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Text DR1. Explanation of curve number data and Delcourt and Delcourt (2004) model.

The SCS curve numbers were used to calculate the percent increase in direct runoff resulting from storm event comparable to the June 2006 storm (24hr rainfall total: 152.4 mm) along the main channel floodplain from the study area to the headwaters at Hancock, NY (floodplain area = 194 sq. km.). The 50% reduction in forest cover was based on a model from the eastern Tennessee River valley (Delcourt and Delcourt, 2004). This model assumes that (1) indigenous people practiced a shifting (e.g. slash-and-burn) agriculture and (2) fields would lay fallow after 20-30 years of continuous cultivation because of reduced yields. After approximately 100 years of this subsistence strategy, 50% of the valley bottom would be deforested. The percent increase in direct runoff could range from 50% - 125% based on the degree of ground disturbance caused by planting.

References for Text DR1:

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey: Available online at http://websoilsurvey.nrcs.usda.gov/ accessed [17/April/2010]

Natural Resources Conservation Service, 1986, *National Engineering Manual Section 4 Hydrology*: United States Department of Agriculture.

Table DR1. Curve number calculations, forested condition for study area to headwaters upstream.

Hydrologic Soil Group	Land Use	CN	% Area	CN % Area
A	Forested	30	40.74204	1222.261324
B	Forested	55	56.22895	3092.592127
C	Forested	70	1.980795	138.6556734
D	Forested	77	1.048213	80.71238248
			$\mathbf{CN_{fldpln}}$ =	45.34221507

Table DR2. Curve number calculations, 50% row crops for study area to headwaters upstream.

Hydrologic Soil Group	Land Use	CN	% Area	CN % Area
A	Forested	30	20.37102	611.1306
A	Row Crops	64	20.37102	1303.74528
B	Forested	55	28.11448	1546.296125
B	Row Crops	75	28.11448	2108.585625
C	Forested	70	0.990398	69.327825
C	Row Crops	82	0.990398	81.212595
D	Forested	77	0.524107	40.3562005
D	Row Crops	85	0.524107	44.5490525
			$\mathbf{CN_{fldpln}}$ =	58.05203303

Table DR3. Curve number calculations, 50% grasses for study area to headwaters upstream.

Hydrologic Soil Group	Land Use	CN	% Area	CN % Area
A	Forested	30	20.37102	611.1306
A	Grass	39	20.37102	794.46978
B	Forested	55	28.11448	1546.296125
B	Grass	61	28.11448	1714.982975
C	Forested	70	0.990398	69.327825
C	Grass	74	0.990398	73.289415
D	Forested	77	0.524107	40.3562005
D	Grass	80	0.524107	41.92852
			$\mathbf{CN_{fldpln}}$ =	48.91781441

Table DR4. Manna-1 soil description.

soil horizon	depth (cmbs)	color	texture	structure	roots	ped/void features	lower boundary
A	0-7	10YR4/2	silt loam	weak, fine, granular; moderate, thin, platy	common, medium	-	clear, smooth
C	7-12	10YR4/2	silt loam	moderate, thin, platy; massive	common, fine	-	abrupt, smooth
Oeb1	12-15	10YR3/1	silt loam	moderate, fine, granular	common, fine	-	abrupt, wavy
Ab1	15-33	10YR4/2	silt loam	moderate, fine, granular	few, fine	common, distinct,(10YR4/2) burrows	clear, smooth
Cb1	33-45	10YR4/3	loamy fine sand	massive	few, fine to medium	-	clear, smooth
Ab2	45-64	10YR4/3	loamy fine sand	massive	few, medium	common, fine, charcoal; few, fine, pebbles	diffuse, smooth
BCb2	64-95	10YR 4/3	loamy fine sand	massive	few, medium	common, distinct, very thin,(5YR4/3) lamellae; few, fine, charcoal	clear, wavy
Ab3	95-108	10YR4/2	loamy fine sand	massive	few, fine	common, fine, charcoal; few, fine, pebbles	clear, wavy
Cb3	108-115	10YR4/3	loamy fine sand	massive; platy	few, medium	-	abrupt, smooth
A/Cb4	115-137	10YR4/2-10YR4/3	loamy fine sand	massive	common, medium	lamellae?	diffuse, wavy
Cb4	140-161	10YR5.4/3	fine sand	single-grained	few, fine	-	abrupt, irregular
Ab5	161-175	7.5YR4/3	loamy fine sand	weak, fine, granular; massive	few, fine	common, distinct,(2.5Y6/3) burrows; lower 5cm may be another 10YR4/2 Ab	abrupt, irregular
Cb5	175-193	10YR5.4/3	very fine sand	single-grained; massive	very few, medium	common, distinct,(10YR4/2) burrows	abrupt, irregular
Ab6	193-213	10YR4/3	silt loam	weak, medium, angular blocky; massive	-	-	diffuse, smooth
BCb6	213-223	10YR4/3	loamy fine sand	weak, medium, angular blocky; massive	common, fine	few, fine,tubular pores	clear, smooth
Cb6	223-228	10YR5.4/3	loamy fine sand	massive	few, fine	-	abrupt, smooth
A1b7	228-233	5YR4/3	silt loam	weak, fine, granular; moderate, fine, angular blocky	-	common, medium, charcoal	clear, wavy
A2b7	233-240	10YR4/2	silt loam	moderate, fine, angular blocky	few, medium	few, fine, charcoal; common, fine,tubular pores	clear, smooth
CBb7	240-260	10YR4/3	loamy very fine sand	weak, medium, angular blocky; massive		-	abrupt, smooth
A1b8	260-268	5YR4/3	silt loam	moderate, fine, granular	few, fine	few, fine to medium, charcoal fragments; common, very fine, tubular pores	clear, smooth
A2b8	268-280	10YR4/2	loamy fine sand	weak, medium, granular; massive	few, fine	few, very fine,tubular pores; few, medium, prominent,(2.5Y6/3) burrows	clear, irregular,
C/Bb8	280-285	2.5Y6/3-10YR4/3	fine sand to loamy sand	massive	very few, fine	-	abrupt, wavy
ABb9	285-310	7.5YR4/3	silt loam	moderate, medium, angular blocky	common, fine	common, fine, charcoal	diffuse, smooth
BgC1b9	310-335	10YR4/3	loamy fine sand to sandy loam	weak, medium, angular blocky; massive	common, medium	few, medium, charcoal; few, distinct,(10YR7/1) spherical and tubular redox depletions with (5YR4/3) hypocoatings	clear, smooth
BgC2b9	335-347	5YR4/3	gravelly sandy loam	massive	-	few, medium,charcoal; few, distinct, (10YR7/1) spherical and tubular redox depletions with (5YR4/3) hypocoatings	abrupt, wavy
2Cb9	347-373	-	gravels	single-grained	-	-	-
3Cb9	373~500	-	very coarse bouldery gravels	single-grained	-	-	-

