A Delaware Sea Grant Technical Report

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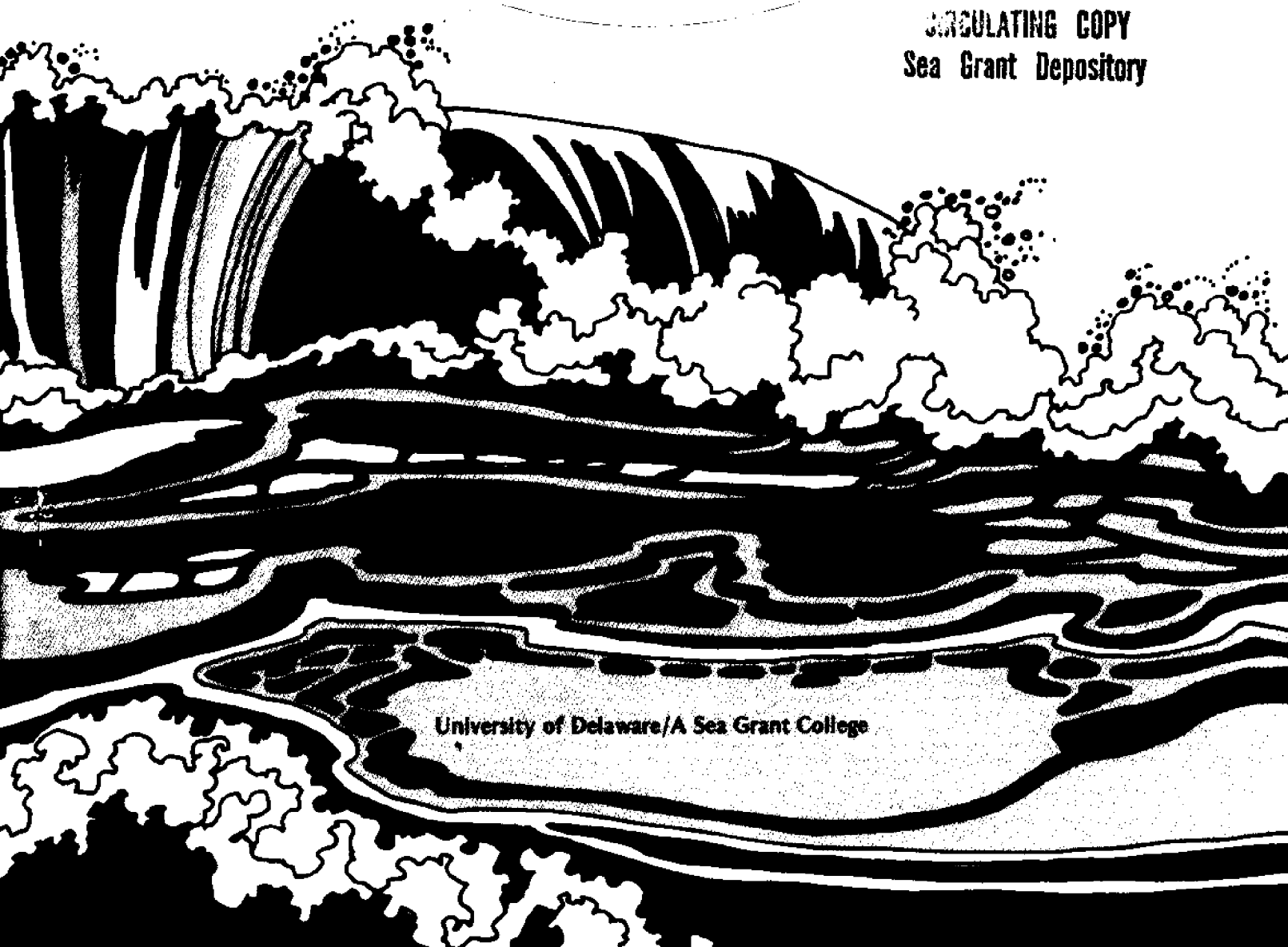
RADIOCARBON DATES IN THE DELAWARE COASTAL ZONE [EASTERN ATLANTIC COAST OF NORTH AMERICA]

by

J. C. Kraft*

DEL-SG-19-76



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and
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INTRODUCTION

The radiocarbon measurements and relevant information presented herein are based on a program of the study of rates of change of coastal sedimentary environments and relative sea level rise, in the Delaware coastal area, over the past decade. This report includes a complete summary of all radiocarbon dates made with a brief comment involving the significance of the sample. In some cases, the samples are "basal peats" and are extremely significant regarding the determination of relative and eustatic sea-level fluctuations. In other cases, the samples were dated in order to obtain information for paleogeographic reconstructions and rates of change or lateral shift of geographic - sedimentary environments. The elevations are relative to mean low sea level. A number of publications have resulted from this work over the past decade. These include mainly paleogeographic interpretations and statements on the geology of lagoon, barrier and marsh-estuarine shoreline environments. For further information regarding uses made of the information herein provided, the reader is referred to Kraft, 1971a, Kraft, 1971b, Kraft, Biggs, and Halsey, 1973,

Kraft, Sheridan, Moose, Strom, and Weil, 1974, Kraft and Belknap, 1975, Belknap and Kraft, 1976 in press, Belknap, 1975, Jordan, 1965, and Jordan, 1974.

