

Development of a Benthic Index for Use in Establishing Sediment Quality Targets for Tampa Bay

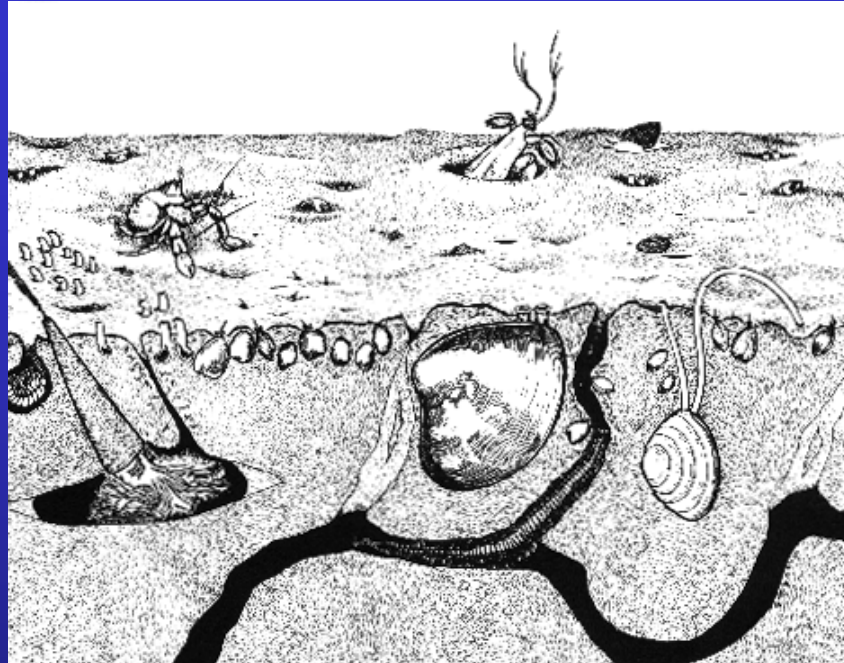
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Overview

- Sediment Quality
- Development Methods
- Resultant Benthic Index
- Classification Success

Objective



Steps in Index Development

- Define Sediment Quality
- Identify Candidate Metrics
- Select Best Linear Combination of Metrics
- Calibrate Index and Test Efficacy
- Validate Index on Independent Data

Data

Sources:

- Tampa Bay Benthic Program
 - EPC Hillsborough County
 - Manatee County EMD
 - Pinellas County DEM

Types of Data:

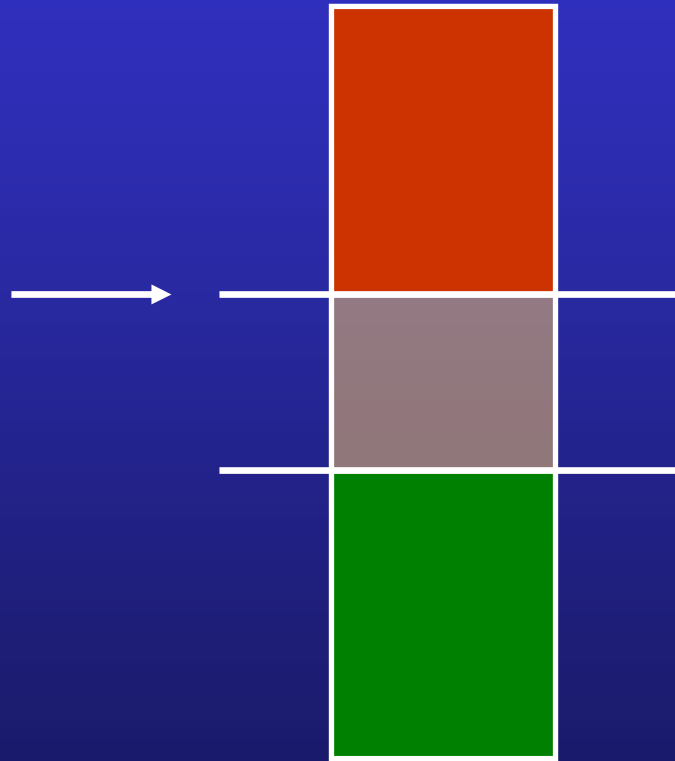
- Benthic Abundance
- Sediment Contaminants
- Physical/Chemical:
 - DO
 - Silt-clay
 - Salinity

