National Environmental Research Program

TROPICAL ECOSYSTEMS hub

Project 6.2

Diversity in shark nursery areas along a tropical coastline

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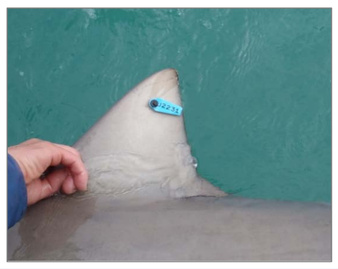
Introduction

The GBR is home to at least 133 species of sharks and rays, of which at least 38 are caught in the inshore gillnet fishery. We know that some species use nearshore waters as nursery areas and that these areas are important for healthy and resilient populations. This project aims to examine how the nursery function of GBR coastal waters varies both in space and time.

Methods

1. Five bays sampled four times during 2012 using gillnets and longlines (Fig. 1).
2. Captured sharks identified, measured, sexed, maturity status determined, tagged and released.
3. Data analysed using multivariate techniques.



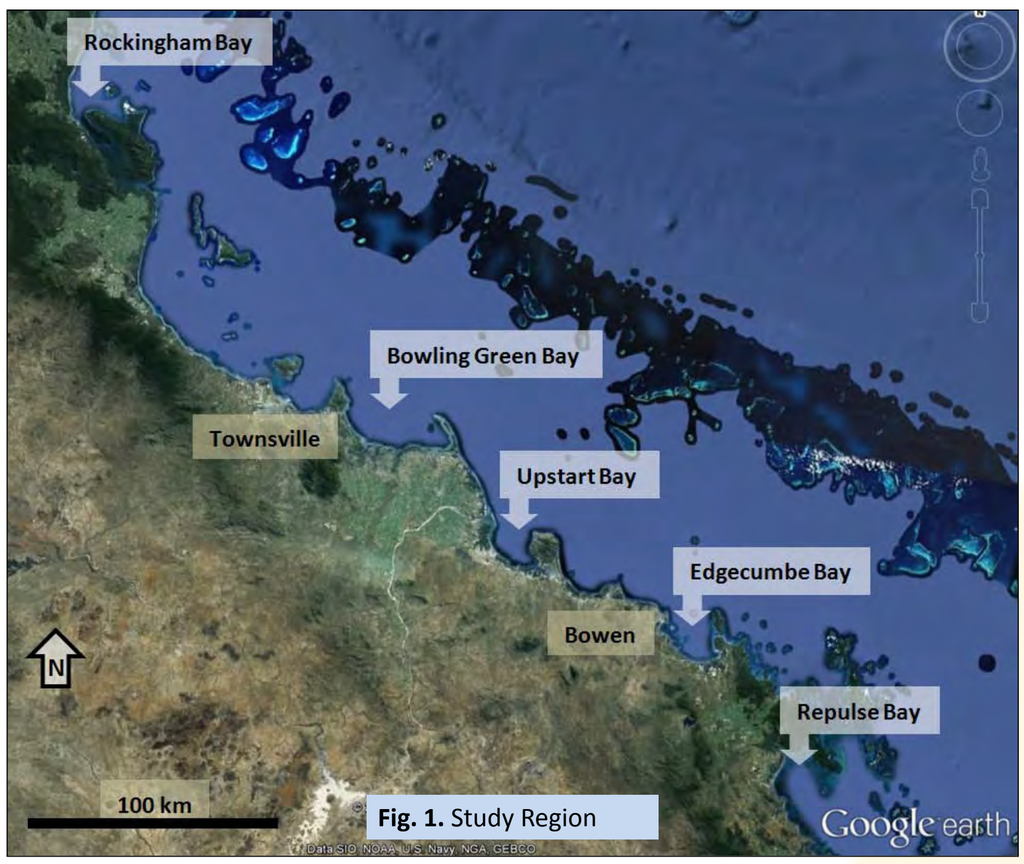


Fig. 1. Study Region

Results and Discussion

- 1178 sharks captured from 19 species
- 16 species present as juveniles and/or young-of-the-year

Proportion of immature sharks:

- 340 immature sharks captured
- Proportions of immature sharks varies among species, bays and time of year (Fig. 2)

Spatial patterns in immature shark communities:

- Some bays were more different than others (Fig. 3)
- Significant variation in 4 pairs of bays (ANOSIM; Fig. 4)
- Scalloped hammerheads, pigeyes and blacktips were primarily responsible (SIMPER).
- Hammerheads and pigeyes were absent from Edgecumbe Bay

Species	Rockingham	Bowling G.	Upstart	Edgecumbe	Repulse
Bamboo		1		1	1
Blacktip reef					1
Blacktip	41	25	11	32	21
Bull shark	4	1		1	5
Creek whaler	1	10	2		1
Fossil shark	1		1	1	
G. Hammer		2	1	4	6
Leopard sh.	1	1	1	1	
Milk shark	12	10	16	20	7
Nervous			6	4	
Pigeye	6	12	6		27
S. Hammer	41	4	3		11
Sharpnose	56	223	67	44	247
Spinner				1	
Spot-tail	15	10	25	37	8
Tiger	3	3	1	1	
Weasel		1	2		
Whitecheek	8	16	11	24	3
% Immature	0 - 20	20 - 40	40 - 60	60 -80	80 - 100

Fig. 2. Spatial variation in the proportion of immature sharks. Total number of sharks is displayed in each box.

