

UNIVERSITY OF ZULULAND

CSIR our future through science




Larval fish biodiversity in relation to biozones off the KwaZulu-Natal Coast: Biodiversity surrogates for marine pelagic conservation planning

Student Makolobe M Mabotja

Degree MSc. Zoology

Institution University of Zululand & CSIR

Supervisor Dr Shael Harris &

Mr Steven Weerts

Outline

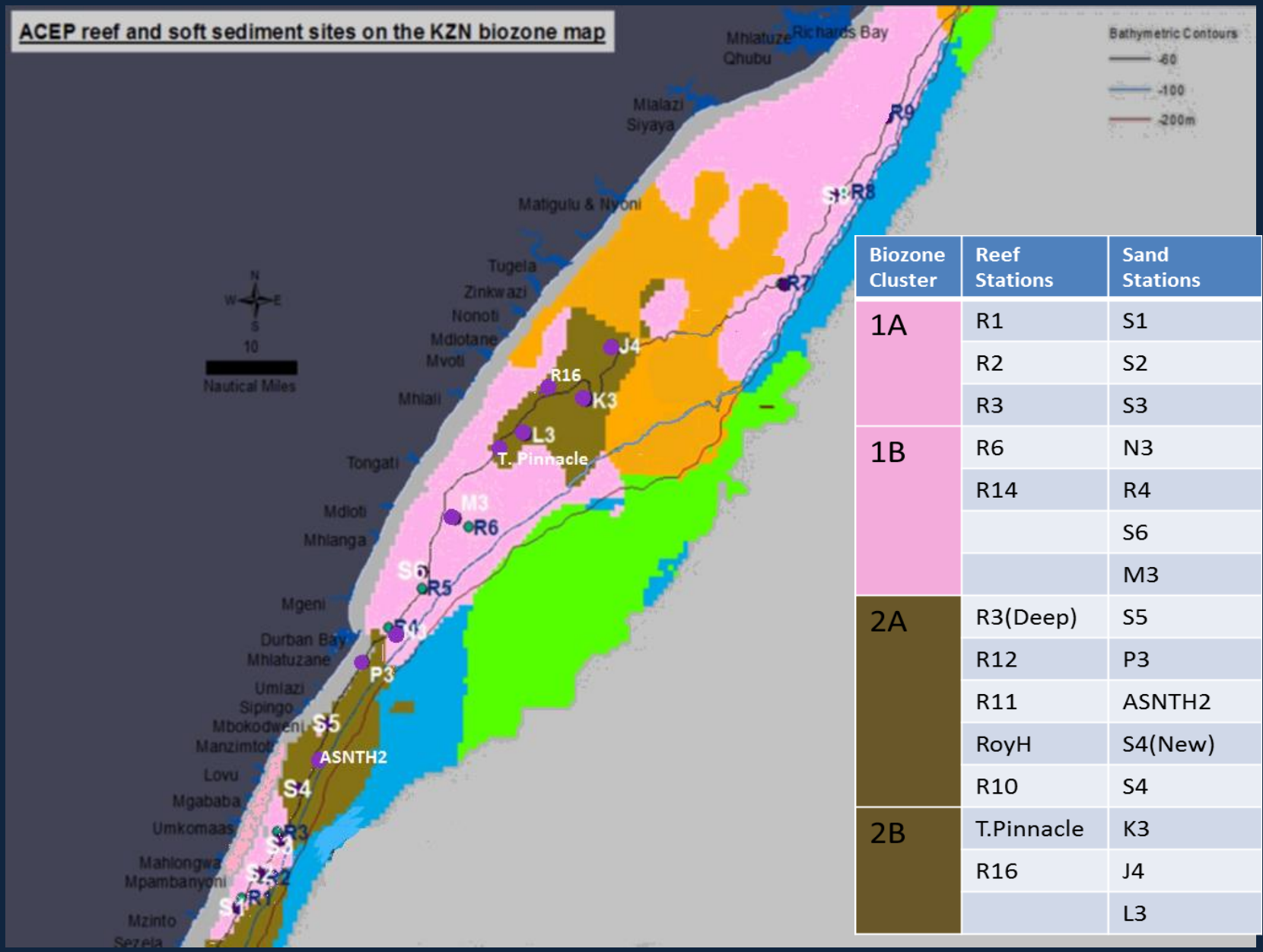
1. Aims of the study
2. Study Area
3. Field Sampling Procedure
4. Preliminary results
   - *Larval fish composition*
   - *Spatial patterns in larval fish assemblages: substrate type and biozones*
5. Discussion

1. Aims of the study

- To understand spatial dynamics of larval fish assemblages in the KZN coastal marine environment (40-80m depths).
- Examine larval fish composition, abundance and distribution between different substrates (reef and sand) and different biozones.
- To investigate the potential application of larval fish as biodiversity surrogates in marine conservation planning.