Tampa Bay



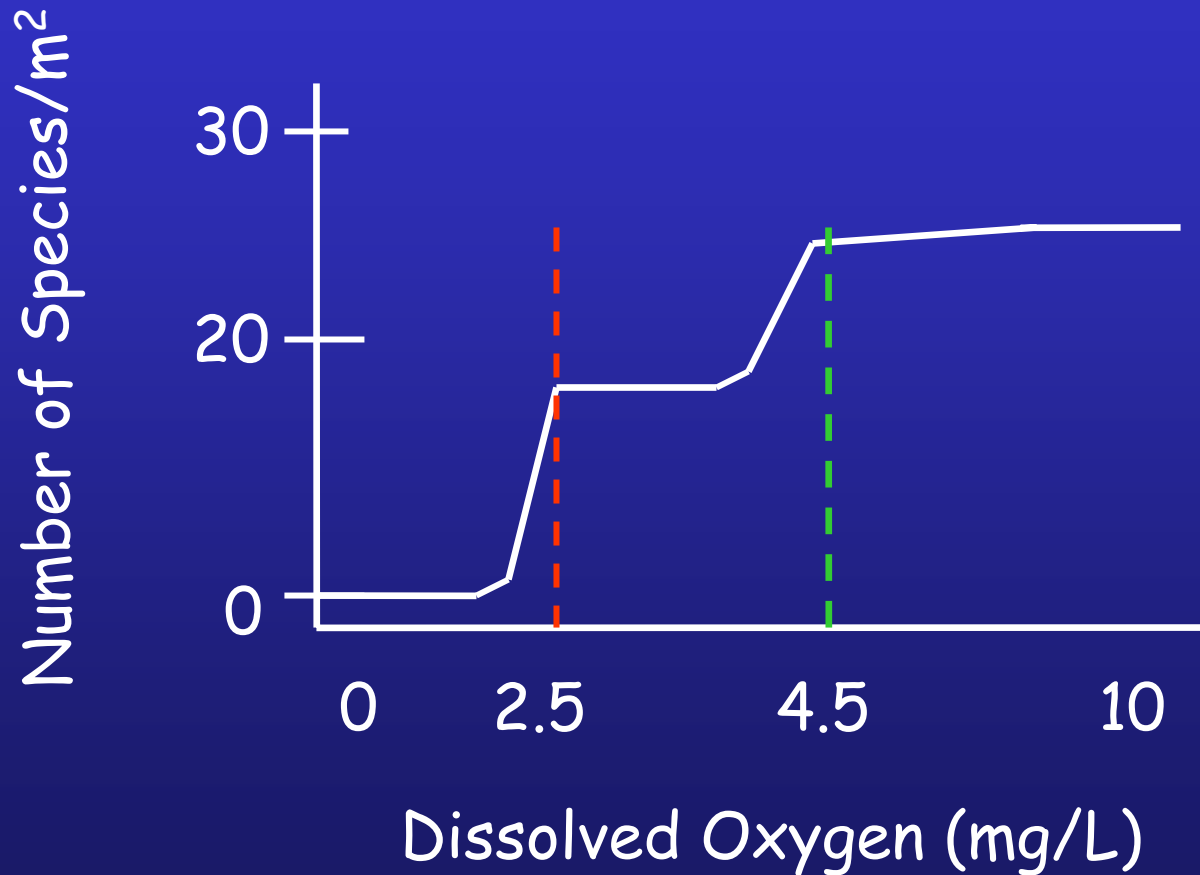
Define Sediment Quality Sediment Contaminants

