

Benthic Community Structure as an Indicator of Habitat Quality

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Conclusions

Benthic invertebrate community in Barnegat Bay – Little Egg Harbor is healthy today

Benthic community largely unchanged from 40 years ago

Why use benthic invertebrates to infer habitat quality?



Most species are relatively sedentary, cannot avoid deteriorating conditions

Relatively long-lived, integrate habitat conditions over time

Different species have different tolerances to stress

Ecologically, play important roles in nutrient cycling and as prey

There are dozens of benthic indices of habitat quality

Used to classify sites along a gradient (bad/degraded to high/reference)

High/reference end usually means:

- Minimally or least disturbed

- Historical

- Best attainable

Examples:

- Benthic Index of Biotic Integrity (Weisberg et al. 1997)

- Virginian Province Index (Paul et al. 2001)

- Multivariate AZTI Marine Biotic Index (Borja et al. 2012)

- Benthic Quality Index (Rosenberg et al. 2004)

What are indices based on?

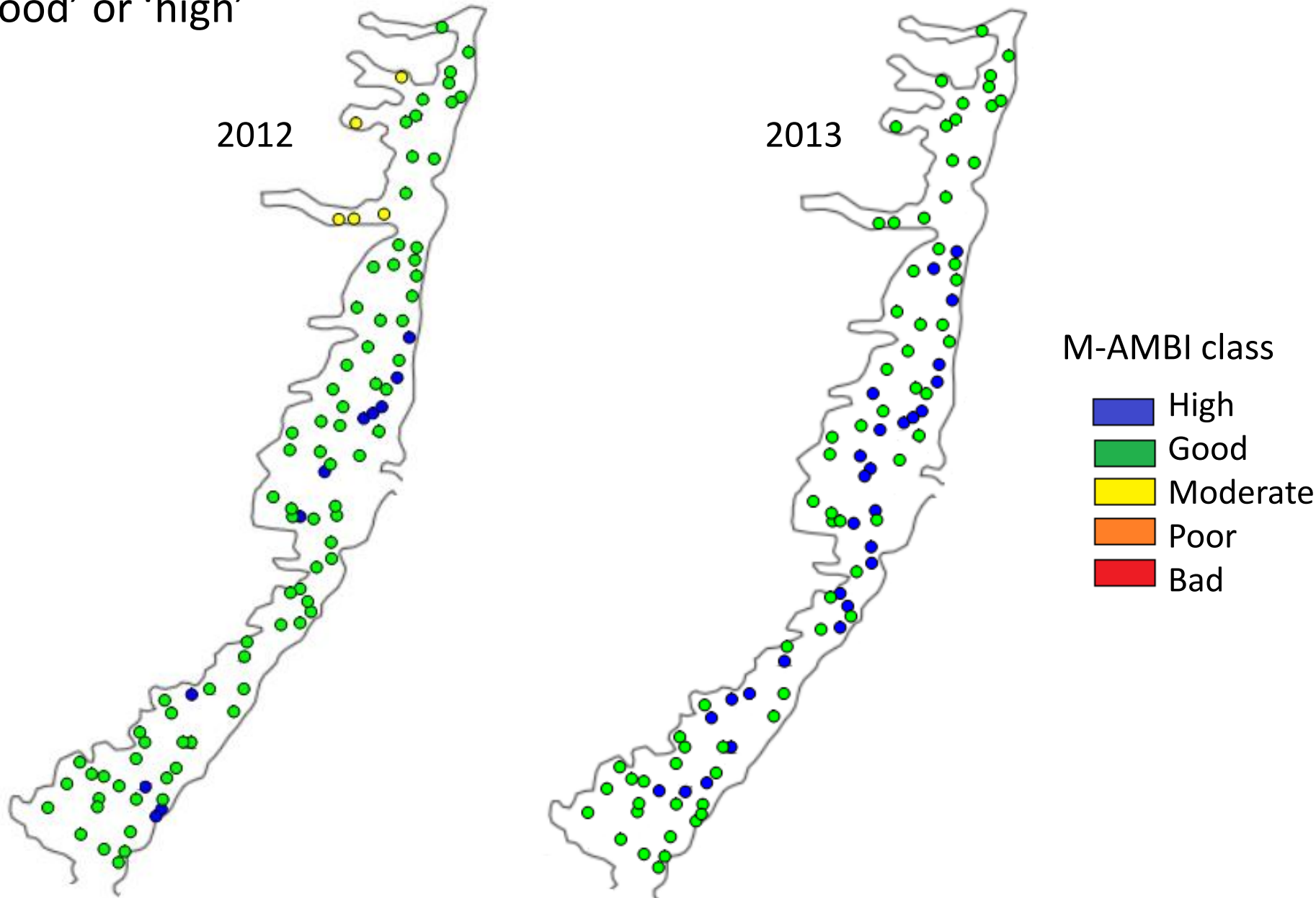
Multivariate AZTI Marine Biotic Index (M-AMBI)

