

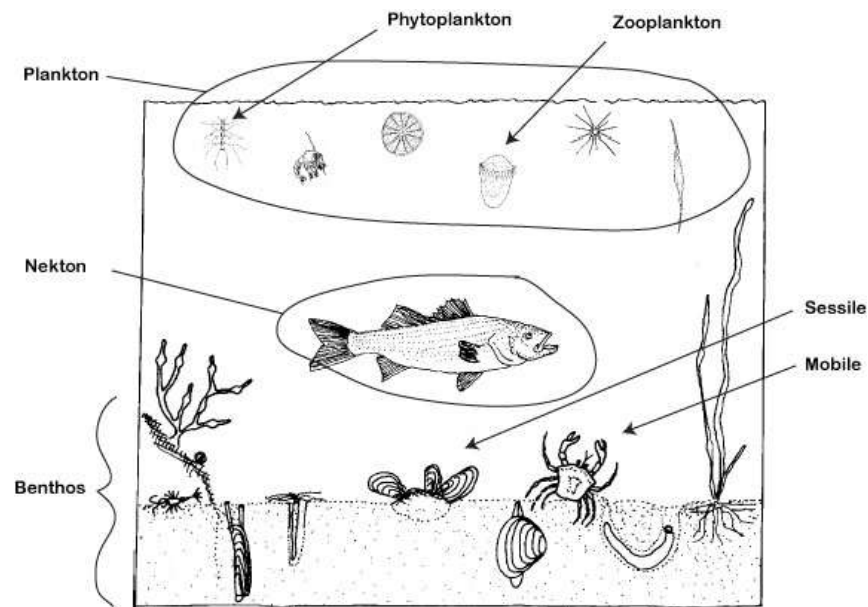


Regional Online Training Course on the Relationship Between Ocean Environment Variability and Marine Resource Abundance and Oceanographic Sampling

Role of Benthic Resource Abundance and Biological Oceanography Sampling

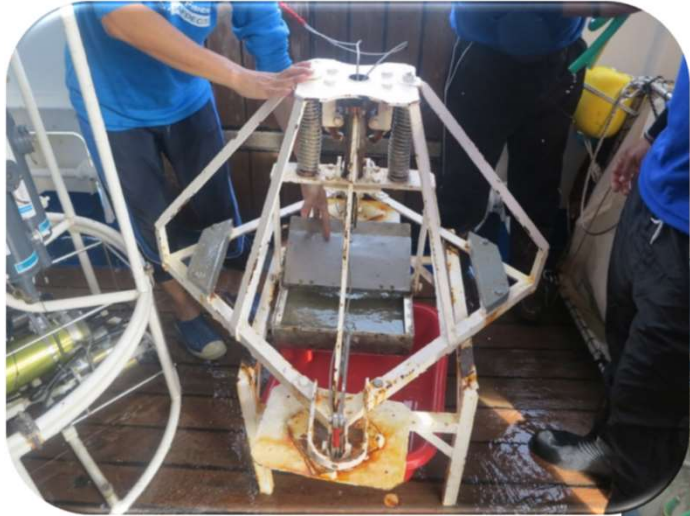
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Plankton nekton and benthos



http://drc.pima.edu/blc/183/10_183/10_183answers.html

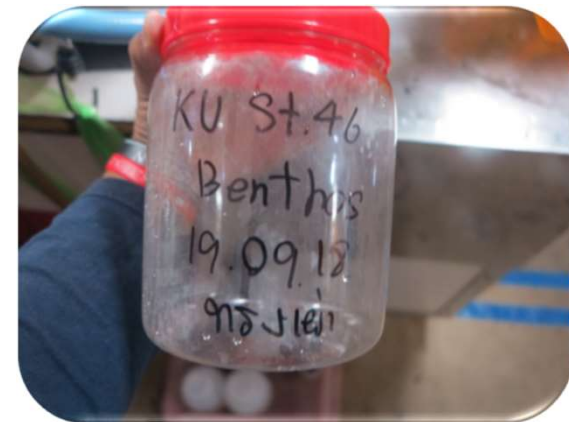
- Plankton = floating or drifting lifestyle
Nekton = swimming
Benthos = bottom dweller - attached or crawling



