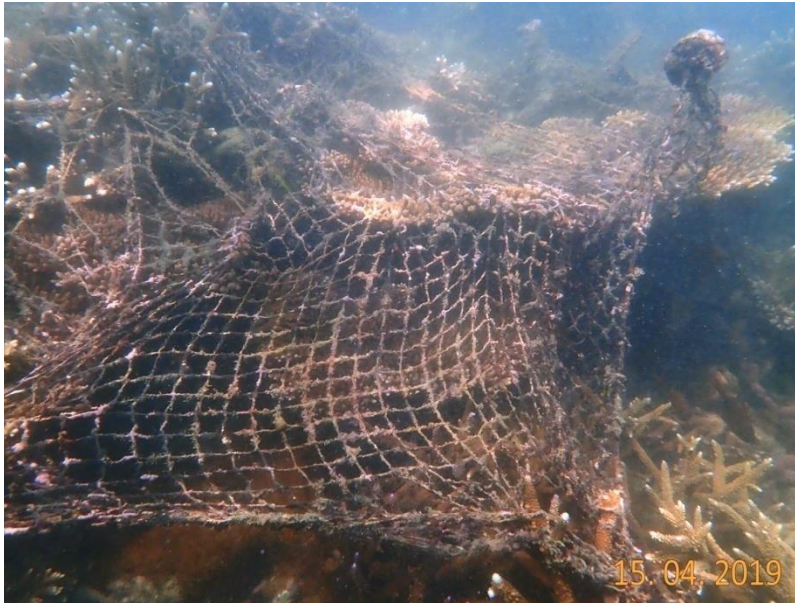


**Removal of Marine Debris from Reef Areas in Gulf of Mannar, Tamil Nadu, India - to reduce the stress to the bleached corals and to support recovery process  
(Ocean Action # 27510)**



