

The tale of a sedentary specie: Saving *Tridacna gigas* in the South China Sea



ABLOS

Monaco, 20-22 October 2015

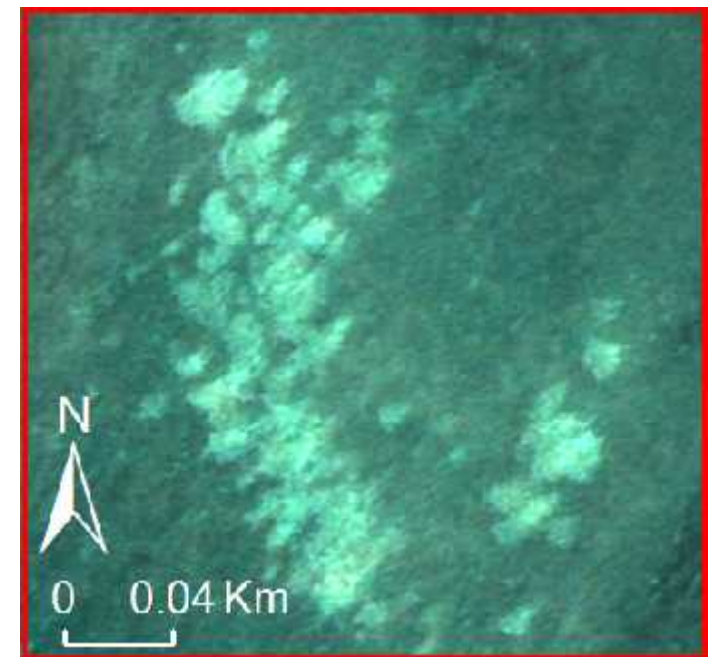
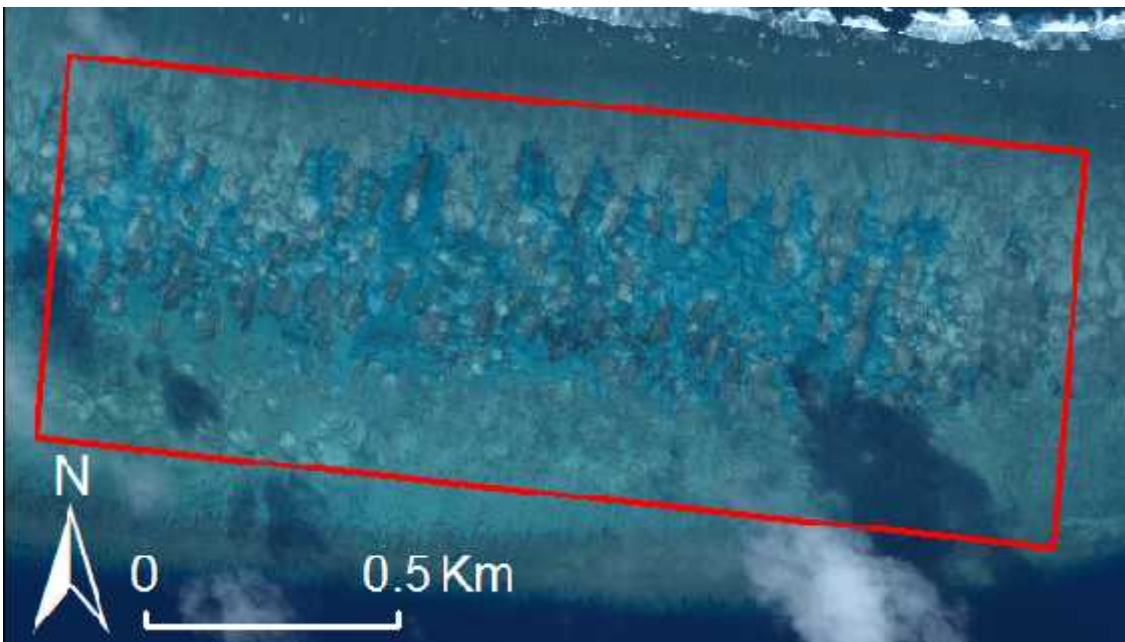
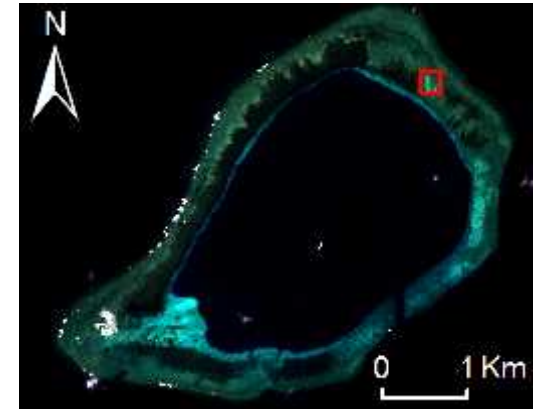
Youna Lyons, Denise Cheong, Neo Mei Lin, Wong Hiu Fung
National University of Singapore

