

經濟觀點下的海洋保護區

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何謂海洋保護區

- IUCN（國際自然保育聯盟）定義：
 - 任何涵蓋潮間帶或是亞潮帶間的水體與其間的植物、動物、歷史及文化上的特色已被保存並以法律或有效的方式部分或全部保護。

海洋保護區的目的

- 國際自然保育聯盟(International Union for Conservation of Nature,IUCN)說法
 - To provide for protection, restoration, wise use, understanding and enjoyment of the marine heritage of the world in perpetuity.

WELL MANAGED MARINE PROTECTED AREAS SUPPORT FISHERIES

MPAs IMPROVE THE HEALTH OF OCEANS BY:



MPA

KEY PRINCIPLES FOR MPAs TO WORK:



MPAs SUPPORT LIVELIHOODS

In Apo Islands, Philippines, fishers have doubled their catch rate 18 years after the MPA was created. As a result, they go out to sea less, saving on fuel and time.

A global review shows that well-managed MPAs can substantially increase fish size, density, biomass and species richness.



MPAs CAN PUMP FISH INTO ADJACENT AREAS

As fish populations recover within MPAs, juveniles and adults can spill over across the boundaries and replenish fishing grounds.

EXAMPLE: APO ISLAND PROTECTED AREA, PHILIPPINES

Surgeonfish and jackfish represent 40-75% of local fishery yields.



Since the MPA was established, their population has tripled...

...resulting in an increase in catch per unit effort of **+50%**

MPAs CAN EXPORT LARVAE INTO ADJACENT AREAS

Larger fish inside MPAs produce disproportionately more eggs and larvae. Some larvae then drift to fished areas.

EXAMPLE: GREAT BARRIER REEF PROTECTED AREA, AUSTRALIA

The coral trout and the stripey snapper are exploited locally.

± 50%

Local MPAs produce ± 50% of total juvenile recruitment in nearby fished areas.

Globally, WWF works to support Marine Protected Areas and ensure they contribute to securing food and livelihoods for people while conserving critical habitat and species.

www.panda.org/mpa



海洋保護區的效益－生態學觀點

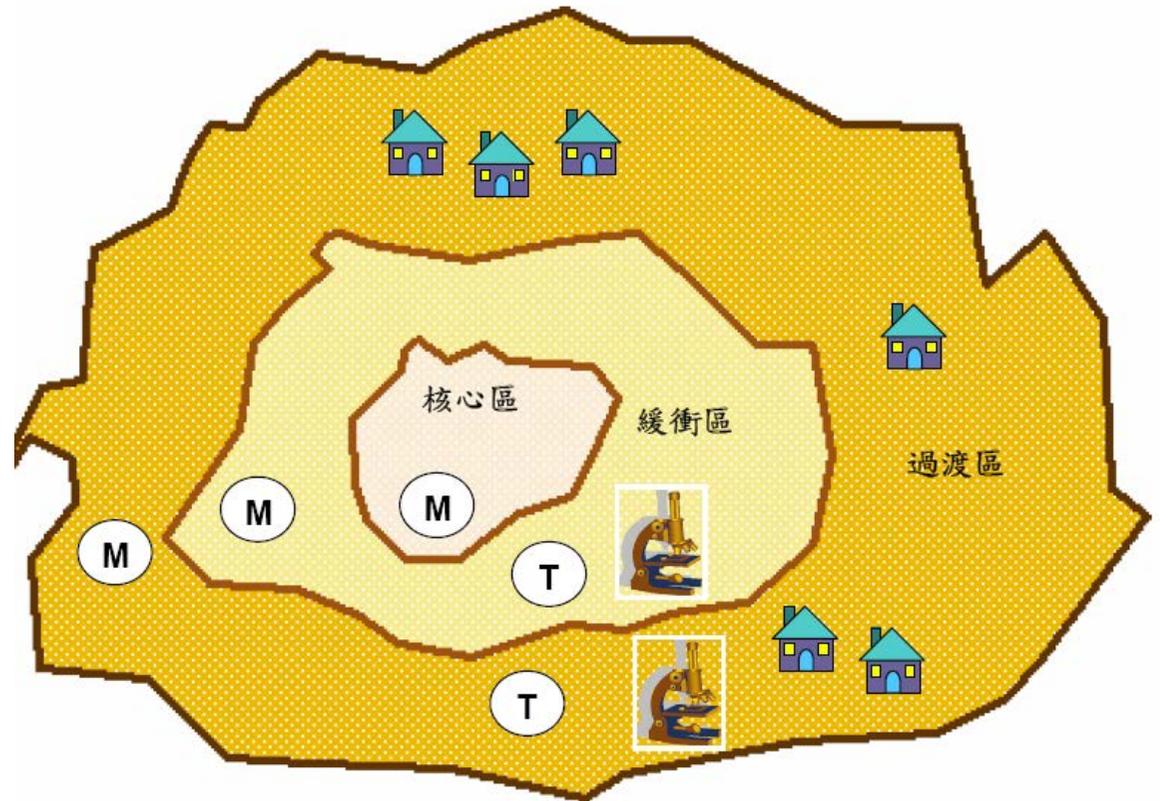
- 增加海洋生物的族群量
 - － 能順利成長到成熟期
 - － 魚的體長、重量可增加
 - － 魚群（生物）密度增加提高交配機率
- 增加物種的多樣性
- 資源量回復的速度較快