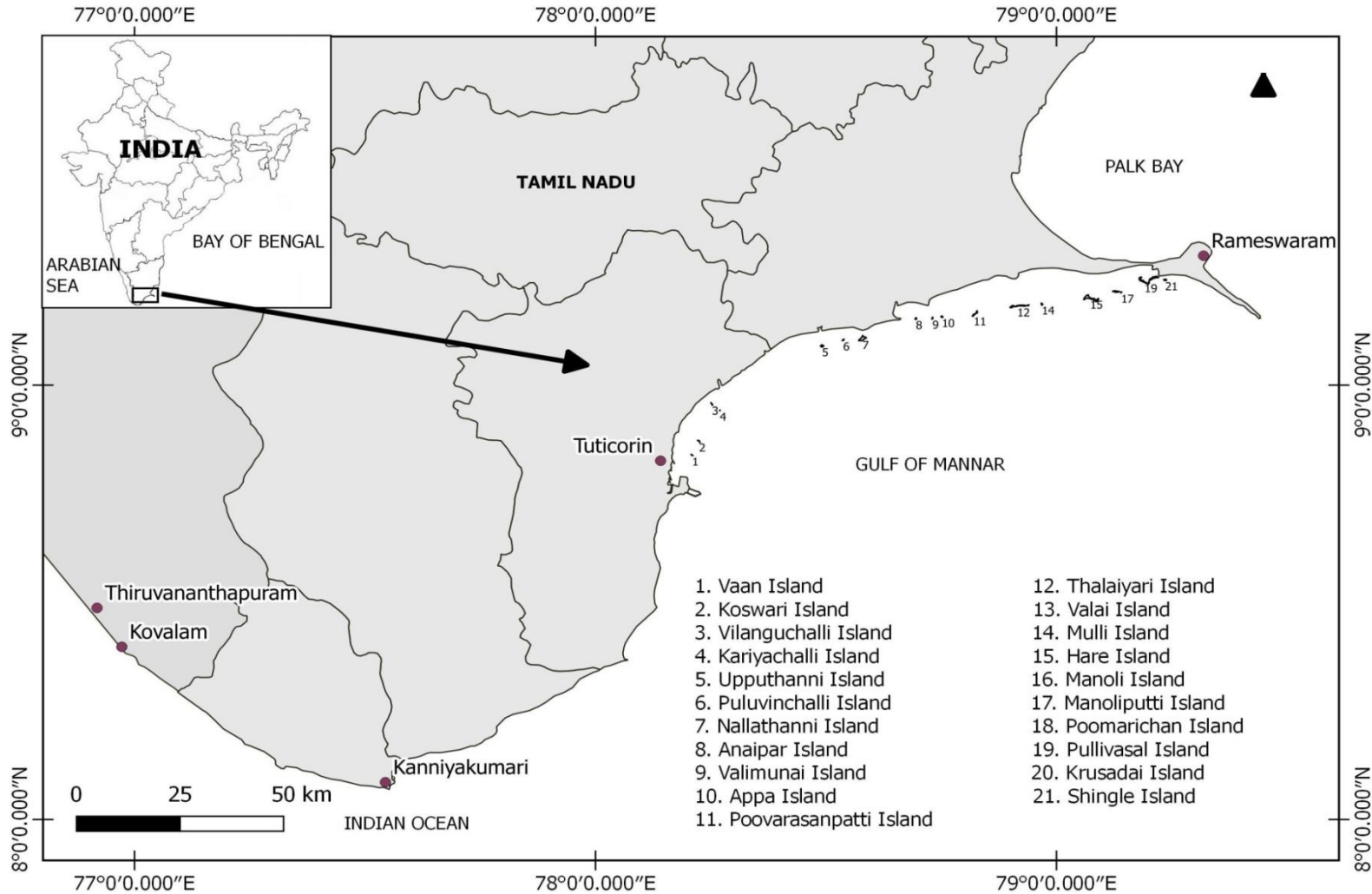
**J.K. Patterson Edward**

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# Gulf of Mannar



**Corals in Gulf of Mannar, Southern India, are distributed around the 21 uninhabited islands located within Marine National Park and stretching 160 km along the coast between Rameswaram and Tuticorin.**



# Gulf of Mannar - Biodiversity & Conservation Status

- Key coastal habitats are coral reefs, seagrass beds, mangroves etc.
- **Coral reef area** - 110 sq.km (including degraded area - 32 sq.km); Coral species - 117 (Common genera - *Acropora*, *Montipora*, *Porites*)
- **Seagrass beds** – 101 sq.km (including degraded area – 24 sq.km); Seagrass species - 14 (Common species - *Thalassia hemprichii*, *Cymodocea serrulata*, *Syringodium isoetifolium*)
- 4,223 species of flora (473) and fauna (3750) identified
- **Marine National Park**, declared in 1986 (21 Islands and surrounding shallow coastal waters, covering 560 sq.km area between Rameshwaram and Tuticorin)
- **Biosphere Reserve**, declared in 1989 (Between Rameswaram and Kanyakumari, covering 10,500 sq.km)
- **Dependent coastal folk** - Over 100,000



# Gulf of Mannar - Issues

## Anthropogenic

- Population (34% increase 15 years - 2.6 to 4.01 lakh people)
- High dependency on fishery resources
- Destructive and over fishing (In shore trawling, Shore seine, push net, traps etc.)
- Seaweed and shell collection
- Pollution - Domestic and Industrial
- Coral mining (stopped since 2005)
- Introduction of exotic invasive seaweed, *Kappaphycus alvarezii*
- Marine debris

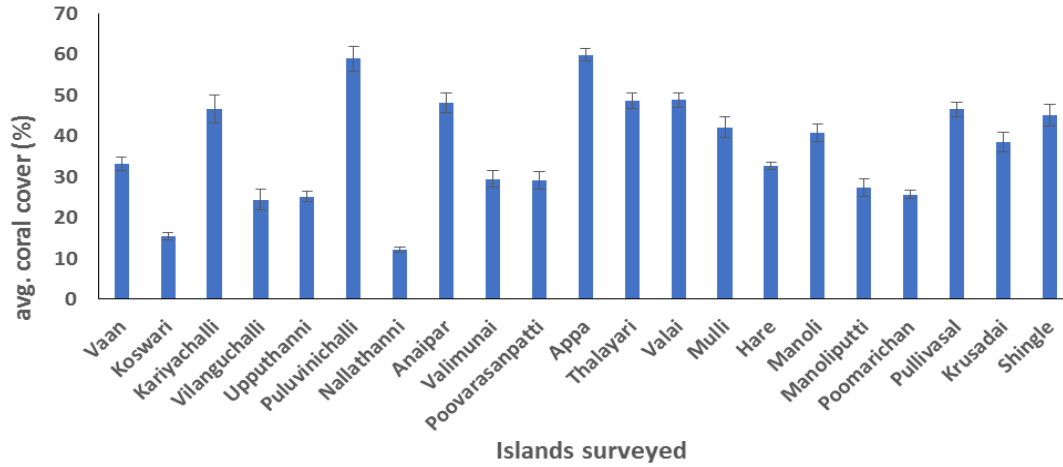
## Others (incl. natural threats)