Parameter	Effect on index
Species diversity	Positive
Species richness	Positive
Abundances of species in 5 categories from least to most sensitive to organic enrichment, based on expert opinion	Varies, 1 – 5

Developed for European coastal zones originally, now includes taxa from Virginian biogeographic province

Classifies habitat into one of five categories: bad, poor, moderate, good, high

Most of Barnegat Bay-Little Egg Harbor is classified presently as 'good' or 'high'

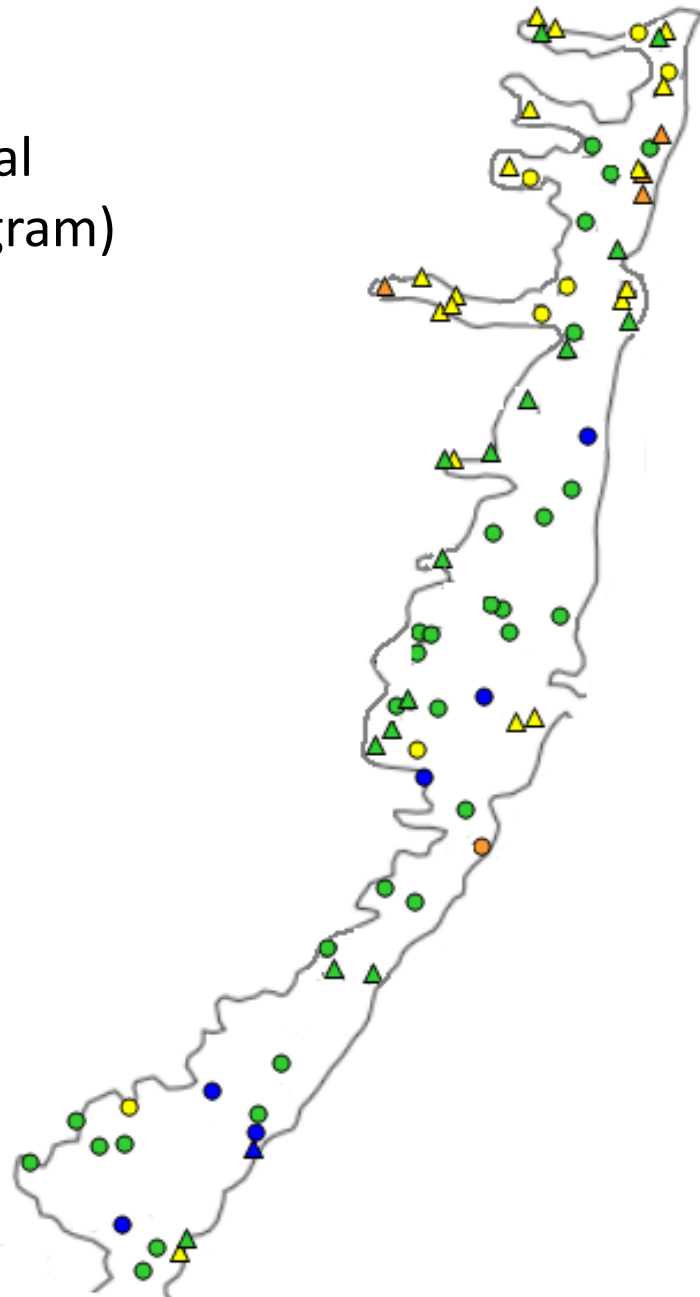


How does benthic community in the present compare with the past?

