

# Coral Reef Conservation by Sekisei Lagoon Restoration Project

based on a comprehensive management approach with various stakeholders' participation

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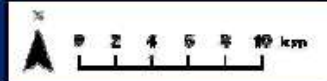
Ishigaki Ranger Office, Naha Nature Conservation Office,  
Ministry of the Environment

21 October 2014

Technical Working Group, the 29<sup>th</sup> ICRI General Meeting  
Okinawa Institute of Science and Technology Graduate University

# Sekisei Lagoon

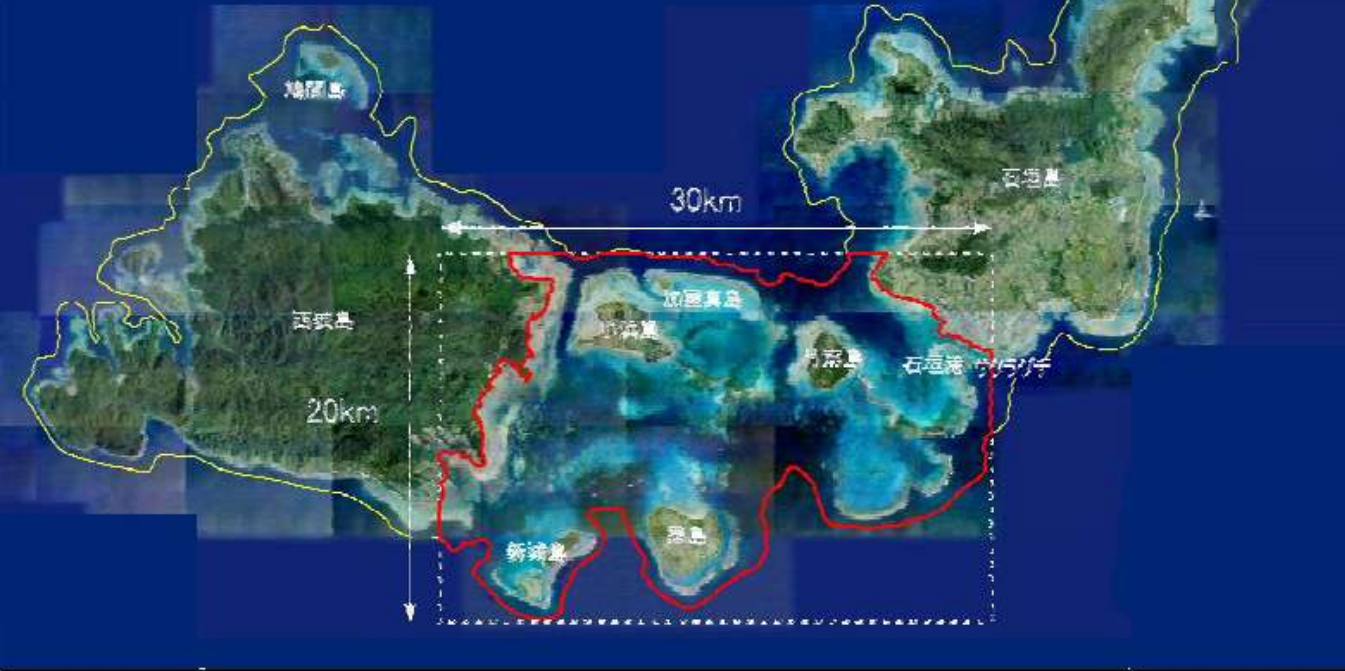
The Nur



重要な区域  
関連する区域

## Sekisei Lagoon

Area: 300km<sup>2</sup>



Great Barrier Reef  
330 species

Data Sources