This is part of the ACEP Surrogacy project and various other biological components were investigated including: BRUVs – adult fish populations; ROV video footage – corals, fish and reef habitats; Soft substrate macrobenthos

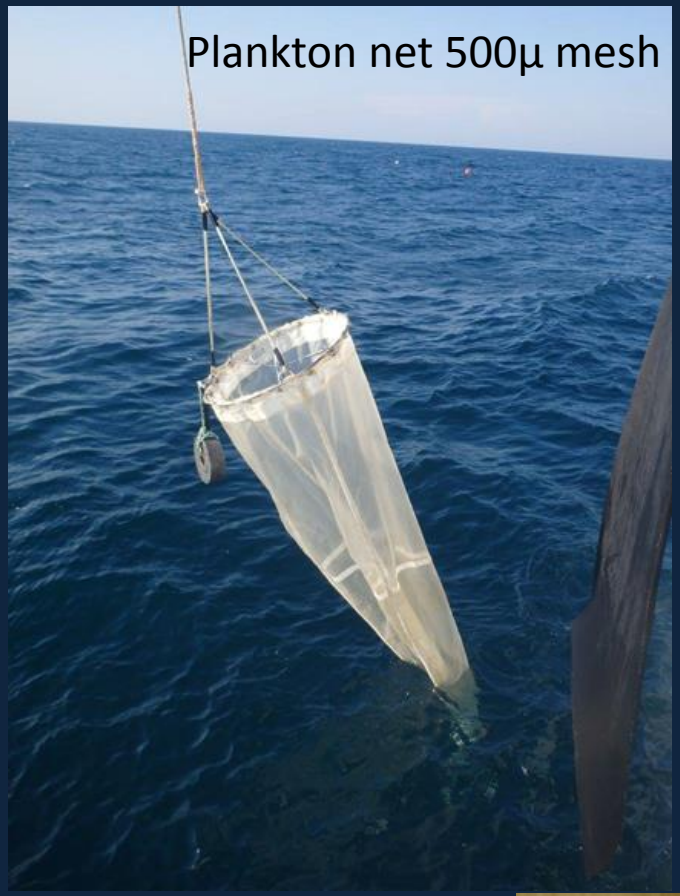
2. Study Area



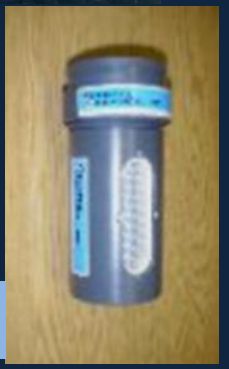
Biozone Cluster	Reef Stations	Sand Stations
1A	R1	S1
	R2	S2
	R3	S3
1B	R6	N3
	R14	R4
		S6
		M3
2A	R3(Deep)	S5
	R12	P3
	R11	ASNTH2
	RoyH	S4(New)
	R10	S4
2B	T.Pinnacle	K3
	R16	J4
		L3

3. Field Sampling Procedure

- Plankton net (500µ mesh) with a cod-end and equipped with a flowmeter, was used to collect samples of fish larvae
- At each of the 29 sites, 3 replicate oblique plankton tows were undertaken: Total 87 samples
- A range of water parameters were measured in situ concurrent with plankton sampling
- In the laboratory, fish larvae were picked out of the plankton samples and identified to nearest possible taxon/species.



