Update on global status of the dugong

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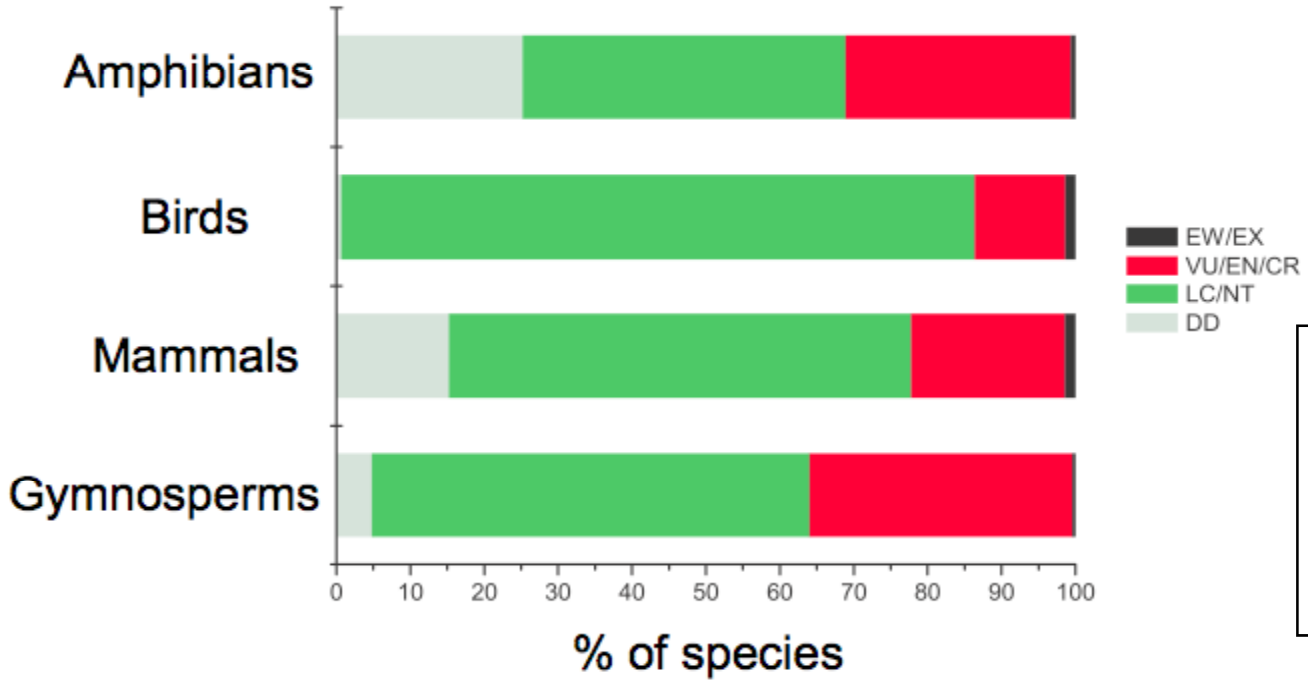
Biodiversity crisis

- Current and projected extinction rates exceed geologically normal background rates by several orders of magnitude
- Predicted extinction episode = mass extinctions of paleontological past



Thomas et al.
15 -37% species "committed to extinction" by 2050 (*Nature* 427:145)

Loss of evolutionary history : mammalian orders at risk

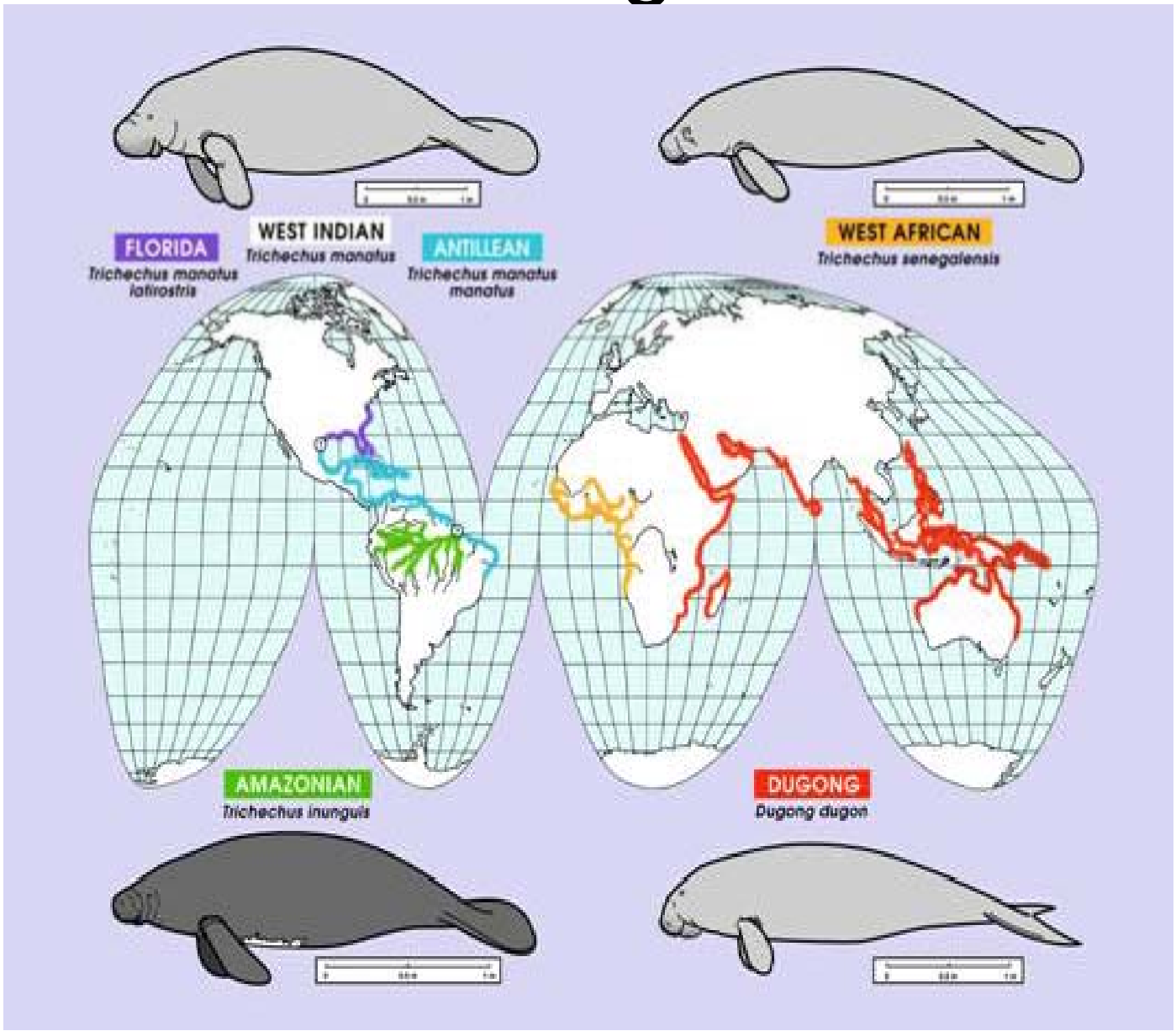
Order Microbiotheria
1 species Monito del Monte