Outline

- I. Background
- II. Maritime zones: does location matter?
- III. Extent of the obligation to protect under UNCLOS and CITES according to international case law
- IV. Assessment of threats
- V. Obligation to consult and cooperate
- VI. Conclusion

I. Background

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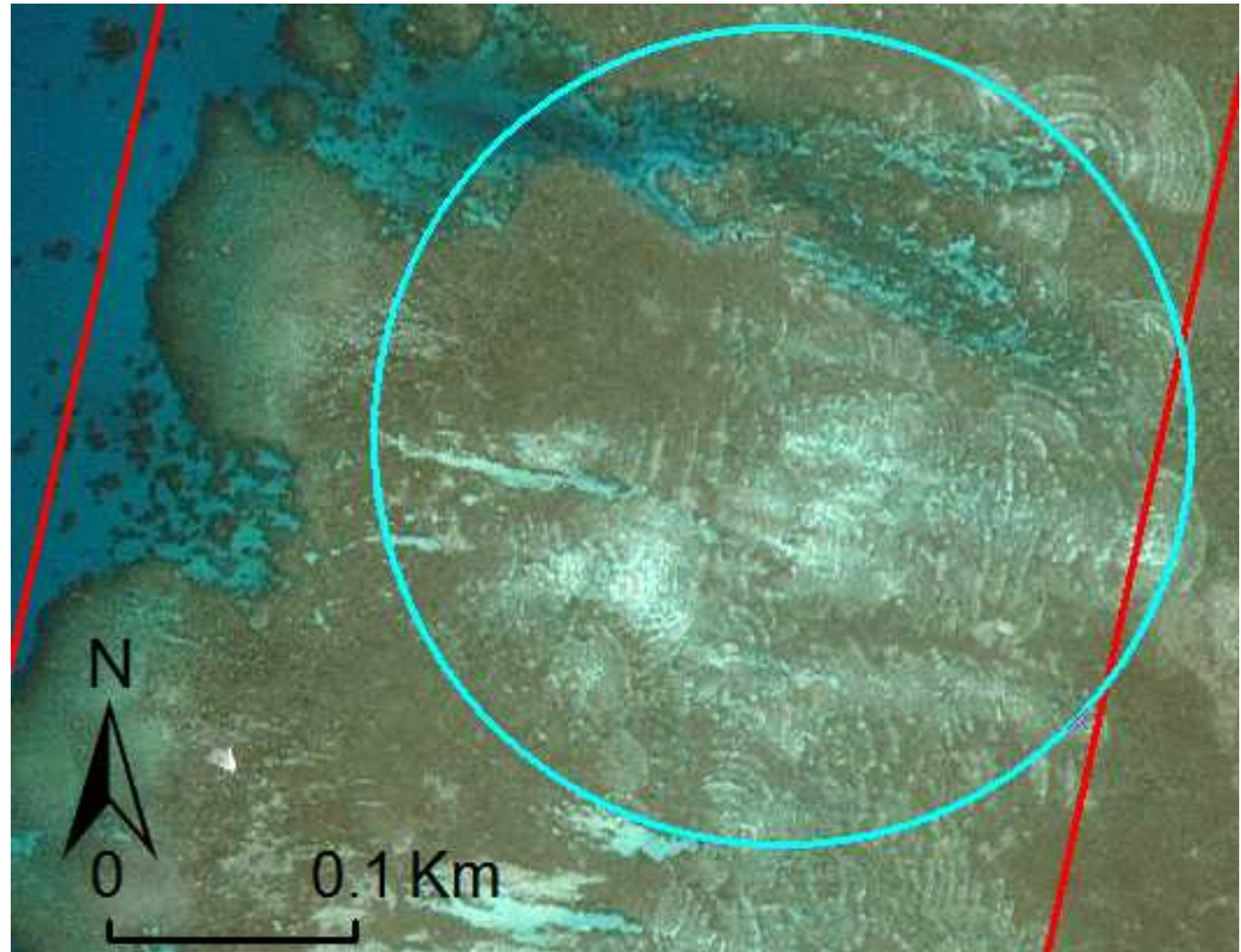
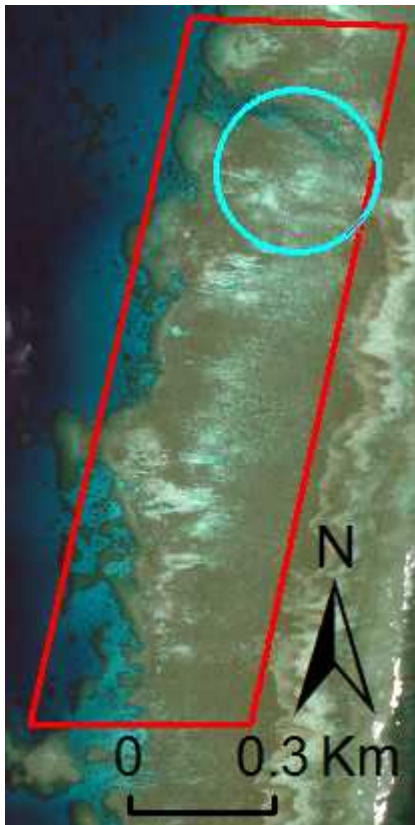
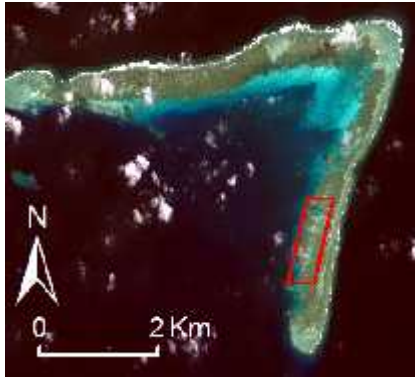