Flowmeter

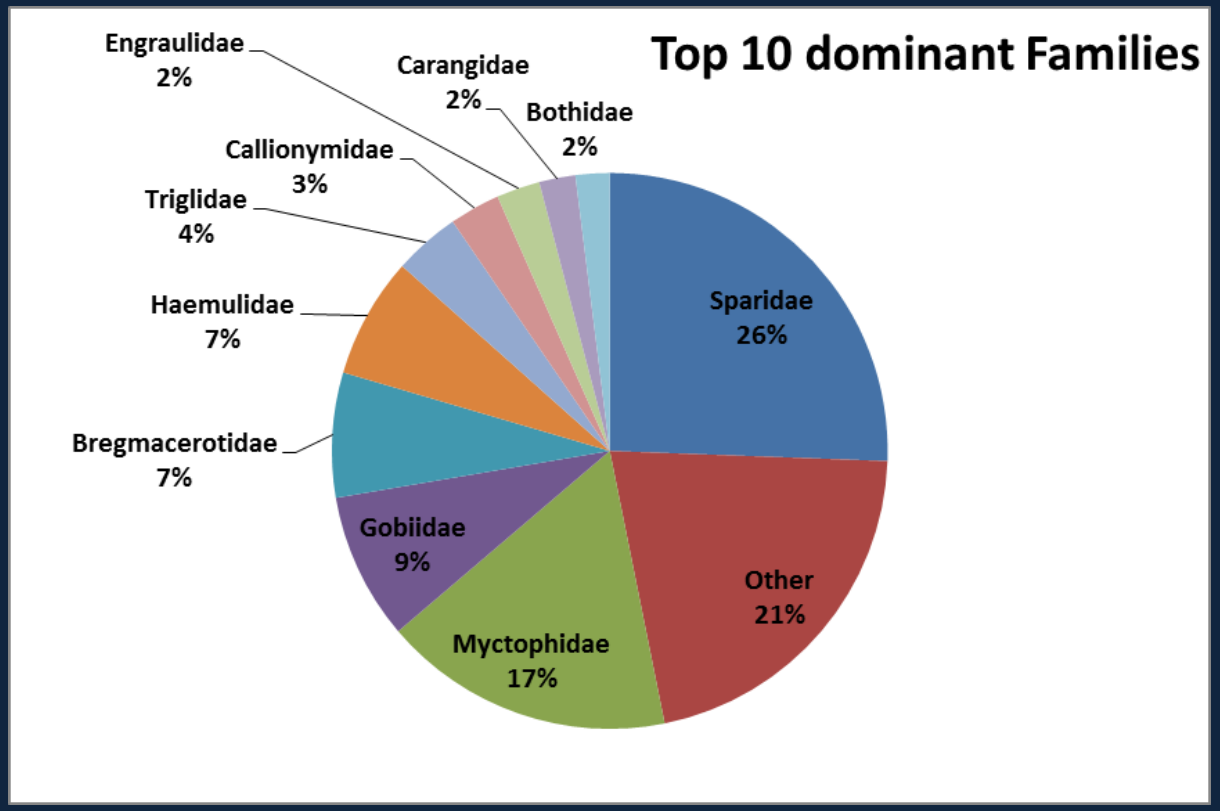


Cod-net

4. Preliminary Results

Larval fish composition

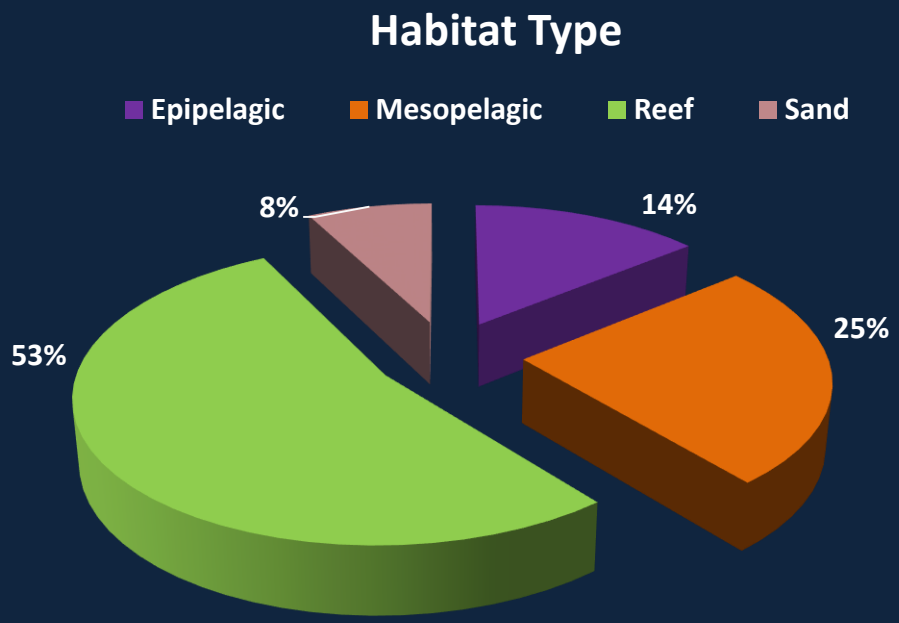
Total No. of larvae	No. of families	No. of Species
15085	100	173



