

POPULATION ASSESSMENT OF **NURSE SHARKS** (*Ginglymostoma cirratum*) IN BELIZE

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Introduction

- Nurse sharks are pan-tropically distributed globally
- Nurse sharks are sensitive to fishing and coral reef degradation due to conservative life history
- Vast areas of suitable habitat in Belize
- Nurse shark fishing is illegal since 2011 but targeted and accidental catch persist
- Little information currently available on nurse shark population size and trend to inform conservation action**



STUDY AIMS:

- Evaluate effect of protected areas on nurse sharks density
- Describe density patterns and estimate population size of nurse sharks in Belize

Methods

To sample nurse shark abundance, baited remote underwater videos (**BRUVs, n=409**) were deployed and **snorkel underwater visual census transects (n=413)** were conducted in reefs and lagoons, at protected and non-protected sites.

Catch-per-unit-effort (CPUE, shark hour⁻¹) and **encounter rate** (ER, shark km⁻¹) were obtained from BRUVs and transects, respectively.

Density patterns were investigated using CPUE and ER to compare PA and non-PA sites and different study regions.

Population size:

- Minimum population size was obtained from ER.
- Maximum likely population size were estimated using Distance Sampling analysis.

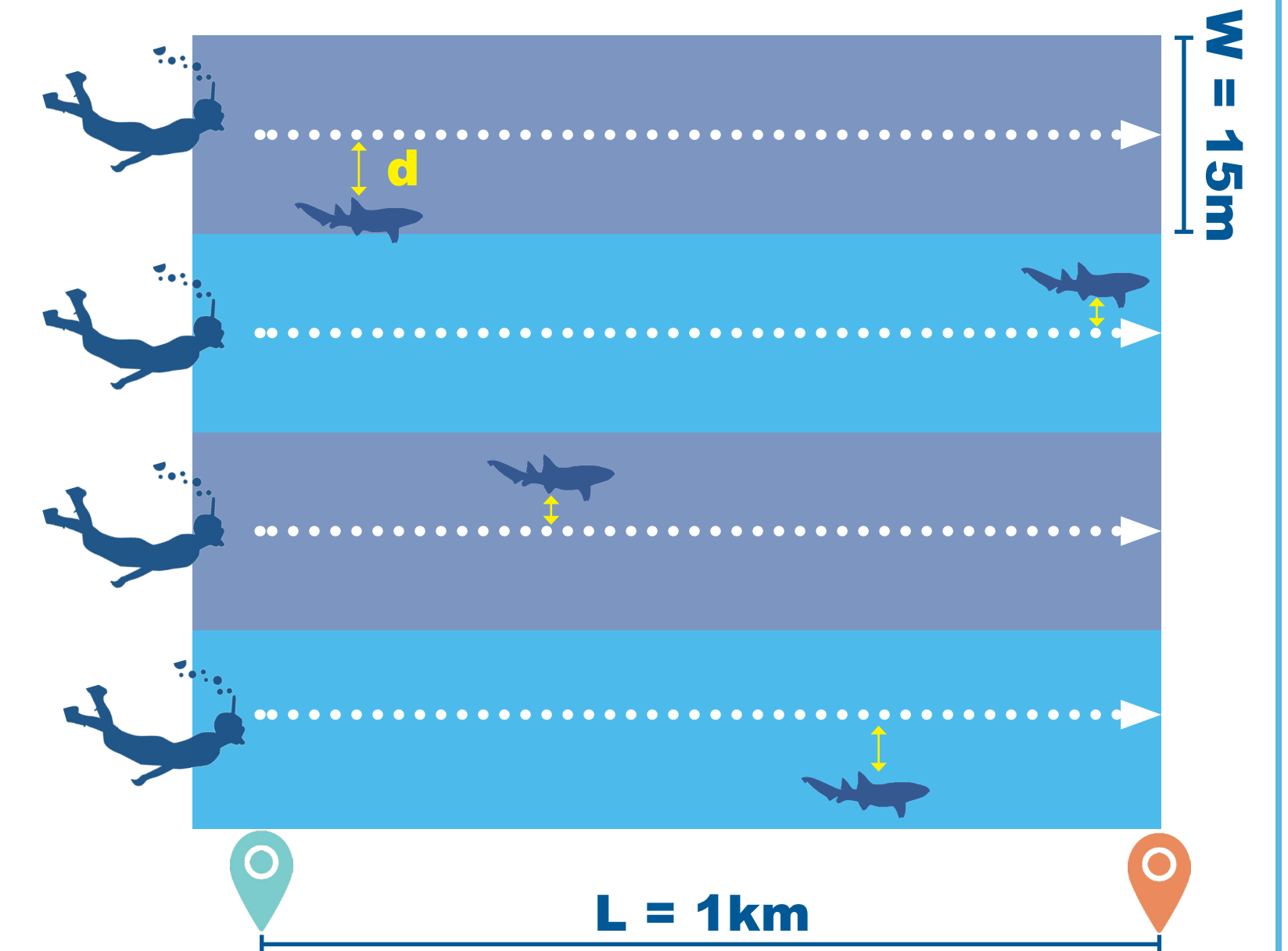
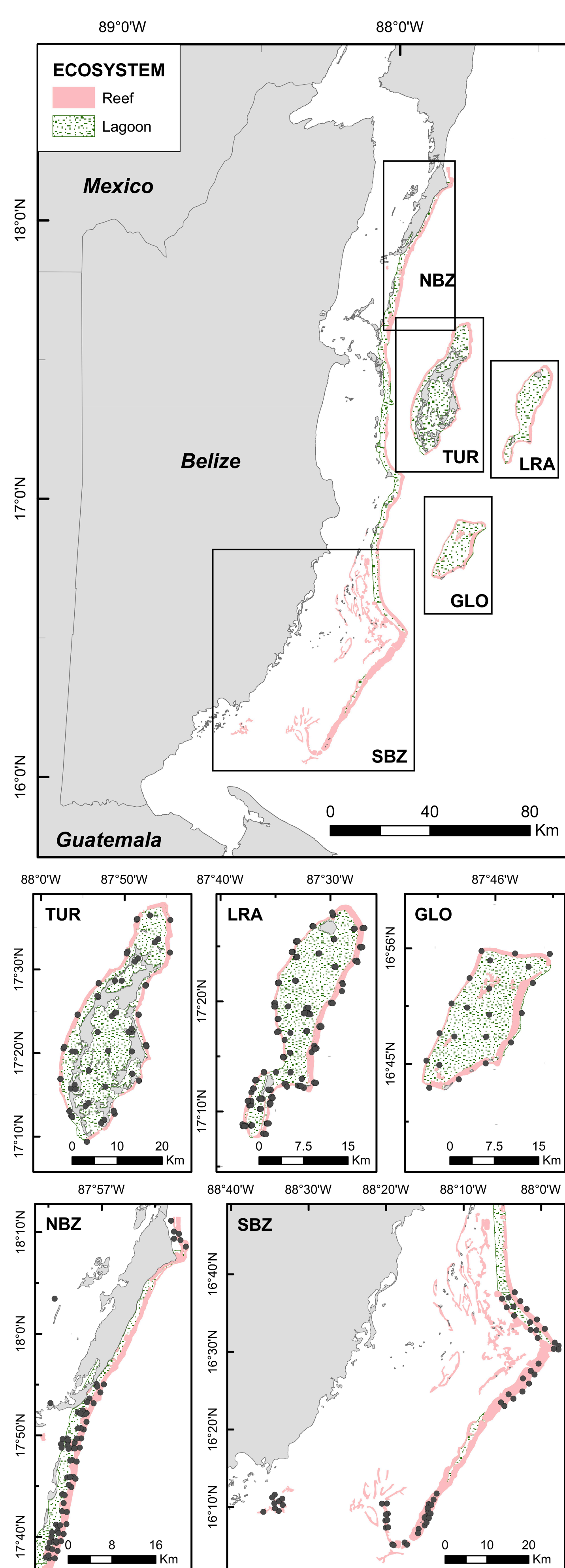