PEL
Probable
Effects
Level



TEL
Threshold
Effects
Level

Define Sediment Quality DO



Degraded vs. Healthy Habitat

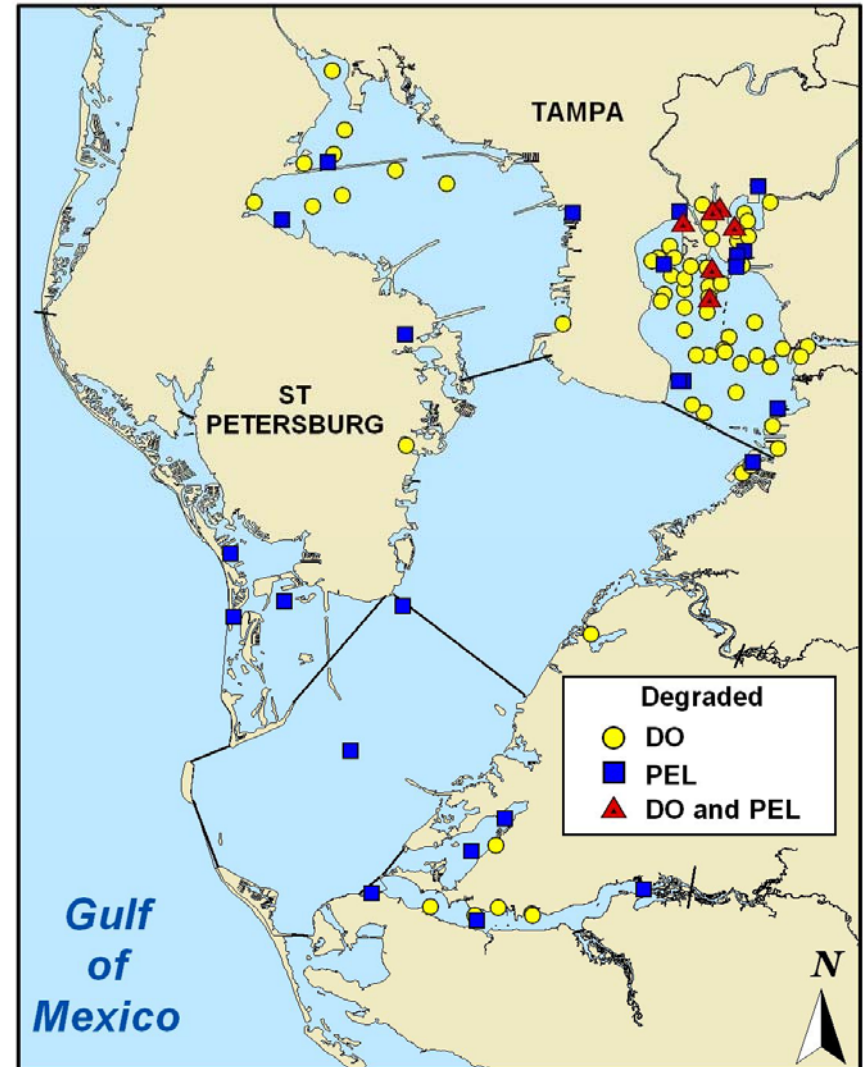
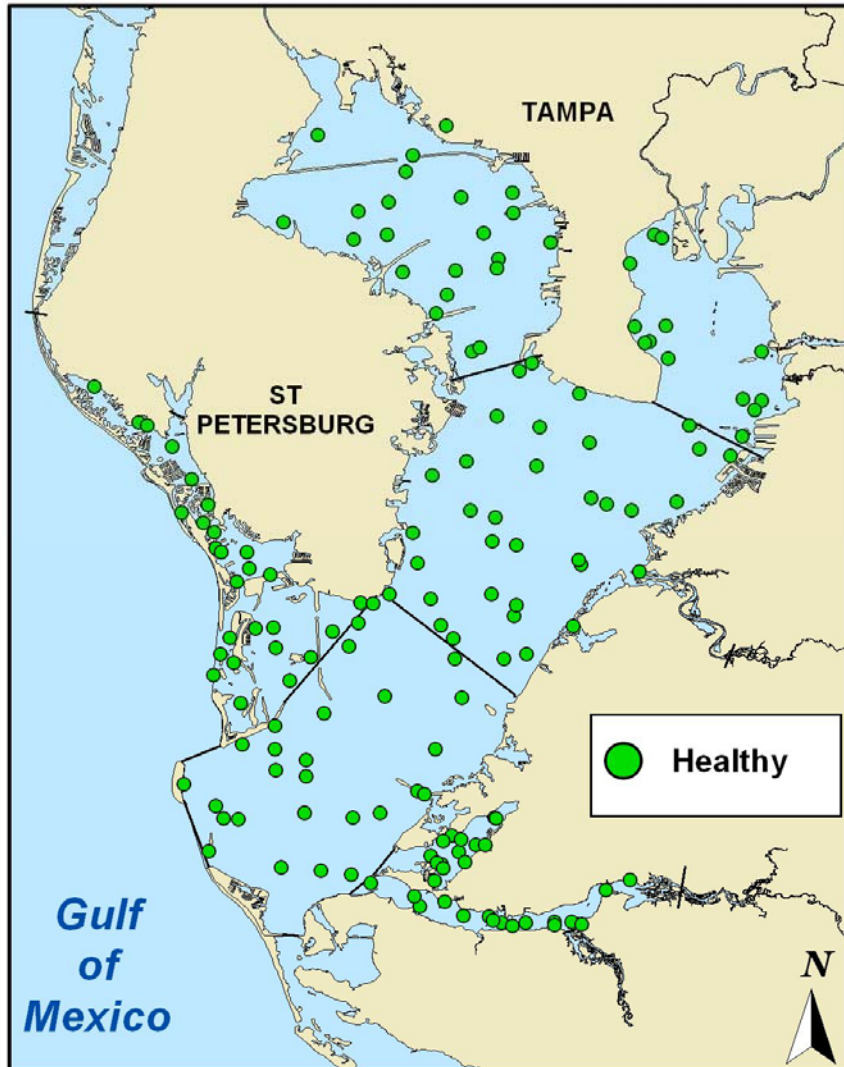
Degraded :