Order Proboscidea
3 species

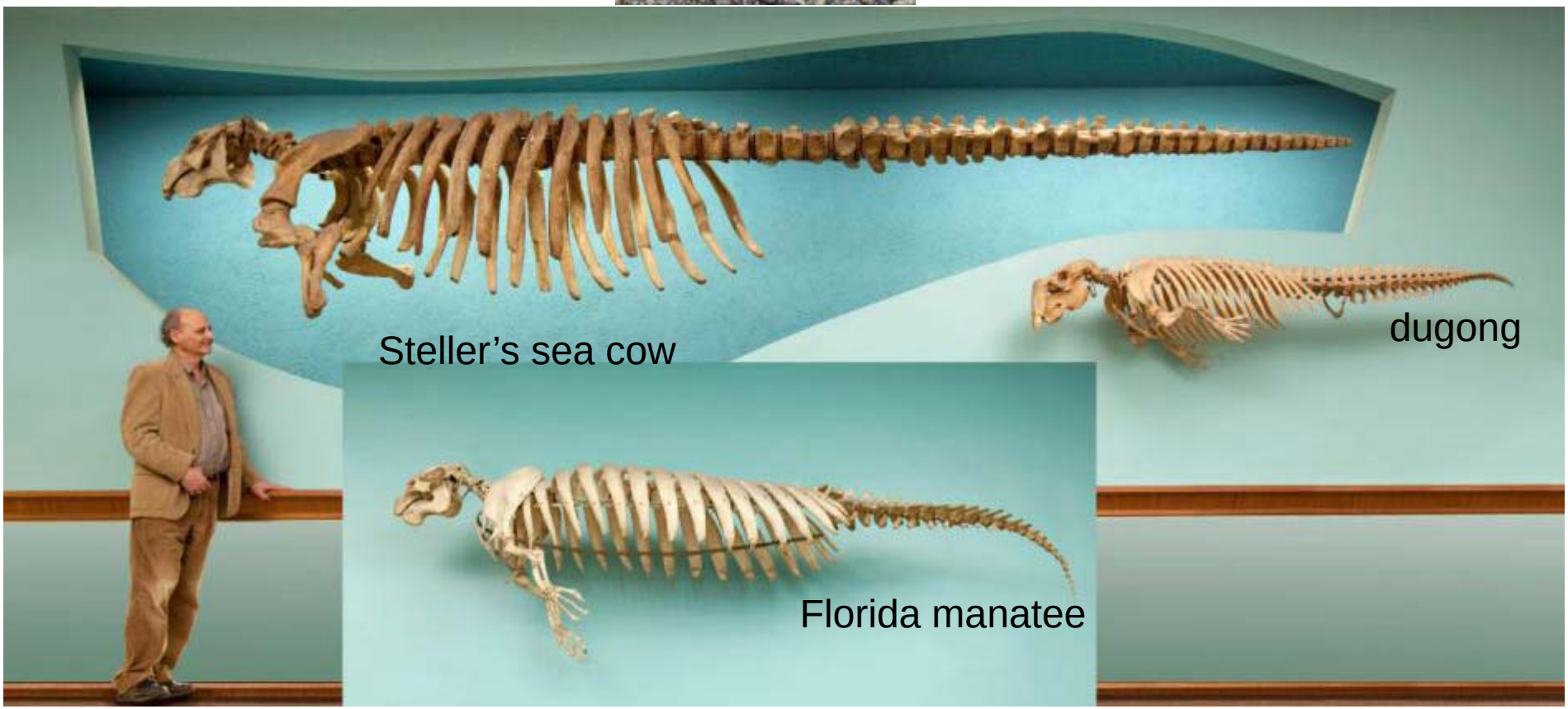
Order Sirenia
4 species

Purvis et al. Science 288: 328-330

The existing Sirenia

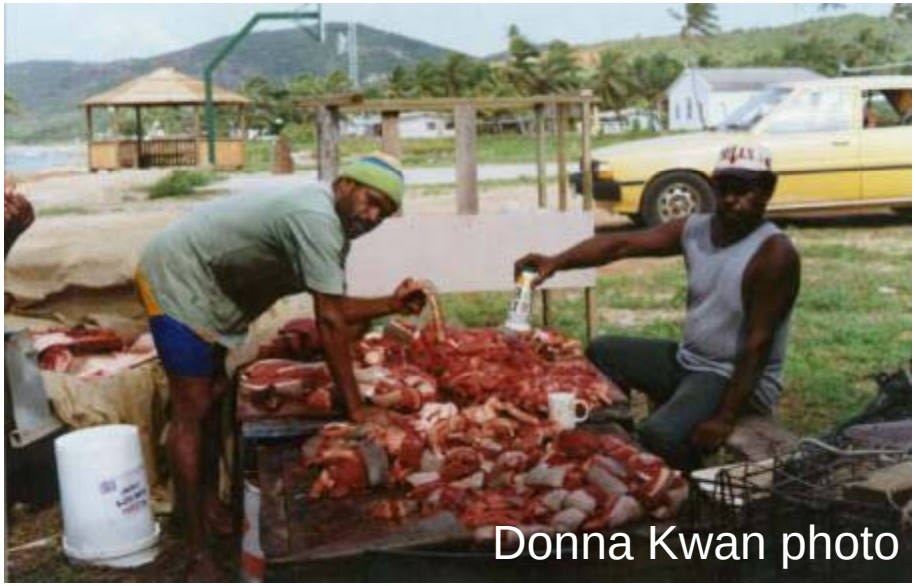


The spectre of Steller’s sea cow



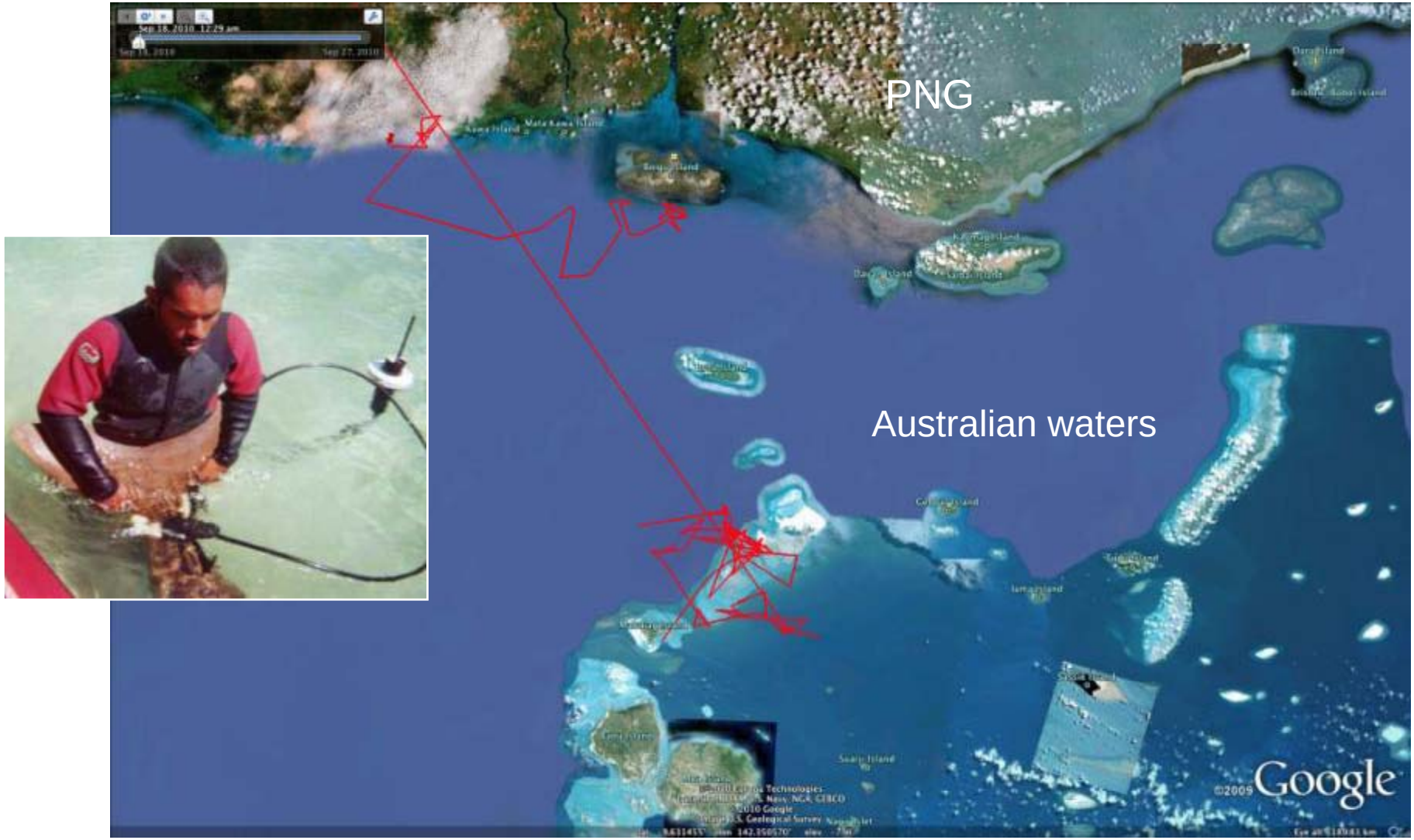
Why are dugongs at risk?

- Long-lived slow breeding
- Warm water habitats accessible to human impact
- Taste very good!
- Valuable by-products