2001 (EPA Regional Environmental Monitoring and Assessment Program)

Not random sampling design

- 'Open bay' stations
- △ 'Marina' stations



M-AMBI class

- High
- Good
- Moderate
- Poor
- Bad

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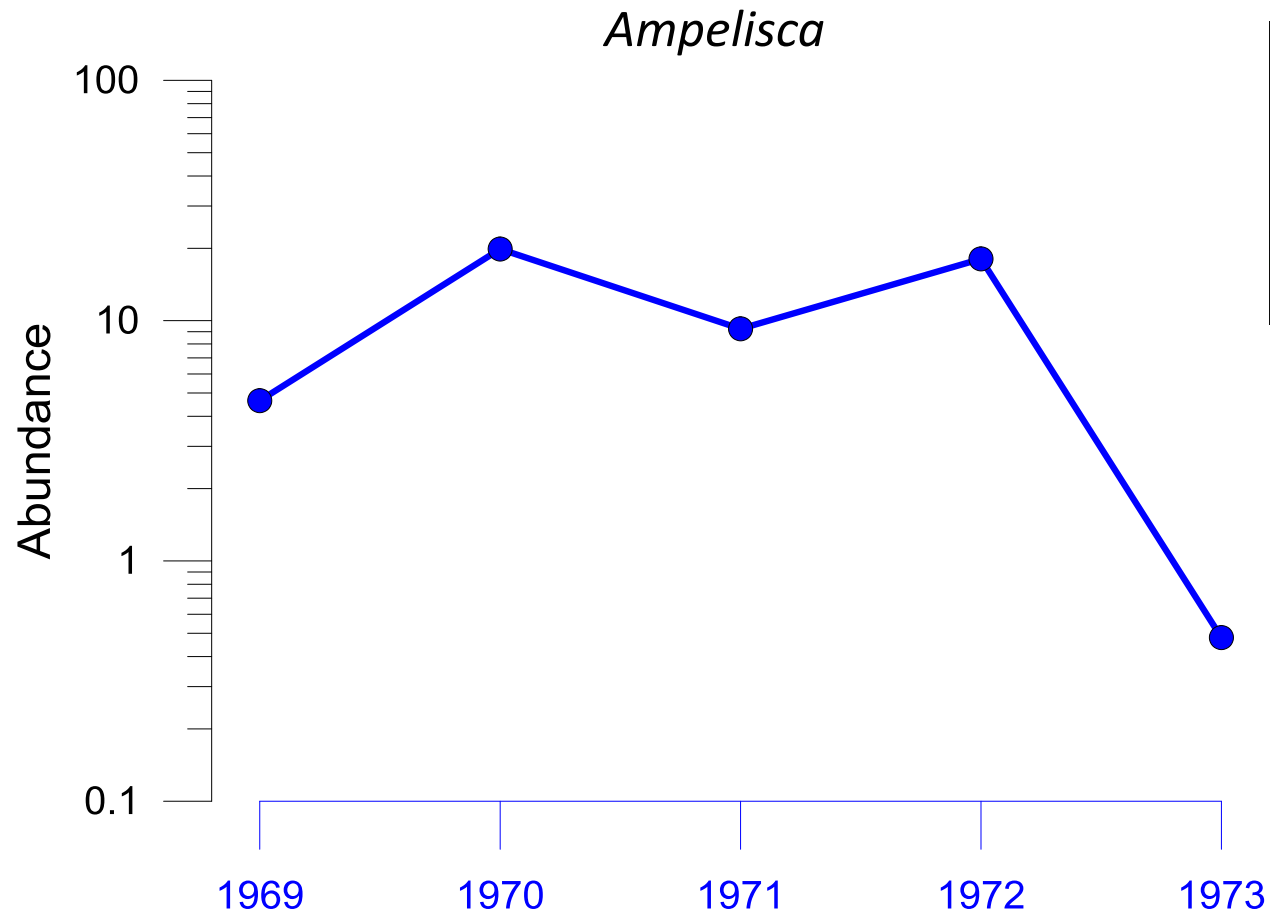