- Dissolved oxygen
< 2.5 mg/L
OR
- 1 or more PEL
exceedance

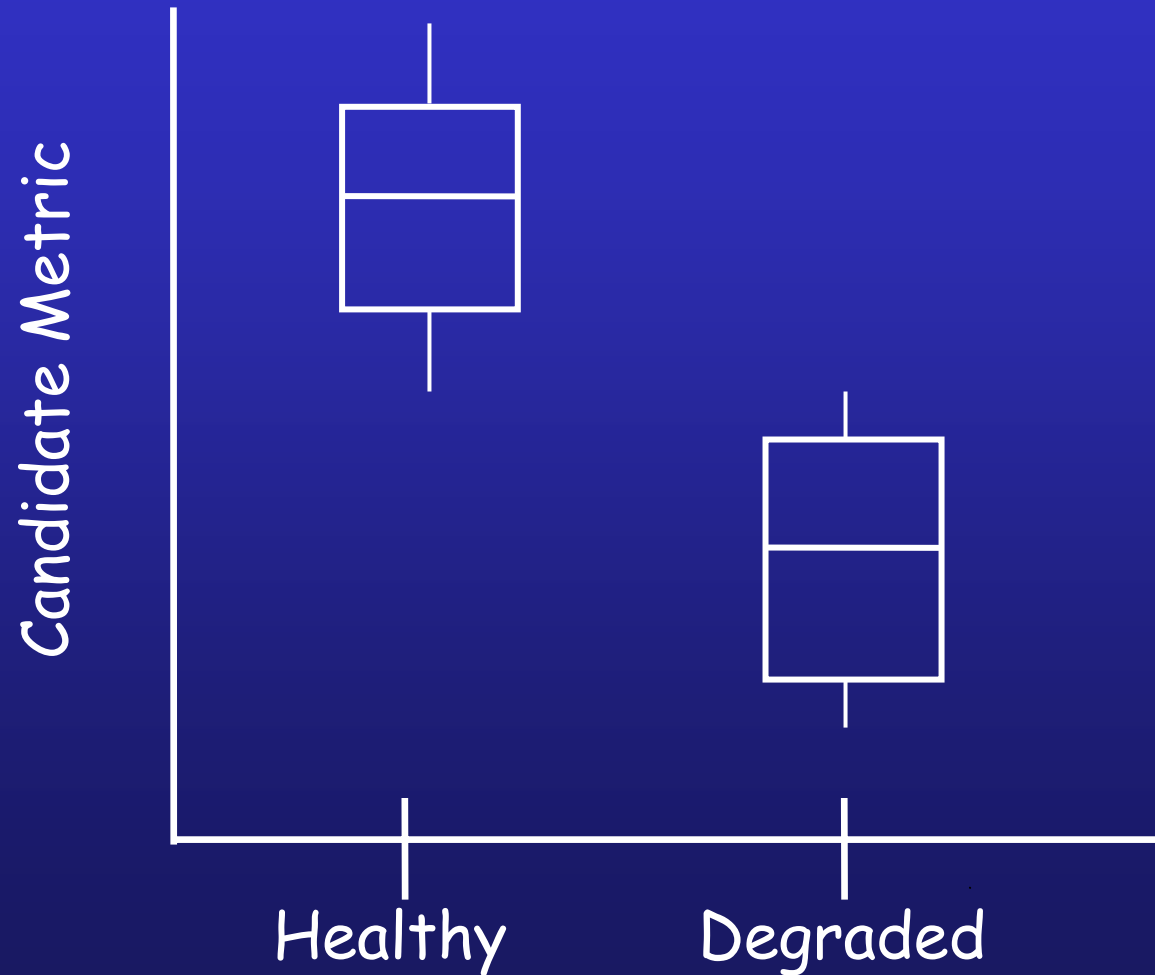
Healthy:

- Dissolved oxygen >
4.5 mg/L
AND
- 0 TEL exceedances

Degraded vs. Healthy Habitat



Identify Candidate Metrics



Identify Candidate Metrics

Number of species

H'

Total Benthic Abundance

Abundance of:

Polychaetes

Capitellids

Spionids

Tubificids

Bivalves

Gastropods

Insects

Dipterans

Amphipods

Isopods

Cumaceans



*Proportion of Total Benthic
Abundance as:*

Polychaetes

Capitellids

Spionids

Tubificids

Bivalves

Gastropods

Insects

Dipterans

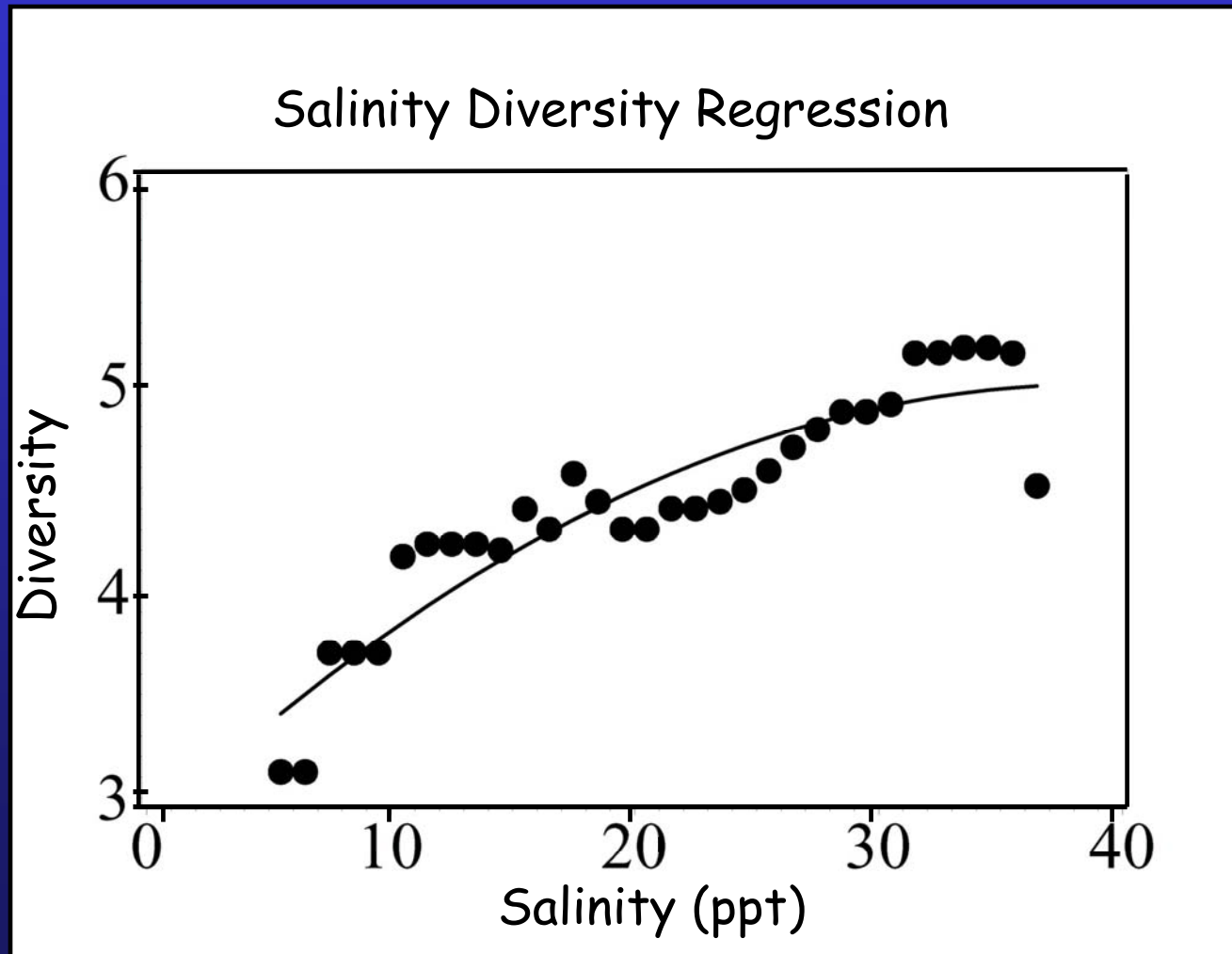
Amphipods

Isopods

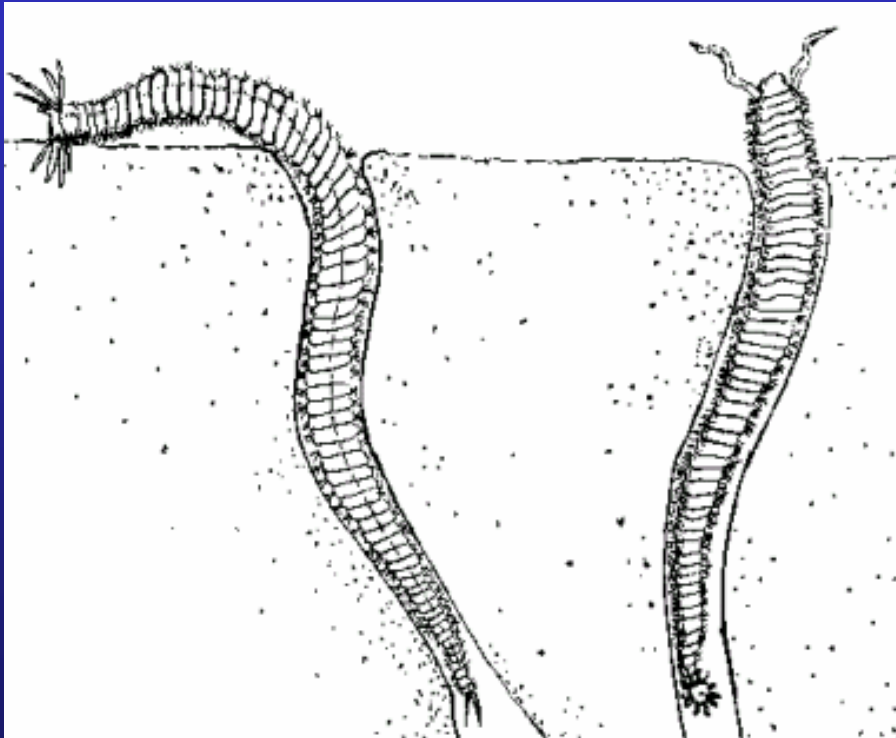
Cumaceans



Correct for Influence of Salinity



Select Best Linear Combination of Candidate Metrics



1. H'^*
2. Gastropod Abundance*
3. Prop. Total Abundance as Spionid Polychaete
4. Bivalves Abundance
5. Spionid Polychaete Abundance