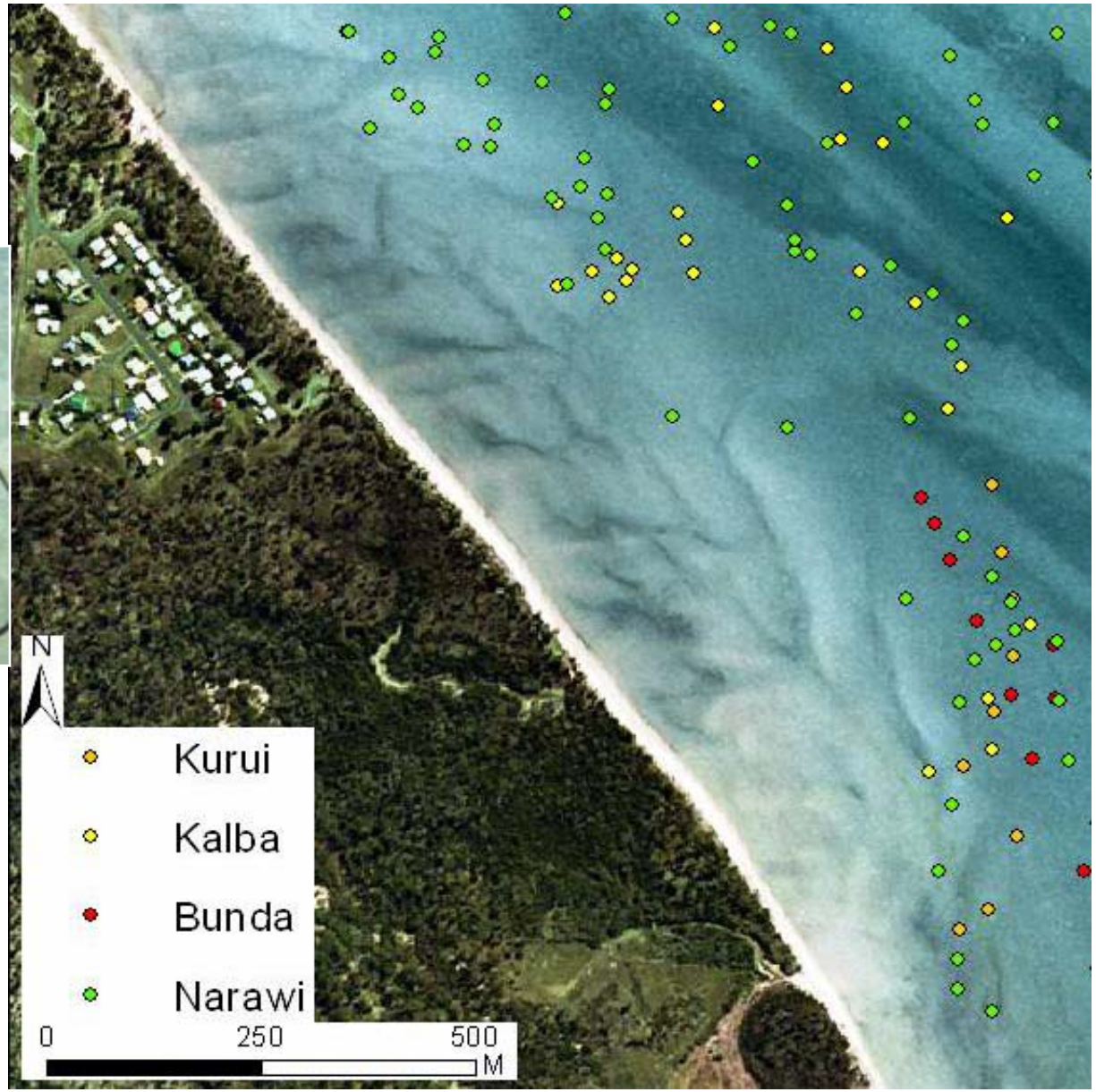
Seagrass community specialist

Satellite tracking shows that dugongs move across international borders



Dugong habitat is very accessible to humans

Locations of dugongs satellite-tracked in Australia



Dugong life history

	Dugong
Lifespan (yr)	73
Age at first reproduction (yr)	7-17
Calving Interval (yr)	2.5-6
Adult survivorship	>95%
Maximum rate of increase %	~5