海洋保護區－經濟學觀點

- 利害關係人重要（Stakeholder matters）
 - － 漁民收益
 - － 生態旅遊
- 海洋生物擴散模式重要
 - － 影響漁民行為
- 效益與成本同等重要
 - － 空間生物經濟學分析方法當道

海洋保護區主要管理方式

- 分區管理
 - 核心區（Core Area）
 - 嚴格禁止任何利用
 - 緩衝區（Buffer Zone）
 - 做為緩衝區，可作為科學研究之用
 - 過渡區（Transition Area）
 - 可做為科學研究、觀光與居住之用

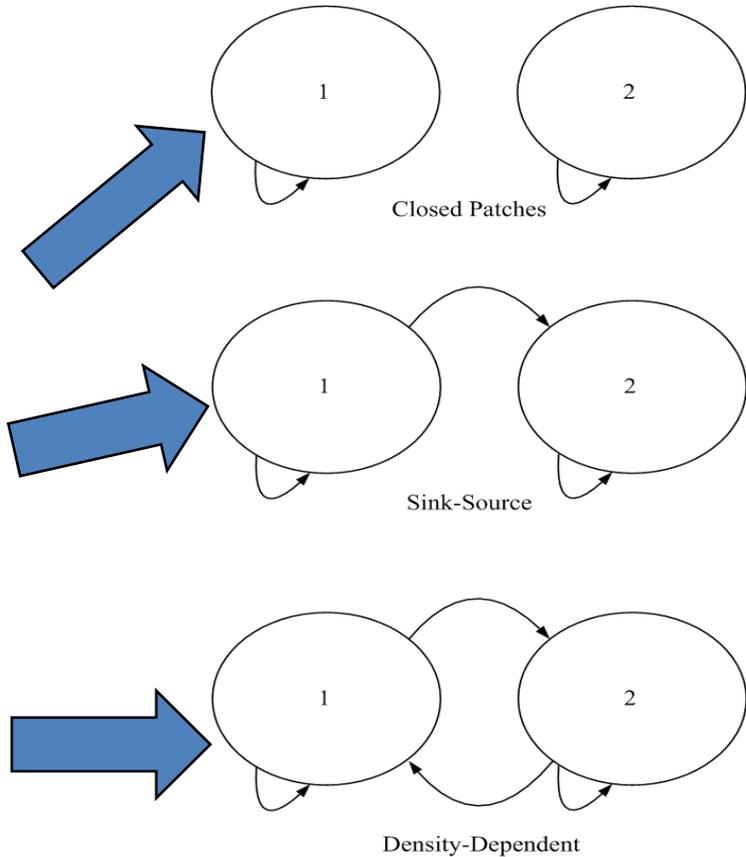
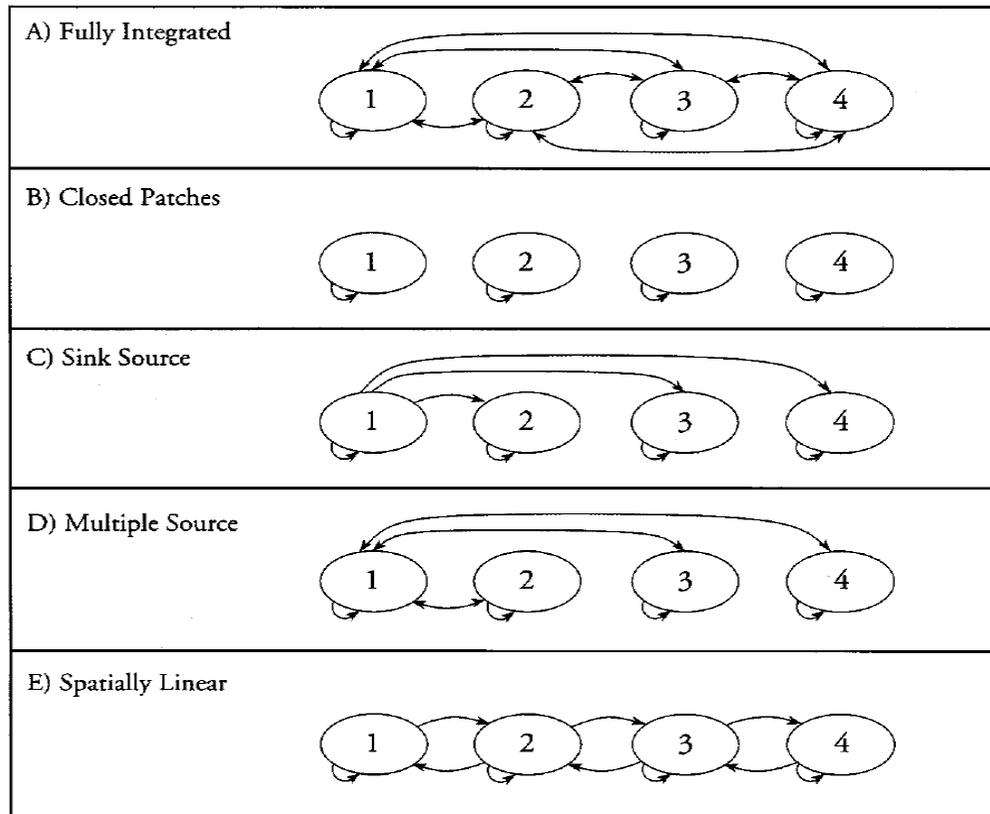