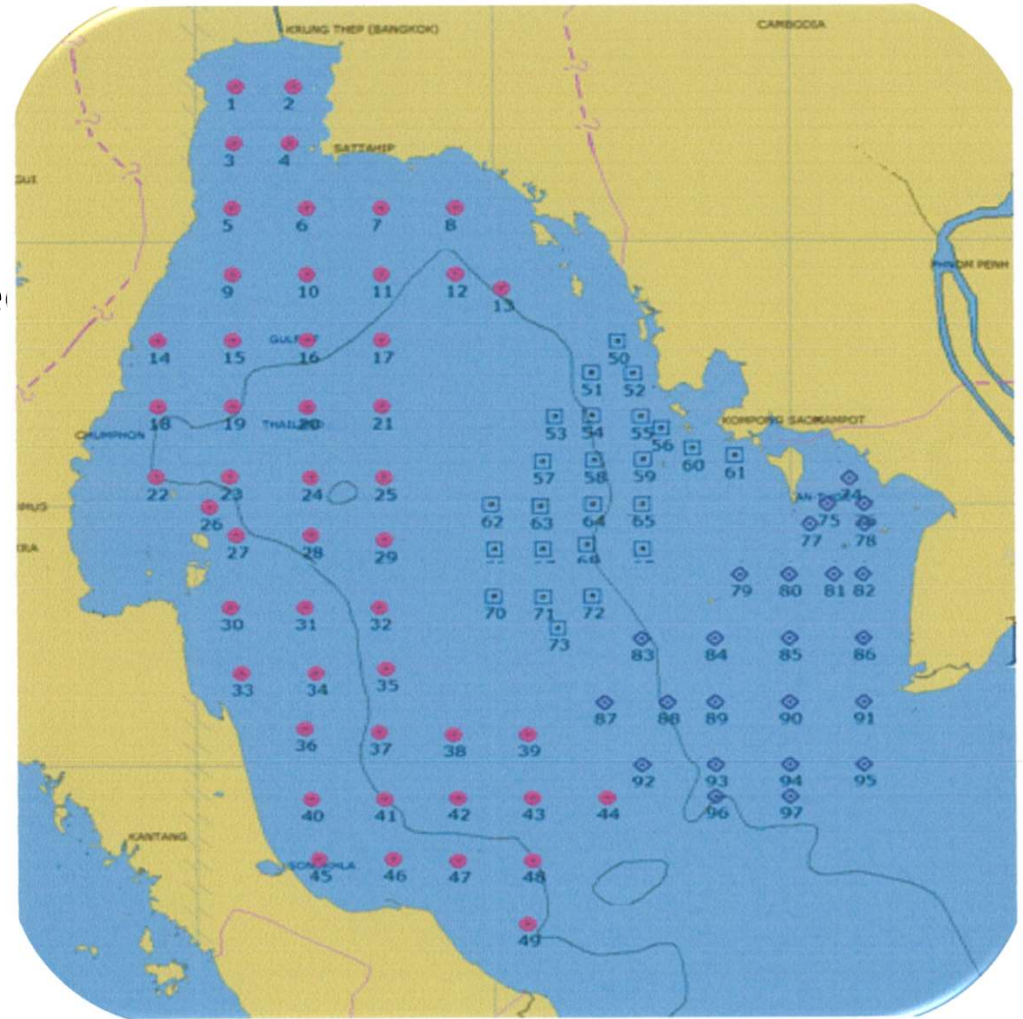
Smith McIntyre Grab



300 micron-mesh



- - A total of 72 samples were collected



Fauna found in this study: Phylum Annelida



Family Maldanidae



Family Eunicidae



Family Pectinariidae



Family Sternaspidae

Phylum Mollusca



Pteropoda



Foraminifera



Gastropoda

Phylum Arthropoda, Subphylum Crustacea



Cumacea



Ostracoda



Decapoda



Phylum Arthropoda, Subphylum Crustacea, Order Amphipoda



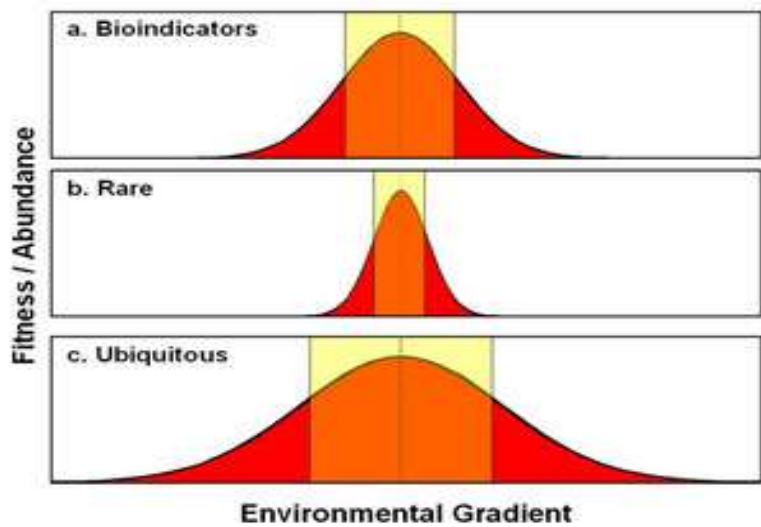
How to use the macro-meibenthos as a bioindicator



Bioindicator

- Include biological processes, species, or communities and are used to assess the environment's quality.