Table DR5. **Manna-1 radiocarbon ages.**

Sample depth (meters)	Pedo-complex	Soil Horizon	Sample Description	Conventional ^{14}C year B.P.	Calibrated 2-sigma range (CALIB 5.0.1)[1]	Wt. mean calendar age[2]
0.70	PC-3	BCb2	Maize kernel (Beta-227480)	390 ± 40	1437 - 1528 A.D. (64%); 1545 A.D. (<01%); 1551 - 1634 A.D. (36%)	1523 A.D.
1.00	PC-2	Ab3	Maize kernel (Beta-227477)	270 ± 40	1486-1604 A.D. (50%); 1607-1675 A.D. (40%)	1618 A.D.
1.26	PC-2	A/Cb4	Maize kernel (Beta-227479)	550 ± 40	1304-1365 A.D. (47%); 1384-1438 A.D. (53%)	1375 A.D.
1.80	PC-2	Ab5	Wood charcoal from cultural feature (Beta-227482)	840 ± 70	1039 A.D. - 1277 A.D. (100%)	1172 A.D.
2.70	PC-1	A2b8	Bulk soil humate (Beta-258885)	1900 ± 40	23 A.D. - 223 A.D. (100%)	113 A.D.
3.42	PC-1	BgCb9	Detrital wood charcoal fragment (Beta-257433)	2070 ± 40	195 B.C. - 5 A.D. (99%)	91 B.C.

References cited in Table DR5:

[1]Reimer, P. J., 2004, IntCal04 terrestrial radiocarbon age calibration, 0–26 cal kyr BP: Radiocarbon, v. 46, pp. 1029–1058.

[1]M. Stuiver, P. J. Reimer, 1993, Extended 14C database and revised CALIB 3.0 14C age calibration program: Radiocarbon, v. 35, pp. 215–230.

[2]Telford R. J., Heegaard, E., Birks H. J. B., 2004, The intercept is a poor estimate of a calibrated radiocarbon age: Holocene, v. 14, pp. 296–298.

Table DR6. Manna-1 Pb concentrations.

Pedo-complex	sample ID	depth (cmbs)	soil horizon	lab	Pb (ppm)
PC-3	M1-0	0-5	A	ALS-Chemex	30.7
PC-3	M1-7	7-11	C	ALS-Chemex	24.9
PC-3	M1-11	12-15	Oeb1	ALS-Chemex	43.1
PC-3	M1-20	20-25	Ab1	ALS-Chemex	38.4
PC-3	M1-30	30-35	Cb1	ALS-Chemex	16.4
PC-3	M1-45	45-50	Ab2	ALS-Chemex	65.6
PC-3	M1-50	50-55	Ab2	ALS-Chemex	13.1
PC-3	M1-70	70-75	Bw&Cb2	ALS-Chemex	8.6
PC-3	M1-90	90-95	Bw&Cb2	ALS-Chemex	7.6
PC-2	M1-100	100-105	Ab3	ALS-Chemex	8.1
PC-2	M1-110	110-115	Cb3	ALS-Chemex	7.8
PC-2	M1-115	115-120	Ab/Cb4	ALS-Chemex	8.2
PC-2	M1-130	130-135	Ab/Cb4	ALS-Chemex	6.7
PC-2	M1-150	150-155	Cb4	ALS-Chemex	6.7
PC-2	M1-165	165-170	ABb5	ALS-Chemex	9.4
PC-2	M1-180	180-185	Cb5	ALS-Chemex	8.2
PC-1	M1-195	195-200	Ab6	ALS-Chemex	9.1
PC-1	M1-210	210-215	BCb6	ALS-Chemex	8.6
PC-1	M1-220	220-225	Cb6	ALS-Chemex	9.2
PC-1	M1-230	230-235	A1b7	ALS-Chemex	11.4
PC-1	M1-235	235-240	A2b7	ALS-Chemex	11.7
PC-1	M1-240	240-245	CBb7	ALS-Chemex	11.2
PC-1	M1-250	250-255	CBb7	ALS-Chemex	9.3
PC-1	M1-260	260-265	A1b8	ALS-Chemex	11
PC-1	M1-270	270-275	A2b8	ALS-Chemex	9.4
PC-1	M1-280	280-285	C/Bb8	ALS-Chemex	7.4
PC-1	M1-290	290-295	ABb9	ALS-Chemex	9.2
PC-1	M1-300	300-305	ABb9	ALS-Chemex	10.2
PC-1	M1-320	320-325	Bw&Cb9	ALS-Chemex	11.1
PC-1	M1-335	335-340	Bwgb9	ALS-Chemex	11.2
PC-1	M1-340	340-345	Cb9	ALS-Chemex	11.1