The majority of the dates herein presented have been gained via our research in coastal sedimentary environments over the past decade and have been supported by a very large number of organizations, in particular including the University of Delaware. I would like to acknowledge and thank the Shell Development Company for permitting me to publish a series of their radiocarbon dates that applied to the area. In addition, I would like to acknowledge the number of helpful comments provided to me by Mr. James Buckley of Isotopes, Inc. Procedures followed regarding the dates made by Isotopes, Inc. are summarized in Buckley, 1968, 1970, and 1973. Specific support for the determination for these radiocarbon dates was obtained from the following sources: 1. Shell Development Company, Houston; 2. National Science Foundation - G.P. 5604; 3. University of Delaware Research Foundation; 4. University of Delaware Sea Grant Program, NOAA, No. 04-3-158-30; 5. Office of Naval Research Geography Programs, No. N0014-69-A0407; 6. Department of Geology, University of Delaware, Unidel Foundation; and 7. College of Graduate Studies, University of Delaware. The "R" dates are from the Shell Development Company, the "P" dates are from the University of Pennsylvania Laboratories and the "I" dates are from Isotopes, Inc. Student colleagues involved in research specifically related to these data include: Mr. Charles Dill, Mr. Glenn K. Elliott, Ms. Susan D. Halsey, Ms. Caryll Shields, Mr. Richard N. Strom, Mr.

Charles B. Weil, Ms. Elizabeth Ann Allen, and Mr. Daniel F. Belknap.

SAMPLE DESCRIPTIONS

330± 90

I-5206. Lewes Creek-Swaanendael, De. (GCR, 2DH-70) A.D. 1620

Spartina-Phragmites peat in a marsh fringe tidal creek $-\delta C^{14} = 40 \pm 11$ mud at -0.5 ft. at 38°47.4'N, 75° 09.0'W.

28,400±1800

R-4104. Whiskey Beach, De. 26450 B.C.

Macerated plant debris in a dark gray lagoonal-estuarine silt under a washover barrier at -48.5 ft. at 38°45.35'N, 75°04.82'W.

>190

R-4104 Whiskey Beach, De.

Back barrier, salt marsh peat under a washover barrier at -2.0 in. at 38°45.35'N, 75°04.82'W

1950±200

R-4104. Whiskey Beach, De. A.D. 0

Anomia simplex D"Orbigny; Ensis minor Dahl; and Pholas campechiensis Gmelin? in an estuary-coastal lagoon environment under washover barrier at -20 ft. to -23 ft. at 38°45.35'N, 75°04.82'W.

3010±180

R-4104. Whiskey Beach, De. 2060 B.C.

Fragile shells, possibly in growth position, in an estuary-coastal lagoon sandy mud under washover barrier at -23 to -28 ft. at 38°45.35'N, 75°04.82'W.

7050±220

R-4103. Fort Miles, De. 5100 B.C.

Matted vegetation in a marsh-back barrier environment at road to Cape at -60 ft. at 38°47.07'N, 75°05.52'W. Possibly

correlative with nearby marsh mud at similar elevation.

R-4100. South of Dewey Beach, De. 350±130 A.D. 1600

Grass in a Spartina marsh back barrier mud under a baymouth barrier at +0.6 ft. at 38°40.27'N, 75°04.27'W. Directly correlative to present back barrier marsh.

R-4100. South of Dewey Beach, De. 2180±150 230 B.C.

Mercenaria mercenaria shells in a coastal lagoon coarse sand under a baymouth barrier at -19.2 ft. at 38°40.27'N, 75°04.27'W.

R-4100. South of Dewey Beach, De. 4860±180 2910 B.C.

Plants and roots in a marsh fringing coastal lagoon under a baymouth barrier at -27.7 ft. at 38°40.27'N, 75°04.27'W.

R-4100. South of Dewey Beach, De. 5860±340 3190 B.C.

Carbonized root embedded in clay in a marsh fringe against a buried hill under a baymouth barrier at -29 ft. at 38°40.27'N, 75°04.27'W.