A Bioeconomic Model of Marine Reserve Creation

Sanchirico and Wilen (2001) JEEM

- 魚群量變化因素
 - － 決定於何種生物擴散模式
 - － 漁撈減少生物量
- 漁民空間行為
 - － 何處有利可圖就開往何處
 - － 該區漁獲量決定於該區的魚群量及船隻數

生物擴散模式－圖形



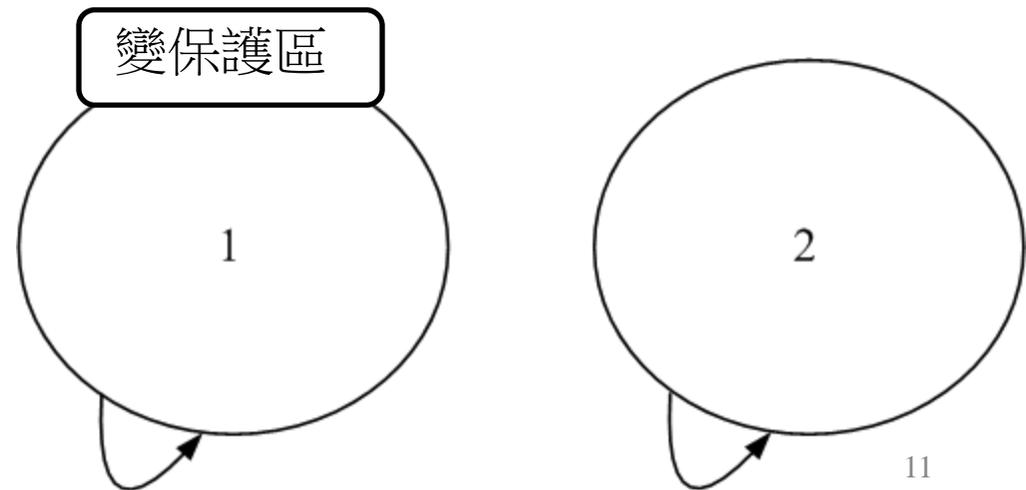
生物擴散模式－說明

- Fully integrated
 - Biomass disperses directly from any patch to any other patch through the system (Ex. 大洋物種)
- Closed patches
 - Maintenance of biomass density within each patch is only determined by own production and there is no dispersal out of into the system (Ex: 底棲)
- Sink-source
 - One patch feeding all others (Ex: 烏魚)
- Multiple source
 - Many patches contribute biomass to one common pool which then is redistributed among the patches (Ex成長與與產卵地方不同的物種)
- Spatially linear
 - Patch dispersal may only occur in a pairwise manner between adjacent patches

