

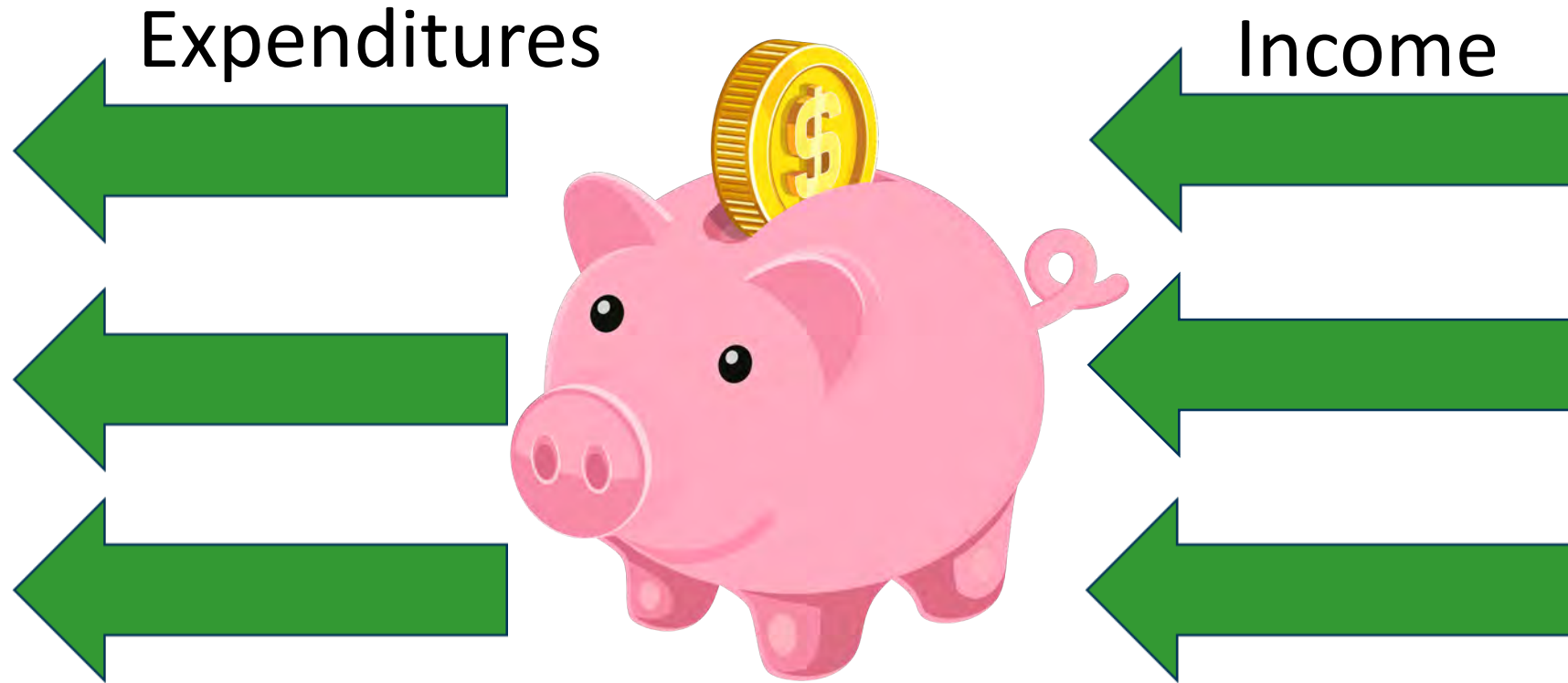


**LITERATURE REVIEW
AND SAND BUDGET**

**PRINCIPAL INVESTIGATORS:
SFEI, USGS, ANCHOR QEA**

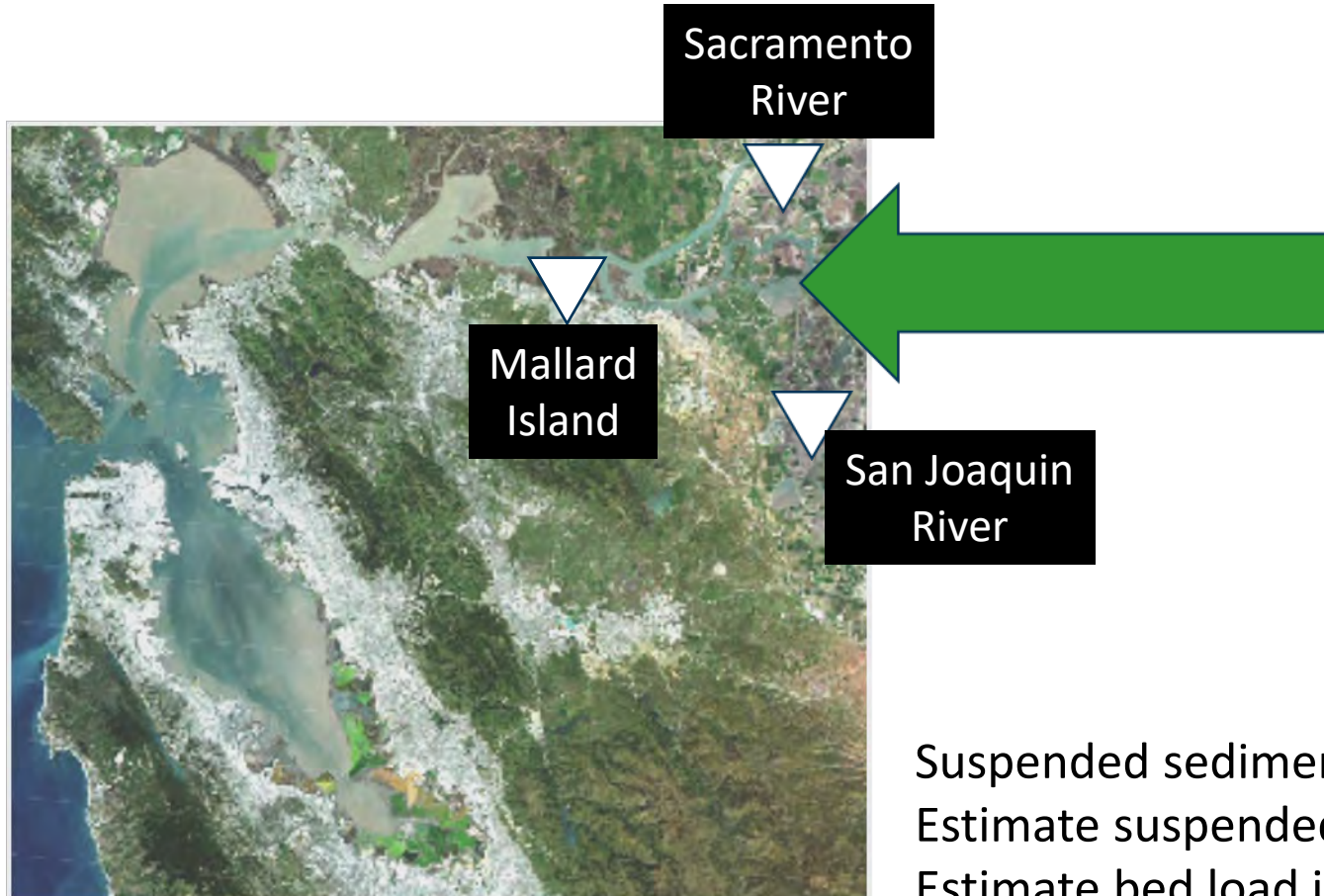
SUMMARY BY DAVID SCHOELLHAMER, ISP

BUDGET BASICS



$$\text{Change in balance} = \text{Income} - \text{Expenditures}$$

SAN FRANCISCO BAY SAND BUDGET: SUPPLY FROM CENTRAL VALLEY



Suspended sediment measured at Mallard Island
Estimate suspended sand there
Estimate bed load in rivers
Transfer bed load estimate to Mallard Island