R-4101. South of Dewey Beach, De. 250±140 A.D. 1700

Spartina peat in a sandy mud of a back barrier marsh under a baymouth barrier at -0.7 ft. at 38°40.27'N, 75°04.15'W.

R-4101. South of Dewey Beach, De. 2630±190 680 B.C.

Cyrtopleura sp., and Tagelus sp. in a coastal lagoon mud under a baymouth barrier at -19.3 ft. at 38°40.27'N, 75°04.15'W.

R-4101. South of Dewey Beach, De. 5470±200
3520 B.C.

Angular wood fragments in a lagoon-tidal flat mud under a baymouth barrier at -36.6 ft. at 38°40.27'N, 75°04.15'W.

R-4101. South of Dewey Beach, De. 6190±190
4240 B.C.

Fragments of vegetation interbedded with silt and sand under a baymouth barrier at -42.3 ft. at 38°40.27'N, 75°04.15'W.

R-4114. Indian River Inlet, De. 3520±160
1570 B.C.

Peat and root fragments in a tidal marsh mud under a baymouth barrier-tidal delta at -14.6 ft. at 38°38.66'N, 75°04.30'W.

R-4114. Indian River Inlet, De. 3890±170
1940 B.C.

Peat and root fragments in a tidal marsh mud under a baymouth barrier-tidal delta at -16.8 ft. at 38° 38.66'N, 75°04.30'W.

R-4114. Indian River Inlet, De. 3780±170
1830 B.C.

Peat and root fragments in mud in a tidal marsh, basal peat environment under a baymouth barrier-tidal delta at -18.4 ft. at 38°38.66'N, 75°04.30'W.

R-4113. Indian River Inlet, De. 3130±170
1180 B.C.

Grass peat in a salt tidal marsh mud under a baymouth barrier-tidal delta at -10.8 ft. at 38°38.68'N, 75°04.16'W.

R-4110. Indian River Inlet, De. <510

Grass peat and root fragments in a tidal marsh mud under a baymouth barrier-tidal delta at -1.8 ft. at 38°38.68'N, 75°04.06'W.

R-4111. Indian River Inlet, De. 2870±160 / 2960±180 / 920 B.C. / 930 B.C.

Detrital peat balls in a crossbedded, tidal delta, ocean-lagoonal sand under a baymouth barrier-tidal delta at -19.4 ft. at 38°38.69'N, 75°03.99'W.

R-4112. Indian River Inlet, De. 2660±530 / 710 B.C.

Detrital peat balls in a crossbedded, tidal delta, ocean-lagoonal sand under a baymouth barrier-tidal delta at-23.3 ft. at 38°38.69'N, 75°03.90'W.

R-4115. Indian River Inlet, De. 3430±170 / 1480 B.C.

Three pairs of Crassostrea virginica Gmelin shells in growth position in a coastal lagoon mud under a baymouth barrier-tidal delta at -35.3 ft. at 38°36.53'N, 75°03.73'W.

R-4115. Indian River Inlet, De. 10,800±300 / 8850 B.C.

Peat and wood fragments between Holocene mud and unconformity with Sangamon or older sediments in a possible marsh-detrital or basal peat environment under a baymouth barrier-tidal delta at -84.3 ft. at 38°36.53'N, 75°03.73'W.

GEOCHRON Under W. Indian River Lagoon, De. (JCK-Core 16-67) 2060±110 / 110 B.C.

Grass peat, possibly detrital, of a tidal marsh under lagoon at -11.5 ft. at 38°36.10'N, 75°07.8'W.

I-3964. Cape Henlopen Light Site, De. 270±90 / A.D. 1680 / $-\delta C^{14}=33\pm11$

White Cedar tree trunk in growth position of a forest environment found in the surf at +0.5 ft. at 38°46.6'N, 75°05.1'W.

I-4353. Great Marsh, Lewes, Oysters Rock, De. (RSE-5-69) 1990±100 40 B.C.
Grass peat in a fringing marsh mud at -9.0 ft. at $-\delta C^{14}=220\pm10$ 38°48.5'N, 75°12.3'W.

I-5208. Great Marsh, De. (GKE-3-70). 2420±95 470 B.C.
Grass peat of a fringing marsh basal peat against an unconformity $-\delta C^{14}=260\pm9$ at -9.6 ft. at 38°47.9'N, 75°10.9'W.

I-4626. Great Marsh, De. (DH-2-69). >39,900 $-\delta C^{14}>993$
Medium brown gyttja of a bog at -13.5 ft. at 38°47.5'N, 75°10.3'W.

I-4627. Great Marsh, De. (DH-2-69). >39,900 $-\delta C^{14}>993$
Gyttja, organic detritus, of a bog at -17.8' at 38°47.5'N, 75°10.3'W.