- Most changes in the environment often caused by
 - Anthropogenic disturbances.
 - Natural stressors.
- Anthropogenic stressors form the primary focus.
- Bioindicator has been applied in many types of environments.





1 Ubiquitous species

2 Not rare species

3 Not very tolerance

4 Not too sensitive

The impacts of tourism activities



Trash



Crowded



Wastewater



Fire camping



Beach cleaning



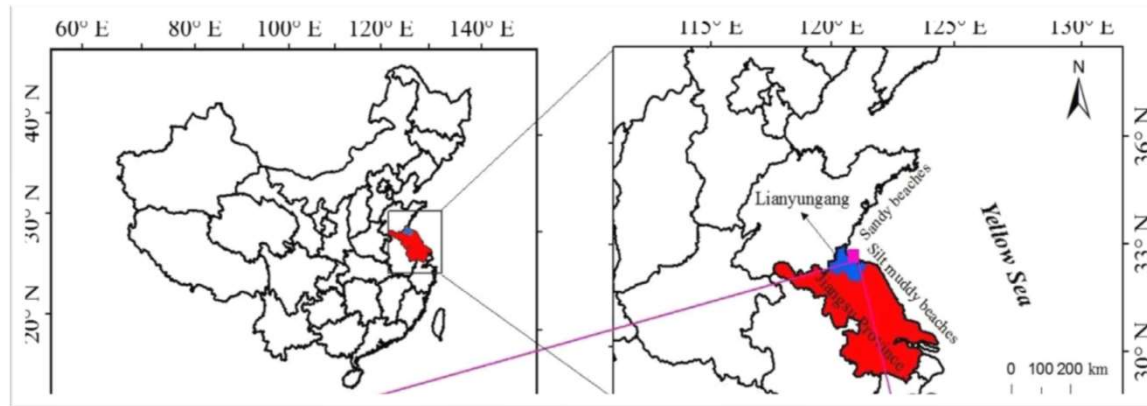
Shell
collecting

<https://www.outerbeaches.com/blog/how-to-make-perfect-beach-fire-on-hatteras-island/>
https://www.xn--82c8e.com/TH/news/beach_cleaning.html
<https://www.iloveshelling.com/blog/2010/10/13/carryer-shell-collecting-seashells/>