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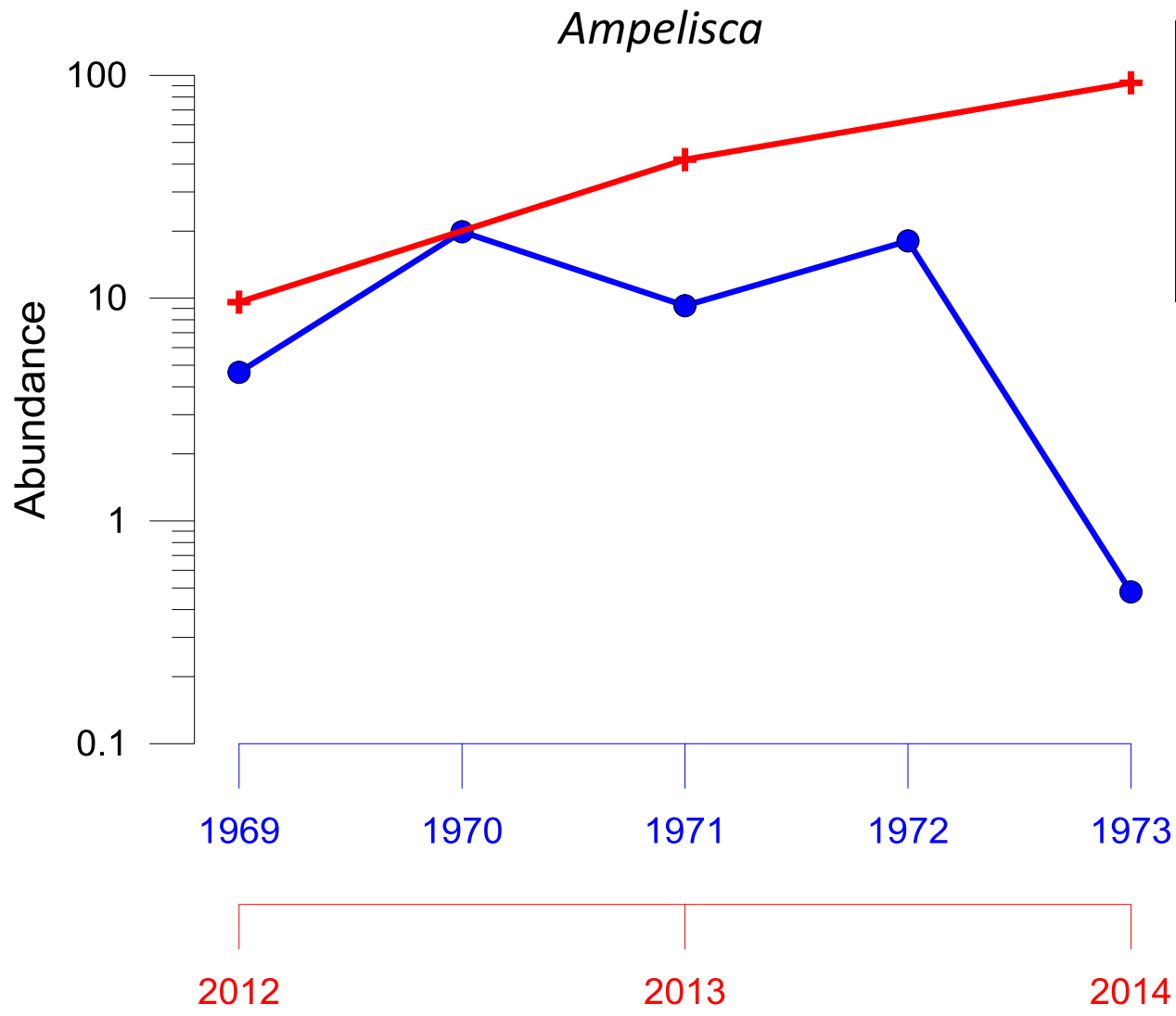
Classification by M-AMBI is similar to present day conditions

	1969	1970	1971	1972	1973
Stouts Creek	Good	High	High	High	High
Forked River	Moderate	High	High	High	High
Oyster Creek	Moderate	Good	High	High	High

How does benthic community species composition and abundance in the past compare to the present?

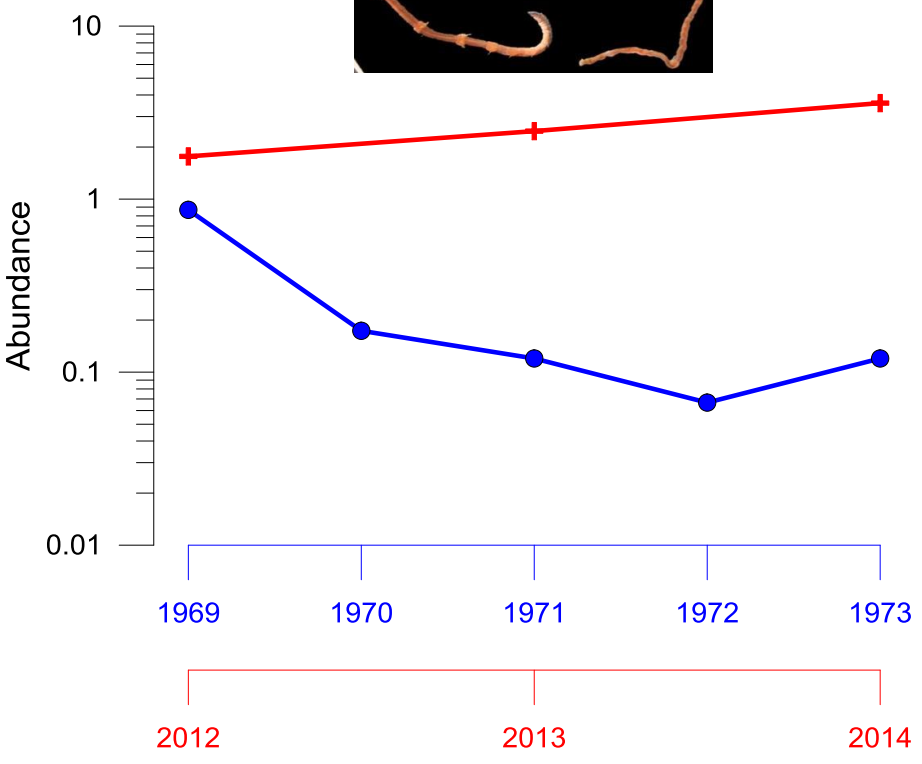
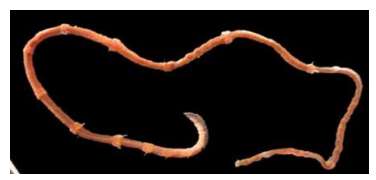