**Heavily dredged reef flat in areas of sandy substrate
(for construction material?)**

**Localized and selective dredging
marks: Why?**

I. Background

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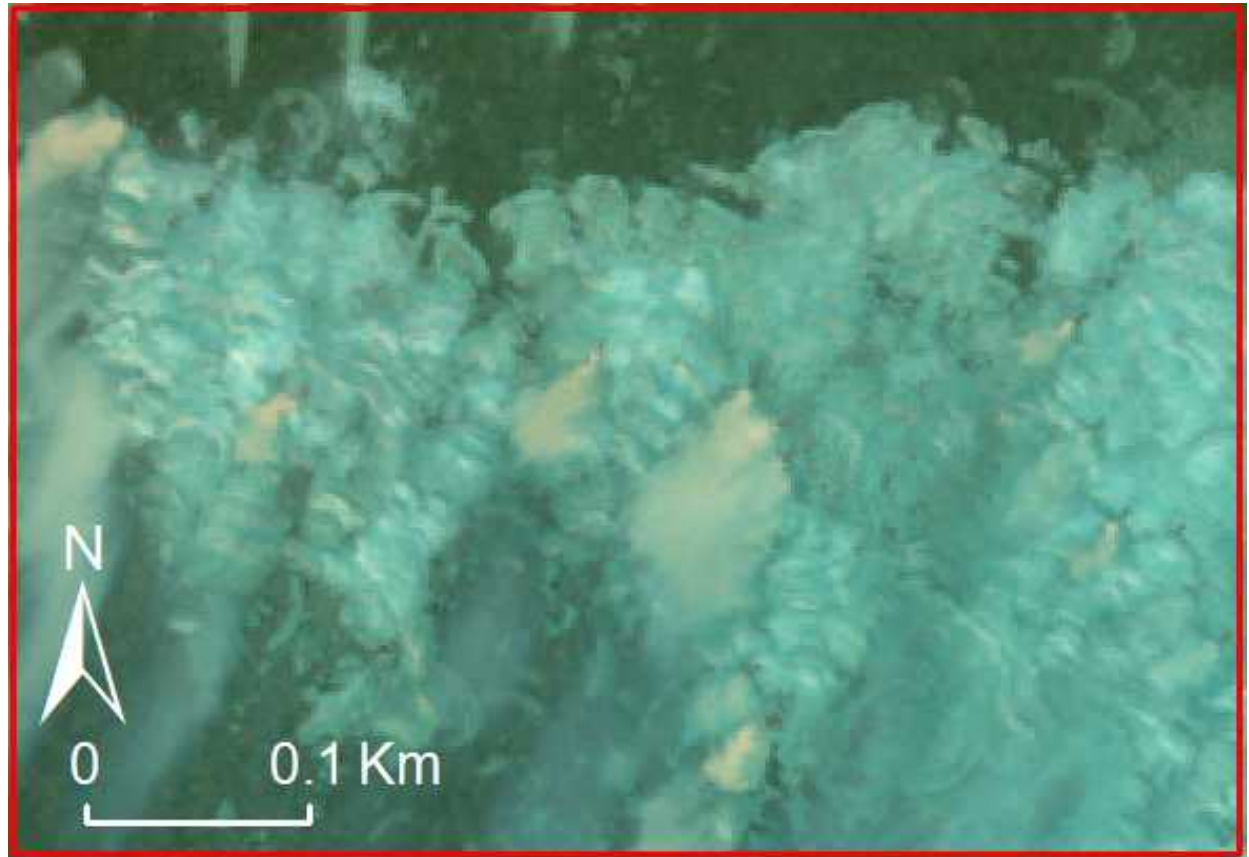
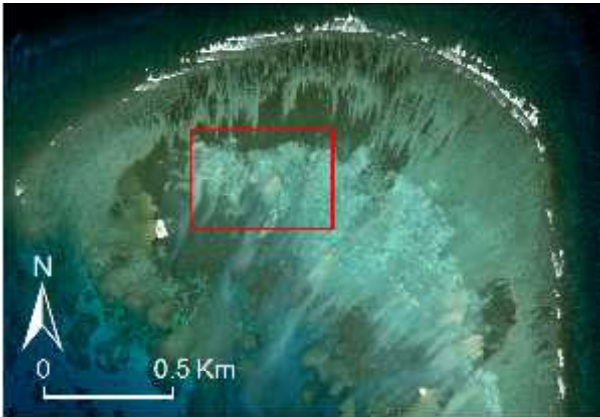