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1st case study

Liandao Beach



4.5k/month



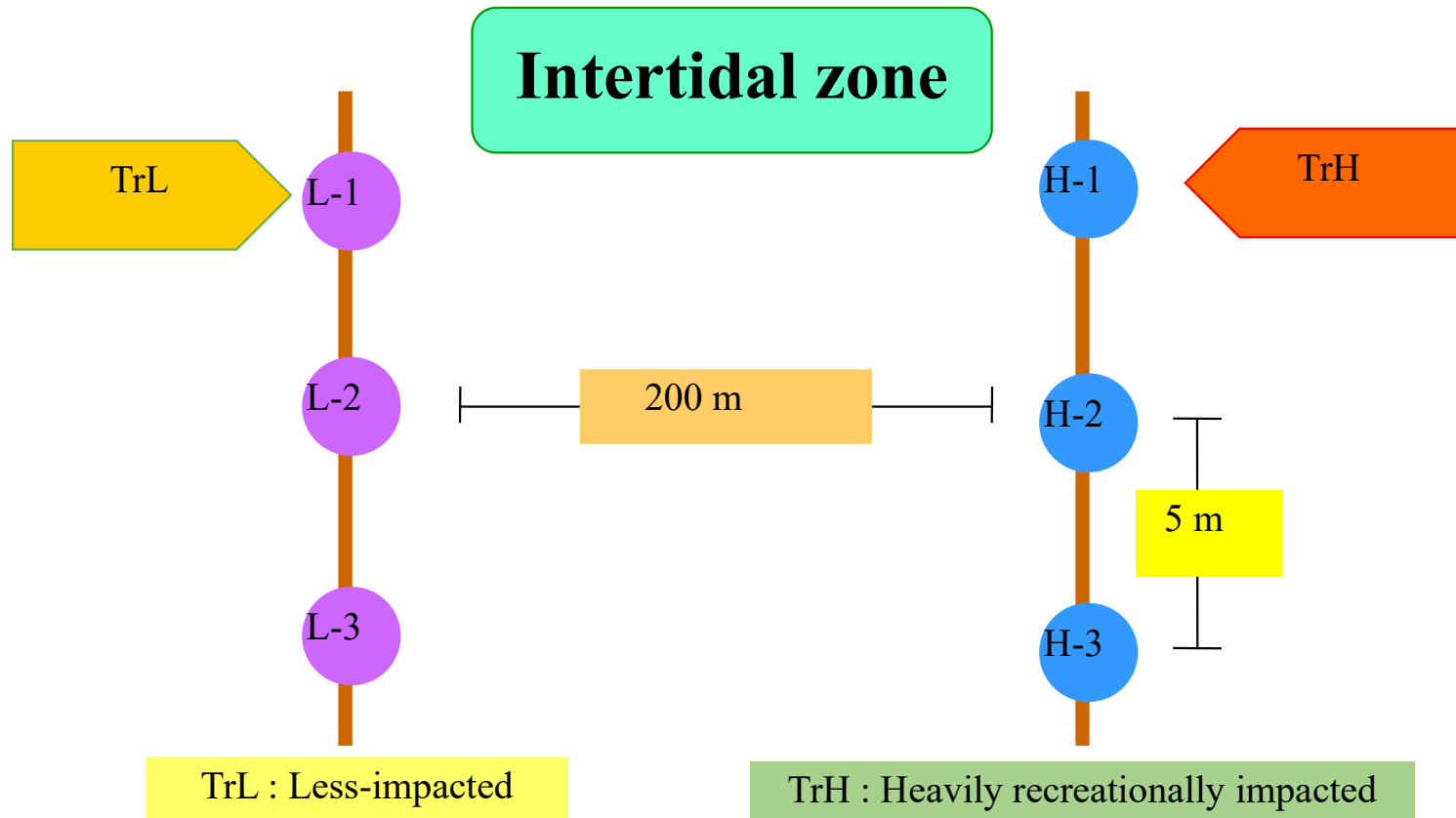
High season



Study area on tourist peak season



Sampling model



