

Sediment Budget and Dynamics

Challenge Questions

- 1.) Have we identified the right questions to be discussed in the RSM Plan?
- 2.) Are there other important issues we should address?
- 3.) What data and data gaps exist?
- 4.) What additional opportunities and applications of the RSM plan should be considered for the Delaware Estuary?

Sediment Sources and Sinks

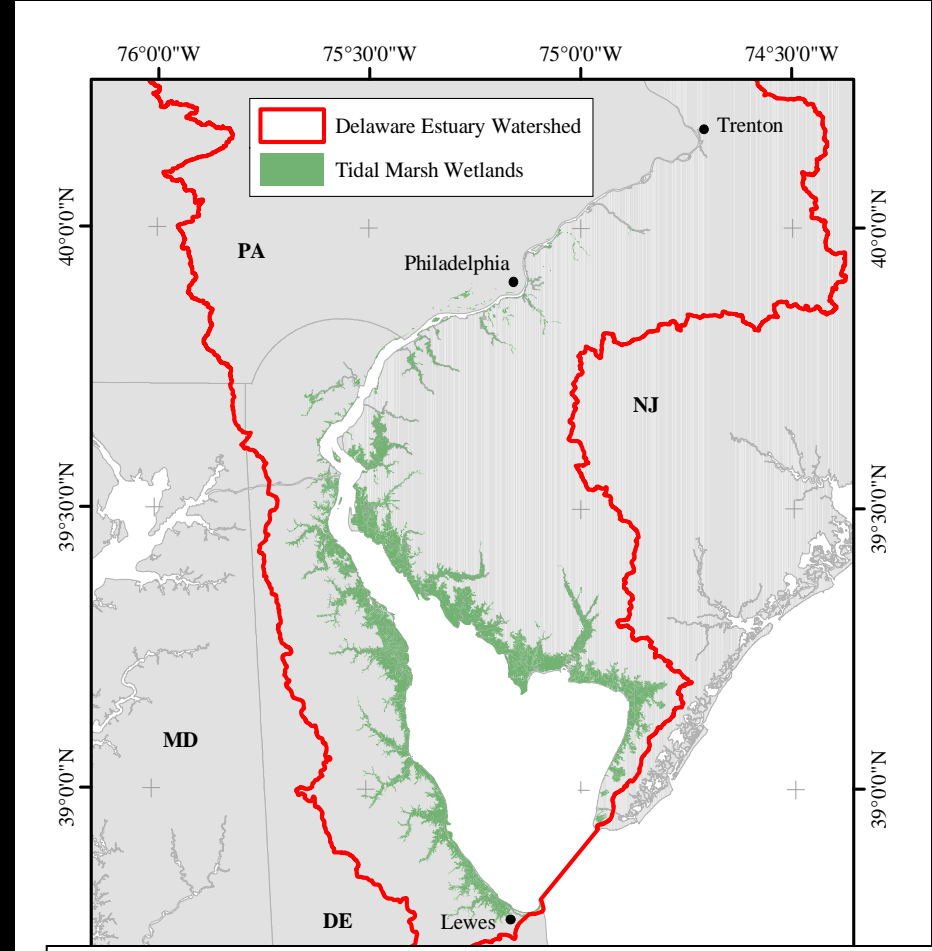
1950-1985 Mass Balance

<u>Source</u>	<u>Mass (tonnes/yr)</u>
Bottom erosion	3.4×10^6
Rivers	1.3×10^6
Phytoplankton	0.2×10^6
Waste/industrial	0.2×10^6
	$5.1 \pm 0.9 \times 10^6$

<u>Sink</u>	<u>Mass (tonnes/yr)</u>
Maint. dredging	2.8×10^6
Marshes	2.1×10^6
Subtidal shoals	0.6×10^6
	$5.5 \pm 1.1 \times 10^6$

2.6 in Walsh (2004)

from Sommerfield/Walsh (2004)



Almost balanced in 2004
Sinks 108 % of sources

SUMMARY

Estuarial sediment dynamics are complicated

Processes, spatial/time scales, how to measure/calculate, etc

Quantitative sediment budgets are hard to “balance”

Units of measure (volume, mass, concentration, bulk density)

Historic maps comparison vs 21st Century measurement tech

No budget yet for entire estuary

Estuary Turbidity Maximum

Location varies with Q/salinity

Tide cycle sediment flux can = months of fluvial input

Bed is largest sediment source (scour)

Mid-estuary mud zone large buffer of fine-grain sediment

Ultimate source is centuries of upland sediment input at head of tide

Dredging is largest sediment sink

O&M dredging areas << total nav channel area

Downward trend in dredged quantities

Present disposal practice sequesters ~ 100% of dredged sediment