- Climate change / variation (impacts on corals, fisheries, coastal erosion and livelihood)
- Monsoon failure
- Increase of disease prevalence like coral diseases such as white syndrome, tumour etc.
- Cyclone, tsunami

The anthropogenic and climate change impacts resulted in loss of Coastal habitats, biodiversity in particular fish population and livelihood

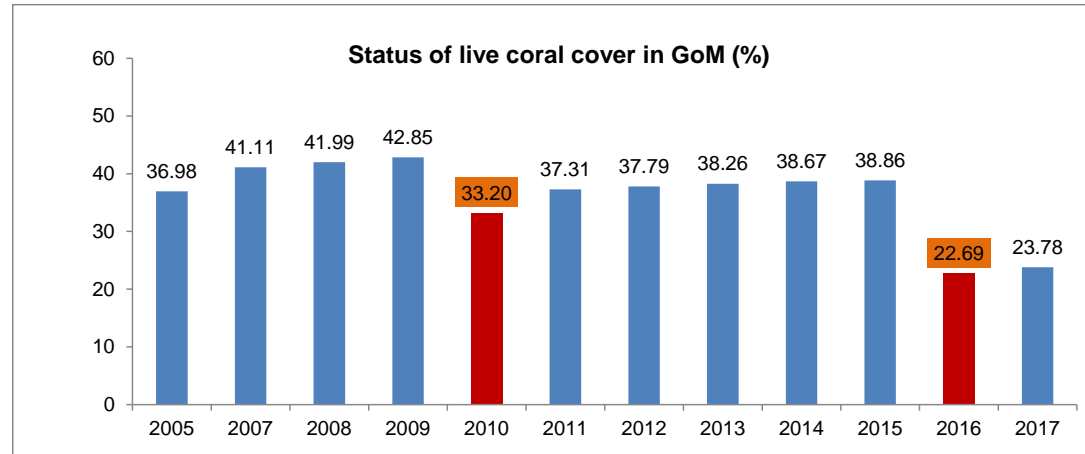


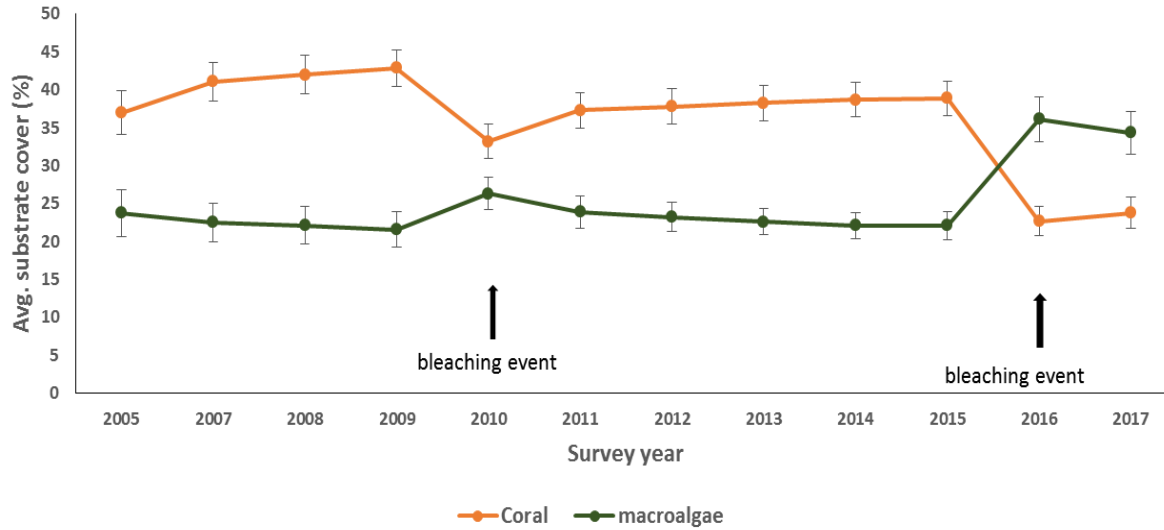
# Coral status



Differences in average coral cover among islands in the GoM in 2005

Coral status in GoM during 2005 - 2017





Changes in coral and macroalgae cover following the two bleaching events in the GoM