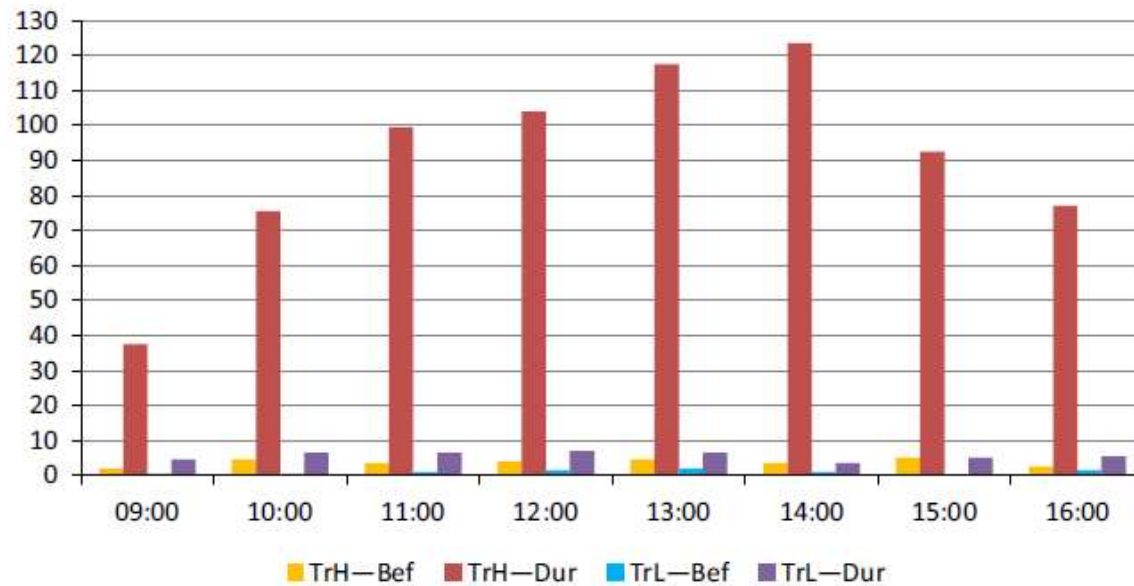


FIGURE 4 Number of beach visitors counted hourly in the two transects before peak season and during peak season at Liandao Beach. Bef, before peak season; Dur, during the peak season