I-4628. Great Marsh, De. (DH-2-69). 39,900 $-\delta C^{14}>993$
Gyttja of a bog at -19.5 ft. at 38°47.5'N, 75°10.3'W.

I-4799. Canary Creek Marsh, De. (GKE-1-70). 2580±95 630 B.C.
Grass peat in a tidal marsh mud at -13.3 ft at $-\delta C^{14}=275\pm9$ 38°46.9'N, 75°10.2'W.

I-4625. Canary Creek Marsh, De. (TMS-10-69). 2330±100 380 B.C.
Grass peat in a tidal marsh mud at -13.0 ft. at $-\delta C^{14}=252\pm9$ 38°46.9'N, 75°10.2'W.

I-5205. Delaware Bay, De. (3 STROM-70). 2560±95 610 B.C.
Grass peat of a tidal marsh basal peat 0.7 miles $-\delta C^{14}=273\pm9$ offshore Fowlers Beach at -7 ft. (Water depth 5') at 38°53.2'N, 75°15.9'W.

I-52-3. Delaware Bay, N.J. (Skimmer 5-70). 2260±95 310 B.C. $-\delta C^{14}=245\pm9$

Grass peat of a detrital tidal marsh 2 miles offshore Maurice River Cove (believed to be allocthonous and out of place) at -16.5 ft. at 39°11.1'N, 75°04.7'W. (approximate)

I-4624. Delaware Bay, De. (JCK-7-69). 2550±100 600 B.C. $-\delta C^{14}272\pm9$

Grass peat of a tidal marsh 1 mile offshore Island Field under Delaware Bay at -15 ft. at 39°03.5'N,75°22.5'W.

I-4388. Island Field Marsh, De. (RSE-12-69). 1935±100 A.D. 15 $-\delta C^{14}=214\pm10$

Grass peat of a Spartina tidal marsh in mud behind a washover barrier at -3.5 ft. at 39°03.0'N, 75°23.6'W.

P-1669. Island Field Marsh, De. (JCK-core 11-69). 2153±69 183 B.C.

Grass peat of a Spartina tidal marsh in mud behind a washover barrier at -3 ft. at 39°02.9'N, 75°23.3'W.

P-1685. Island Field Marsh, De. (JCK-DH 5-69). 3314±63 1364 B.C.

Grass peat of a Spartina tidal marsh basal peat mud behind a washover barrier at -15.2' at 39°03.0'N, 75°23.6'W.

P-1686. Island Field Marsh, De. (JCK-DH 1-69). 1950±55 A.D.1 to B.C.1

Grass peat of a Spartina tidal marsh mud behind a washover barrier at -10.5 ft. at 39°03.1'N, 75°23.5'W.

P-1687. Island Field Marsh, De. (JCK-core 1-68). 1952±45 2 B.C.

Grass peat of a Spartina tidal marsh basal peat mud behind a washover barrier at -3 ft. at 39°02.9'N, 75°23.4'W.

P-1688. Island Field Marsh, De. (JCK-DH1-69) 2999±59 1049 B.C.

Grass peat of a Spartina tidal marsh mud behind a washover barrier at -15.5 ft. at 39°03.1'N, 75°23.5'W.

I-5207. Salt Pond, De. (GCR 8DH-70). >39,900 $-\delta C^{14}$>993

Wood fragment in a possible marsh fringe mud under a barrier at -25 ft. at 38°33.6'N, 75°03.6'W.

I-5204. South of Dewey Beach, De. (9-70E). 7500±135 5550 B.C. $-\delta C^{14}$=607±7

Grass basal peat of a tidal marsh at the pre-Holocene unconformity with probable Sangamon Age sediments offshore at -66 ft. at 38°38.7'N, 75°01.5'W.

I-5950. South Bowers Beach, De. (DH 2-71). 3360±95 1410 B.C. $-\delta C^{14}$=342±8

Grass peat of a Spartina tidal marsh mud behind a washover barrier at -33 ft. at 39°03.3'N, 75°23.7'W.

I-5927. South Bowers Beach, De. (DH 2-71). 5205±110 3255 B.C. $-\delta C^{14}$=477±7

Grass peat of a Spartina tidal marsh mud behind a washover barrier at -50 ft. at 39°03.3'N, 75°23.7'W.

I-5994. South Bowers Beach, De. (DH 2-71). 7730±125 5780 B.C. $-\delta C^{14}$=618±6

Grass peat of a Spartina tidal marsh mud behind the washover barrier at -68 ft. at 39°03.3'N, 75°23.7'W.