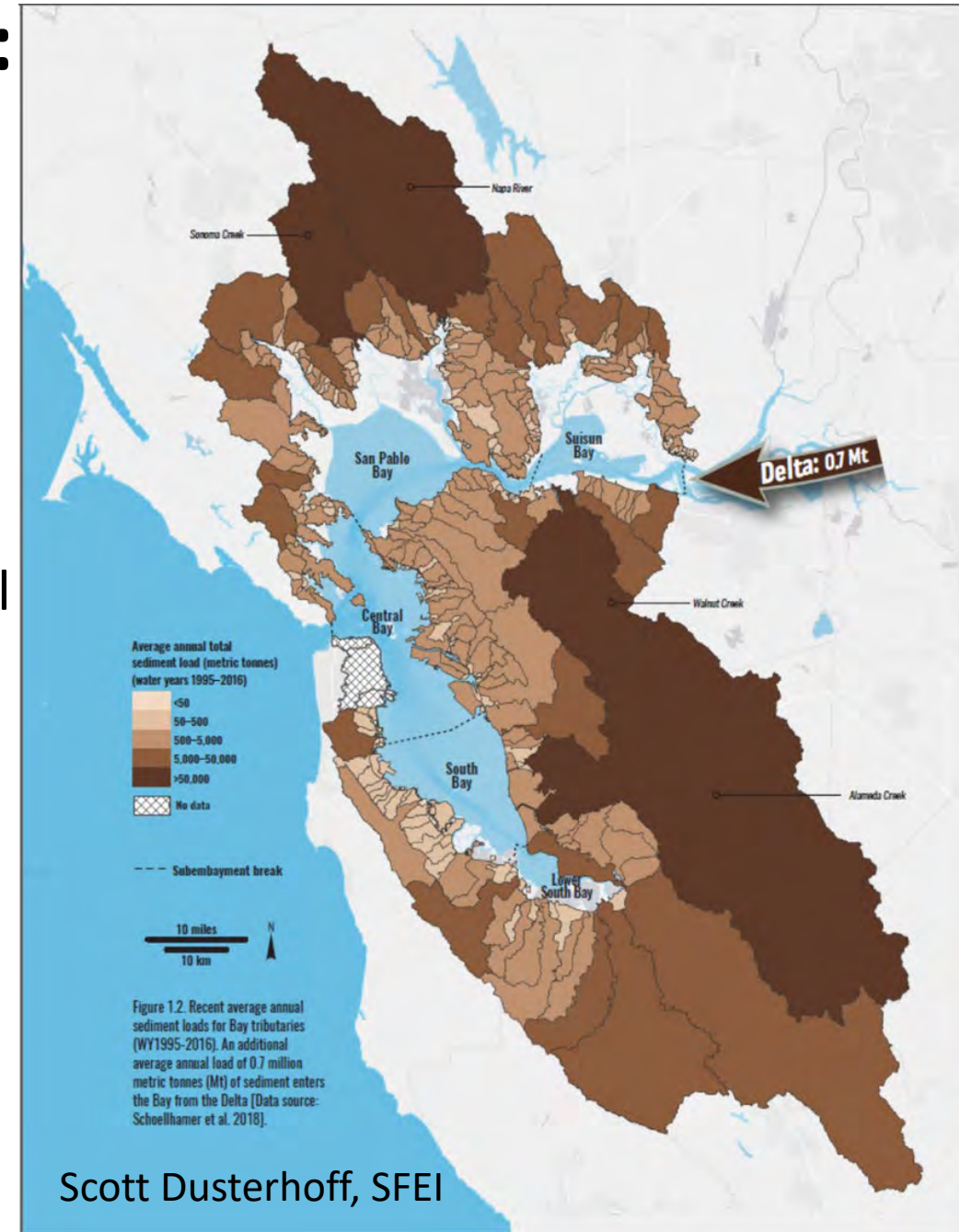
SAN FRANCISCO BAY SAND BUDGET: LOCAL TRIBUTARIES