3. Collect the samples with a 30 cm diameter core to depth 30 cm in sandy beach

4. Samples were sieved on site through a 1-mm mesh sieve and were preserved in 75% ethanol

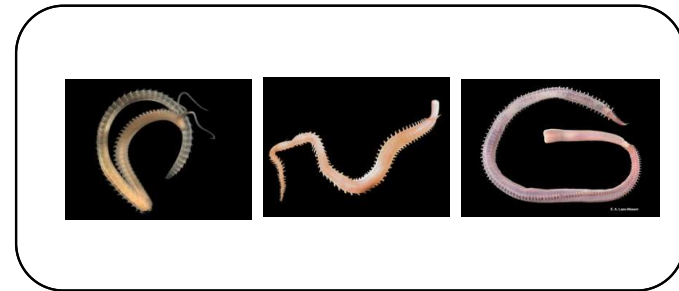


5. The macrobenthos assemblages were quantified and identified in the laboratory.

Molluscs



Polychaetes

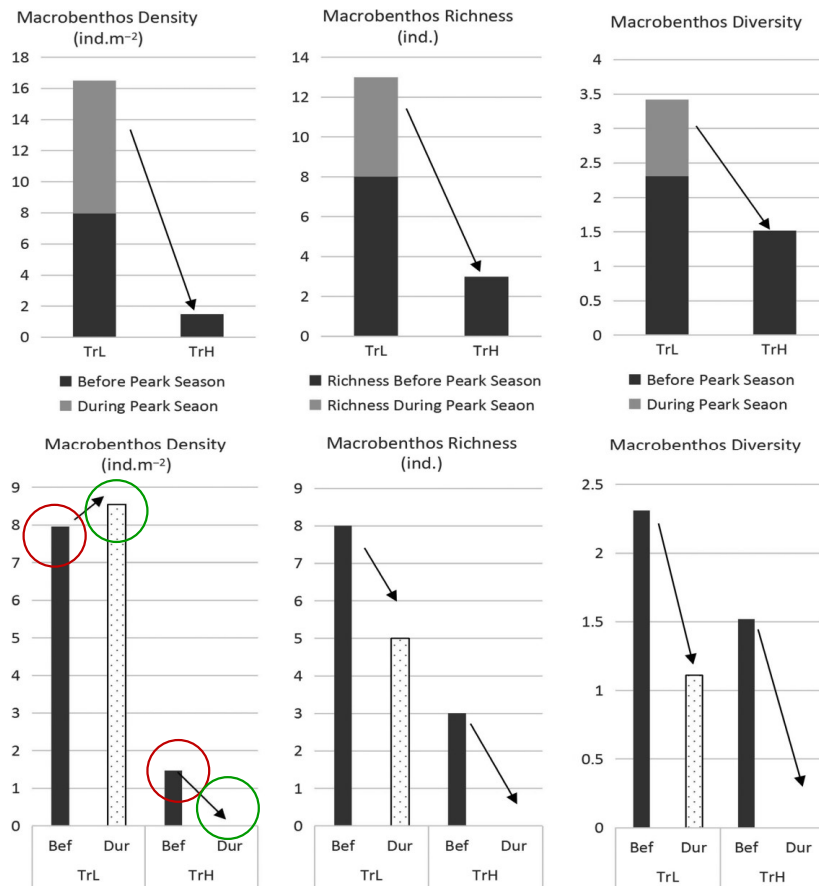


Results and discussion

Table : The specific species and distribution of the macrobenthos at Liandao Beach

TrH : Heavily recreationally impacted				TrL : Less-impacted			
Phyla	Species	Lower	Middle	Upper	Lower	Middle	Upper
Polychaetes	<i>Nereis</i> sp.		+				
	<i>Lumbrineris longifolia</i>		+				
	<i>Glycera chirori</i>				+	+	+
	<i>Glycera subaenea</i>				+	+	
	<i>Scolecopsis squamata</i>				+		
	<i>Neanthes japonica</i>					+	
	Molluscs	<i>Oncomelania hupensis</i>				+	
<i>Nassarius variciferus</i>		+					
<i>Retusa minima</i>						+	
Crustaceans	<i>Sesarma picta</i>				+		
	<i>Macrophthalmus dilatatum</i>				+		
Nemertea	<i>Procephalothrix simulus</i>					+	

- The heavily recreationally impacted site was found fewer species than the less-impacted site.
- Can be concluded that human activities affect the sandy beach benthic community.



Before the high season, it was found macrobenthic density on TrL more than TrH

During the high season, it was found macrobenthic density on TrL while, no individual macrobenthos was found on TrH.

FIGURE 6 Variations in diversity, richness and density of macrobenthos between TrH, TrL and at Before period, During period and After period separately

TABLE 4 Mann–Whitney U test results for differences in macrobenthos density between two transects at Before period and During period

Source	N	Mean rank		Asymp. Sig. (2-tailed)	Source	Group	Mean rank		Asymp. Sig. (2-tailed)
		TrH (Impact)	TrL (Control)				Bef	Dur	
Bef	24	9.21	15.79	0.015	Tr H	Bef*Dur	14.5	10.5	0.033
Dur	24	8.50	16.50	0.001	Tr L	Bef*Dur	11.75	13.25	0.598
Total	48	17.02	31.98	0.000	Total	Bef*Dur	25.79	23.21	0.480

In the difference of areas, the value of TrL area more than TrH area.