I-5928. South Bowers Beach, De. (DH 3-71). 9435±155 7485 B.C. $-\delta C^{14}$=691±6

Grass peat of a Spartina tidal marsh mud behind the washover barrier at -79 ft. at 39°03.3'N, 75°23.7'W.

I-5929. Port Mahon Marsh, De. (DH 8-71). 2945±95 995 B.C. $-\delta C^{14}=307\pm8$

Grass basal peat of a Spartina tidal marsh at -15 ft. at 39°10.8'N, 75°24.3'W.

I-5930. Slaughter Beach, De. (DH 11-71). 5345±110 3395 B.C. $-\delta C^{14}=486\pm7$

Grass basal peat in a Spartina tidal marsh under a washover barrier at -42 ft. at 38°55.2'N, 75°18.6'W.

I-5955. Kitts Hummock, De. (No. 29-W-71). 4090±100 4140 B.C. $-\delta C^{14}=399\pm8$

Grass basal peat of a tidal marsh at unconformity with probable Sangamon Age sediment in 21 ft. of water at -23 ft. and 4 NM east of Kitts Hummock at 39°06'N, 75°19'W.

I-5984. Nantuxent Point, N.J. (No. 56-W-71). 3980±105 2030 B.C. $-\delta C^{14}=391\pm8$

Grass peat, possible basal peat of a tidal marsh at unconformity with probable Sangamon Age sediments in 17 ft. of water at -19 ft. and 1.3 NM due southwest of Nantuxent Point at 39°16'N, 75°17'W.

I-6575. Augustine Creek, De. (JCK-Aug. Cr.). 2685±90 735 B.C. $-\delta C^{14}=284\pm8$

Grass peat of a Spartina tidal marsh mud at -17 to -18.5 ft. at 39°29.7'N, 75°35.3'W.

I-6576. Augustine Creek, De. (JCK-Aug. Cr.). 4515±100 2565 B.C. $-\delta C^{14}=430\pm7$

Grass peat of a Spartina tidal marsh mud at -34 ft. to -35 ft. at 39°29.7'N, 75°35.3'W.

I-6577. Augustine Creek, De. (JCK-Aug. Cr.). 5600±110 3650 B.C. $-\delta C^{14}=502\pm7$

Grass basal peat of a Spartina tidal marsh mud at -40 to -42 ft. at 39°29.7'N, 75°35.3'W.

I-6587 Reedy Point, De. (JCK R.P.). 1410±90 A.D. 540 $-\delta C^{14}=161\pm10$

Grass peat of a Spartina tidal marsh mud at -16 to -18 ft. at 39°33.5'N, 75°33.8'W.

I-6588. Reedy Point, De. (JCK R.P.). 4265±95 2315 B.C. $-\delta C^{14}=412\pm7$

Grass peat of a Spartina tidal marsh mud at -29 to -31 ft. at 39°33.5'N, 75°33.8'W.

I-6589. Duck Creek, De. (JCK-D.C., D.H. 2). 6835±115 4885 B.C. $-\delta C^{14}=573\pm6$

Grass basal peat of a Spartina tidal marsh mud at -45 to -49 ft. at 39°19.2'N, 75°29.0'W.

I-6597. Assateague Island, Md. (SDH-4-71). 32,750±1650 30,800 B.C. $-\delta C^{14}=983\pm3$

Grass and wood fragments of a marsh fringe environment at -32 to -37 ft. (est.) at 38°14.2'N, 75°08.0'W.

I-7035. Holly Oak, De. (JCK-DH 1-H.O.). 31,850±1300 29,900 B.C. $-\delta C^{14}=981\pm3$

Total organic "rotten" wood fragments in a tan mud of a possible alluvial silt at -4 ft. at 39°47.0'N, 75°28.3'W. Possibly contaminated by rootlets from overlying marsh.

I-7036. Holly Oak, De. (JCK-DH 2-H.O.). 2355±85 405 B.C. $-\delta C^{14}=254\pm8$

Total organic carbon of "fresh" twigs and grass in a gray tidal marsh mud at 1.0 ft. at 39°46.9'N, 75°28.4'W.

I-7038. Holly Oak, De. (JCK-DH 2-H.O.). 2450±85 500 B.C. $-\delta C^{14}=263\pm8$

Black wood fragments at the base of marsh at -4.0 ft. at 39°46.9'N, 75°28.4'W.

I-7799. Holly Oak, De. (JCK-DH-1-74-H.O.). >40,000 $-\delta C^{14}$>993

Organic twigs and leaves in a possible alluvial silt at 1.5 ft. at 39°46.9'N, 75°28.5'W.

I-7801. Holly Oak, De. (JCK-DH-2-74-H.O.). >40,000 $-\delta C^{14}$>993

Organic twigs and leaves in a possible alluvial silt at -4.0 ft. at 39°47.0'N, 75°28.3'W.