Duplicate Analysis

PC-3	M1-50	50-55	Ab2	ALS-Chemex	13.1
PC-3	M1-50	50-55	Ab2	ALS-Chemex	12
PC-2	M1-110	110-115	Cb3	ALS-Chemex	7.8
PC-2	M1-110	110-115	Cb3	ALS-Chemex	7.8

Table DR7. **Manna-1 Particle-size analysis results.**

Sample ID	depth (cmbs)	soil horizon	sample weight (g)	clay (weight %)	silt (weight %)	sand (weight %)
Manna-1, 0	0-5	A	22.05	6.80	55.92	37.28
Manna-1, 7	7-11	C	31.31	6.39	33.02	60.59
Manna-1, 11	12-15	Oeb1	24.38	4.10	40.28	55.62
Manna-1, 15	15-20	Ab1	33.4	5.99	44.46	49.55
Manna-1, 20	20-25	Ab1	35.52	11.26	48.99	39.75
Manna-1, 30	30-35	Cb1	43.52	4.60	26.68	68.73
Manna-1, 40	40-45	Cb1	45.16	5.54	27.45	67.01
Manna-1, 45	45-50	Ab2	51.25	5.85	27.65	66.50
Manna-1, 50	50-55	Ab2	53.13	5.65	27.07	67.29
Manna-1, 60	60-65	Ab2	56.83	5.28	23.88	70.84
Manna-1, 70	70-75	BCb2	48.66	3.08	26.43	70.49
Manna-1, 80	80-85	BCb2	42.89	4.66	26.60	68.73
Manna-1, 90	90-95	BCb2	44.61	2.24	22.82	74.94
Manna-1, 95	95-100	Ab3	40.49	3.70	20.84	75.45
Manna-1, 100	100-105	Ab3	43.01	2.33	21.53	76.15
Manna-1, 110	110-115	Cb3	44.57	3.37	16.89	79.74
Manna-1, 115	115-120	A/Cb4	50.44	4.96	25.83	69.21
Manna-1, 120	120-125	A/Cb4	50.34	4.97	23.00	72.03
Manna-1, 130	130-135	A/Cb4	60.79	2.47	14.97	82.56
Manna-1, 140	140-145	Cb4	55.6	1.80	12.43	85.77
Manna-1, 150	150-155	Cb4	53.02	1.89	14.58	83.53
Manna-1, 160	160-165	Ab5	44.73	3.35	25.55	71.09
Manna-1, 165	165-170	Ab5	42.74	3.51	28.87	67.62
Manna-1, 170	170-175	Ab5	43.96	5.69	28.25	66.06
Manna-1, 180	180-185	Cb5	46.35	2.16	18.75	79.09
Manna-1, 190	190-195	Cb5	49.33	5.07	33.95	60.98
Manna-1, 195	195-200	Ab6	42.03	4.76	38.28	56.96
Manna-1, 200	200-205	Ab6	40.37	4.95	35.32	59.72
Manna-1, 210	210-215	BCb6	42.05	3.57	29.54	66.90
Manna-1, 215	215-220	BCb6	43.23	4.63	30.14	65.23
Manna-1, 220	220-225	Cb6	41.58	8.42	26.24	65.34
Manna-1, 230	230-235	A1b7	40.53	6.17	38.98	54.85
Manna-1, 235	235-240	A2b7	40.91	4.89	47.69	47.42
Manna-1, 240	240-245	CBb7	39.64	3.78	46.75	49.47
Manna-1, 250	250-255	CBb7	40.59	3.70	35.62	60.68
Manna-1, 260	260-265	A1b8	41.12	6.08	38.93	54.99
Manna-1, 270	270-275	A2b8	42.44	1.18	40.81	58.01
Manna-1, 280	280-285	C/Bb8	43.64	0.00	25.76	74.24
Manna-1, 285	285-290	ABb9	40.76	4.91	33.44	61.65
Manna-1, 290	290-295	ABb9	40.59	4.93	35.18	59.89
Manna-1, 300	300-305	ABb9	40.2	3.73	38.08	58.18
Manna-1, 310	310-315	BgC1b9	41.2	2.43	39.68	57.89
Manna-1, 320	320-325	BgC1b9	37.27	2.68	40.01	57.31
Manna-1, 330	330-335	BgC1b9	39.83	2.51	38.79	58.70
Manna-1, 335	335-340	BgC2b9	41.41	4.83	37.96	57.21
Manna-1, 340	340-345	BgC2b9	30.91	3.24	48.72	48.04
Duplicates						
Manna-1, 50	50-55	Ab2	53.13	5.65	27.07	67.29
Manna-1, 50	50-55	Ab2	35.52	4.22	31.65	64.13
Manna-1, 130	130-135	A/Cb4	60.79	2.47	14.97	82.56
Manna-1, 130	130-135	A/Cb4	42.58	3.52	14.87	81.61
Manna-1, 150	150-155	Cb4	53.02	1.89	14.58	83.53
Manna-1, 150	150-155	Cb4	46.24	3.24	12.44	84.32
Manna-1, 250	250-255	CBb7	40.59	3.70	35.62	60.68
Manna-1, 250	250-255	CBb7	44.56	5.61	33.66	60.73

Table DR8. Manna-1 Archaeology.