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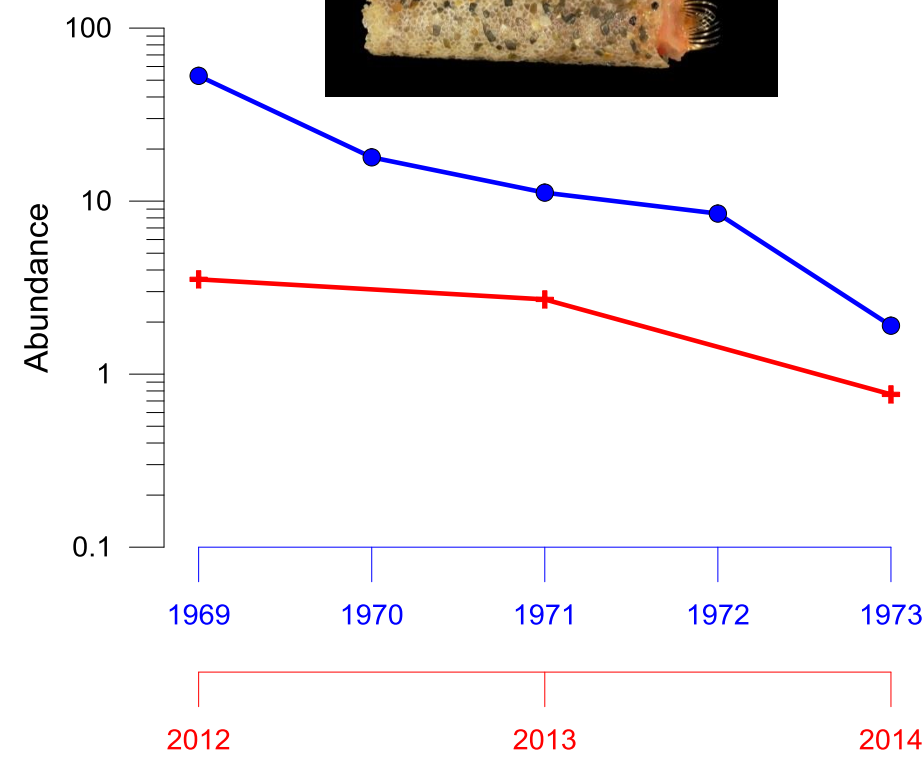