I-7802. Holly Oak, De. (JCK-DH-2-74-H.O.). >40,000 $-\delta C^{14}$>993

Organic twigs and leaves in a possible alluvial silt at -5.5 ft. at 39°47.0'N, 75°28.3'W.

I-7800. Holly Oak, De. (JCK-DH-2-74-H.O.). >40,000 $-\delta C^{14}$>993

Organic twigs and leaves of a possible alluvial silt at -6 ft. at 39°47.0'N, 75°28.3'W.

I-7037. Appoquinimink, De. (JCK-DH 3-APM). 6170±115 4220 B.C. $-\delta C^{14}$=536±7

Grass basal peat of a Spartina tidal marsh mud at -46 ft. at 39°27.1'N, 75°39.3'W.

I-6947. Big Stone Beach, De. (CBW-10E71). 9590±145 7640 B.C. $-\delta C^{14}$=697±6

Total organic carbon, possibly shallow marine, at -84 ft. (Water Depth 72') in the anchorage area at 38°51.2'N, 75°05.6'W.

I-6948. Big Stone Beach, De. (CBW-26E71). >40,000 $-\delta C^{14}$>993

Crassostrea virginica Gmelin of an estuarine environment at -32 ft. (Water Depth 29 ft.) in the anchorange area at 39°01,7'N, 75°15.4'W.

I-6674. Joe Flogger Shoal, De. (PCE30-E71). 2685±90 735 B.C. $-\delta C^{14}$=284±8

Mullinia sp. and Nucula sp. of a shallow water-subtidal environment at -33.7 ft. (water depth 32 ft.) at 39°05.15'N, 75°13.85'W.

I-6675. Joe Flogger Shoal, De. (PCE 30-71). 2855±90 905 B.C. $-\delta C^{14}=299\pm8$

Mullinia sp. and Nucula sp. of a shallow water subtidal environment at -34 ft. (water depth 32 ft.) at 39°05.15'N, 75°13.85'W.

I-6885. Chincoteague Island, Va. (SDH-33-1972-C.I.). 28,700±850 26,750 B.C. $-\delta C^{14}=972\pm3$

Cedar branch and stump of a forest at -36 to -37 ft. at 37°57'N, 75°21'W.

I-6052. Pepper Creek Ditch, De. (JCK-R.S.E. outcrop). 16,970±290 15,020 B.C. $-\delta C^{14}=879\pm4$

Total organic carbonate from a blue clay oyster horizon mud at 18 ft. at 38°31.58'N, 75°14.67'W. No contaminate was visible in the sample. However, the date, and position of the environment in relation to the time is not in accord with any known hypothesis.

Jordan INQUA VII. Pepper Creek Ditch, De. 34,000±2000 * 32,050 B.C.

Crassostrea virginica, Elphidium clavatum, and Ammonia beccarii of an estuarine-lagoon environment at 18 ft. at 38°31.58'N, 75°14.67'W.

Jordan INQUA VII. Pepper Creek Ditch, De. >37,000 *

Crassostrea virginica, Elphidium clavatum, and Ammonia beccarii of an estuarine-lagoon environment at 18 ft. at 38°31.58'N, 75°14.67'W.

I-7524. Pepper Creek Ditch, De. (JCK-C.L.S.-73). 31,900±1400 29,950 B.C. $-\delta C^{14}=981\pm3$

Crassostrea virginica in an oyster reef outcrop at 18 ft. at 38°31.60'N, 75°14.72'W.

I-747. Omar Well, De. (QH-44-1). 32,000 approx.

Wood in a shallow marine-estuarine gray blue silt at -2 ft. at 38°32.1'N, 75°11.2'W.

I-748. Omar Well, De. (QH-44-1). 20,000 approx.

Wood in a shallow marine-estuarine blue gray silt at 14 ft. at 38°32.1'N, 75°11.2'W.

I-854. Indian River Inlet, De. (PJ-42-3). 23,300±850 * 21,350 B.C.

Wood in a shallow marine-estuarine organic clay matrix at -120 ft. at 38°36.4'N, 75°03.0'W.

I-4155. Bethel, De. (QC-23-1). >39,900 *

Wood in a shallow marine-estuarine organic clay matrix at -13.2 to -14.2 ft. at 38°32.4'N, 75°37.4'W.

I-4156. Woodland, De. (PC-41-1). >39,900 *

Wood in a shallow marine-estuarine organic clay matrix at -7.4 to -12.4 ft. at 38°36.4'N, 75°39.8'W.

I-4157. Seaford, De. (PC-25-4). >39.900 *

Shell in a shallow marine-estuarine sandy silt matrix at 16.4 to 17.9 ft. at 38°38.7'N, 75°35.8'W.