"**Others**"= are comprised of 90 Families with varying numbers per family

4. Preliminary Results

Larval fish composition



Epipelagic

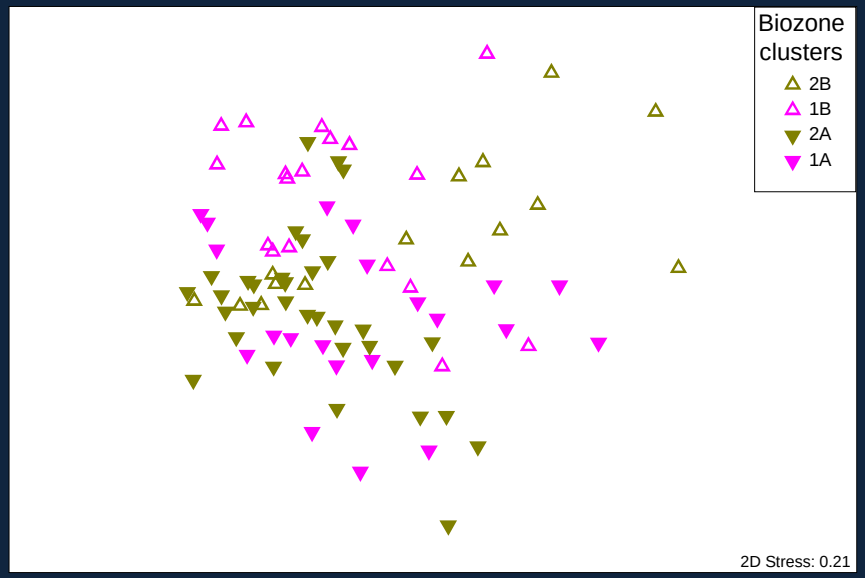
Reef

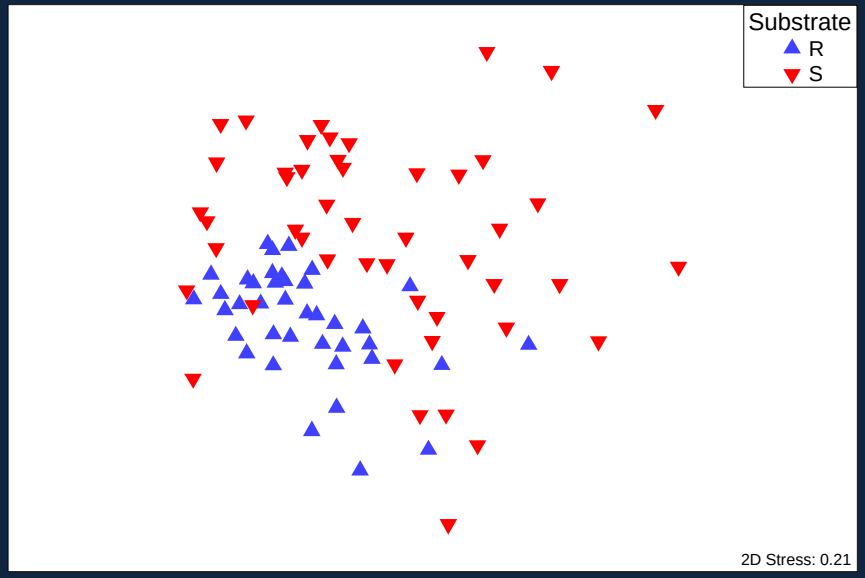
Sand

Mesopelagic

4. Preliminary Results

Community analyses (non metric MDS)





- ❑ High stress MDS ordinations

- ❑ ANOSIM/SIMPER revealed:
- ➢ Biozone differences
- Statistically significant, but very small
- Largest difference between 2A and 2B
- *Pagellus natalensis* influential (↑1A, 2A)