Figure 2. Transects were swum by four snorkelers at a time. The perpendicular distances of nurse sharks from transect line were recorded at first sighting.

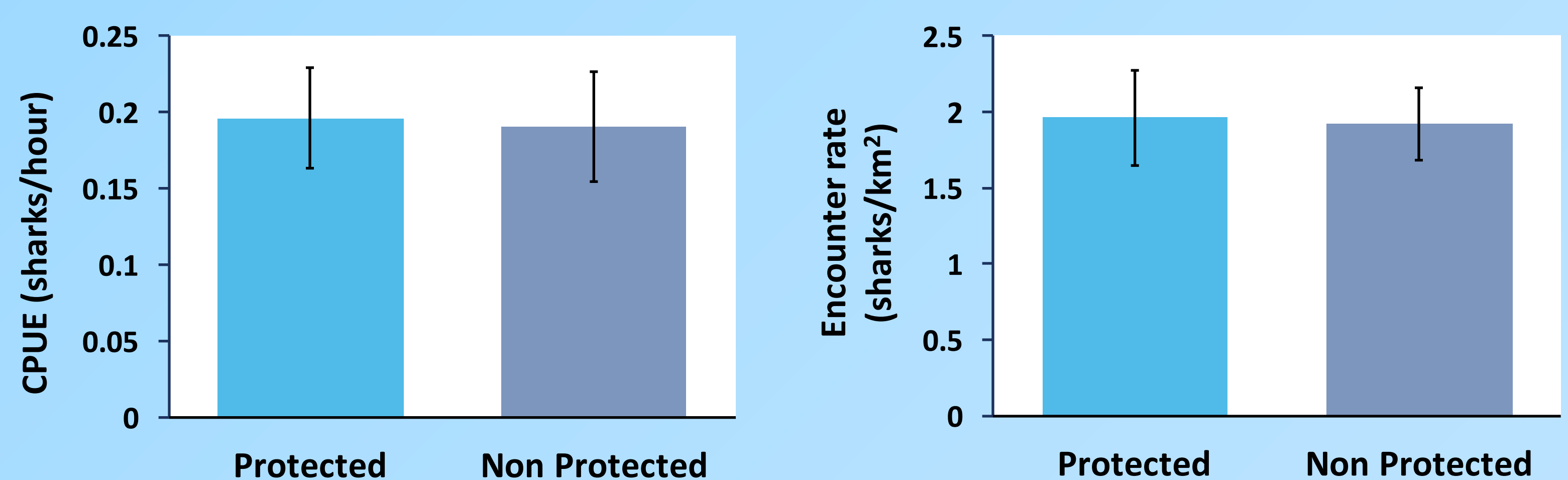
Study Regions



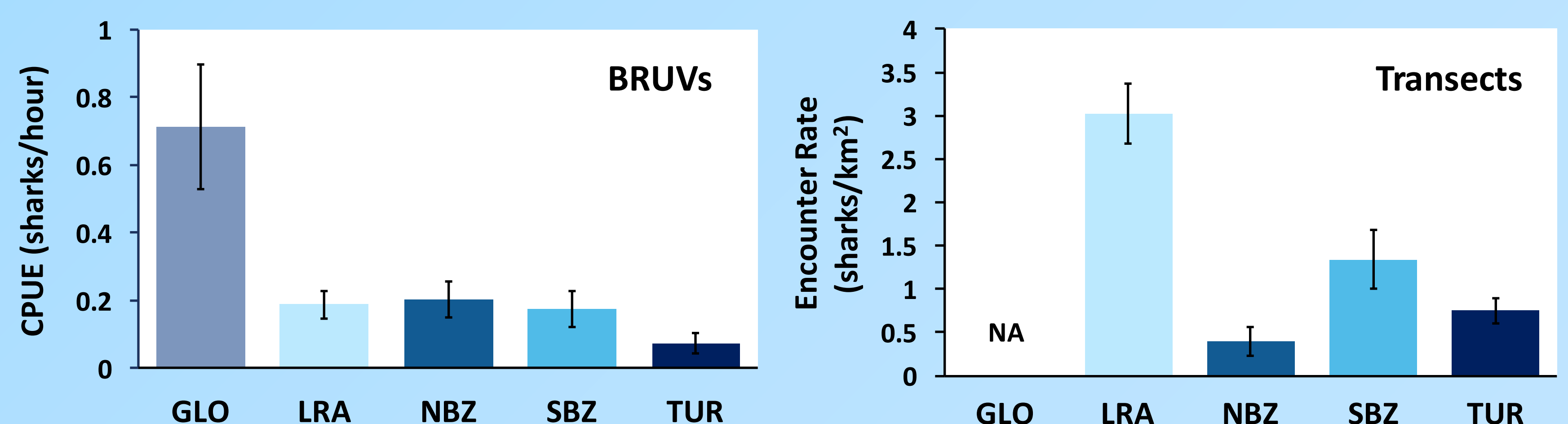
Surveyed study regions. Black dots represent survey stations. Area of Reef and Lagoon ecosystems were adapted from the map of the ecosystems of Belize redacted by Meerman & Clabaugh (2017).

Results

1. No difference between sites within and outside of protected areas was recorded.



2. BRUVs and Transect document different trends in density. No transects at Glover's.



3. SBZ is the region with highest absolute density, followed by Lighthouse Reef Atoll.

Study Region	Number of sharks	S.E.
Lighthouse Reef Atoll- LRA	2,976	719
Northern Belize - NBZ	709	417
Southern Belize - SBZ	4,674	1,881
Turneffe Atoll - TUR	1,403	784
Non surveyed areas	4,613	3,081

Key messages

3,858 – 14,375
Nurse sharks
in Belize

- CPUE highest at Glover's Reef Atoll
- ER highest at Lighthouse Reef Atoll
- Turneffe Atoll has lowest CPUE and ER
- MPAs not effective at protecting nurse sharks