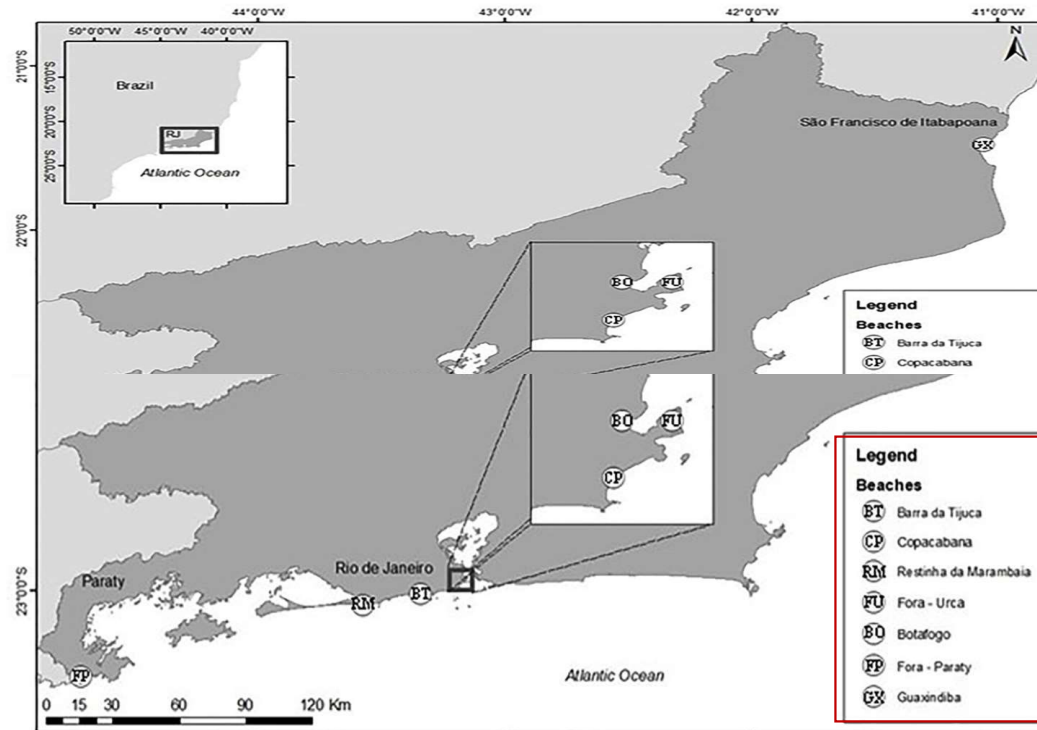
In the difference of time periods, the value of before high season more than during high season

The extreme recreational impacts seriously damaged the beach habitat of the macrobenthos that the challenging in recover the macrobenthic community in this ecosystem.



2nd case study

Seven beaches from Rio de Janeiro



Classified as exposed and located at the oceanic portion of Rio de Janeiro state



Barra da Tijuca (BT)



Copacabana (CP)



Fora – Paraty
(FP)



Restinga da Marambaia (RM)



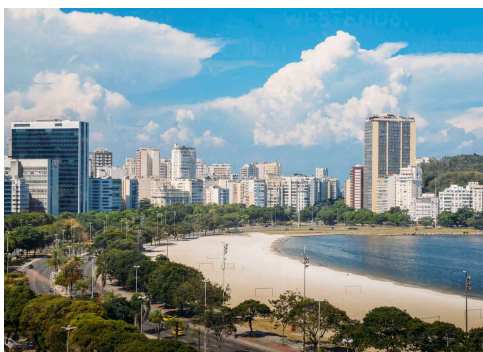
Guaxindiba
(GX)





Fora – Urca (FU)

Classified as semi-exposed



Botafogo (BO)