<http://reefgis.reefbase.org>



# Rich Marine Biodiversity of Sekisei Lagoon



Sekisei Lagoon provides habitats for a variety of marine organisms

# Ecosystem Services from Sekisei Lagoon

## Fishery



## Provisioning

## Tourism



Annual divers number: 120,000  
Tourists number: 700,000 in Ishigaki

## Preserving

## Disaster Security

## Cultural

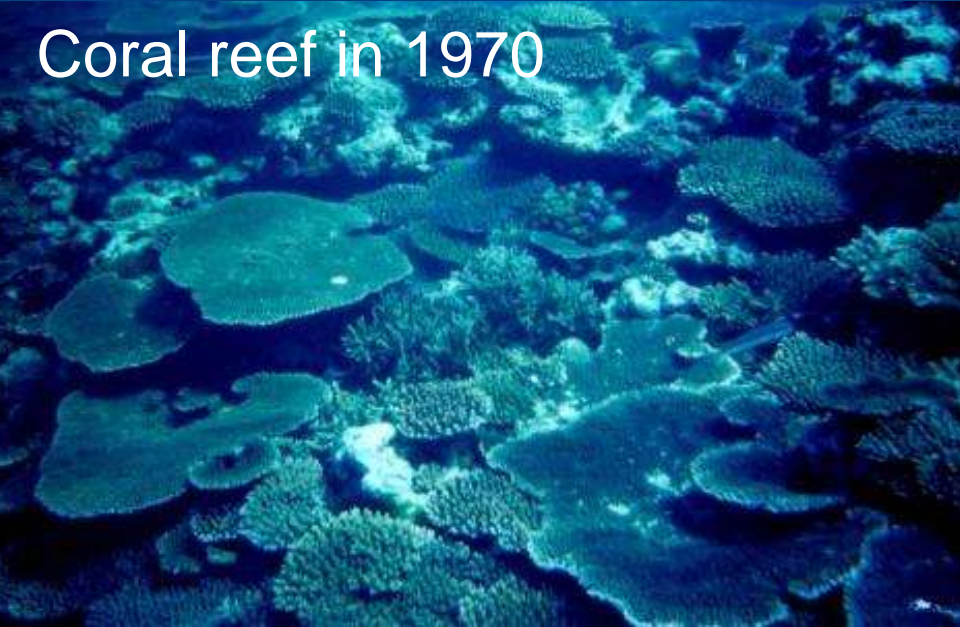


God, "Miruku"  
coming from sea

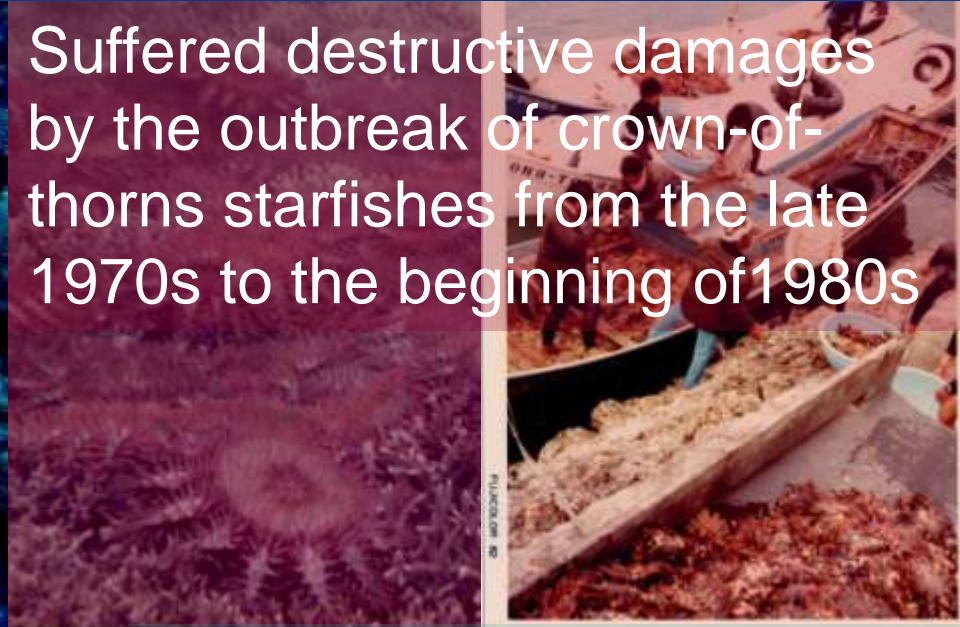
Natural Barriers from Waves and Tsunami

# Factors threatening Coral Reef

Coral reef in 1970



Suffered destructive damages by the outbreak of crown-of-thorns starfishes from the late 1970s to the beginning of 1980s