建立海洋保護區可以兼顧保育與漁業嗎？

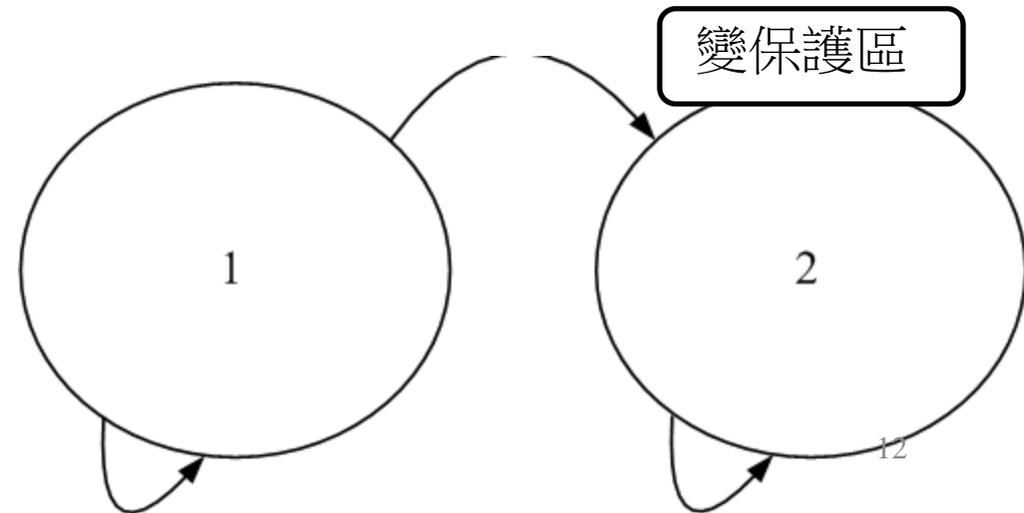
- Closed patches

- Patch1：原本可捕變不能捕，漁民損失，但生物量增加
- Patch2：與設立保護區之前相同
- 總生物量增加（保育贏），總捕獲量減少（漁業輸）



Sink-Source

- Closing the sink (patch2)
 - Patch2：原本可捕變不能捕，漁民損失，但生物量增加
 - Patch1：與設立保護區之前相同
 - 總生物量增加（保育贏），捕獲量減少（漁業輸）



Sink-Source

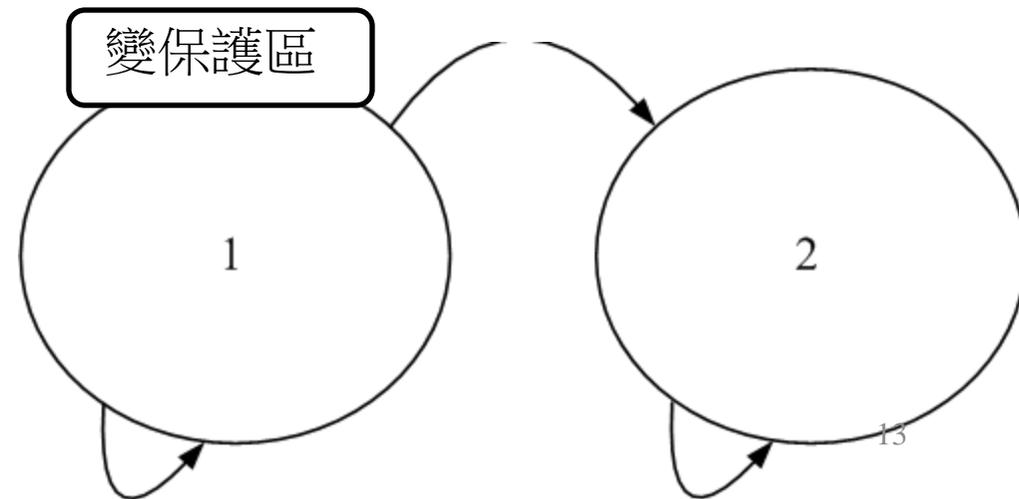
- Closing the Source (patch1)

