ESTIMATING THE AGE OF MARSH SOILS OVER THE PAST ~50-100 YEARS

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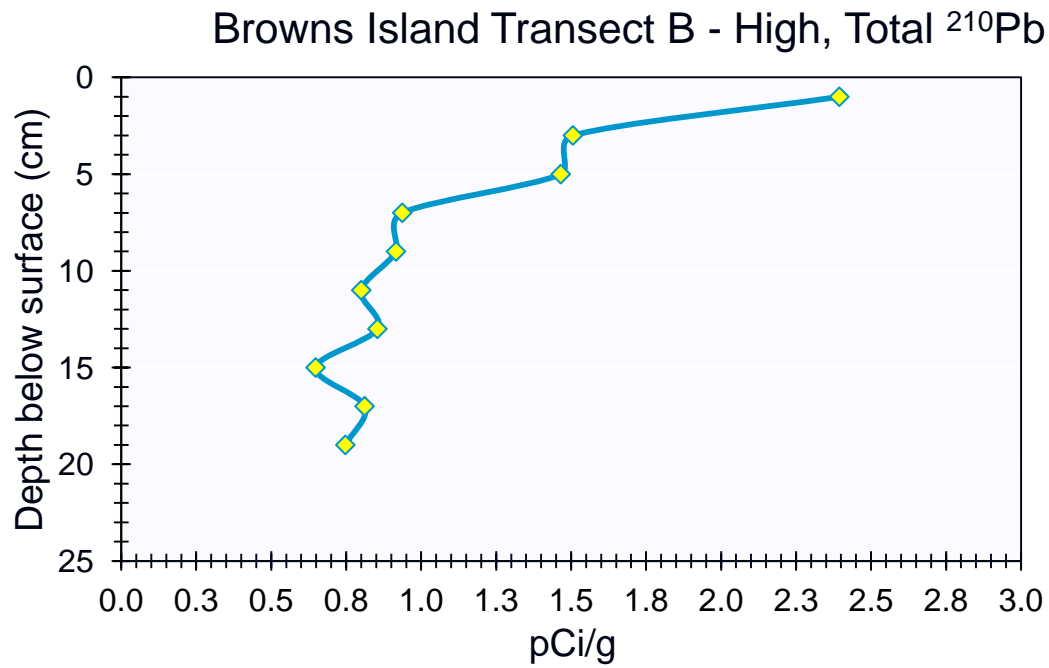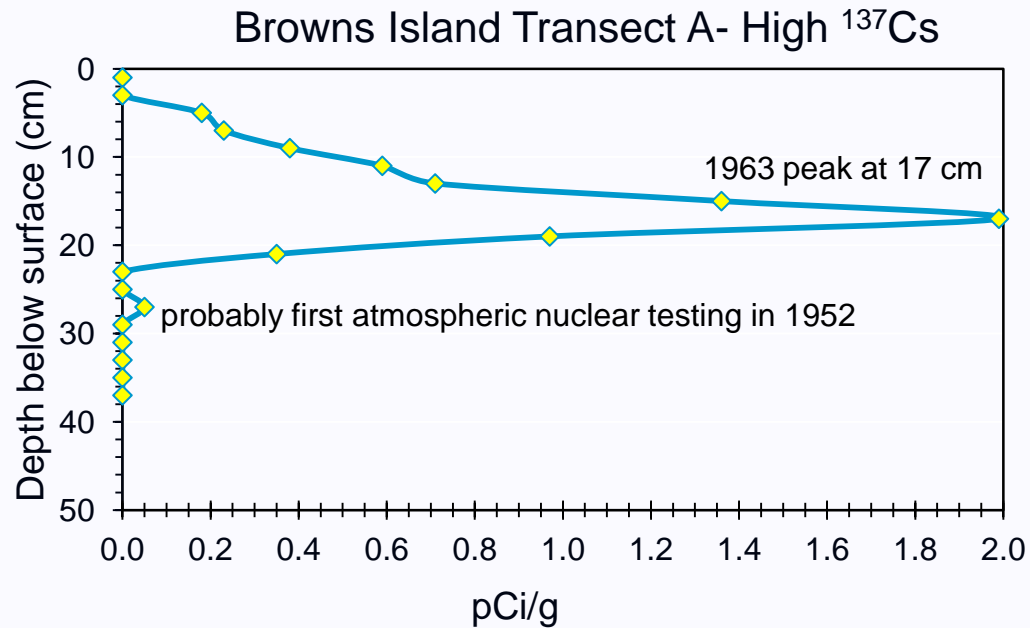^{137}Cs: fallout product from atmospheric nuclear testing with peak in 1963