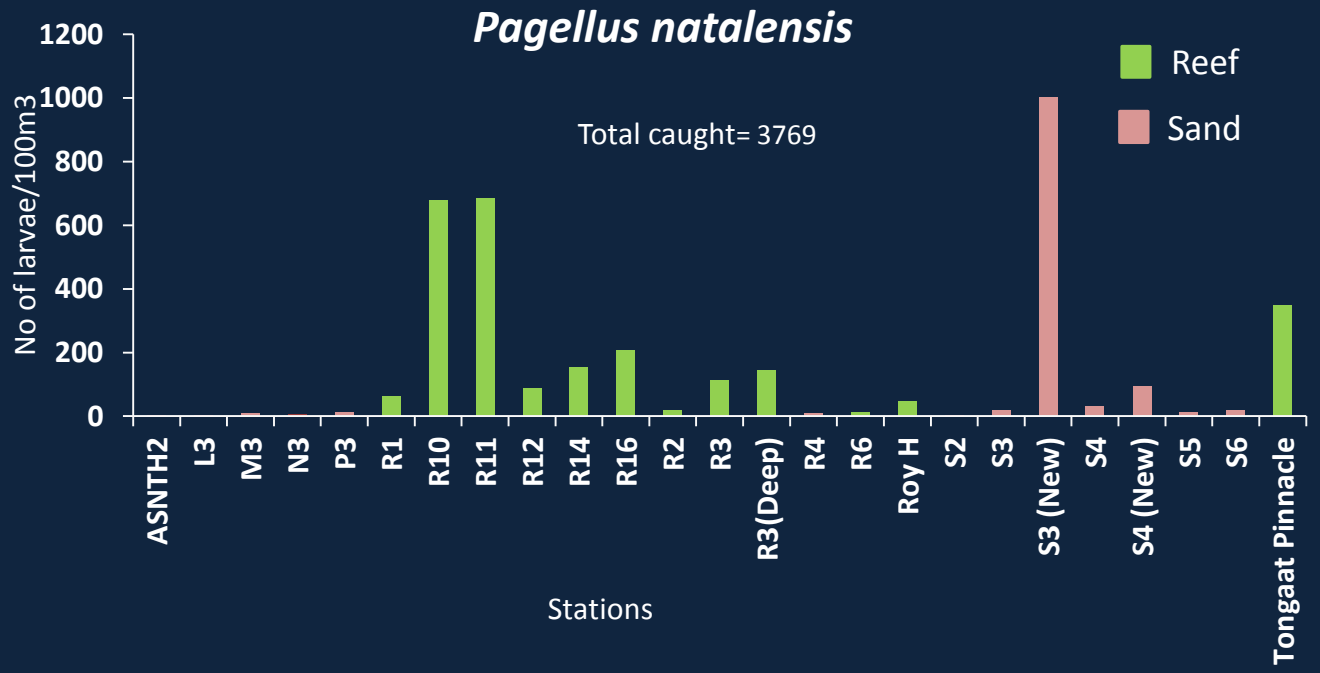
- ➢ Substrate differences
- Statistically significant, but very small
- *Pagellus natalensis* influential (↑Reef)

4. Preliminary Results

Pagellus natalensis – Distribution & Development stages

	Developmental Stages[1]		
Size	**Pr** (1.9-3mm)	**Fl** (4.2-5.8mm)	**Po** (6.3-19mm)
No. larvae	3015	571	177
Days old[2]	1 to 9	6 to 16	17 days

Leis et al., 2002 Connell, 2008



5. Discussion

- At the level of community there is some (but weak) structure in larval fish assemblages across Biozones and Substrates.

- Reef areas appear to support higher abundance and more diverse larval fish assemblages, suggesting they act as sources of larval fishes, or that larval fishes have mechanisms of locating reefs as preference settlement (and juvenile) habitats.

- Some species display significant and marked patterns in distribution and life stages between Reef and Sand habitats.

- Can the *Pagellus natalensis* be used as an indicator species for monitoring the health of the marine environment and therefore in planning of MPAs?

- Preliminary results are indicating that the biozones are not good surrogates in terms of larval fish abundance.

- Habitat differences (reef and sand) are the main drivers influencing the larval fish assemblages in the study area.

Acknowledgements