- Patch1：原本可捕變不能補，漁民損失，但生物量增加

- Patch2：因有增加的生物量流入，捕獲量增加

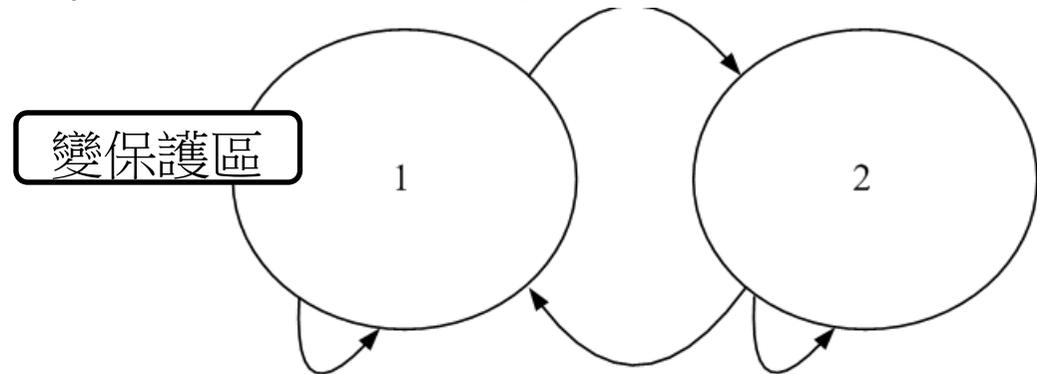
- 總生物量增加，總捕獲量變化視patch1與patch2的淨效果

- 有機會達成雙贏



Density Dependent (生物密度決定)

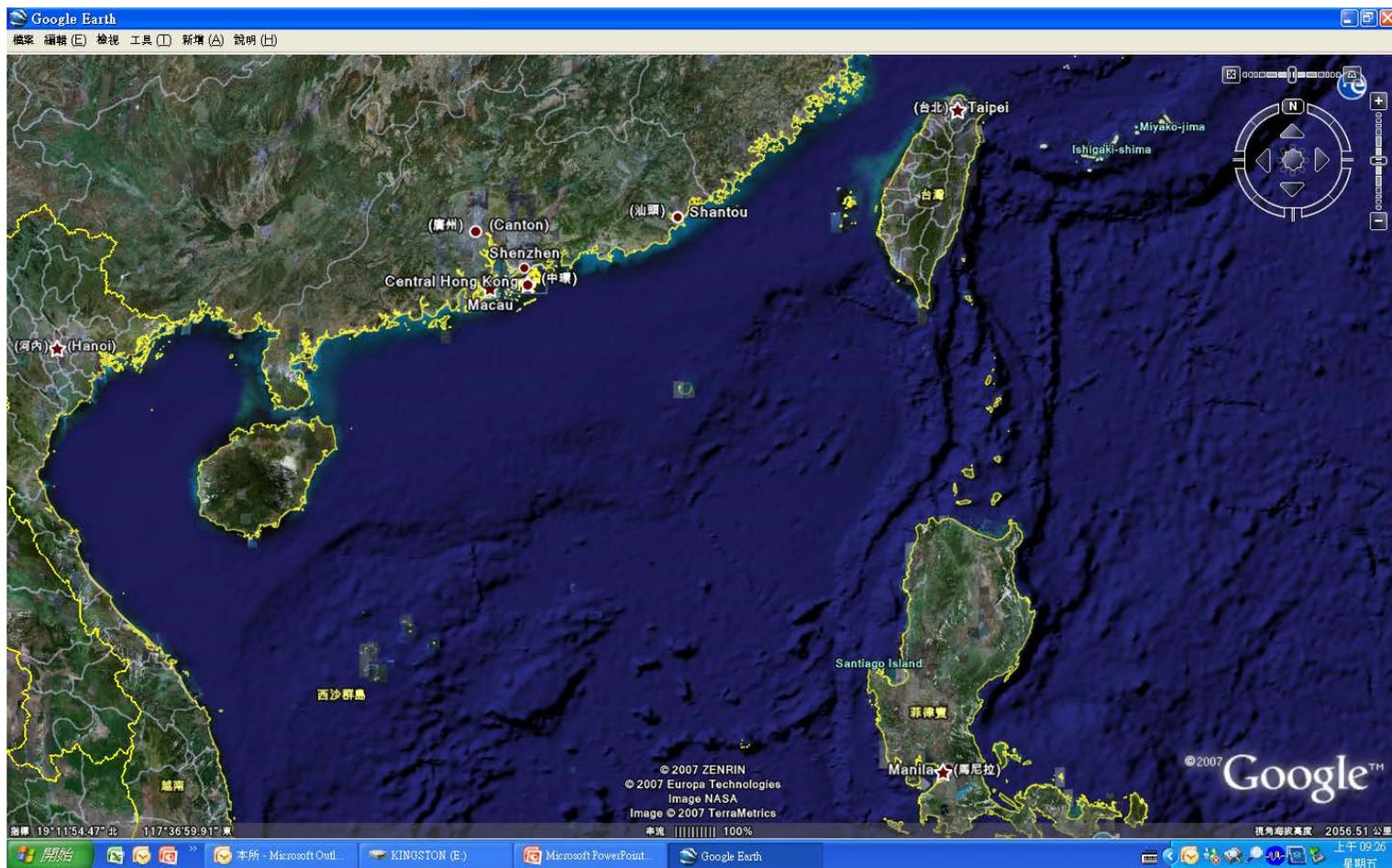
- Patch1 closed
 - Patch1：原本可捕變不能補，漁民損失，但生物量增加
 - Patch2：因有增加的生物量流入，捕獲量增加
 - 有機會達成雙贏
 - Patch2：若在設立前的生物量過高，造成其生物量流入 patch1，patch1設立保護區之後，要有極大的生物量產生才扭轉流勢，轉而流入 patch1，進而產生雙贏的結果