Quantitatively Define Benthic Index

Tampa Bay Benthic Index =

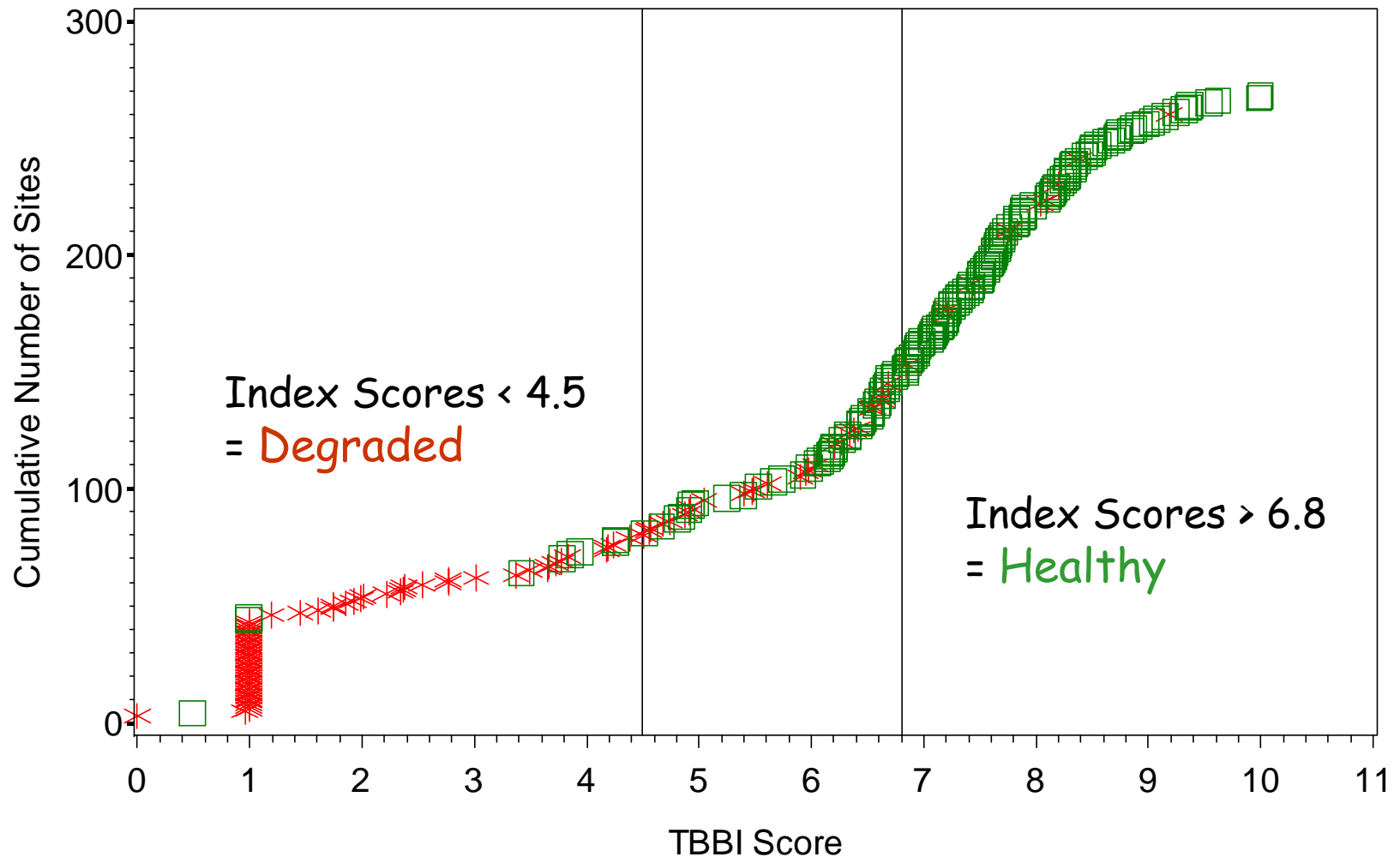
- + 0.31273
- + $1.01611 \times H'$
- + $0.32589 \times \text{Gastropod Abundance}^*$
- $0.01165 \times \text{Proportion of Total Abundance as Spionid Polychaetes}$
- $0.01061 \times \text{Bivalve Abundance}$
- $0.25415 \times \text{Spionid Polychaete Abundance}$