soil horizon	depth (cmbs)	ceramics (ct)	lithic (ct)	fire-altered rock (ct)	historic (ct)	Prehistoric (% of total)	Historic (% of total)
Ab1	15-33	2	2	1	84	1.04	63.15789474
Cb1	33-45	20	13	4	37	7.66	27.81954887
BCb2	64-95	21	4	4	12	6.00	9.022556391
Ab3	95-108	72	7	15	0	19.46	0
A/Cb4	115-137	228	9	72	0	63.98	0
Cb4	140-161	0	0	1	0	0.21	0
Ab5	161-175	5	0	0	0	1.04	0
Ab6	193-213	0	1	0	0	0.21	0
A1b7	228-233	0	2	0	0	0.41	0

prehistoric artifact assemblage (total count)	483
historic artifact assemblage (total count)	133

Table DR9. Manna-1 Phytolith results.

soil horizon	depth (cmbs)	*Chloridoideae* (%)	*Panicoideae* (%)
CBb2	80	17	14
Ab3	100	8	11
A/Cb4	125	11	7
Ab5	165	5	8
Cb5	185	4	4
Ab6	197	2	5
BCb6	212	1	5
Cb6	222	0	6
A1b7	232	5	12
CBb7	253	2	4
A1b8	263	8	17
A2b8	273	18	24
C/Bb8	283	19	22
ABb9	295	7	10
Bw&Cb9	323	1	12
Bwgb9	338	0	0
Cb9	343	1	3

percent C*hloridoideae* and *Panicoideae* based on population of 300

Table DR10. Manna-1 $\delta^{13}C$ of soil organic carbon results.

Sample ID	Sample depth (cmbs)	soil horizon	Lab	Sample Weight (mg)	Nitrogen Weight (%)	Carbon Weight (%)	Final d15N (vs AIR)	Final d13C (vs VPDB)
Manna-1, 0	0-5	A	U. Tenn.	6.638	0.166	2.184	4.31	-26.48
Manna-1, 7	7-11	C	U. Tenn.	4.120	0.146	2.087	3.27	-26.34
Manna-1, 11	12-15	Oeb1	U. Tenn.	5.340	0.337	3.970	3.71	-27.91
Manna-1, 15	15-20	Ab1	U. Tenn.	8.090	0.099	1.347	6.16	-24.91
Manna-1, 20	20-25	Ab1	U. Tenn.	10.020	0.100	1.287	5.88	-24.25
Manna-1, 30	30-35	Cb1	U. Tenn.	39.770	0.035	0.380	6.36	-23.66
Manna-1, 40	40-45	Cb1	U. Tenn.	34.574	0.032	0.333	6.43	-23.55
Manna-1, 45	45-50	Ab2	U. Tenn.	31.886	0.031	0.282	6.12	-23.54
Manna-1, 50	50-55	Ab2	U. Tenn.	48.876	0.035	0.303	6.25	-23.69
Manna-1, 60	60-65	Ab2	U. Tenn.	34.608	0.032	0.246	5.10	-23.16
Manna-1, 70	70-75	BCb2	U. Tenn.	35.260	0.057	0.170	4.59	-21.46
Manna-1, 80	80-85	BCb2	U. Tenn.	37.580	0.024	0.160	4.85	-21.47
Manna-1, 90	90-95	BCb2	U. Tenn.	30.160	0.023	0.189	5.16	-21.13
Manna-1, 95	95-100	Ab3	U. Tenn.	35.586	0.022	0.155	4.03	-22.95
Manna-1, 100	100-105	Ab3	U. Tenn.	44.264	0.023	0.156	4.42	-22.84
Manna-1, 110	110-115	Cb3	U. Tenn.	40.830	0.022	0.179	4.38	-23.92
Manna-1, 115	115-120	A/Cb4	U. Tenn.	24.182	0.029	0.223	4.32	-23.08
Manna-1, 120	120-125	A/Cb4	U. Tenn.	28.300	0.028	0.237	3.89	-24.13
Manna-1, 130	130-135	A/Cb4	U. Tenn.	35.588	0.025	0.194	4.79	-24.12
Manna-1, 140	140-145	Cb4	U. Tenn.	51.056	0.018	0.131	4.34	-24.73
Manna-1, 150	150-155	Cb4	U. Tenn.	40.722	0.020	0.138	4.70	-25.06
Manna-1, 160	160-165	Ab5	U. Tenn.	39.800	0.025	0.166	4.28	-25.05
Manna-1, 165	165-170	Ab5	U. Tenn.	35.342	0.025	0.175	5.20	-25.01
Manna-1, 170	170-175	Ab5	U. Tenn.	31.472	0.029	0.207	5.65	-25.20
Manna-1, 180	180-185	Cb5	U. Tenn.	39.472	0.018	0.079	3.25	-24.10
Manna-1, 190	190-195	Cb5	U. Tenn.	39.246	0.025	0.132	4.90	-24.71
Manna-1, 195	195-200	Ab6	U. Tenn.	30.134	0.030	0.173	5.15	-24.67
Manna-1, 200	200-205	Ab6	U. Tenn.	34.606	0.026	0.173	5.18	-25.10
Manna-1, 210	210-215	BCb6	U. Tenn.	49.600	0.044	0.129	5.57	-25.07
Manna-1, 215	215-220	BCb6	U. Tenn.	28.220	0.025	0.142	6.67	-24.01
Manna-1, 220	220-225	Cb6	U. Tenn.	41.102	0.049	0.153	5.62	-25.08
Manna-1, 230	230-235	A1b7	U. Tenn.	33.400	0.042	0.332	6.02	-25.27
Manna-1, 235	235-240	A2b7	U. Tenn.	29.932	0.033	0.254	6.38	-25.03
Manna-1, 240	240-245	CBb7	U. Tenn.	33.920	0.029	0.156	5.79	-24.14
Manna-1, 250	250-255	CBb7	U. Tenn.	35.15	0.051	0.102	5.65	-23.73
Manna-1, 260	260-265	A1b8	U. Tenn.	27.996	0.064	0.189	6.42	-22.31
Manna-1, 270	270-275	A2b8	U. Tenn.	28.552	0.060	0.249	4.79	-20.34
Manna-1, 280	280-285	C/Bb8	U. Tenn.	33.082	0.048	0.103	4.92	-24.20
Manna-1, 285	285-290	ABb9	U. Tenn.	38.854	0.046	0.152	4.66	-24.98
Manna-1, 290	290-295	ABb9	U. Tenn.	37.528	0.075	0.173	5.97	-25.26
Manna-1, 300	300-305	ABb9	U. Tenn.	40.8	0.049	0.186	6.07	-25.36
Manna-1, 310	310-315	BgC1b9	U. Tenn.	26.762	0.064	0.153	5.50	-25.02
Manna-1, 320	320-325	BgC1b9	U. Tenn.	35.226	0.051	0.114	5.19	-23.11
Manna-1, 330	330-335	BgC1b9	U. Tenn.	33.77	0.077	0.080	5.20	-23.73
Manna-1, 335	335-340	BgC2b9	U. Tenn.	34.36	0.055	0.131	6.57	-23.98
Manna-1, 340	340-345	BgC2b9	U. Tenn.	34.996	0.060	0.180	6.49	-24.31
Duplicates								
Manna-1, 270	270-275	A2b8	U. Tenn.	28.552	0.060	0.249	4.79	-20.34
Manna-1, 270	270-275	A2b8	Beta	-	-	-	-	-19.50
Manna-1, 270	270-275	A2b8	Baylor U.	85.694	0.020	0.250	4.76	-20.38
Manna-1, 11	12-15	Oeb1	U. Tenn.	5.340	0.337	3.970	3.707	-27.91
Manna-1, 11	12-15	Oeb1	Baylor U.	12.049	0.350	4.190	3.570	-27.97