I-7525. Noxontown Dam, De. (JCK-Noxontown). 2875±90 925 B.C. $-\delta C^{14}=301\pm8$

Grass peat of a Spartina tidal marsh at -17 to -21 ft. 39°26.2'N, 75°41.6'W.

I-7526. Assawoman Canal, De. (C.L.S., DH4-73) >40,000
$-\delta C^{14}=993$

Grass peat and twigs of a tidal marsh fringe at -25 to -27 ft. at 38°32.63'N, 75°05.6'W.

I-6884. Dill Farm, De. (JCK-D.F.-R.C. 1). 8930±125
6980 B.C.
$-\delta C^{14}=671\pm5$

Wood branches from a Holocene stream deposit at approximately 50 ft. at 39°03.2'N, 75°40.0'W. Mr. Ronald Thomas, State Archaeologist, discovered an arrowhead intruded into a piece of the trunk of the tree dated.

I-6886. Dill Farm, De. (JCK-D.F.-R.C. 2). 2330±85
380 B.C.
$-\delta C^{14}=252\pm8$

Carbonized wood fragments from alluvium at approximately 50 ft. at 39°03.2'N, 75°40.0'W.

I-6891. Dill Farm, De. (JCK-D.F.-R.C. 3). 2450±85
500 B.C.
$-\delta C^{14}=263\pm8$

Fragments of a large tree from alluvium at approximately 50 ft. at 39°03.2'N, 75°40.0'W.

I-8118. Rehoboth Bay, De. (DFB-2b-74). 690±85
A.D. 1260
$-\delta C^{14}=82\pm9$

Grass basal peat of a Spartina tidal marsh at -1.1 ft. at 38°40.2'N, 75°07.8'W.

I-8119. Lewes Creek Marsh, De. (DFB-3-74). 920±90
1030 B.C.
$-\delta C^{14}=108\pm10$

Grass basal peat of a Spartina tidal marsh at -2.4 ft. at the edge of the spit tip at 38°45.6'N, 75°06.0'W.

I-9228** Mispillion River mouth (Kayan 5) 1690±85 A.D. 260 $-\delta C^{14}=190\pm9$

Black mud peat. Some wood fragments at -100 to -140 cm below mean sea level at 38°56'30"N, 75°19'15"W.

I-9229** Slaughter Beach, Cohee Drive (Kayan 3) 285±75 A.D. 1665 $-\delta C^{14}=35\pm9$

Black tidal peat (possibly transported) at -47 to -70 cm below mean sea level at 38°51'40"W, 75°19'00"W.

I-9230** Slaughter Beach, SE end of Rd. (Kayan 2) 720±80 A.D. 1230 $-\delta C^{14}=86\pm9$

Black marsh peat at -170 to -240 cm below mean sea level at 38°54'20"N, 75°17'50"W.

I-9418** Slaughter Beach, Harrison Avenue (Kayan 10) 4585±95 2635 B.C. $-\delta C^{14}=435\pm7$

Blackish-dk. brown marsh peat and mud at -9 to -10 meters below mean sea level at 38°55'20"N, 75°18'40"W.

I-9447** Cedar Creek, Rte. 216 West of Rte. 14 by-pass bridge (Kayan 11) 195±90 A.D. 1755 $-\delta C^{14}24=11$

Black marsh peat (probably brackish to fresh floral infill at head of small tidal creek) at -266 cm to -296 cm below mean sea level at 38°52'35"N, 75°21'40"W.

Dates with (*) on right side are from R.R. Jordan 1965 and 1974.

