

# Physical Destruction of Coral Reef Ecosystems and Overexploitation of Endangered Species: Compromising Biodiversity and Economic Productivity

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# Coral reefs sustain fish life

- Fusiliers &

- Jacks

among others

- (Show Video 1)

**Reclamation  
Activities  
GAVEN REEF  
(BURGOS REEF)**

# IHS Jane's Satellite Imagery Analysis

31 March 2014

7 August 2014



Original structure



Original structure



Artificial island



Dredged channel



Airbus Defence and Space imagery shows Chinese activity in Gaven Reefs in the Spratly Islands. China built an artificial island between March and August 2014.



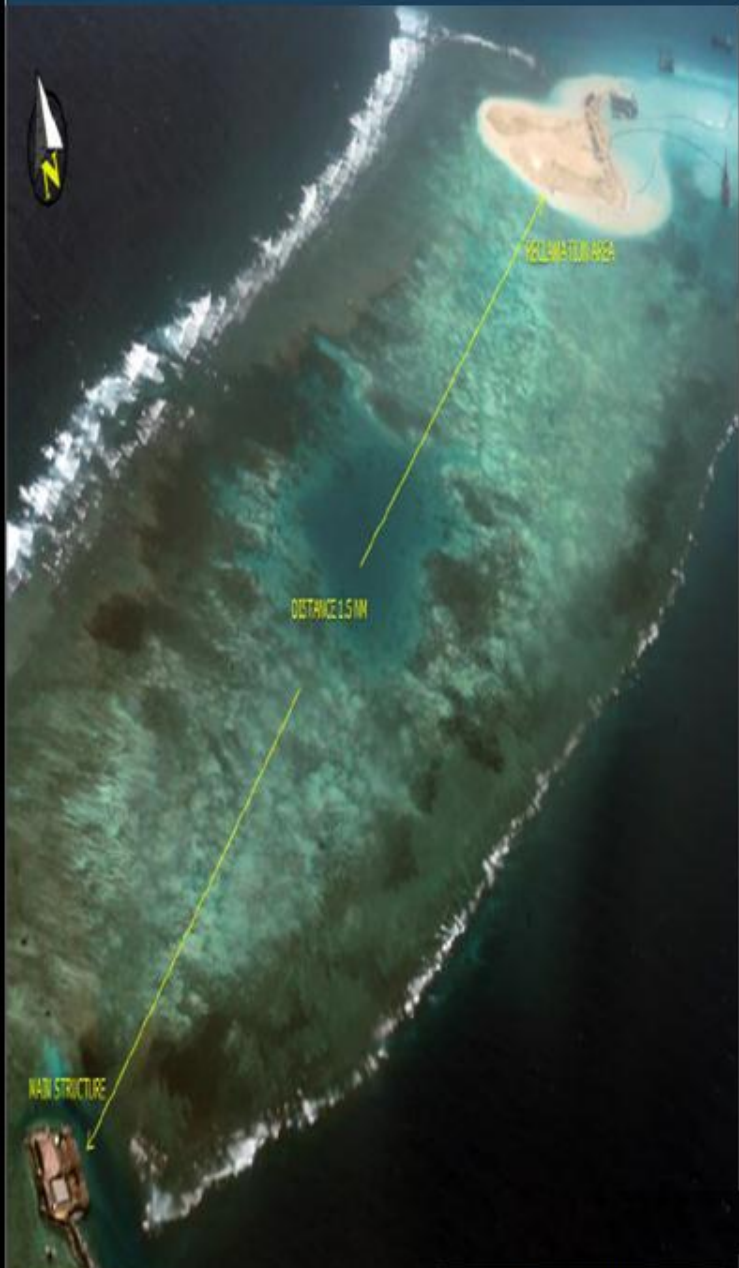
An aerial photo taken over the Gaven Reefs in the Spratly Islands in the South China Sea on Oct. 4 (Source: *The Asahi Shimbun – Asia and Japan Watch*)



**Reclamation  
Activities  
FIERY CROSS  
REEF  
(KAGITINGAN  
REEF)**



# IHS Jane's Satellite Imagery Analysis



19 July 2014



14 November 2014





*Details of plans published by the No. 9 Design & Research Institute of China State Shipbuilding Corporation showing a possible Chinese military base on reclaimed land in the Spratly islands. (China State Shipbuilding Corporation)*



# Recent estimates (March 2015) of reef ecosystems destroyed in the Spratlys:

From images in Jane's magazine:

<b>REEF</b>	<b>EST. RECLAIMED LAND AREA</b>
<b>GAVEN REEF</b>	<b>14 has</b>
<b>UNION REEF NORTH</b>	<b>7.5 has</b>
<b>UNION REEF SOUTH</b>	<b>12.5 has</b>
<b>CUATERON REEF</b>	<b>12 has</b>
<b>FIERY CROSS REEF</b>	<b>265 has</b>
<b>TOTAL RECLAIMED AREA</b>	<b>311 has</b>

# Coral Reef Ecosystem services value

**\$ 350,000 /ha/yr**

**Global estimates of the value of ecosystems and their services in monetary units** (de Groot et al., 2012)

<b>CORAL REEF</b>	<b>Int.\$/ha/yr</b>
<b>Provisioning services</b>	<b>55,724</b>
Food	677
Raw Materials	21,528
Genetic resources	33,048
Ornamental resources	472
<b>Regulating services</b>	<b>171,478</b>
Climate regulation	1,188
Disturbance moderation	16,991
Waste treatment	85
Erosion prevention	153,214
<b>Habitat services</b>	<b>16,210</b>
Genetic diversity	16,210
<b>Cultural services</b>	<b>108,837</b>
Esthetic information	11,390
Recreation	96,302
Cognitive information	1,145
<b>Total economic</b>	<b>352,249</b>