Normalize TBBI Scores

Range 0-10

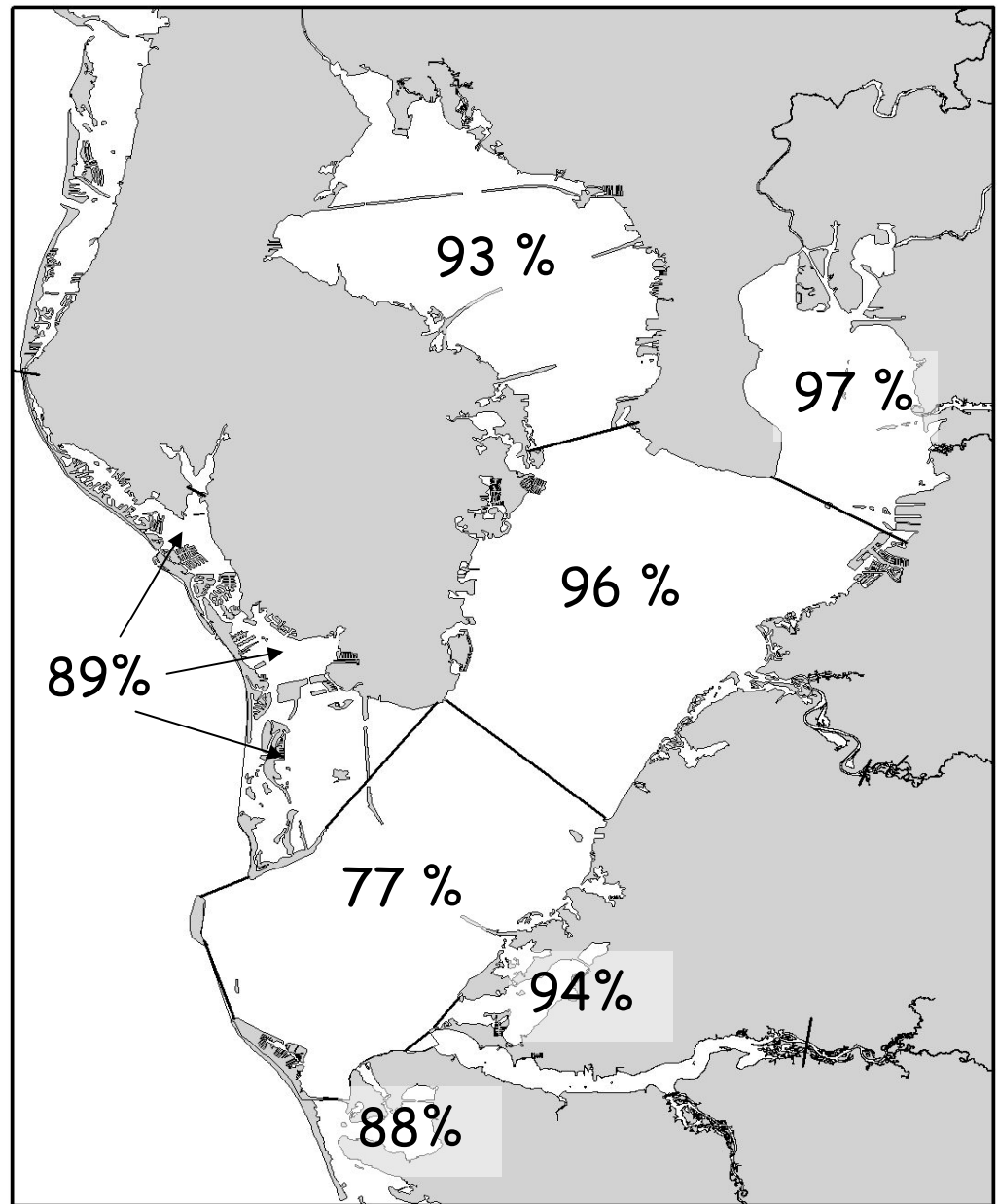


Calibrate the TBBI



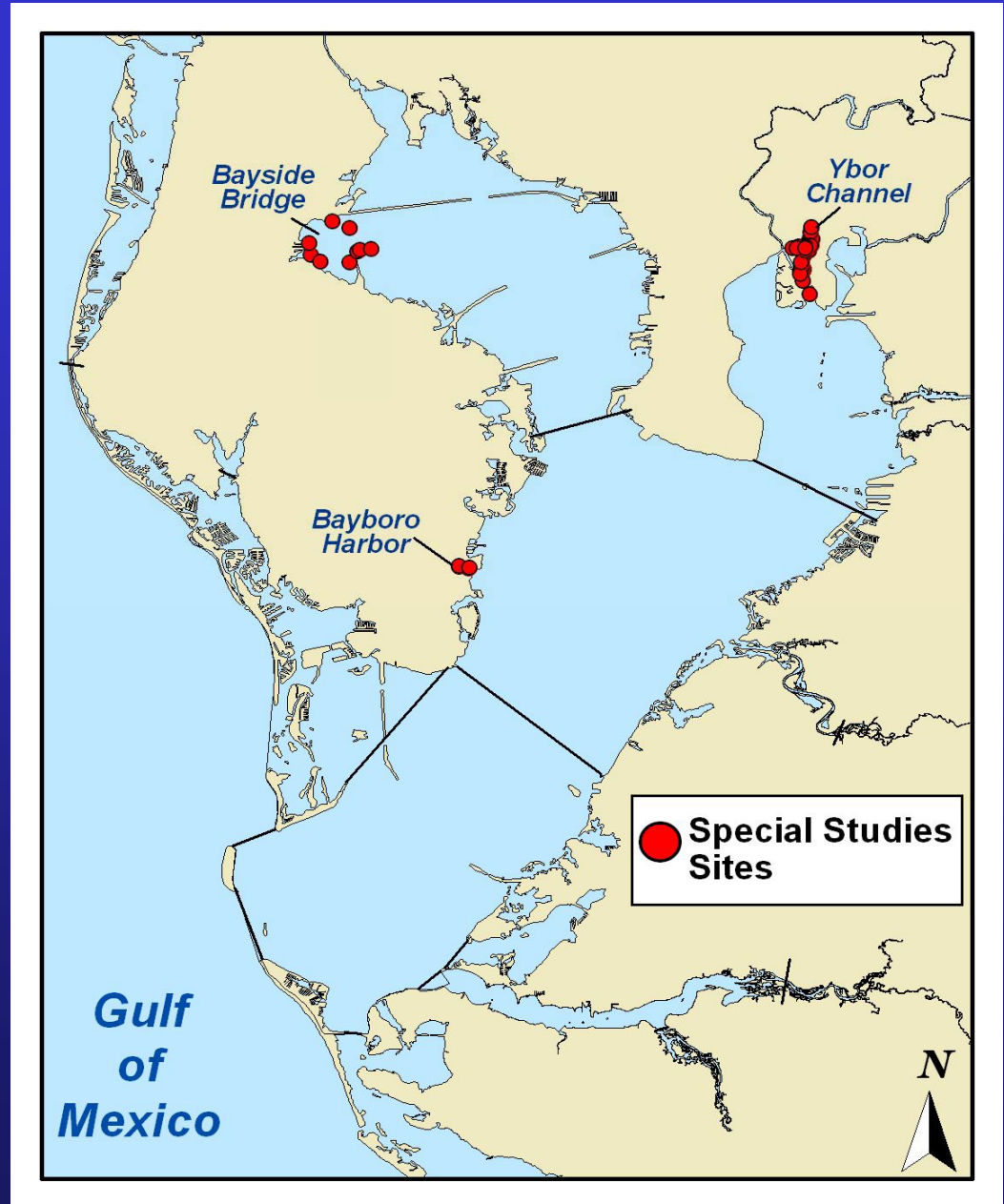
Test TBBI Efficacy

Bay-wide
Classification
Success
92%



Validate the TBBI

- Independent data set :
(sediment contaminants, do, salinity and silt-clay)
- Provided by 2002 Special Studies:
directed sampling of known "hot spots"



Validate the TBBI

Special Studies Sites	Classification Success Rate (%)