Dredge marks on the living (reddish-brown) cover of the reef flat, but not on the sandy bottom (bluish) of the reef flat.

I. Background

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Many dredgers around



I. Background

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I. Background

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True giant clam, *Tridacna gigas*



Largest giant clam species

Inhabits the shallow-water coral reefs, and free-living on the sand

Geographically found largely within the Indo-Pacific

Harvested for its adductor muscles and shells = high-value marine products

Currently locally extinct in numerous regions

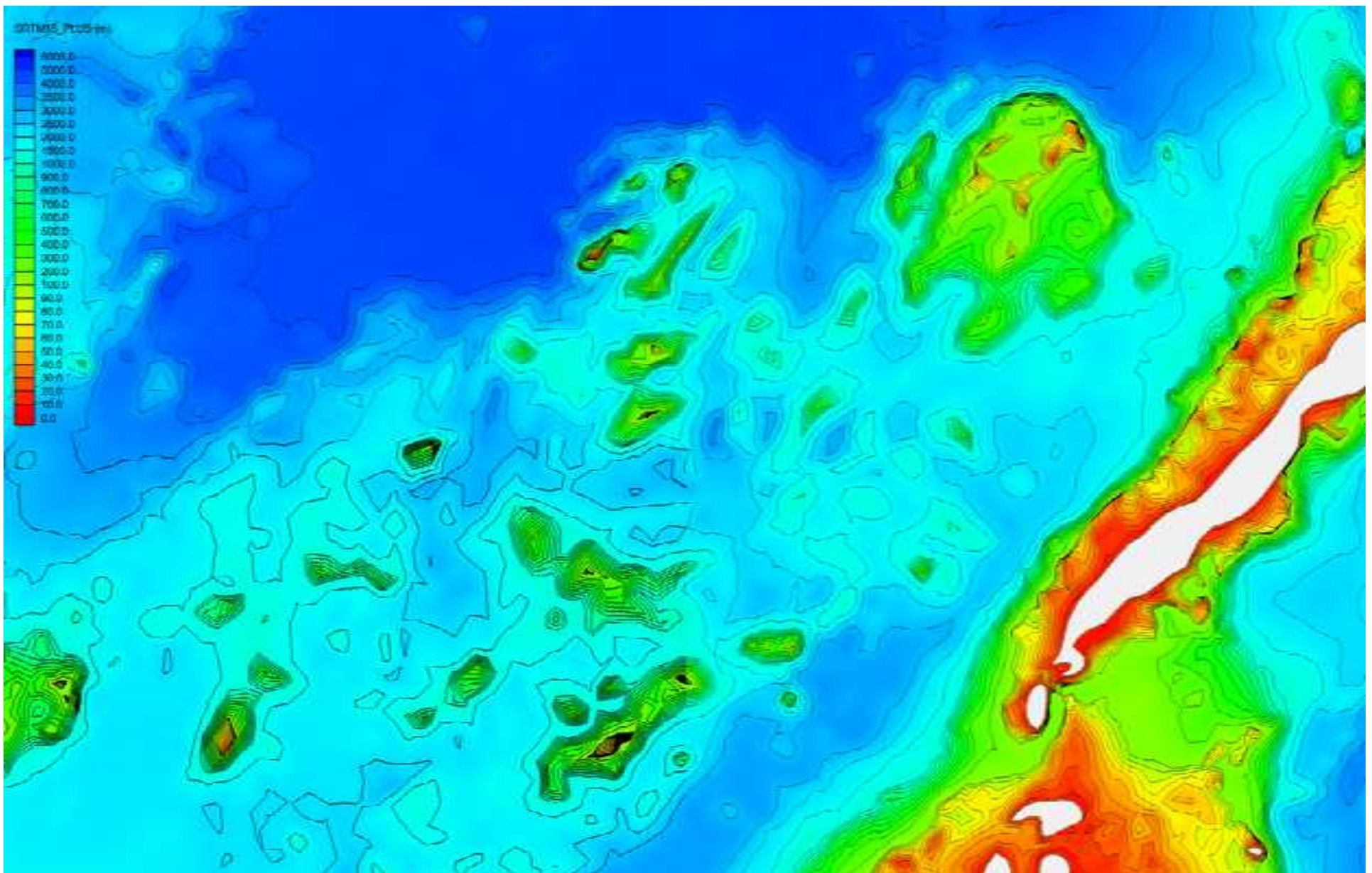
II. Maritime Zones: does location matter ?