Consequences of being a long-lived slow breeder

- Survival of adults critical and must be more than 95% to maintain population
- Low sustainable human mortality

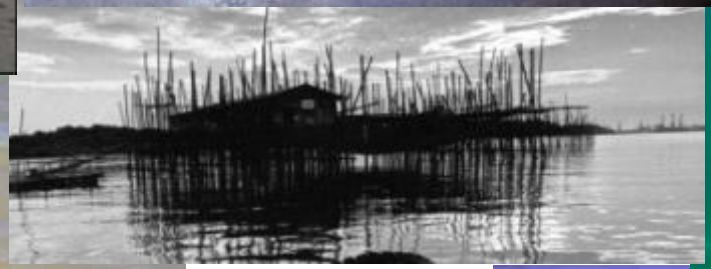
Dugong population size	Sustainable human-caused mortality per year*
100	0
1000	<13
10000	<130

*using PBR technique mandatory in US

Threats: developing countries and rural and remote areas

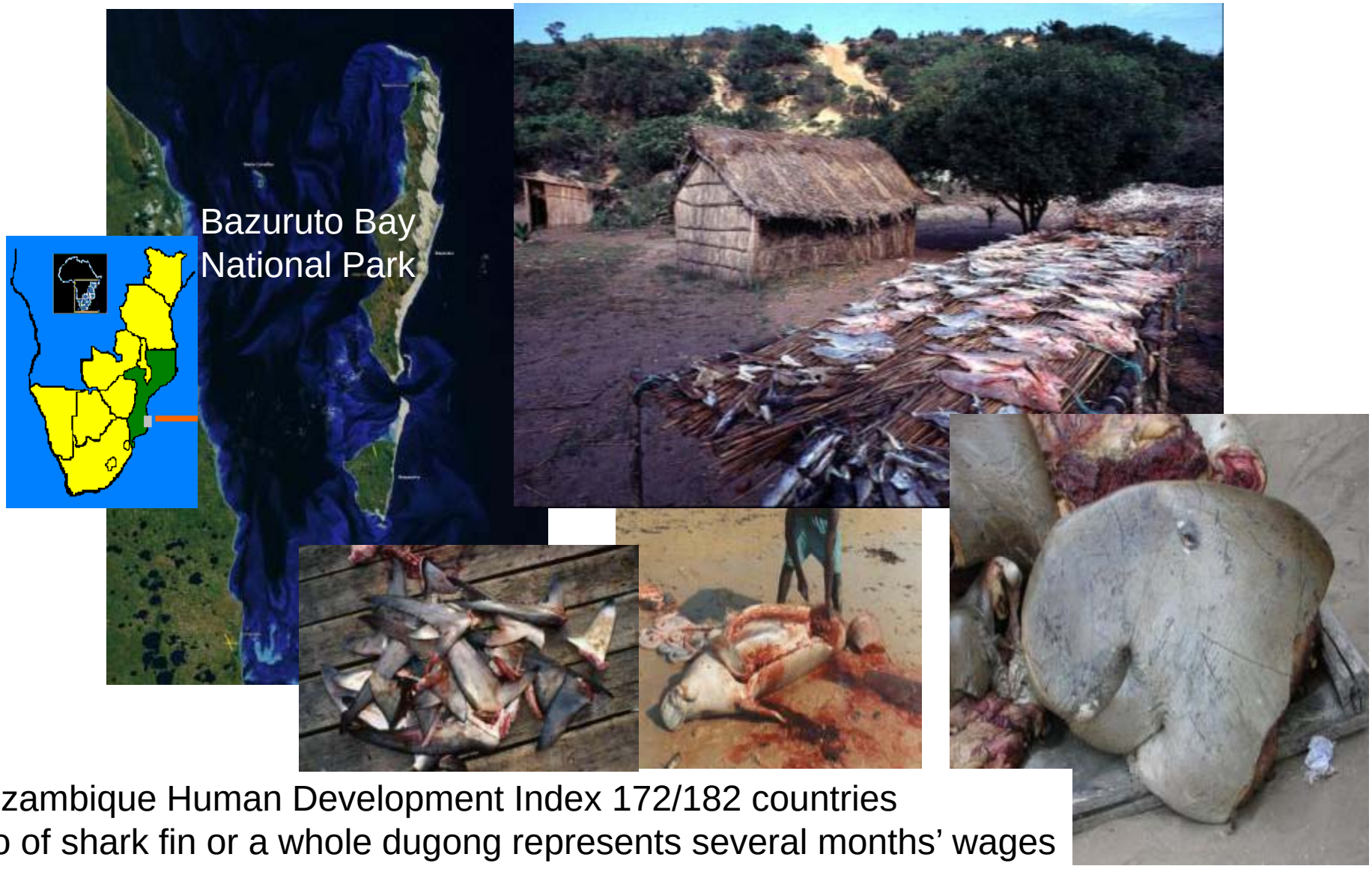
Incidental catch artisanal fisheries



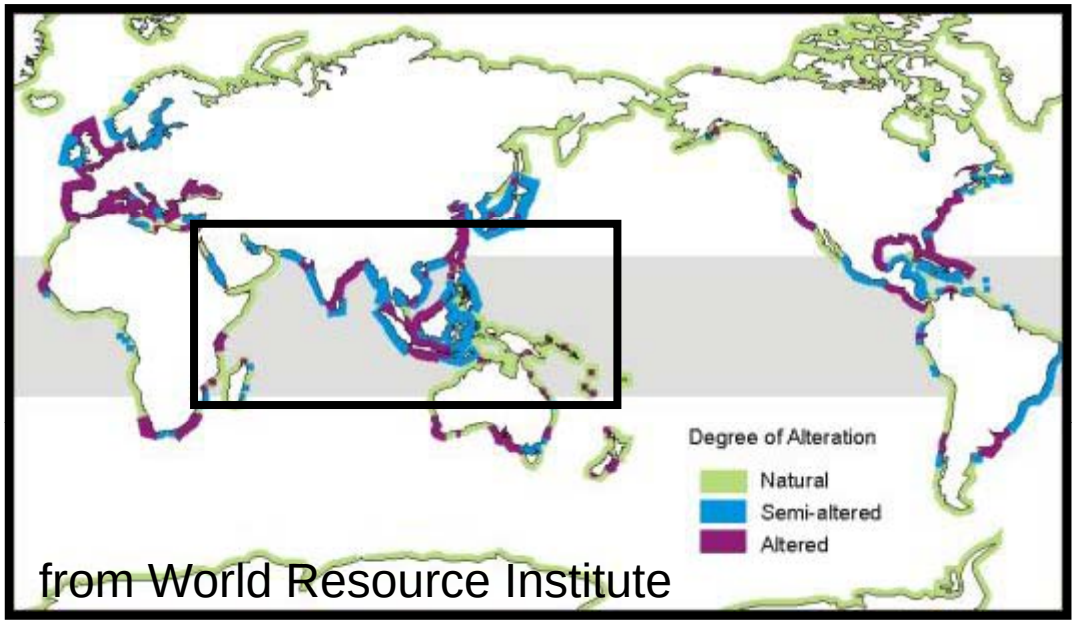


Catching a dugong: windfall for artesinal fishers



Mozambique Human Development Index 172/182 countries
Kilo of shark fin or a whole dugong represents several months' wages