** Note different datum level is mean sea level.

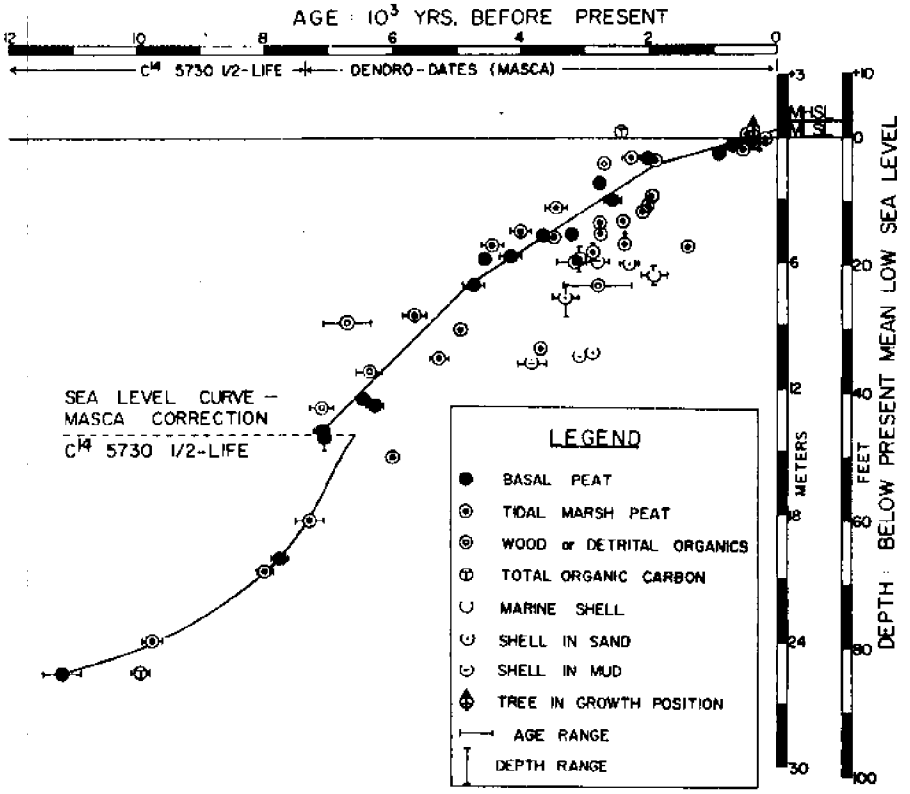

Figure 1. A local relative sea level rise curve for the coastal Delaware region. This curve is constructed from the data presented within this report. Please note that the age in years before present has been corrected to 5730 1/2-life or the dendro-date correction (MASCA) of the University of Pennsylvania Museum, Applied Science Center for Archaeology, as appropriate.

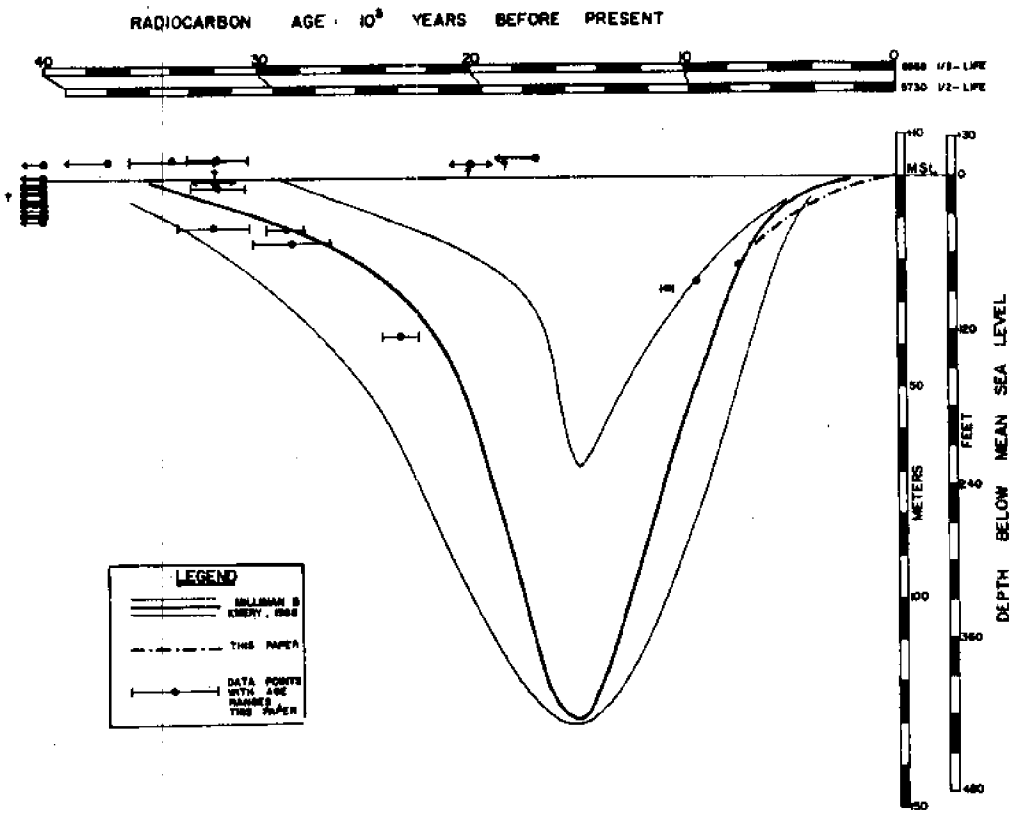

Figure 2. A local relative sea level rise curve for the coastal region utilizing the "older" data enclosed within this report. These dates have been compared with the work of Milliman and Emery (1968). Illustration is from Belknap and Kraft (1976).

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