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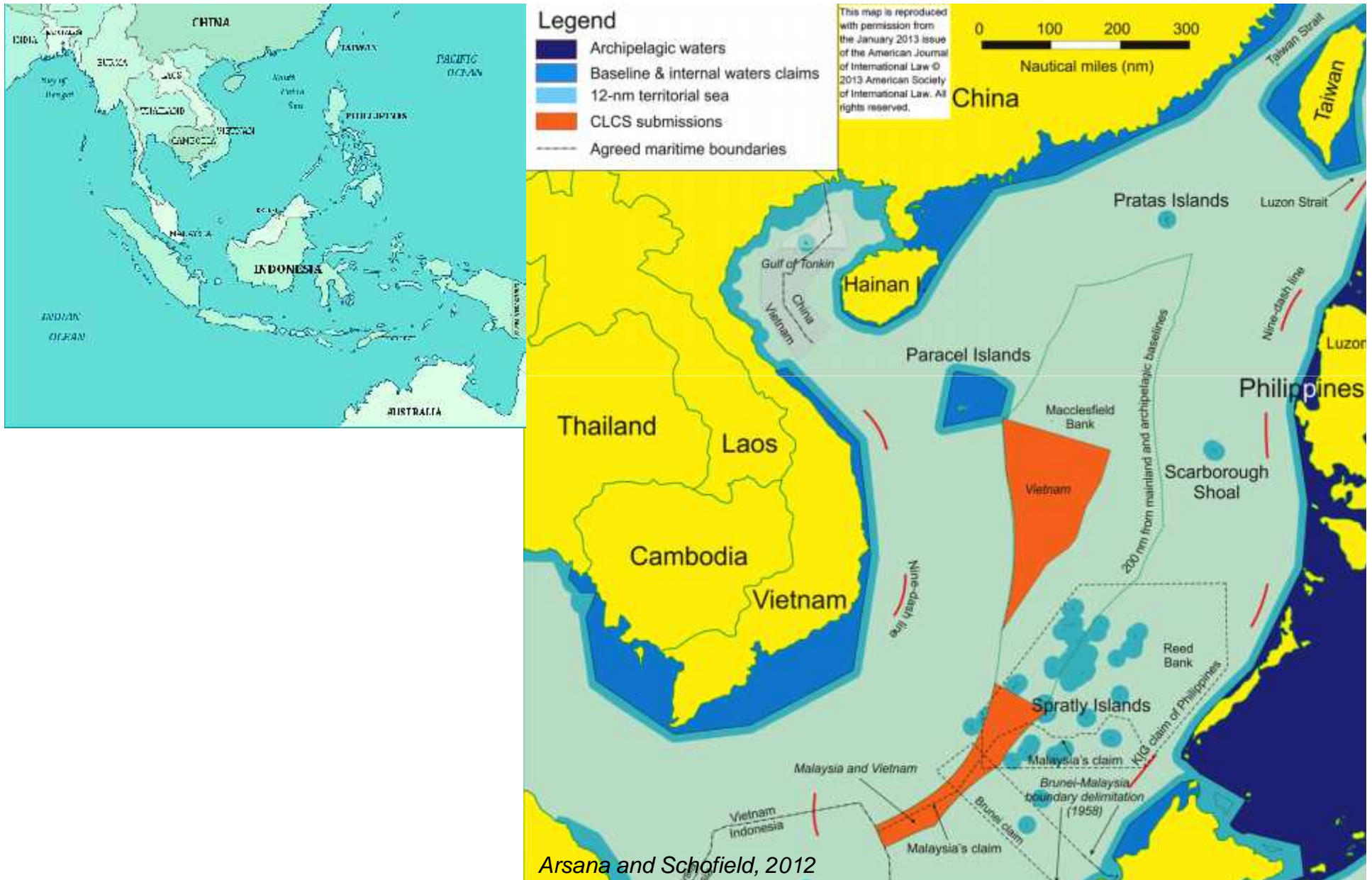
- On sandy flats located on reef systems that may be
 - partly above water at high tide,
 - partly above water only at low tide,
 - Always submerged
- Sand flats may be within 12NM of an above water feature or beyond
- Clams may thus be located in hypothetical territorial sea, on a continental shelf or extended continental shelf or in the Area
- Given the existing uncertainty and lack of any State's position on the above water status of insular features in the South China Sea, any maritime zone attribution can only be hypothetical and for the sake of discussion