Threats: urbanized areas



from World Resource Institute

IUCN Red Listing

Categories

- Extinct (EX),
- Extinct in the Wild
- **Critically Endangered**
- **Endangered**
- **Vulnerable**
- Near Threatened
- **Data Deficient**
- **Least Concern**
- Not Evaluated

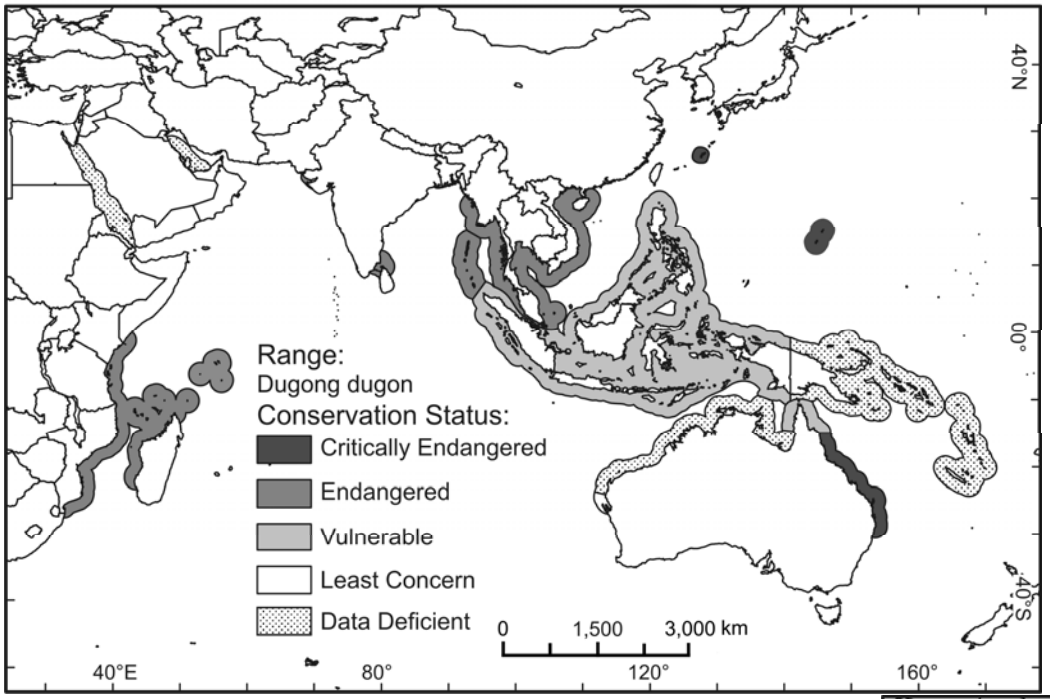
Criteria (decision rules)

- *population reduction (A)*
- small distribution area + fragmentation, decline or extreme fluctuations in population size (B)
- small population size + population decline (C)
- extremely small population (D)
- quantitative analysis of extinction probability (E)

Numerical thresholds different for each category

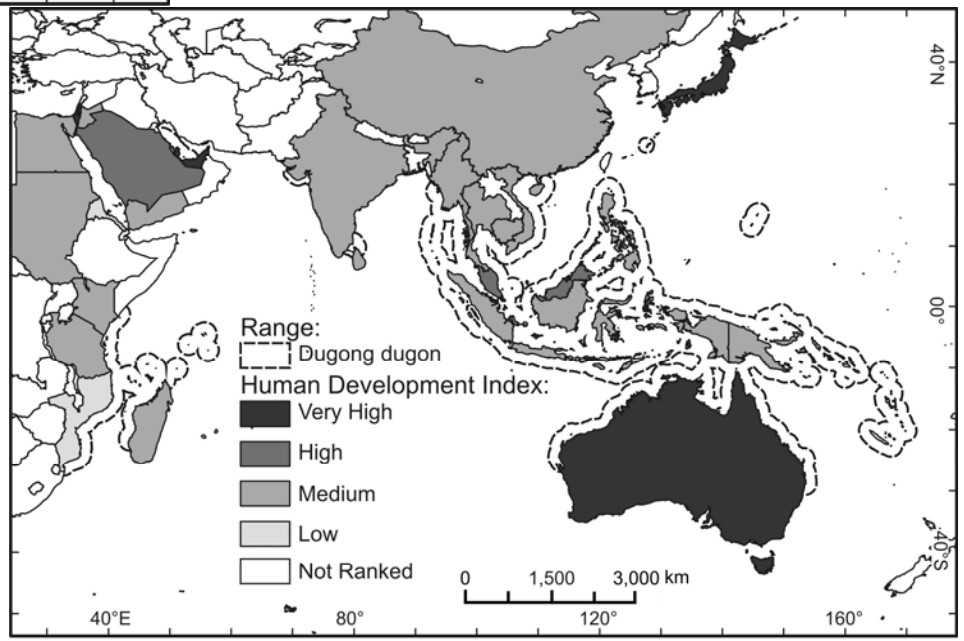
% of range affected by various threats		
	Based on % of coastline	
	Certain	Possible
Gill netting	87	99
Human settlement	82	82
Food for subsistence	85	92
Agricultural pollution	80	82

Marsh (2008)