Table DR11. Eastern North America sedimentation rate data.

Study	sample number	Analysis number	Sample Description	Depth	Depth (norm)	14C Age	Error	wt. mean age
Scully & Arnold, 1981	U-site, C	I-9514	charcoal	30	0.42	295	80	1566 AD
Scully & Arnold, 1981	U-site, A1b1	I-9685	bulk soil humate	36	0.51	665	95	1311 AD
Scully & Arnold, 1981	U-site, A11b2	I-9681	bulk soil humate	46	0.65	1490	85	535 AD
Scully & Arnold, 1981	U-site, A1b3	I-9642	bulk soil humate	71	1.00	2130	85	-182 BC
Scully & Arnold, 1981	S-site, A1b1	I-9512	charcoal	61	0.69	235	80	1594 AD
Scully & Arnold, 1981	S-site, A11b2	I-9684	bulk soil humate	68	0.76	660	90	1324 AD
Scully & Arnold, 1981	S-site, A1b3	I-9684	bulk soil humate	89	1.00	2195	95	-200 BC
Ekdahl et al. 2004	CL-058	CAMS-88432	wood	13.05	0.17	255	40	1659 AD
Ekdahl et al. 2004	CL-117	CAMS-94399	wood	24.20	0.31	170	60	1792 AD
Ekdahl et al. 2004	CL-128	CAMS-94400	pine needles	25.65	0.33	125	40	1813 AD
Ekdahl et al. 2004	CL-129	CAMS-87874	pine needles	25.94	0.33	175	40	1793 AD
Ekdahl et al. 2004	CL-130	CAMS-88434	twig	26.24	0.33	90	50	1811 AD
Ekdahl et al. 2004	CL-130#	CAMS-94401	twig	26.24	0.33	125	50	1820 AD
Ekdahl et al. 2004	CL-132	CAMS-94402	pine needles	26.83	0.34	140	35	1808 AD
Ekdahl et al. 2004	CL-144	CAMS-94403	leaf	30.00	0.38	285	40	1591 AD
Ekdahl et al. 2004	CL-160	CAMS-80891	leaf	34.00	0.43	340	60	1557 AD
Ekdahl et al. 2004	CL-174	CAMS-94404	leaf	37.71	0.48	285	40	1591 AD
Ekdahl et al. 2004	CL-174#	CAMS-94405	leaf	37.71	0.48	255	45	1659 AD
Ekdahl et al. 2004	Cl-175	CAMS-80892	leaf	38.00	0.48	390	35	1519 AD
Ekdahl et al. 2004	CL-196	CAMS-80893	twig	43.00	0.55	510	60	1403 AD
Ekdahl et al. 2004	CL-197	CAMS-94406	sunflower seed	43.40	0.55	400	45	1479 AD
Ekdahl et al. 2004	CL-197#	CAMS-94407	sunflower seed	43.40	0.55	410	30	1489 AD
Ekdahl et al. 2004	CL-258	CAMS-90098	sunflower seed	56.26	0.71	660	30	1336 AD
Ekdahl et al. 2004	CL-261	CAMS-87875	leaf	56.88	0.72	635	35	1344 AD
Ekdahl et al. 2004	CL-285	CAMS-94411	leaf	61.80	0.78	715	40	1292 AD
Ekdahl et al. 2004	CL-285#	CAMS-94412	leaf	61.80	0.78	680	40	1325 AD
Ekdahl et al. 2004	CL-288	CAMS-94413	leaf	62.41	0.79	705	40	1277 AD
Ekdahl et al. 2004	CL-288#	CAMS-94414	leaf	62.41	0.79	720	40	1287 AD
Ekdahl et al. 2004	CL-300	CAMS-94416	stick	64.87	0.82	830	30	1212 AD
Ekdahl et al. 2004	CL-305	CAMS-94418	leaf	65.90	0.84	990	40	1065 AD
Ekdahl et al. 2004	CL-306	CAMS-94419	stick	66.10	0.84	915	50	1117 AD
Ekdahl et al. 2004	CL-315	CAMS-80896	twig	68.00	0.86	890	40	1134 AD
Ekdahl et al. 2004	CL-321	CAMS-94421	twig	69.18	0.88	1065	40	967 AD
Ekdahl et al. 2004	CL-338	CAMS-94422	leaf	72.65	0.92	1045	40	986 AD
Ekdahl et al. 2004	CL-01 64.8	CAMS-80897	twig	78.80	1.00	1060	40	972 AD
Pederson et al. 2005				82	0.30	145	40	1806 AD
Pederson et al. 2005				90	0.32	modern		
Pederson et al. 2005				94	0.34	270	40	1618 AD
Pederson et al. 2005				98	0.35	275	40	1607 AD
Pederson et al. 2005				110	0.40	355	35	1547 AD
Pederson et al. 2005				122	0.44	520	35	1404 AD
Pederson et al. 2005				134	0.48	515	45	1401 AD
Pederson et al. 2005				134	0.48	600	60	1354 AD
Pederson et al. 2005				142	0.51	455	35	1447 AD
Pederson et al. 2005				150	0.54	660	70	1332 AD
Pederson et al. 2005				178	0.64	785	45	1236 AD
Pederson et al. 2005				186	0.67	1035	45	999 AD
Pederson et al. 2005				190	0.69	1300	35	719 AD
Pederson et al. 2005				194	0.70	1030	40	1005 AD
Pederson et al. 2005				215	0.78	1210	40	812 AD
Pederson et al. 2005				277	1.00	1580	80	473 AD
Wall and Stewart, 1996	South Block, A			46	0.43	historic		1680 AD
Wall and Stewart, 1996	South Block, B1	Beta-15627		49	0.46	440	100	1519 AD
Wall and Stewart, 1996	South Block, C1	Beta-15626		69	0.64	560	80	1372 AD
Wall and Stewart, 1996	South Block, D1	Beta-15625		79	0.74	1270	80	770 AD
Wall and Stewart, 1996	South Block, F1	Beta-15624		107	1.00	2220	110	-259 BC
This study	Manna-1	Pb peak		50	0.15	-	-	1900 AD
This study	Manna-1			72	0.21	390	40	1523 AD
This study	Manna-1			100	0.29	270	40	1618 AD
This study	Manna-1			126	0.37	550	40	1375 AD
This study	Manna-1			180	0.53	840	70	1172 AD
This study	Manna-1	triangle point		190	0.56	-	-	1000 AD
This study	Manna-1			270	0.79	1900	40	113 AD
This study	Manna-1			342	1.00	2070	40	-91 BC