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Sabaco

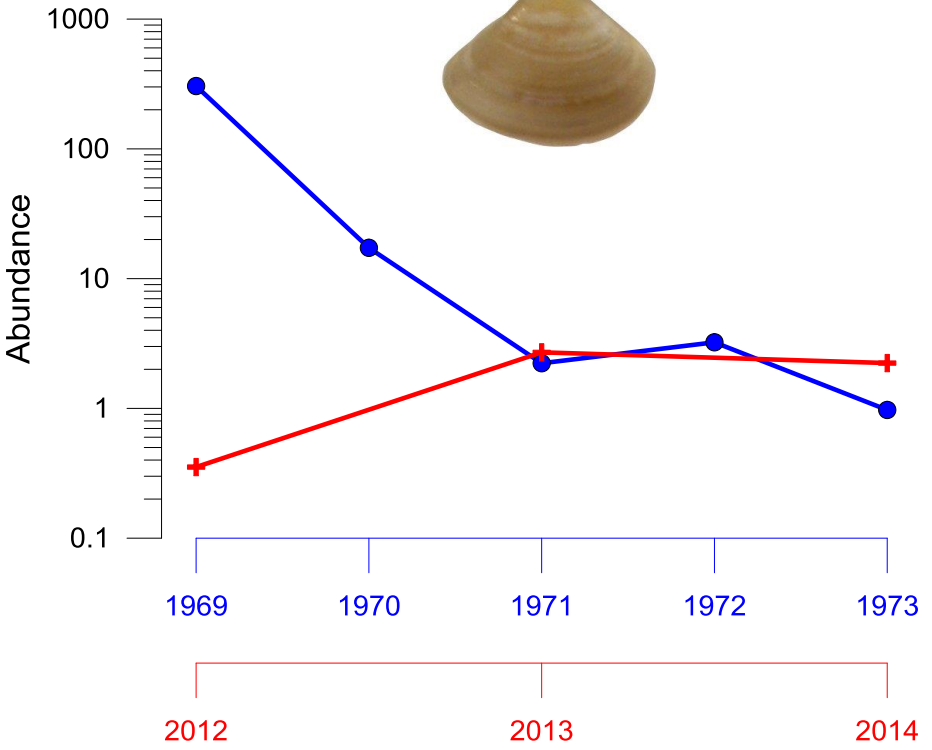


Pectinaria

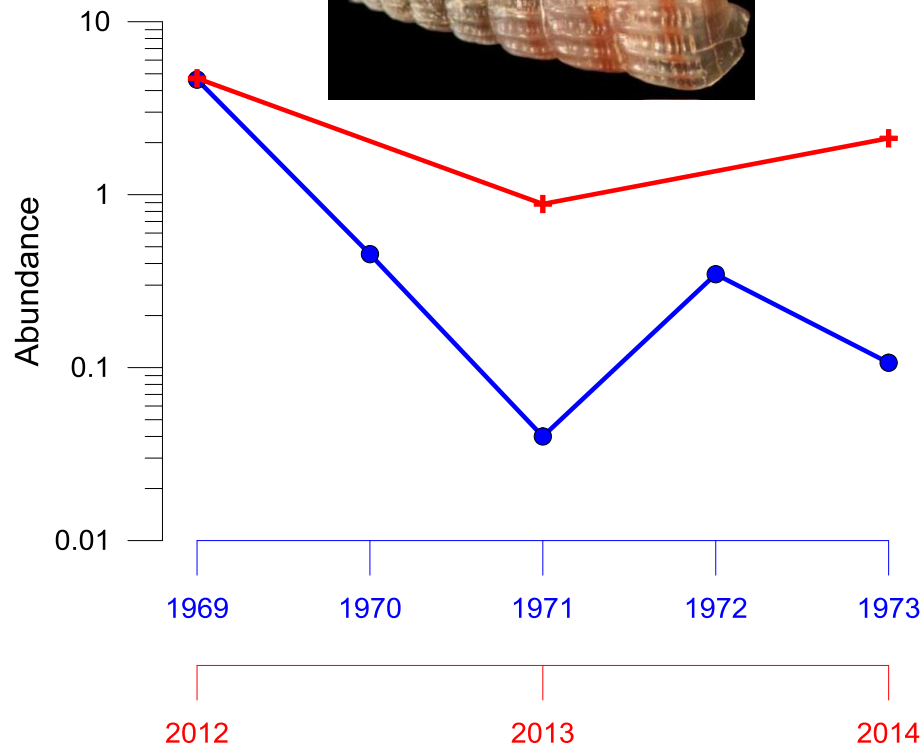