Global range
spanning 128,00 km
38-45 countries

IUCN Global Status
vulnerable

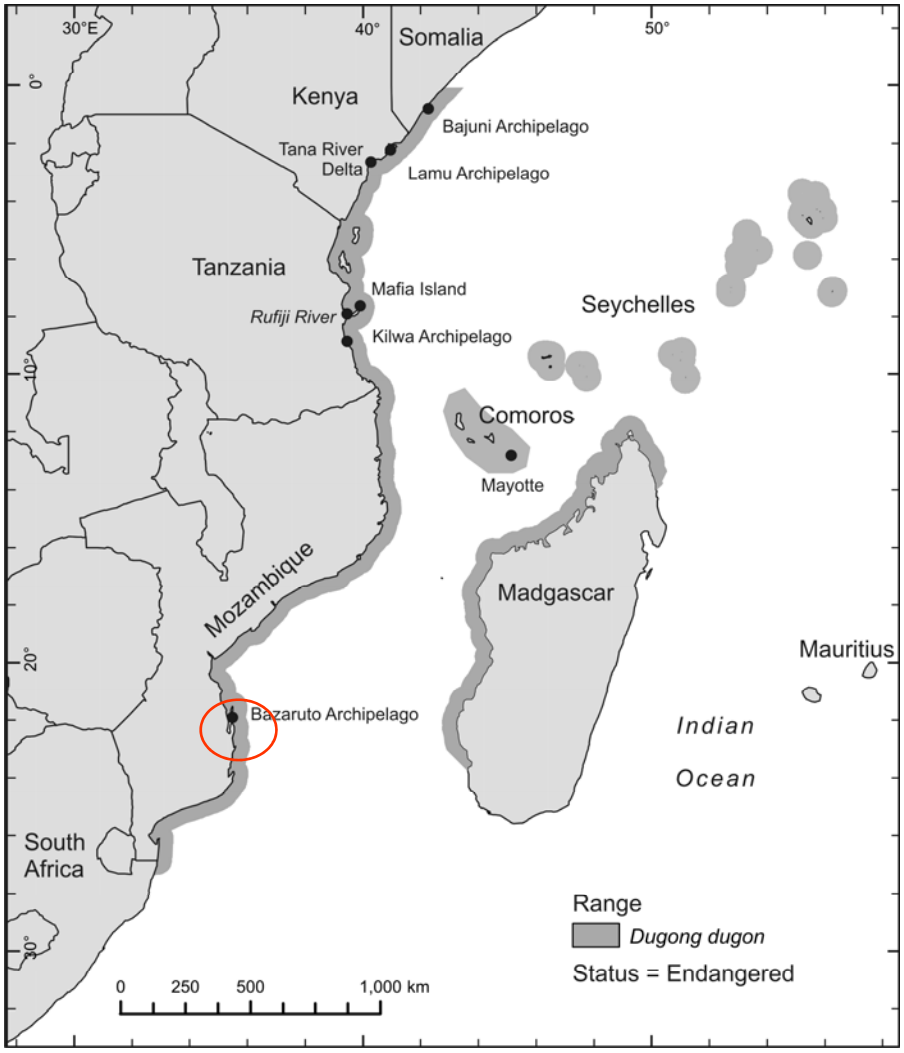


Human Development Index

UN composite index based on
3 indices of human development
- life expectancy at birth
- adult literacy rate
- purchasing power

Southern Indian Ocean Region:
Endangered

1600 km to Red Sea



% global range	**8.5**
Population size	**<2500 mature**
Isolation	**High**
Human Development Indices	**Low Medium**
Threat score	**High**
Effective Response Score	**Limited**

Red Sea: Data deficient

CMS Northern Indian Ocean region

1600 km East Africa

2000 km Arabian Gulf

% global range	**6**
Population size	**1000s**
Isolation	**High**
Human Development Indices	**Low-Med-High**
Threats score	**High**
Effective Response Score	**Limited**

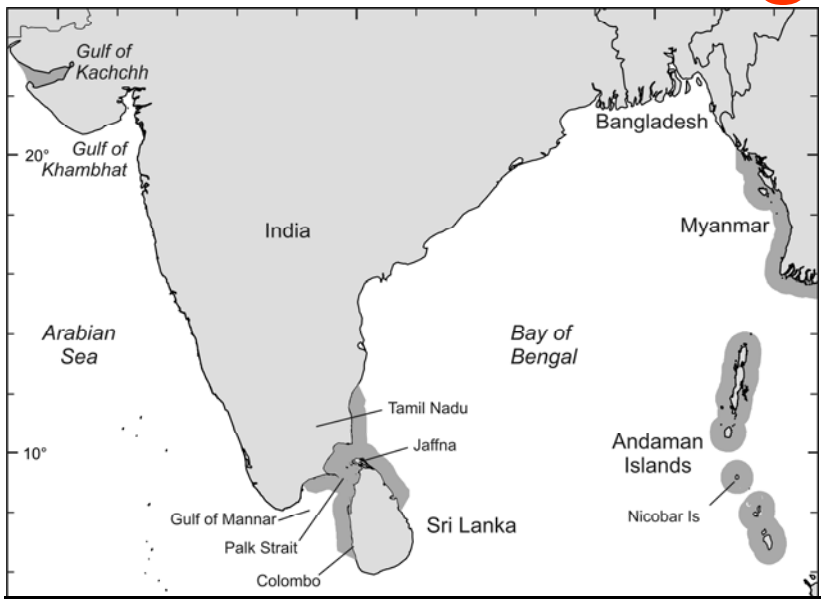
The Gulf: Data deficient

CMS Northern Indian Ocean region

2000 km
Red Sea
1700 km
India

% global range	**<2**
Population size	**1000s**
Isolation	**High**
Human Development Indices	**High- Very High**
Threats score	**High**
Effectivie Response Score	**Variable**

South Asia : Endangered



1700 km Gulf of Kachchh - Arabian Gulf

3100 km Gulf of Kachchh - Gulf of Mannar

4000 km Gulf of Mannar to Myanmar

% global range	**3**
Population size	**<2500 mature**
Isolation	**High**
Human Development Indices	**Medium**
Threats score	**High**
Response score	**Limited**

Continental SE Asia: Endangered

CMS South East Asian region

4000 km Gulf of Mannar to Myanmar

% global range	**9**
Population size	**<2500 mature**
Isolated	**No but fragmented**
Human Development Indices	**Medium-High**
Threats score	**High**
Effective Response Score	**Generally Low**