II. Maritime Zones: does location matter ?

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II. Maritime Zones: does location matter ?



II. Maritime Zones: does location matter ?

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- Sedentary species are not the subject of detailed fisheries management rules in UNCLOS
- Coastal States have exclusive fisheries rights up to the outer edge of their exclusive economic zone
- However, this sovereign right has to be exercised in accordance with their duty to protect and preserve the marine environment [art.193 UNCLOS]
- This obligation to protect the marine environment applies to all maritime zones
- Further all the shallow features located in the Spratly area are the subject of competing claims

III. Obligation to protect

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General yet clear obligation to protect under UNCLOS ...

Protect and preserve the marine environment [Art.192]

Exploit their natural resources [living and non-living] in accordance with the duty to protect the marine environment [Art. 193]

Protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life [Art. 194(5)]

These apply to the maritime environment of all maritime zones (and therefore include sedentary species)

III. Obligation to protect

2/7

... Operationalized in CITES with respect to endangered species ...

Species included in CITES [1973 Conv. On the Int'l Trade in Endangered Species of Wild Fauna and Flora] Appendices I and II qualify as 'threatened and endangered species' in UNCLOS Art 194(5) UNCLOS

Giant clam is in Appendix II

Introduction from the sea of any specimen of a species included in Appendix II requires the prior grant of a certificate from a Management Authority of the State of introduction which is subject to:

- recognition that the introduction will not be detrimental to the survival of the species involved (on the basis of scientific data; and
- recognition that any living specimen will be so handled as to minimize the risk of injury, damage to health or cruel treatment

III. Obligation to protect

3/7

... Operationalized in CITES with respect to endangered species ...

- CITES Art. 2 (para. 1 & 2) sets out conditions for species to be included in Appendices I and II
- Appendices I and II can be amended by meetings of the COP with a two-thirds majority of the Parties present and voting
- Criteria for amendment of Appendices I and II are set out in COP 9.24 (Rev. COP 16) which strongly calls for a precautionary approach in cases of uncertainty (Annex 4)

III. Obligation to protect

4/7

... Operationalized in CITES with respect to endangered species ...