^{210}Pb: naturally radiogenic isotope in the ^{238}U series with half-life 22.3 yrs; sedimentation rates determined by rate at which *unsupported* ^{210}Pb decays to ^{210}Po

Collecting and Processing Cores for Dating

Lab analysis for ^{137}Cs and ^{210}Pb with gamma spectroscopy

Activities of ^{210}Pb and ^{137}Cs

Browns Island Transect A- High ^{137}Cs

1963 peak at 17 cm

probably first atmospheric nuclear testing in 1952

Browns Island Transect B - High, Total ^{210}Pb

Results of ^{210}Pb Dating

CRS Model: Example of Results for Browns Island Transect B -High Core				
Mid interval depth (cm)	Vertical accretion rate (cm/yr)	Mass accumulation rate (g/cm^2/yr)	Mid interval date	Estimated error
1		0.03	2010.22	5.39
3	0.27	0.04	2002.69	4.48
5	0.25	0.04	1994.62	6.58
7	0.27	0.05	1987.09	6.93
9	0.33	0.07	1981.06	9.27
11	0.29	0.04	1974.21	13.76
13	0.20	0.03	1964.44	18.46
15	0.14	0.03	1949.70	23.62
17	0.08	0.01	1923.92	63.52
19	0.04	0.01	1874.99	333.60
	mean =0.249	mean =0.041		

Dated Soil Profile
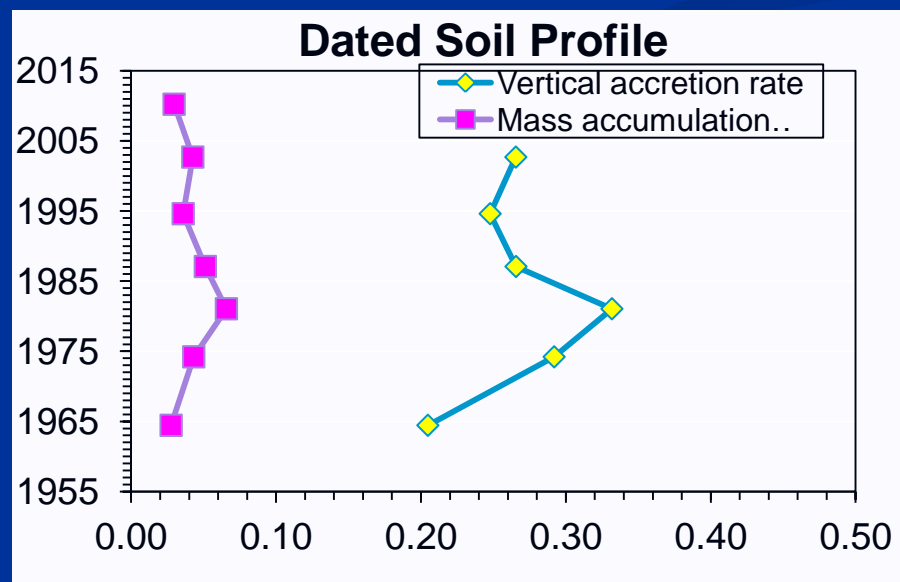
Take-Home Messages

➢ Dating marsh soils is time-consuming and $$$.

➢ You must choose the right model.

➢ Soil dating produces age *estimates*.

➢ Marsh soil age profiles can vary greatly among marshes.

➢ Marsh soils have recently been dated at Browns Island, China Camp, Greco Island, Rush Ranch, Coon Island, Whale's Tail, Newark Slough, and Petaluma River Marsh.

➢ (1) How best can marsh soil age data be shared? and (2) Where do we need to focus new dating efforts?