# Economic value of coral reefs and what we are losing

- Considering direct use, indirect use, existence values, etc. - de Groot (2012)  
@ \$350,000/hectare/year
- Applied to the area reclaimed to date ~ 311 hectares
- Gives more than \$ 100,000,000.00 lost to the countries around the South China Sea annually



Show Video 2

**Biodiversity in Adversity:  
Wholesale removal of giant  
clam shells, dead or alive, by  
Chinese fishers**



**The Return of the Giant  
Clam**

by Edgardo D. Gomez



# Where all the giant clam shells go: Tanmen, Hainan, China





A few cultured *Tridacna gigas*, the true giant clam, in the Philippines (with a diver swimming above for scale)

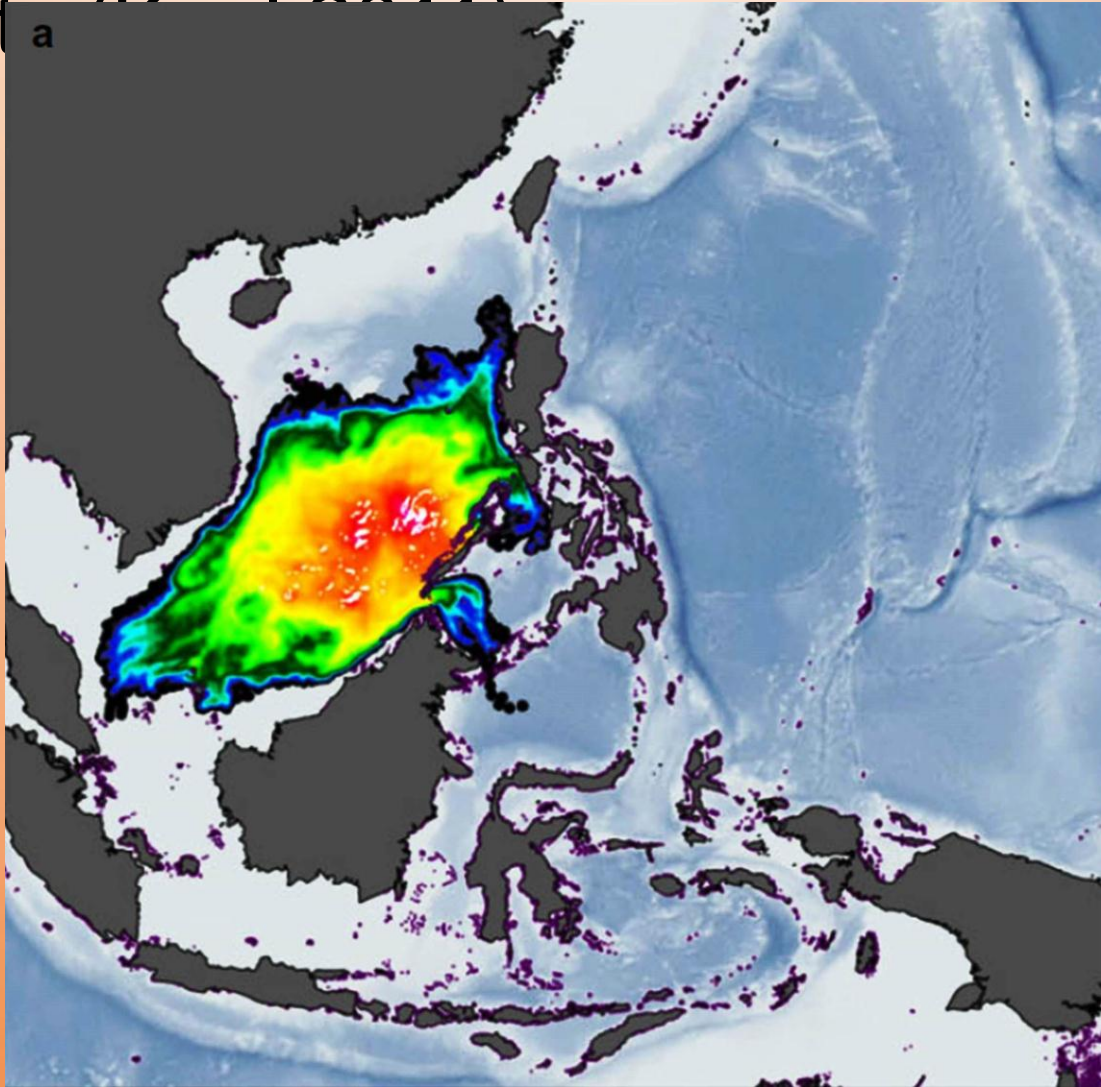


# Ecosystem services of giant clams at the Hundred Islands National Park, Philippines





Healthy coral reefs in the West Philippine Sea (=SCS) are important for the productivity of neighboring marginal seas, such as thru larval connectivity (Kobayashi et al., 2014)





# Thank you for your attention.

Acknowledgement: This presentation represents a combination of information from various sources: marine scientific research in the Philippines and other countries, led by many individuals, government agencies, and open sources