As protected





Suitable organisms to be used as ecological indicators in sandy beaches because

High abundance on marine sediments

Have rapid responses to different sorts of impacts



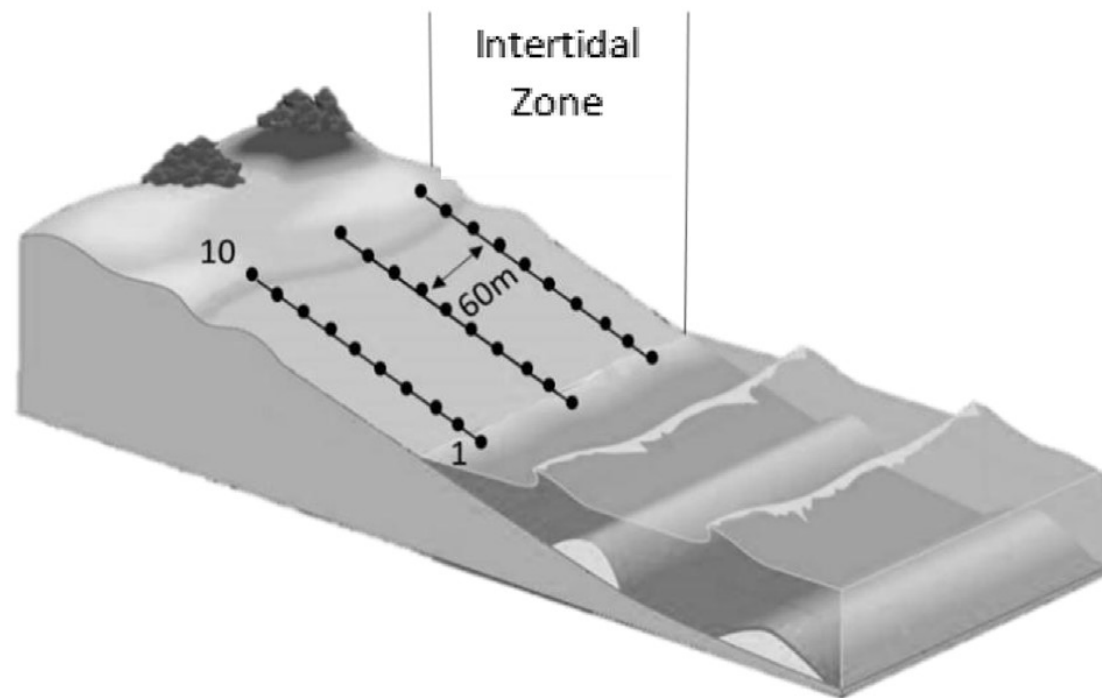
Materials and Methods

1. Determine the area to study



2. Setting the line and station for each sampling location

Sampling model



3. Collect each samples with a plexiglass core 10 cm² to depth 10 cm in sandy beach and study of physical factors

Granulometry analysis

Total organic matter

Thermotolerant coliforms

Salinity



4. Samples were sieved on site through a 38 μm and were 4% formaldehyde buffered with borax and identified in the laboratory.

Diversity indexes average number of genera per sample (S)

Shannon index (H')

Rarefaction index $ES(x)$

Pielou's evenness (J')



Classified by diet

Predators

Trissonchulus , *Eracanthion* , *Metachromadora*

Has a bigger body volumes and be benefited from smaller sorting values since their occurrence is associated to very well sorted to moderately well sorted sediments.

Non-selective deposit feeders

Daptonema , *Theristus*

Can enables everything and to survive on a large variety of environments .

Results and discussion

Table : Results of the SIMPER analysis showing the contribution(%) of the most relevant genera to each beach, cut-off at 50%. Overall similarity for each beach is presented in brackets.

	Barra da Tijuca (49%)	Copacabana (55%)	Fora - Urcu (57%)	Guaxindiba (71%)	Fora - Paraty (34%)	Restinga da Marambaia (45%)	Botafogo (57%)
<i>Ascolaimus</i>	12			10	35	7	
<i>Chromadorita</i>							17
<i>Daptonema</i>		17	22	14		13	
<i>Epacanthion</i>					16		
<i>Latronema</i>				9			
<i>Leptolaimus</i>	20						
<i>Microaimus</i>		9					
<i>Metachromadora</i>						6	
<i>Odontophora</i>							34
<i>Paracanthochus</i>						15	
<i>Thalassomonhystera</i>	10	10					
<i>Theristus</i>		12	22	17		9	
<i>Trissochulus</i>	11						

BT and CP

FU

RM

BO



Results and discussion

Botafogo beach (highly affected) - least diverse assemblage, with high dominance from genus *Chromadorita*

The higher human density, most urban and touristic beaches (BT,CP) and most preserved beaches (RM and FU) are not different

The sediment sorting coefficient was the major cause on the nematode distribution



References

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**THANK YOU FOR
YOUR ATTENTION**