**Live  
(October 2015)**

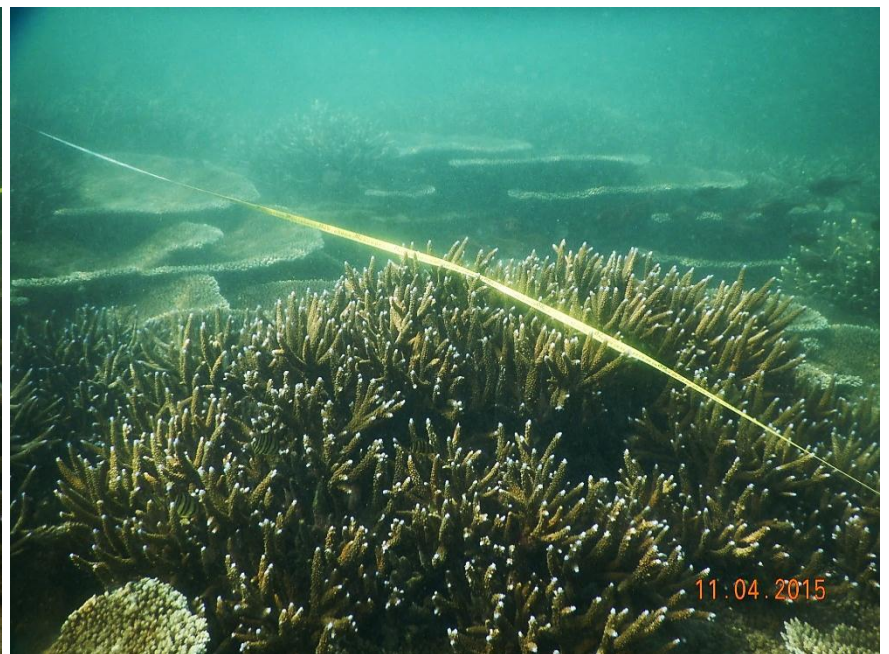
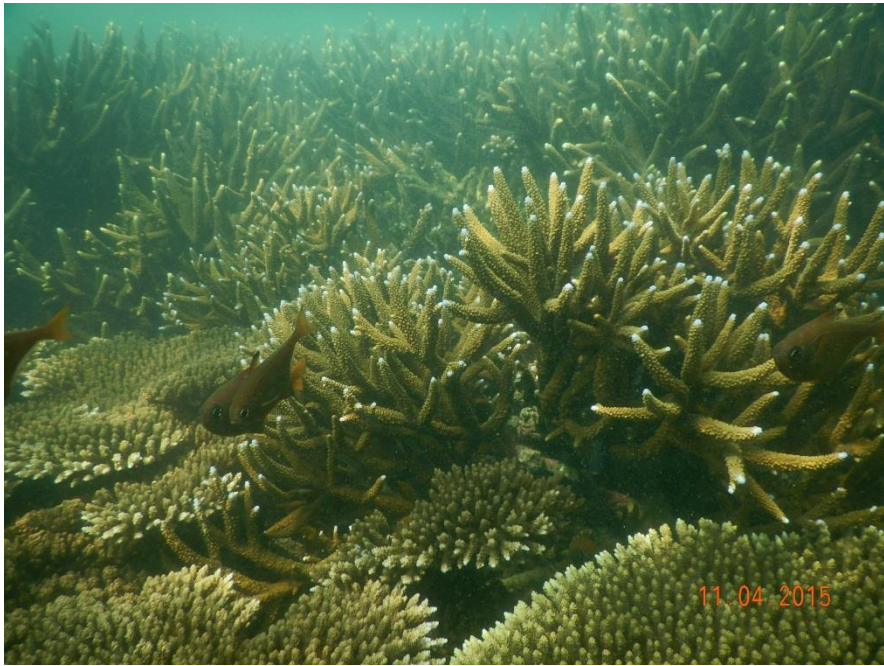