See manuscript for references for Table DR11.

Text DR2: Sedimentation Rate Equations

Best-fit polynomial regression equations were used to help illustrate the changing sedimentation rates for Manna-1, Pederson et al. (***2005***), and Ekdah et al. (2004). The equations are:

Manna-1 (Eq. 1):

$y = 4E\text{-}13x^4 - 2E\text{-}09x^3 + 2E\text{-}06x^2 - 0.0011x + 0.8863$ ($R^2 = 0.9824$)

Pederson et al. (2005) (Eq. 2):

$y = 5E\text{-}10x^4 – 3E\text{-}06x^3 + 0.0042x^2 – 3.0518x + 1015.7$ ($R^2 = 0.9672$)

Ekdahl et al. (2004) (Eq. 3):

$y = -2E\text{-}14x^5 + 1E\text{-}10x^4 - 4E\text{-}07x^3 + 0.0005x^2 - 0.3513x + 96.796$ ($R^2 = 0.9469$)

Wall and Stewart (1996) (Eq. 4):

$y = -2E\text{-}10x^3 + 4E\text{-}07x^2 - 0.0004x + 0.873$ ($R^2 = 0.969$)

A best-fit polynomial equation (Eq. 5) fo r *all* normalized data shows a distinct increase in sedimentation rate starting around 1,000 – 1,100 A.D. This provides supporting evidence for placing the beginning of the Pre-Colonial sediment interval at 1,100 A. D.

Equation 5:

$y = 1E\text{-}13x^4 - 6E\text{-}10x^3 + 5E\text{-}07x^2 - 0.0002x + 0.9152$ ($R^2 = 0.8627$)

Table DR12. Eastern North America directly-dated maize results.

