+0.4	375	±45	≤0			814	± 53				448 ± 115
	AA-14476	+2.4	-		≤0			814	± 53				448 ± 115
	AA-14511	+1.6	-		≤0			814	± 53				448 ± 115
	AA-14512	+1.9	130	±45	≤0			814	± 53				448 ± 115
	AA-14513	+1.5	500	±55	≤0			814	± 53				448 ± 115
	AA-14477	+4.3	630	±50	≤0			814	± 53				448 ± 115
	AA-14478	+3.4	-		≤0			814	± 53				448 ± 115
	AA-14479	+2.1	255	±45	≤0			814	± 53				448 ± 115
	AA-14480	+2.3	-		≤0			814	± 53				448 ± 115
	AA-14514	+1.4	220	±50	≤0			814	± 53				448 ± 115
	AA-14515	+2.2	-		≤0			814	± 53				448 ± 115
	AA-14516	+2.7	845	±55		0	270	814	± 53	out of the range of Marine04			
	AA-14481	+1.4	1180	±50		280	530	814	± 53	360	0	564	448 ± 115
	AA-14482	+1.8	-		≤0			814	± 53				448 ± 115
	AA-14483	-7.9	760	±65	≤0			814	± 53				448 ± 115
	AA-14517	+1.0	130	±45	≤0			814	± 53				448 ± 115
	AA-14518	+2.2	115	±40	≤0			814	± 53				448 ± 115
	AA-14519	+2.1	-		≤0			814	± 53				448 ± 115
	AA-14484	+1.0	50	±45	≤0			814	± 53				448 ± 115
	AA-14485	+2.0	-		≤0			814	± 53				448 ± 115
	AA-14486	+2.7	860	±50		0	280	814	± 53	out of the range of Marine04			
	AA-14520	+0.9	1065	±40		0	460	814	± 53	249	0	447	448 ± 115
	AA-14521	+1.7	50	±45	≤0			814	± 53				448 ± 115
	AA-14522	+2.3	885	±45		0	280	814	± 53	out of the range of Marine04			
Meldahl et al. 1997, Appendix – Inner Flats: Same raw data as Flessa et al 1993, but recalibrated with revised R value.													
	A-5781	+0.7	2650	±60		1410	1820	950	± 42	See Flessa et al. 1993			
	A-5782	+0.6	1300	±50	≤0			950	± 42				
	A-5838	+0.4	102	±1		0	500	950	± 42				
	A-5839	+1.1	1085	±45		0	270	950	± 42				
	A-5840	+0.1	1110	±50		280	520	950	± 42				
	A-5841	+1.3	1000	±40		0	300	950	± 42				
	A-5842	+0.6	1220	±60		0	270	950	± 42				
	A-5843	-0.1	970	±40		0	430	950	± 42				
	A-5844	+1.0	1305	±35		0	260	950	± 42				
	A-5845	+1.1	4025	±80		290	510	950	± 42				
	A-5846	+1.1	955	±65		290	540	950	± 42				
	A-5847	-0.2	1160	±55		0	310	950	± 42				
	A-5848	+1.8	1560	±65		510	690	950	± 42				
	A-5849	+1.0	1250	±55		0	510	950	± 42				
	A-5850	+1.5	1330	±60		2970	3450	950	± 42				
	A-6548	+1.3	2785	±40		1570	1920	950	± 42				
	A-6549	+1.5	3055	±50		1900	2300	950	± 42				
Meldahl et al. 1997, Appendix – Tidal Channel: Same raw data as Flessa et al 1993, but recalibrated with revised R value.													
	A-6253	+1.3	1025	±50		0	280	950	± 42	See Flessa et al. 1993			
	A-6254	+0.5	1140	±45		0	310	950	± 42				
	A-6255	+0.7	1055	±45		0	290	950	± 42				
	A-6256	+0.9	905	±40	≤0			950	± 42				
	A-6257	+1.7	1325	±55		290	530	950	± 42				
	A-6259	+1.4	1155	±50		0	420	950	± 42				
	A-6260	+0.2	1175	±30		0	420	950	± 42				
	A-6261	+0.5	2530	±60		1310	1690	950	± 42				
	A-6262	+1.1	1425	±70		310	650	950	± 42				
	A-6263	+1.5	1315	±65		0	530	950	± 42				
	A-6264	+1.0	1015	±40		0	270	950	± 42				

Supplemental Online Material 3 - Recalibrated radiocarbon data used to determine half-life estimates