**Bleached  
(April 2016)**



**Dead  
(October 2016)**

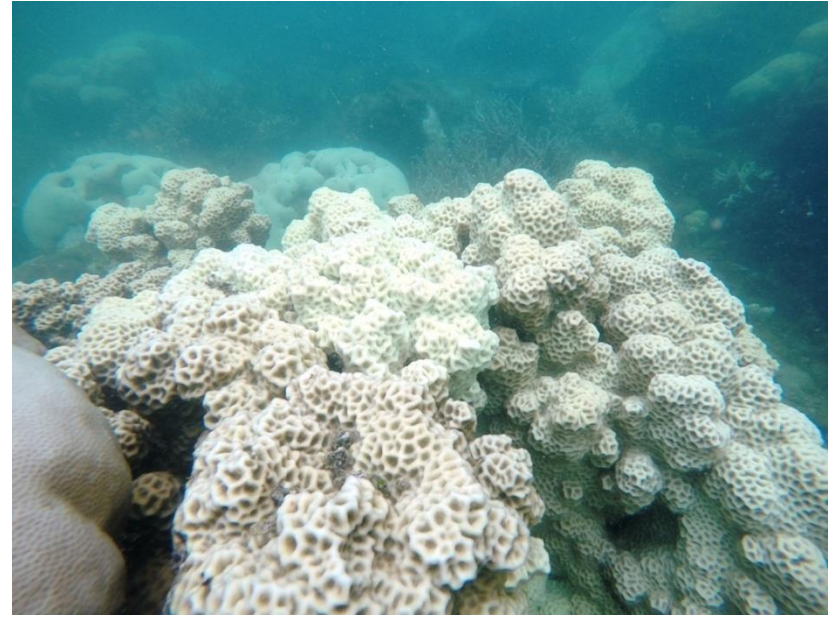
2015





# Coral Bleaching in 2016





# Post-bleaching - Coral Mortality 2016



# Marine Debris in Reef Areas

Fishing in the reef areas has caused considerable damage to corals.

The derelict nets and other debris including plastics, ropes, lines and traps pose severe threat to the already stressed corals.

About 1,152 m<sup>2</sup> reef area is affected Tuticorin Group with an affected area cover of 548 m<sup>2</sup>.



# Composition of Marine Debris

43% of the total debris is made of fishing nets

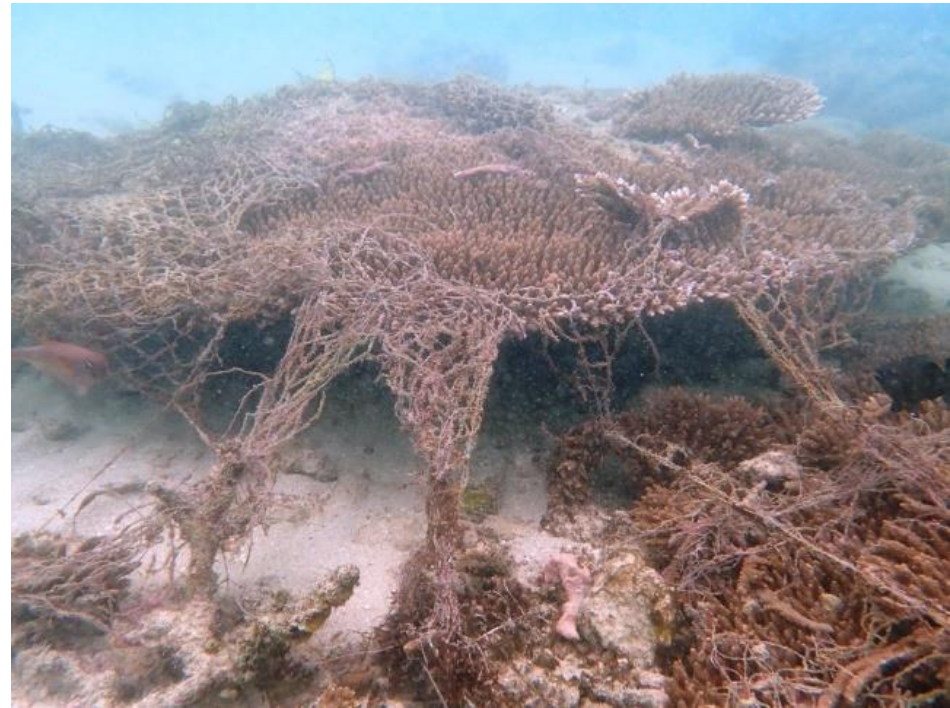


The debris affects live corals (39%), Dead coral with algae (36%) and Dead coral (25%).

# Impact of Marine Debris

Branching and massive corals are the most affected types.

The categories of damages are: Fragmentation (FR), Tissue Loss (TL), and Coral Mortality considered as Dead Coral (DC).



# Impact of Marine Debris

The rehabilitation sites are contaminated with plastics, ropes, lines and abandoned fishing nets. Fishing nets constitute the major threat (66%).

Branching and table corals are the most affected coral types, with the damages mostly fragmentation and coral mortality in the rehabilitation sites.



# Conclusion

Marine debris particularly the derelict nets are associated with small scale fishing activities

Removal of debris is in progress with the support of few fisher folk

Removal has been completed in about 30% affected natural reefs and 70% in rehabilitated coral sites.

Presently more focus is given to coral recruits

This is a continuous process and so, removal, enforcement and awareness building among fishers should be in place





# Acknowledgements



United Nations Office for  
Sustainable Development  
Incheon - ROK