^{14}C yr BP	calibrated age range[a]	weighted mean[b]	lab code	sample type	Region	Source
850 ± 60	1115 - 1271 (0.78)	1167.1	B-84970	maize	NE	Chilton, 2006
810 ± 50	1152 - 1284 (0.95)	1211.8	B-84969	maize	NE	Chilton, 2006
	1435 - 1531 (0.58);					
390 ± 50	1537 - 1635 (0.41)	1527.1	B-84971	maize	NE	Chilton, 2006
690 ± 60	1224 - 1399 (1.)	1315.5	B-84973	maize	NE	Chilton, 2006
310 ± 60	1448 - 1668 (0.97)	1577.1	B-84972	maize	NE	Chilton, 2006
620 ± 70	1273 - 1428 (1.)	1347.6	B-27676	maize	NE	Chilton, 2006
620 ± 59	1279 - 1417 (1.)	1347.3	GX-19319	maize	NE	Chilton, 2006
610 ± 60	1281 - 1420 (1.)	1350.2	B-15769	maize	NE	Chilton, 2006
	1299 - 1370 (0.60);					
570 ± 40	1380 - 1429 (0.40)	1362.3	B-102060	maize	NE	Chilton, 2006
555 ± 85	1270 - 1491 (0.99)	1377.7	B-15788	maize	NE	Chilton, 2006
	1378 - 1496 (0.74);					
500 ± 60	1298 - 1371 (0.24)	1412.5	GX-22044	maize	NE	Chilton, 2006
500 ± 40	1391 - 1454 (0.90)	1415	GX-26424	maize	NE	Chilton, 2006
440 ± 40	1410 - 1519 (0.93)	1467.7	B-141592	maize	NE	Chilton, 2006
400 ± 60	1427 - 1636 (1.)	1523.5	GX-21994	maize	NE	Chilton, 2006
400 ± 30	1437 - 1522 (0.80)	1500.4	B-123998	maize	NE	Chilton, 2006
	1441 - 1533 (0.55);					
380 ± 50	1536 - 1635 (0.45)	1533.3	GX-22651	maize	NE	Chilton, 2006
310 ± 40	1472 - 1653 (1.)	1567.5	GX-27629	maize	NE	Chilton, 2006
290 ± 40	1483 - 1665 (0.98)	1583.4	B-123997	maize	NE	Chilton, 2006
	1670 - 1780 (0.41);					
130 ± 40	1798 - 1896 (0.42)	1810.1	B-104792	maize	NE	Chilton, 2006
	399BC - 349BC (0.45);			maize		
2270 ± 35	313BC - 208BC (0.55)	-309.5		phytolith	NE	Asch-Sidell, 2008
840 ± 40	1151 - 1271 (0.90)	1191.7		maize	NE	Asch-Sidell, 2008
	1299 - 1370 (0.60);			maize		
570 ± 40	1380 - 1429 (0.40)	1362.3		cupule	NE	Asch-Sidell, 2008
	1434 - 1524 (0.72);					
401 ± 38	1558 - 1631 (0.28)	1510.2	A-0328	maize	NE	Hart et al., 2003
317 ± 38	1473 - 1648 (1.)	1563.9	A-0326	maize	NE	Hart et al., 2003
	1259 - 1322 (0.67);					
691 ± 39	1347 - 1392 (0.33)	1315.4	A-0327	maize	NE	Hart et al., 2003
1050 ± 50	884 - 1048 (0.95)	980.4		maize	NE	Hart et al., 2007
1150 ± 100	661 - 1041 (0.995)	871.4		maize	NE	Hart et al., 2007
1270 ± 100	607 - 979 (1.)	775.7		maize	NE	Hart et al., 2007
1551 ± 78	376 - 648 (0.97)	498.7		maize	NE	Hart et al., 2007
1730 ± 0	136 - 423 (1.)	306.5		maize	NE	Hart et al., 2007
970 ± 50	984 - 1185 (1.)	1083.4	TO-5875	maize cupules	NE	Crawford et al., 1997
1060 ± 60	857 - 1051 (0.90)	969.3	TO-4584	maize kernel	NE	Crawford et al., 1997

Table DR12. Eastern North America directly-dated maize results (cont').

^{14}C yr BP	calibrated age range[a]	weighted mean[b]	lab code	sample type	Region	Source
1250 ± 80	650 - 903 (0.93)	785.8	TO-4585	cupules	NE	Crawford et al., 1997
1500 ± 150	226 - 875 (1.)	528.6	TO-5308	cupules	NE	Crawford et al., 1997
1570 ± 90	322 - 648 (0.97)	476.8	TO-5307	cupules	NE	Crawford et al., 1997
1550 ± 40	423 - 594 (1.)	502.5		maize phytolith	MAR	Crawford et al., 1997
270 ± 40	1486 - 1604 (0.50); 1607 - 1675 (0.40)	1616.6	B-227477	kernel	MAR	this study
550 ± 40	1304 - 1365 (0.47); 1384 - 1438 (0.53)	1374.1	B-227478	kernel	MAR	this study
550 ± 40	1304 - 1365 (0.47); 1384 - 1438 (0.53)	1374.1	B-227479	kernel	MAR	this study
390 ± 40	1437 - 1528 (0.64); 1551 - 1634 (0.36)	1522.3	B-227480	kernel	MAR	this study
830 ± 50	1148 - 1278 (0.87)	1193	B-219495	kernels	MAR	this study
560 ± 50	1298 - 1372 (0.55); 1378 - 1437 (0.45)	1367.3	B-219496	maize	MAR	this study
500 ± 40	1391 - 1454 (0.90)	1415	B-266107	maize	MAR	this study
370 ± 40	1446 - 1530 (0.53); 1539 - 1635 (0.47)	1537.2	B-265508	maize	MAR	this study
440 ± 40	1410 - 1519 (0.93)	1467.7	B-265507	maize	MAR	this study
985 ± 45	979 - 1162 (1.)	1069.3	AA-19127	maize	MAR	Hart and Asch-Sidell, 1996
794 ± 38	1175 - 1279 (1.)	1234.1	AA-40133	maize	MAR	Hart et al., 2002
692 ± 46	1251 - 1328 (0.64); 1341 - 1395 (0.35)	1315.3	AA-53310	maize	MAR	Means, 2005
605 ± 34	1296 - 1407 (1.)	1349.5	AA-38458	maize	MAR	Hart et al., 2002
590 ± 50	1291 - 1422 (1.)	1355.4	AA-5311	maize	MAR	Means, 2005
590 ± 100	1219 - 1491 (0.996)	1362.4	M-2198	maize	MAR	Hart et al., 2007
429 ± 40	1414 - 1522 (0.88)	1480.9	AA-19126	maize	MAR	Hart and Asch-Sidell, 1996
364 ± 44	1448 - 1635 (1.)	1689.1	AA-53309	maize	MAR	Means, 2005
246 ± 33	1626 - 1681 (0.53); 1762 - 1803 (0.26)	1689.1	AA-53308	maize	MAR	Means, 2005
202 ± 33	1644 - 1692 (0.28); 1728 - 1811 (0.55)	1774	AA-53307	maize	MAR	Means, 2005
1040 ± 40	893 - 1043 (0.98)	990.9	B-212295	maize	MAR	Messner et al., 2008
330 ± 45	1460 - 1646 (1.)	1557.8	AA-21978	maize	MAR	Hart 1999
675 ± 55	1256 - 1406 (1.)	1326.5	AA-21979	maize	MAR	Hart 1999
440 ± 45	1408 - 1522 (0.88)	1474.7	AA-26539	maize	MAR	McKnight and Gallivan, 2007
830 ± 45	1151 - 1276 (0.91)	1197.8	AA-26541	maize	MAR	Hart, 1999

Table DR12. Eastern North America directly-dated maize results (cont').