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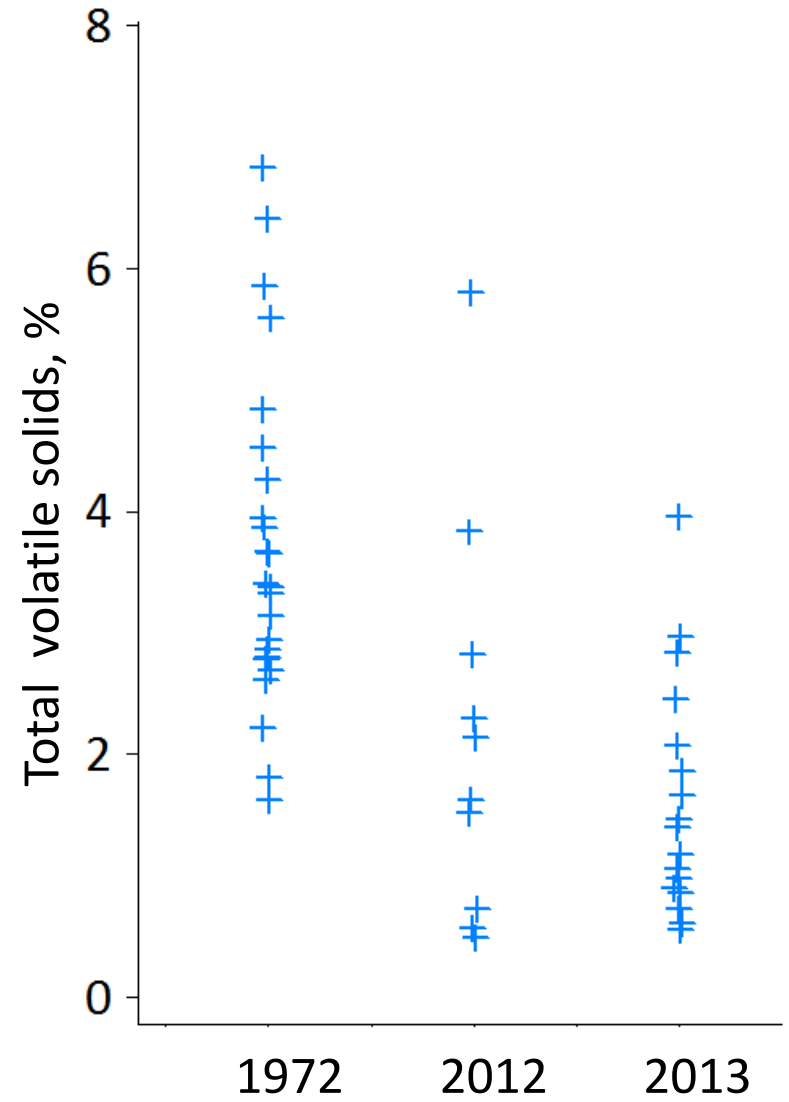
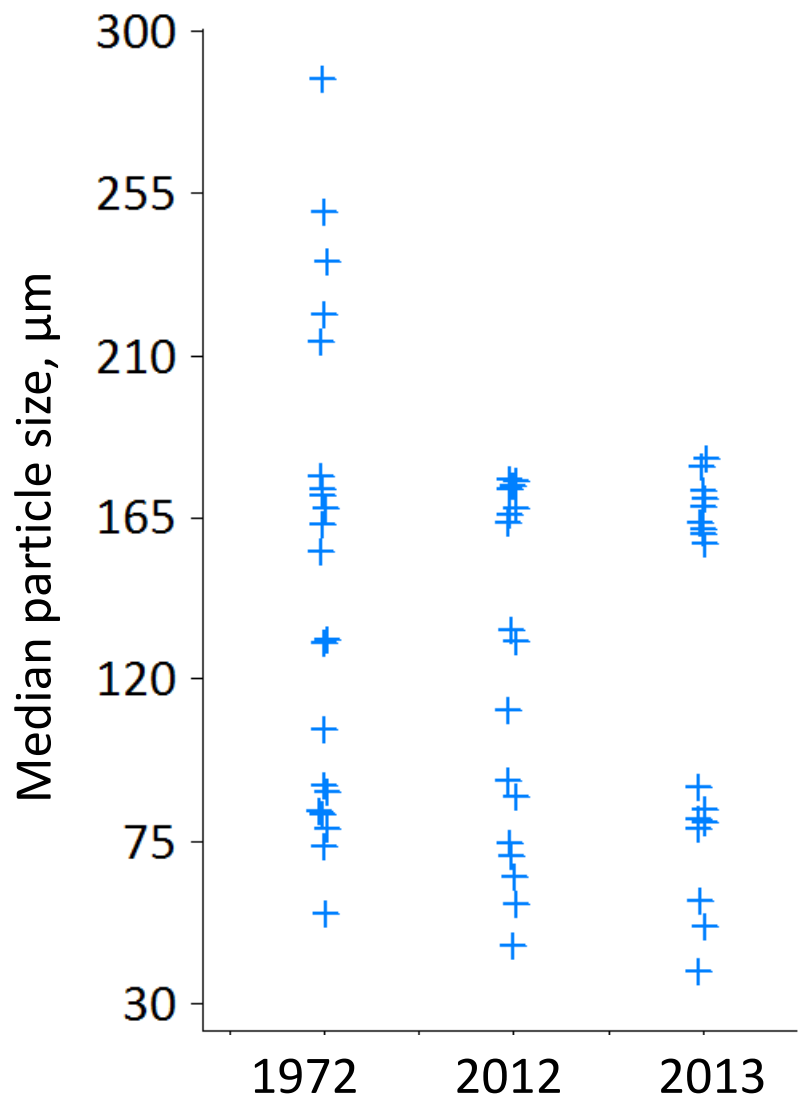
Mulinia