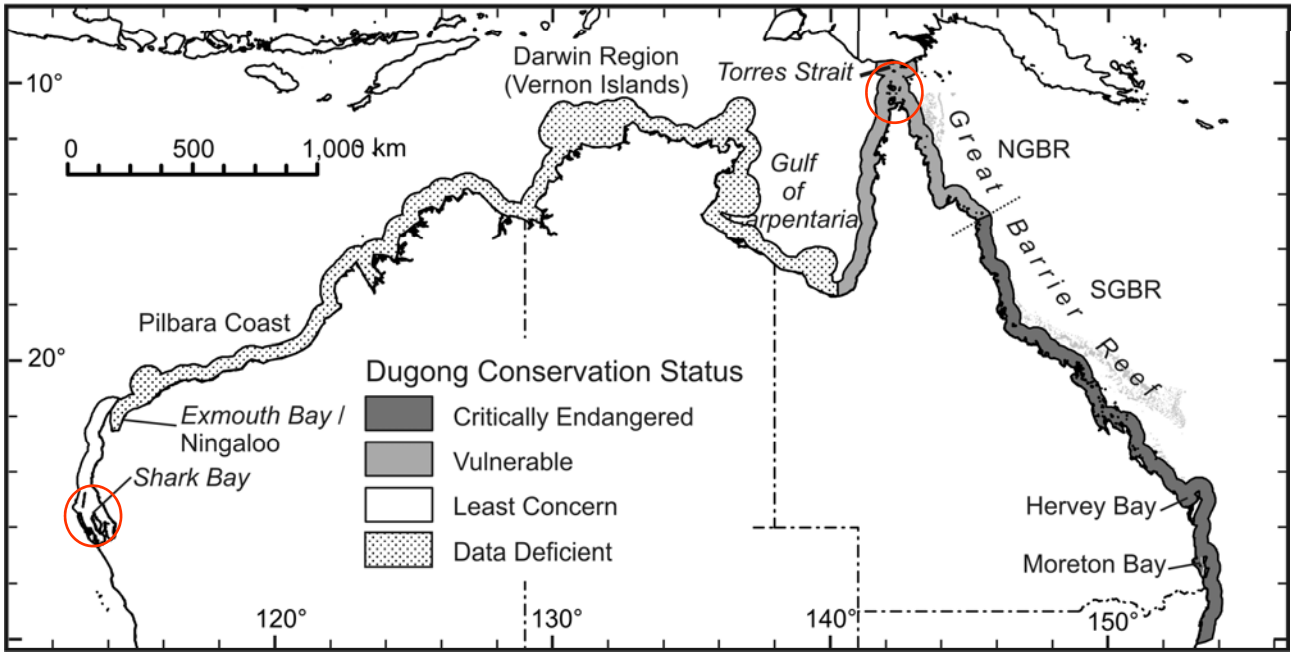
Archipelagic SE Asia:Vulnerable

CMS South East Asian region

Japan:
Critically Endangered
Palau:
Critically Endangered

% global range	**40**
Population size	**? 1000s**
Isolated	**No but fragmented**
Human Development Indices	**Medium-High**
Threats score	**High**
Effective Response Score	**Limited**

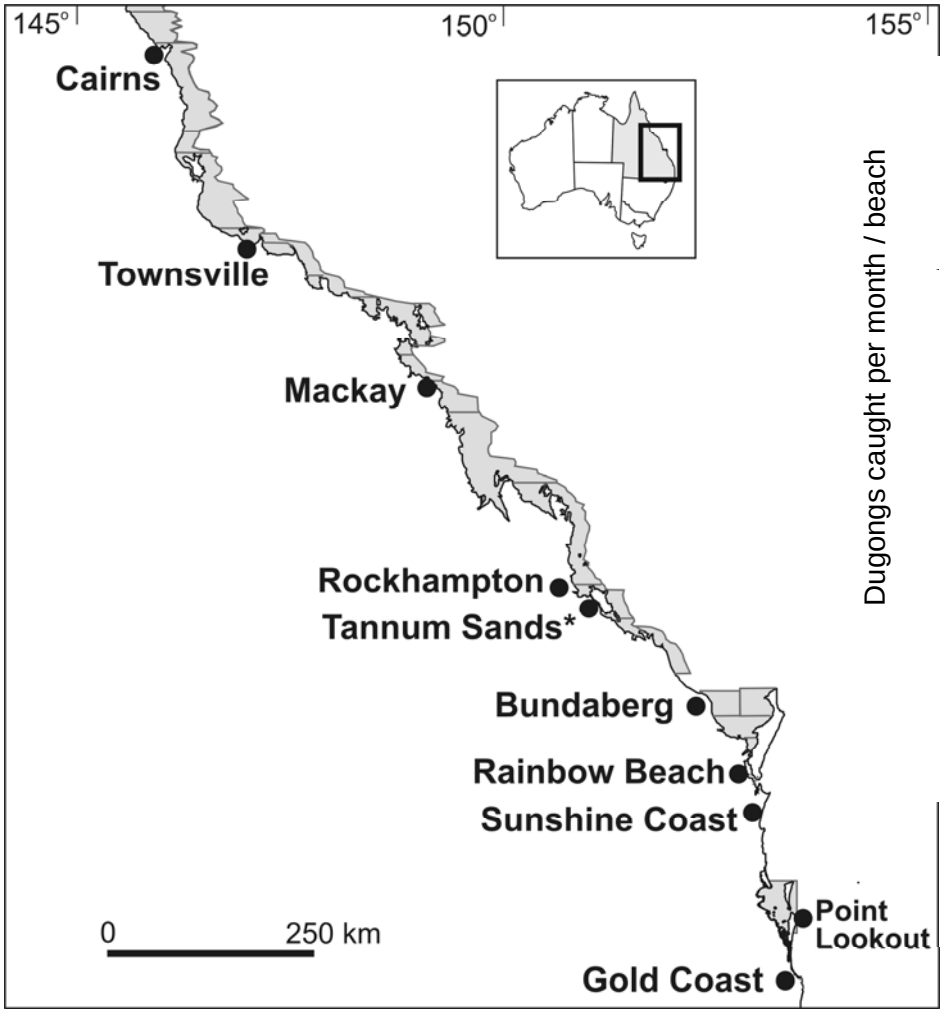
Australia: mixed

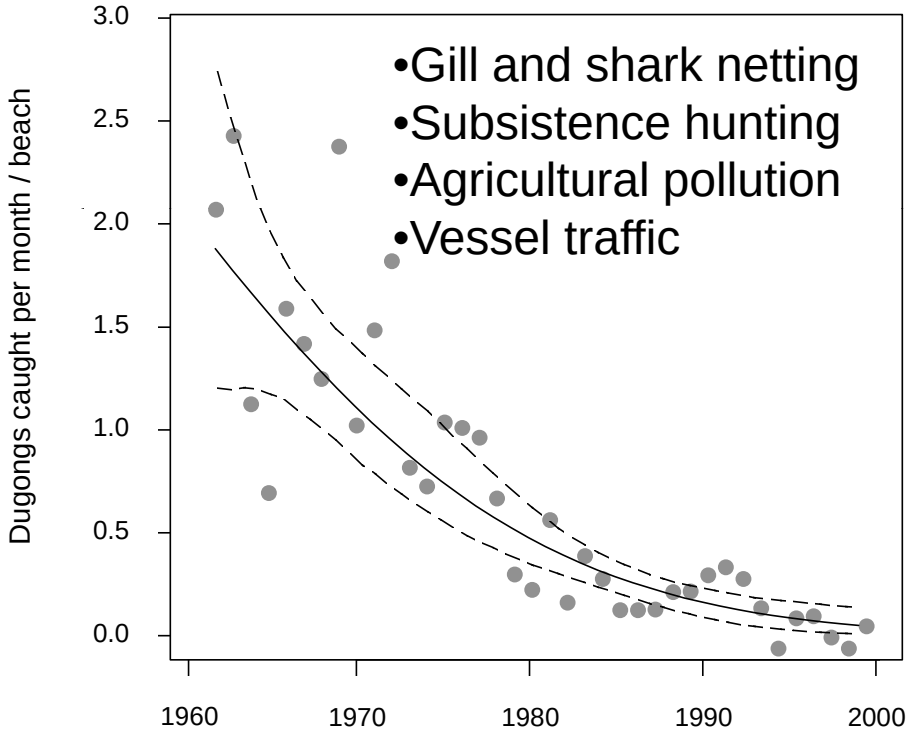


CMS Pacific region

% global range	**24**
Population size	**70,000++**
Human Development Index	**Very High**
Threat score	**Low-High**
Effective Response Score	**Limited -High**