Bayboro Harbor	100
Bay Side Bridge	75
Ybor Channel	100
Overall	97

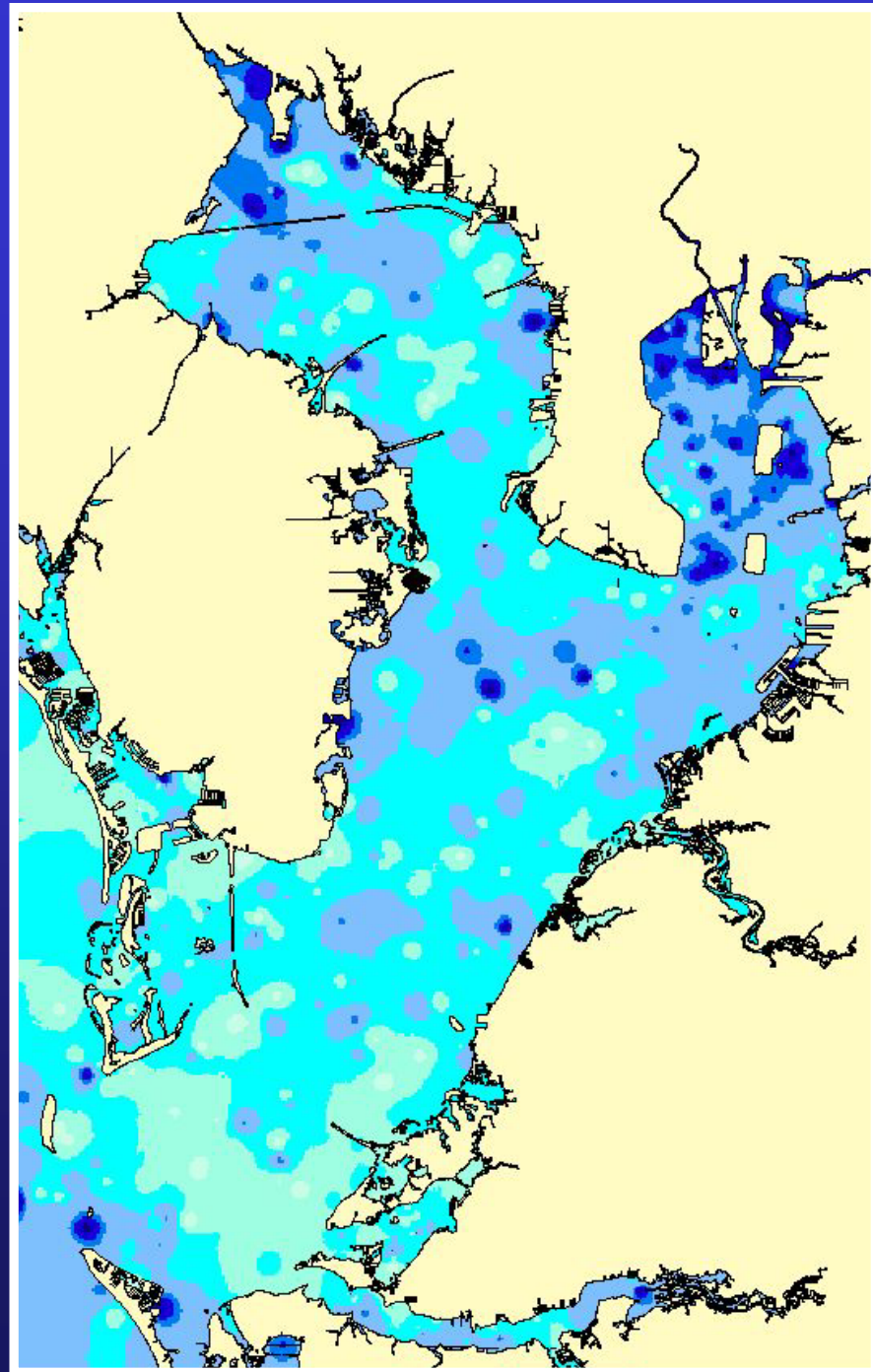
Tampa Bay Benthic Index

Index Score



10 ← → 0

Healthy Degraded



Conclusions

- A benthic index that successfully identifies degraded benthic environments in Tampa Bay has been developed, calibrated and validated
- The TBBI will be an integral component of the sediment quality target setting process