- Results confirm importance of region for numerous shark species
- Evidence of spatial variation in nursery function

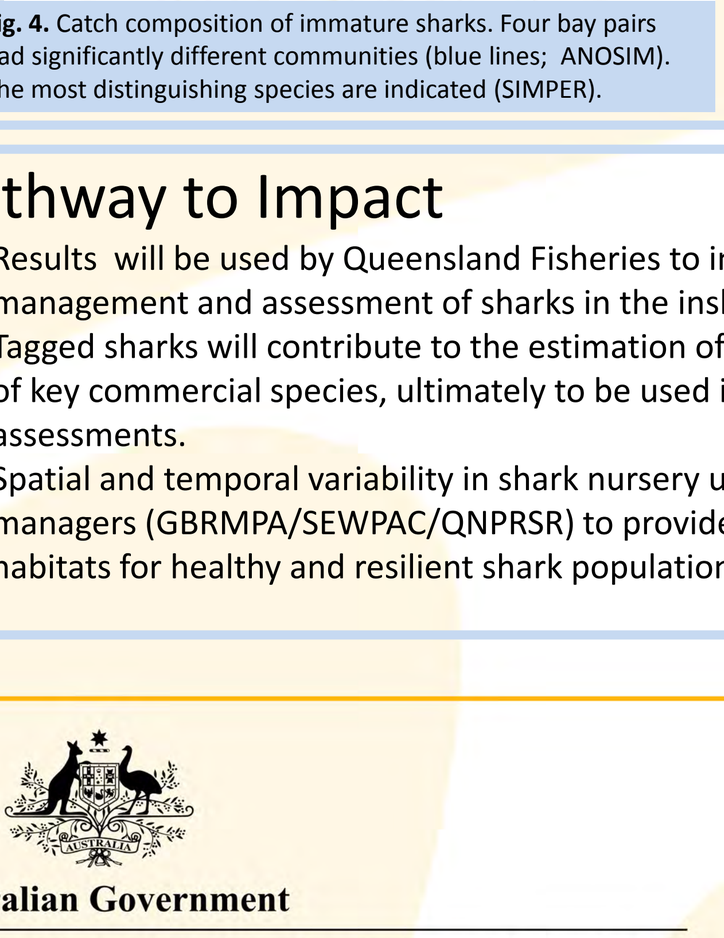


Fig. 4. Catch composition of immature sharks. Four bay pairs had significantly different communities (blue lines; ANOSIM). The most distinguishing species are indicated (SIMPER).

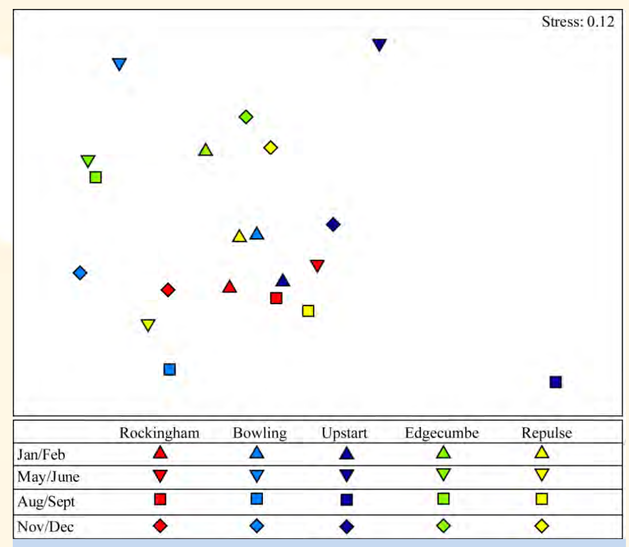


Fig. 3. MDS ordination of immature shark communities in 5 bays. Distances between points are proportional to similarities/dissimilarities in immature shark community.

Pathway to Impact

1. Results will be used by Queensland Fisheries to improve management and assessment of sharks in the inshore gillnet fishery.
2. Tagged sharks will contribute to the estimation of fishing mortality of key commercial species, ultimately to be used in stock assessments.
3. Spatial and temporal variability in shark nursery use will help habitat managers (GBRMPA/SEWPAC/QNPRSR) to provide the best possible habitats for healthy and resilient shark populations.

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