Index site: urban coast of Queensland



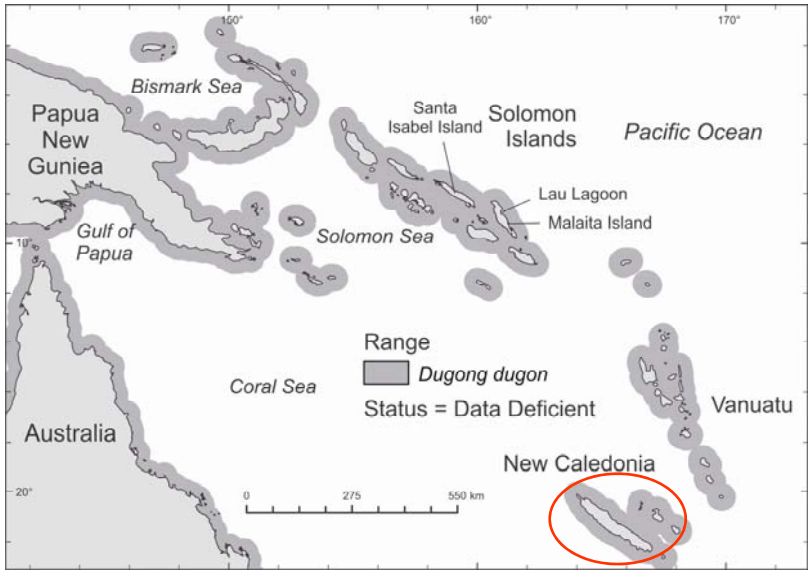


The dugong by-catch in the shark nets declined at 8.7% per year for 40 years = 97% decline

Critically Endangered

Pacific Islands: Data Deficient

CMS Pacific region



% global range	**9**
Population size	**1000s**
Isolation	**? Connection Australia**
Human Development Index	**Medium-Very High**
Threat score	**High**
Effective Response Score	**Limited**

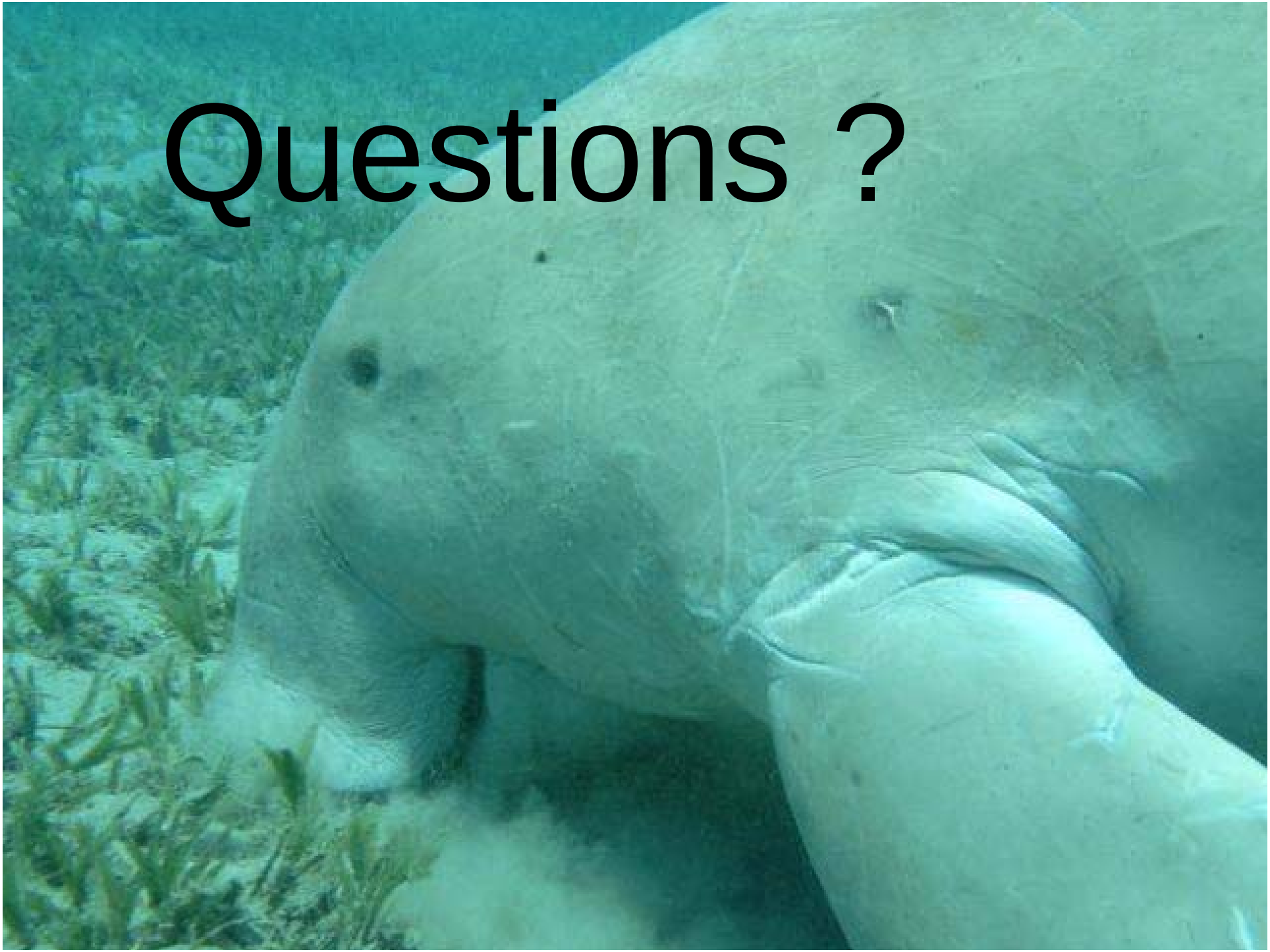
Global Prospects?

	Human Development Index			
Estimated Pop^{n} Size	**L**	**M**	**H**	**VH**
10^{4}-10^{5}				**1**
10^{3}-10^{4}		**4**	**2**	**3**
10^{2}-10^{3}	**3**	**6**	**1**	
10-10^{2}		**9**	**1**	**4**

Numbers are numbers of range states

Conclusions

- Total global population ?100,000 dugongs
- Huge range: still present at edges
- Anecdotal evidence of reduction in area of occupancy
- Seagrass community specialist suffering habitat loss
- Long-lived slow breeding
- Declines in much of range – multiple threats
- Index site in Australia has threats common to most of range
- Serious decline at index site
- High uncertainty in most regions


Questions ?