Study	Radiocarbon data				Original calibration					Recalibrated				
	Lab ID	δ ^{13}C per mil	Conv. ^{14}C Age		Calibrated Age (before AD 1950)					Calibrated Age (before AD 1950)				
			age	1σ unc.	age	2σ Yng	2σ Old	R	ΔR	age	2σ Yng	2σ Old	ΔR	
	A-6265	+1.0	1045	±30		0	280	950 ± 42						
	A-6266	+0.3	1005	±55		0	280	950 ± 42						
Kowalewski et al. 1998 does not report carbon data...														
Kowalewski et al. 2000 uses the same data (I think)... and also does not report.														
Flessa 1998, Table 1 – Intertidal														
	AA13208		5015	±60	Original paper used uncalibrated dates.					5381	5030	5643	-23 ± 109	c
	AA13209		7355	±75						7839	7585	8112	-23 ± 109	
	AA13210		37000	±1075						out of the range of Marine04				
	AA13211		630	±55						287	0	487	-23 ± 109	
	AA13212		6305	±70						6799	6494	7130	-23 ± 109	
	AA13213		2020	±55						1615	1334	1887	-23 ± 109	
	AA13214		5565	±65						5988	5701	6264	-23 ± 109	
	AA13215		6650	±70						7188	6886	7434	-23 ± 109	
	AA13226		735	±50						383	131	605	-23 ± 109	
Flessa 1998, Table 1 – 10-12 meters														
	AA13216		3220	±60						3068	2768	3352	-23 ± 109	
	AA13217		6070	±70						6526	6262	6828	-23 ± 109	
	AA13218		6510	±65						7036	6731	7307	-23 ± 109	
	AA13219		6285	±75						6775	6465	7117	-23 ± 109	
	AA13220		3060	±55						2882	2585	3228	-23 ± 109	
	AA13221		Post-bomb										-23 ± 109	
	AA13222		Post-bomb										-23 ± 109	
	AA13223		590	±50						245	0	443	-23 ± 109	
	AA13224		7690	±75						8176	7915	8431	-23 ± 109	
	AA13225		2110	±55						1717	1409	1996	-23 ± 109	
Flessa 1998, Table 1 – Dodgers Bank														
	AA13526		7920	±65						8414	8136	8745	-23 ± 109	
	AA13527		4880	±55						5203	4862	5505	-23 ± 109	
	AA13528		8510	±65						9168	8806	9469	-23 ± 109	
	AA13529		7905	±65						8397	8111	8715	-23 ± 109	
	AA13530		5240	±60						5632	5332	5892	-23 ± 109	
	AA13531		8320	±60						8903	8564	9255	-23 ± 109	
	AA13532		8655	±60						9327	9002	9555	-23 ± 109	
	AA13533		7700	±60						8187	7933	8415	-23 ± 109	
	AA13534		9740	±65						10669	10376	11084	-23 ± 109	
	AA13535		9000	±85						9757	9460	10139	-23 ± 109	
	AA13536		10000	±100						10956	10571	11257	-23 ± 109	
	AA13537		9245	±65						10059	9675	10399	-23 ± 109	
Flessa 1998, Table 1 – German Bight														
	AA13538		715	±45						367	89	562	-23 ± 109	
	AA13540		Post-bomb										-23 ± 109	
	AA13541		1415	±55						991	737	1242	-23 ± 109	
	AA13542		5630	±55						6056	5760	6296	-23 ± 109	
Martin et al. 1996														
	University of Arizona numbers not reported		2530	±55	1740	1540	1931	360 ± 65		1632	1391	1865	471 ± 84	a
			1030	±55	291	101	475	360 ± 65		187	0	382	471 ± 84	
			2805	±60	2071	1875	2296	360 ± 65		1959	1707	2242	471 ± 84	
			1970	±65	1161	956	1305	360 ± 65		1054	831	1269	471 ± 84	
			1125	±60	416	244	532	360 ± 65		293	0	483	471 ± 84	
			1045	±55	299	124	481	360 ± 65		200	0	395	471 ± 84	
			1275	±55	511	363	648	360 ± 65		426	260	610	471 ± 84	
			1605	±55	766	642	934	360 ± 65		698	530	890	471 ± 84	

Supplemental Online Material 3 - Recalibrated radiocarbon data used to determine half-life estimates

Study	Radiocarbon data				Original calibration					Recalibrated				
	Lab ID	δ ^{13}C per mil	Conv. ^{14}C Age		Calibrated Age (before AD 1950)					Calibrated Age (before AD 1950)				
			age	1σ unc.	age	2σ Yng	2σ Old	R	ΔR	age	2σ Yng	2σ Old	ΔR	
Wehmiller et al. 1995														
	AA-12731	+0.0	6905	±80						7279	7078	7451	154 ± 43	**d**
	AA-12732	+0.0	4035	±70						3851	3628	4079	154 ± 43	
	AA-12733	+0.0	5000	±70						5136	4862	5327	154 ± 43	
	AA-12728	+0.0	2935	±65						2519	2330	2705	154 ± 43	
	AA-12729	+0.0	3070	±115						2664	2337	2947	154 ± 43	
	Beta 64968	+0.0	4160	±90						4022	3733	4312	154 ± 43	
	Beta 64969	+0.0	5340	±80						5542	5315	5729	154 ± 43	
	AA-12734	+0.0	4445	±80						4411	4141	4688	154 ± 43	
	AA-12735	+0.0	6385	±80						6679	6453	6900	154 ± 43	
	AA-12730	+0.0	7345	±85						7664	7484	7857	154 ± 43	
	Beta 60546	+0.0	>42,000							out of the range of Marine04				
	Beta 62753	+0.0	Modern							out of the range of Marine04				
	Beta 62754	+0.0	5150	±70						5350	5084	5560	154 ± 43	
	Beta 62755	+0.0	2610	±60						2107	1925	2298	154 ± 43	
	Beta 62756	+0.0	5510	±70						5727	5572	5899	154 ± 43	
	Beta 62757	+0.0	29900	±290						out of the range of Marine04				
	AA-11807	+0.0	43100	±1200						out of the range of Marine04				
	Beta 65463	+0.0	4300	±50						4216	4018	4405	154 ± 43	
	Beta 49949	+0.0	6370	±100						6662	6403	6922	154 ± 43	
	Beta 49950	+0.0	2180	±70						1594	1394	1799	154 ± 43	
	Beta 49951	+0.0	1350	±70						750	618	916	154 ± 43	
	Beta 60545	+0.0	>39,500							out of the range of Marine04				

Original paper did not correct "for possible reservoir effects, isotopic fractionation (^{13}C assumed = 0.0), or for known differences between ^{14}C and calendar years" (i.e., used uncalibrated dates).