^{14}C yr BP	calibrated age range[a]	weighted mean[b]	lab code	sample type	Region	Source
930 ± 40	1023 - 1187 (0.99)	1103.8	n/a	maize	MAR	McKnight and Gallivan, 2007
910 ± 40	1032 - 1210 (1.)	1115.7	n/a	maize	MAR	McKnight and Gallivan, 2007
910 ± 40	1032 - 1210 (1.)	1115.7	n/a	maize	MAR	McKnight and Gallivan, 2007
870 ± 40	1043 - 1106 (0.25); 1118 - 1255 (0.75)	1154.9	n/a	maize	MAR	McKnight and Gallivan, 2007
850 ± 50	1118 - 1269 (0.82)	1172.3	n/a	maize	MAR	McKnight and Gallivan, 2007
830 ± 60	1118 - 1279 (0.85)	1185	n/a	maize	MAR	McKnight and Gallivan, 2007
770 ± 50	1161 - 1297 (0.99)	1242.5	n/a	maize	MAR	McKnight and Gallivan, 2007
720 ± 40	1221 - 1308 (0.88)	1285.5	n/a	maize	MAR	McKnight and Gallivan, 2007
700 ± 60	1219 - 1333 (0.68)	1307.3	n/a	maize	MAR	McKnight and Gallivan, 2007
610 ± 40	1291 - 1408 (1.)	1348.9	n/a	maize	MAR	McKnight and Gallivan, 2007
590 ± 40	1296 - 1415 (1.)	1354.3	n/a	maize	MAR	McKnight and Gallivan, 2007
570 ± 40	1299 - 1370 (0.60); 1380 - 1429 (0.40)	1362.3	n/a	maize	MAR	McKnight and Gallivan, 2007
470 ± 70	1385 - 1528 (0.73); 1553 - 1633 (0.15)	1455.8	n/a	maize	MAR	McKnight and Gallivan, 2007
420 ± 40	1420 - 1523 (0.82)	1491.7	n/a	maize	MAR	McKnight and Gallivan, 2007
350 ± 40	1455 - 1637 (1.)	1548.6	n/a	maize	MAR	McKnight and Gallivan, 2007
350 ± 40	1455 - 1637 (1.)	1548.6	n/a	maize	MAR	McKnight and Gallivan, 2007
330 ± 40	1466 - 1645 (1.)	1557.9	n/a	maize	MAR	McKnight and Gallivan, 2007
320 ± 30	1483 - 1645 (1.)	1563.8	n/a	maize	MAR	McKnight and Gallivan, 2007
425 ± 40	1417 - 1522 (0.85)	1486.8	A0522	residues	MAR	Hart et al., 2007
480 ± 40	1394 - 1475 (0.97)	1430.8	A0523	residues	MAR	Hart et al., 2007
1043 ± 40	892 - 1042 (0.99)	988.4	A0229	residues	MAR	Hart et al., 2007
1138 ± 40	801 - 988 (0.96)	901.7	A0196	residues	MAR	Hart et al., 2007
1211 ± 46	682 - 897 (0.97)	810.8	A0198	residues	MAR	Hart et al., 2007
1231 ± 44	678 - 889 (1.)	788.1	A0192	residues	MAR	Hart et al., 2007
1315 ± 50	637 - 783 (0.95)	717.6	A0506	residues	MAR	Hart et al., 2007
1430 ± 40	559 - 662 (1.)	617.2	A0499	residues	MAR	Hart et al., 2007

Table DR12. Eastern North America directly-dated maize results (cont').

^{14}C yr BP	calibrated age range[a]	weighted mean[b]	lab code	sample type	Region	Source
1575 ± 35	413 - 561 (1.)	486.7	A0497	residues	MAR	Hart et al., 2007
2205 ± 30	376BC - 197BC (1.)	-279.1	A0505	residues	MAR	Hart et al., 2007
1390 ± 35	594 - 683 (1.)	642.7	A0501	residues	MAR	Hart et al., 2007
1428 ± 41	559 - 663 (1.)	617.9	A0227	residues	MAR	Hart et al., 2007
1470 ± 43	533 - 656 (0.97	587.9	A0225	residues	MAR	Hart et al., 2007
1995 ± 35	59BC - 80AD (0.98)	5.7	A0410	residues	MAR	Hart et al., 2007
1600 ± 35	393 - 544 (1.)	473.1	A0498	residues	MAR	Hart et al., 2007
2270 ± 35	313BC - 208BC (0.55); 399BC - 349BC (0.45)	-309.5	A0500	residues	MAR	Hart et al., 2007
1990 ± 40	93BC - 86AD (0.99)	9.1	A0455	residues	MAR	Hart et al., 2007
1940 ± 35	2BC - 130AD (0.96)	62.6	A0452	residues	MAR	Hart et al., 2007
1228 ± 42	681 - 889 (1.)	791	A0190	residues	MAR	Hart et al., 2007

[a] - 2-sigma age ranges calibrated using CALIB 5.0.1 (INTCAL04)

[b] - weighted means calculated from 2-sigma probability distributions using MATLAB 7.0.1

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