東沙環礁國家公園



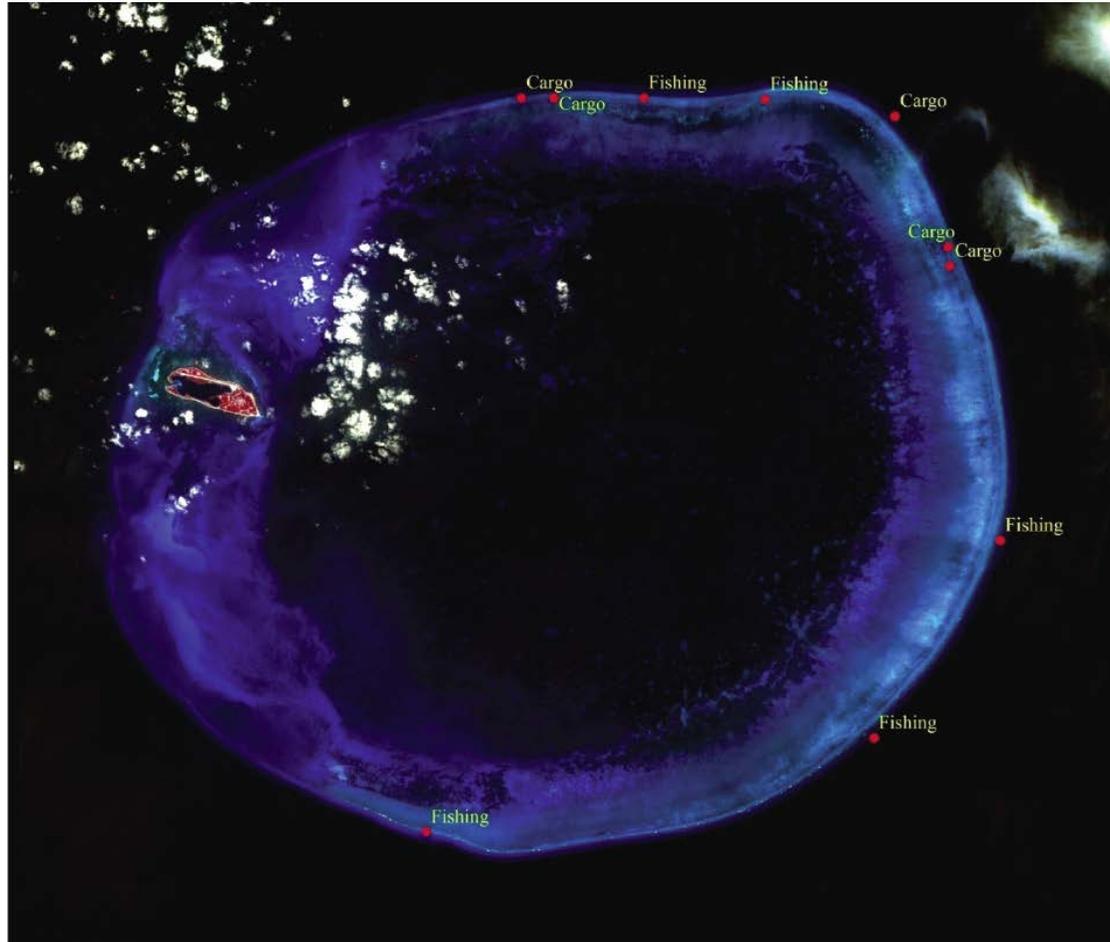
東沙環礁國家公園相對位置



東沙環礁國家公園衛星照



環礁周邊遺跡



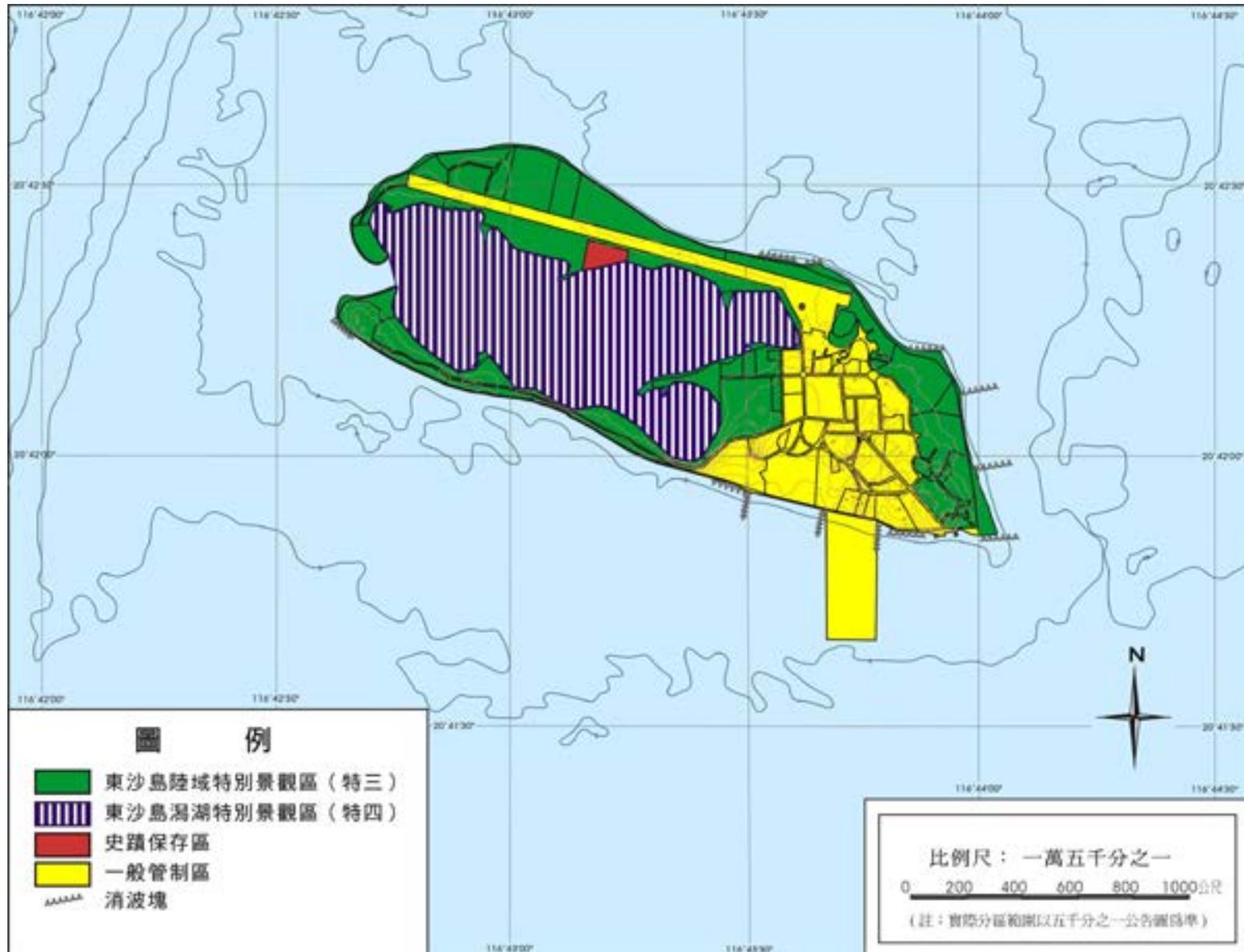
東沙島



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東沙島分區規劃



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