200+ local tributaries

Estimate bed load

Estimate suspended sand

Estimate flood control channel deposition and removal

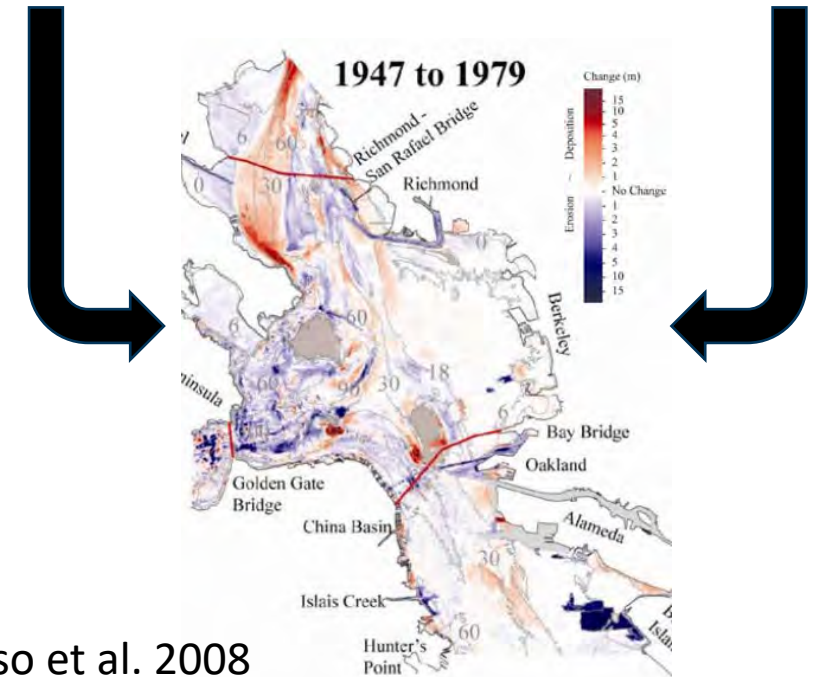
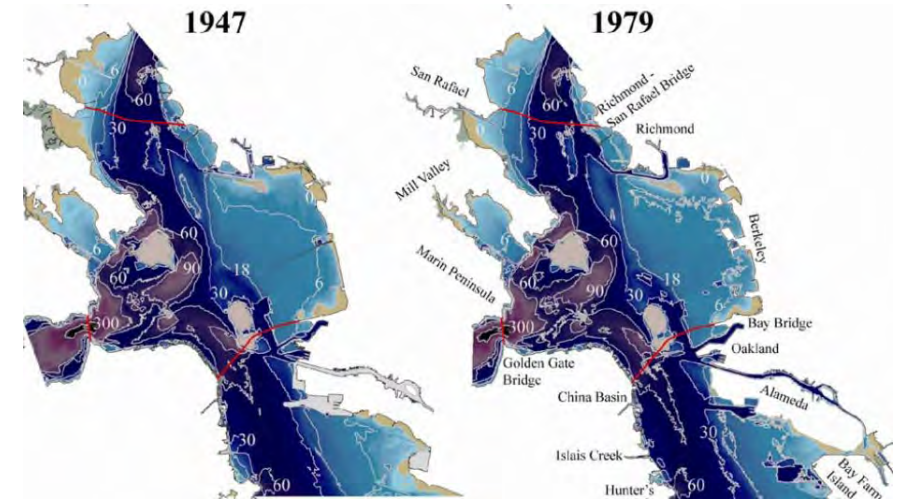


SAN FRANCISCO BAY SAND BUDGET: BATHYMETRIC CHANGE

1979 and 2014 surveys

Combine with bottom grain size data

Calculate sand erosion and deposition



Fergoso et al. 2008

SAN FRANCISCO BAY SAND BUDGET: GOLDEN GATE

Change in balance=Income-Expenditures

Golden Gate = Central Valley supply
+ Local tributary supply
- deposition
- ocean and land dredging disposal
- sand mining

Decadal average 1979~2014

Compare with numerical model estimate of wet and dry years

Compare with recent literature on Golden Gate sediment transport



SAN FRANCISCO BAY SAND BUDGET: MANAGEMENT QUESTION

- 1) Is sand mining at existing lease areas, at permitted levels, having a measurable or demonstrable impact on sediment transport and supply within San Francisco Bay?
- a) Does sand mining influence sand transport through SF Bay ?

Golden Gate = Central Valley supply
+ Local tributary supply
- deposition
- ocean and land dredging disposal
- sand mining