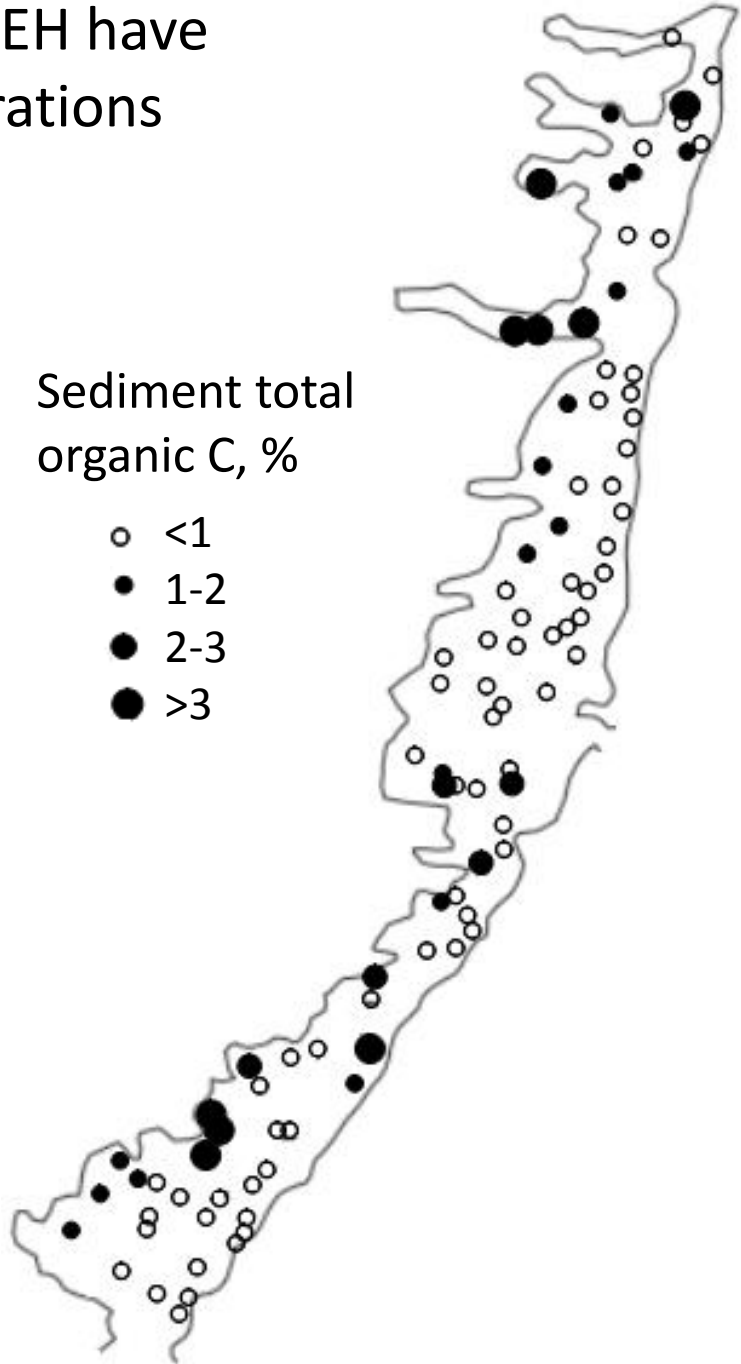
Turbonilla



How do sediment properties 40 years ago compare with the present?



Today, most locations (67/100) in BB-LEH have low sediment organic carbon concentrations (<1% by mass)



Conclusions

Based on benthic community structure, the habitat quality of 92 of 100 locations throughout Barnegat Bay – Little Egg Harbor is presently categorized as **Good to High**

Locations sampled in 2001 in open parts of the bay were categorized as **Moderate to High**, while locations in or near marinas were categorized as **Poor to High**

Three locations sampled from 1969 to 1973 were categorized as **Moderate to High**; species present then are also present now in generally comparable abundances

The particle size and organic content of sediments does not appear to have changed appreciably over the last 40 years