- CITES Significant Trade Review: only for period from 1994-2003; range states did not include states bordering South China Sea except for Vietnam; data deficient (either no data or collected at family and not species level)
- *T. gigas* should be moved to Appendix I as it meets the biological criteria Annex I to Conf. 9.24 (Rev. CoP16)
- Strong implementation of CITES also requires domestic trade in the specimens of *T. gigas* to be prohibited by national legislation - review of national legislation of SCS States required

III. Obligation to protect

1/7

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III. Obligation to protect

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... further detailed by the ICJ and ITLOS

‘Obligation to ensure’ that activities are so conducted as to not cause damage to the marine environment is an obligation of due diligence according to the ICJ

An obligation ‘to deploy adequate means to exercise best possible efforts, to do the utmost to obtain this result’

‘Due diligence’ is a ‘variable concept’ that ‘may change over time as measures considered sufficiently diligent at a certain moment may become not diligent enough in light, for instance, of new scientific or technological knowledge’

Due diligence also includes the Obligation to apply a precautionary approach and best environmental practices

III. Obligation to protect

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... Also reinforced in area subject to overlapping maritime claims

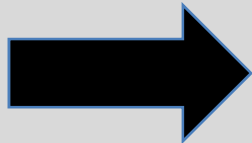
- States bordering the South China Sea claim an EEZ and continental shelf and many of the sand flats are located within these zones
- Potential sovereignty claims over insular features located within these zones generate overlapping maritime zones
- There is therefore an obligation of mutual restraint on all claimants
- This include on obligation to refrain from unilateral activities that to could may result in permanent change to the marine environment

III. Obligation to protect

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In the context of the giant clam

- Existing commercial pressure
- Lack of certainty on the impact of existing threats cannot be used to justify that no measures are necessary
- If evidence suggests serious depletion and a risk of extinction, steps must be taken to avert this risk
- If evidence of threats but lack of data on population level and impact of current activities, impacts must be studied and the population assessment should be undertaken



What is the current state of knowledge?

IV. Assessment of threats

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1. Slow-growing with late reproductive maturity

Simultaneous hermaphrodites

–Males = 2-3 years old

–Females = 8-10 years old

Rely on synchronous spawning among neighbouring clams

Exploitation selectively removes mature spawning individuals and increases nearest-neighbour clam distances

Impedes reproduction success, and natural recovery of stocks



IV. Assessment of threats

2/6

2. On-going loss of functioning reef systems limits recruitment of giant clam larvae

Older planktonic clam larvae eventually settle out onto suitable reef habitats after approximately 9 days

The clam larvae are capable of actively selecting their settlement sites by swimming and via chemosensory

Specifically, they were found to preferentially settle on functional coral reefs containing crustose coralline algae (CCA), or in the presence of giant clams

In the absence of both CCA and giant clams, larvae are less likely to settle and recruit successfully



IV. Assessment of threats

3/6

3. Population genetic structures among wild *Tridacna gigas* populations in the Pacific and SCS are different

Previous genetic studies on *T. gigas* suggest that wild populations remaining in the world are genetically structured and differentiated

Giant clams within a localised region were genetically more similar, compared to giant clams found outside of this region

Considering the geographic barriers and hydrodynamics of currents, we expect that the genetic diversity of wild *T. gigas* populations in SCS to be different from the remaining wild populations in the world

Loss of *T. gigas* in SCS would lead to a total loss of their genetic diversity

IV. Assessment of threats

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4. Reinstatement of population *via* mariculture does not replace wild stocks

The mariculture and restocking of giant clams have provided an immediate and effective solution to increasing depleted wild stocks

However, a critical consideration is how to maintain genetic diversity of existing wild stocks

Previous studies have shown that hatchery-produced juveniles are genetically limited relative to the wild populations, despite improved protocols

Introducing large numbers of genetically un-diverse juveniles could overwhelm the gene pool of wild stocks, and result in the loss of

genetic integrity of local T. ... populations

IV. Assessment of threats

5/6

5. Threats extended to coral reef ecosystems in the SCS due to the ecological roles of giant clams

Giant clams are effective ecosystems engineers

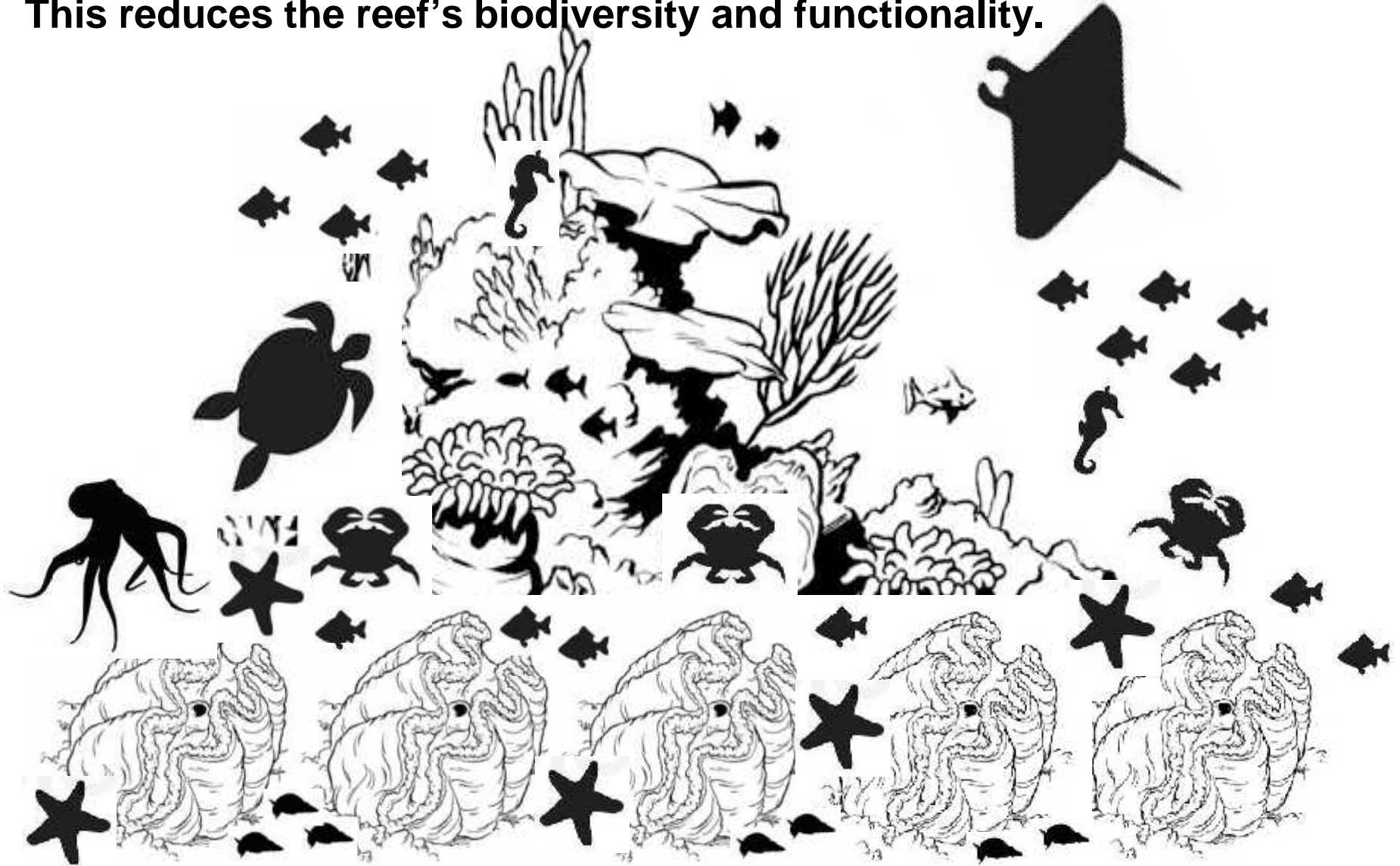
Providers of food and shelters, as well as reef builders and shapers



A healthy coral reef ecosystem looks like this...

When giant clams are removed...

This reduces the reef's biodiversity and functionality.



V. Obligation to cooperate and consult

States bordering enclosed or semi-enclosed seas have an obligation to cooperate with each other to manage, conserve, explore and exploit living resources [UNCLOS Art 123]

States also have an obligation to consult other States when activities conducted within their jurisdiction or under their control can have transboundary impacts on resources of other States

These two obligations are particularly relevant in the context of giant clams that, even if sedentary in their adult form, are planktonic when in their larval stage; removal of adult clams upstream may impact recruitment of giant clams downstream

Conclusion

- International law provides clear grounds to hold coastal States accountable
- Conditions are met for up-listing of *Tridacna gigas* from Appendix 2 to Appendix 1, even globally
- SCS specific population assessment needed
- Moratorium on harvesting until assessment results
- Joint management mechanisms based on a regional arrangement including for instance quotas and gear types and compliance ensured by coastal States

A map of Southeast Asia, including the Malay Peninsula and the Indonesian archipelago. The map is overlaid with a grid and features numerous red and blue circular markers scattered across the landmasses. The text 'Thank you!' and 'Questions?' is centered over the map, and the email address 'younalyons@nus.edu.sg' is positioned below it.

Thank you!

Questions?

younalyons@nus.edu.sg