Large scale bleaching in 1998 and 2007 damaged corals.



Pollution and sedimentation by red clay silt



# Sekisei Lagoon Nature Restoration Committee

**Feb. 2006** In accordance with Law for the Promotion of Nature Restoration (enforced in 2003), the committee was established in 2006.

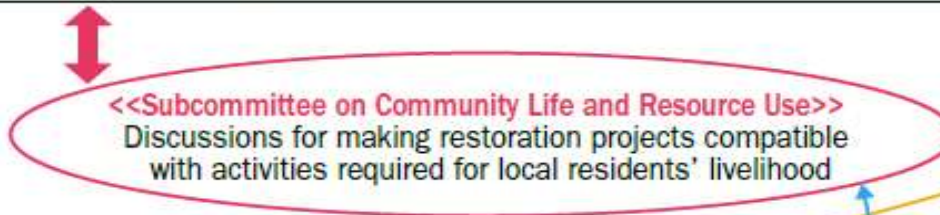
**Jul. 2007** Drew up the “Overall Plan for Sekisei Lagoon Nature Restoration Project”



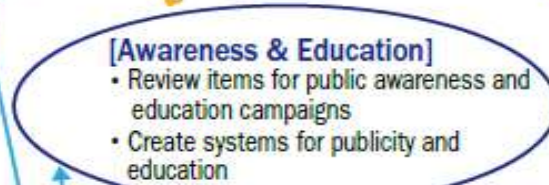
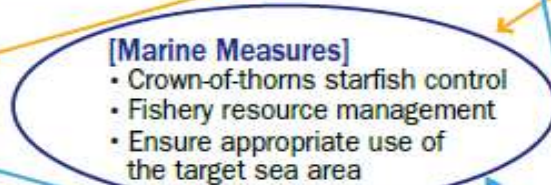
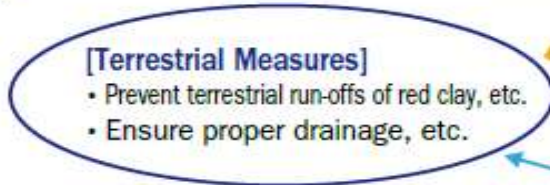
<Committee (meetings held once or twice a year primarily to hear working group reports)>

Members: Nature restoration project implementers, local residents, non-profit organizations, experts, and relevant government agencies

<Agenda> (a) Prepare nature restoration master plans, (b) plan specific projects, and (c) exchange information and coordinate on project implementation



Working Groups (future subcommittees)



<Agenda> Theme-based information exchange and coordination concerning the implementation of nature restoration activities

# General Concept for Sekisei Lagoon Nature Restoration Project

## Long-term Goal (30 years: 2007 - 2037)

Realize a healthy interaction between man and nature, and restore to the rich coral reef ecosystem that existed at the time of national park designation in 1972.

## Short-term Goal (10 years)

Eliminating environmental pressures, bring recovery of the coral reef ecosystem to visible.

## Main Principles:

Comprehensive approach, Reinforcing coral regeneration itself, Scientific data collection and utilization, Project management based on monitoring and evaluation, Collaboration by various organizations and individuals, Information publication and sharing, CEPA

## Activities:

1. Removal of threatening factors
2. Restoration of coral reef ecosystem
3. Promotion of sustainable resource use
4. Communication, Education and Public Awareness
5. Research and monitoring
6. Evaluation and improvement of the project

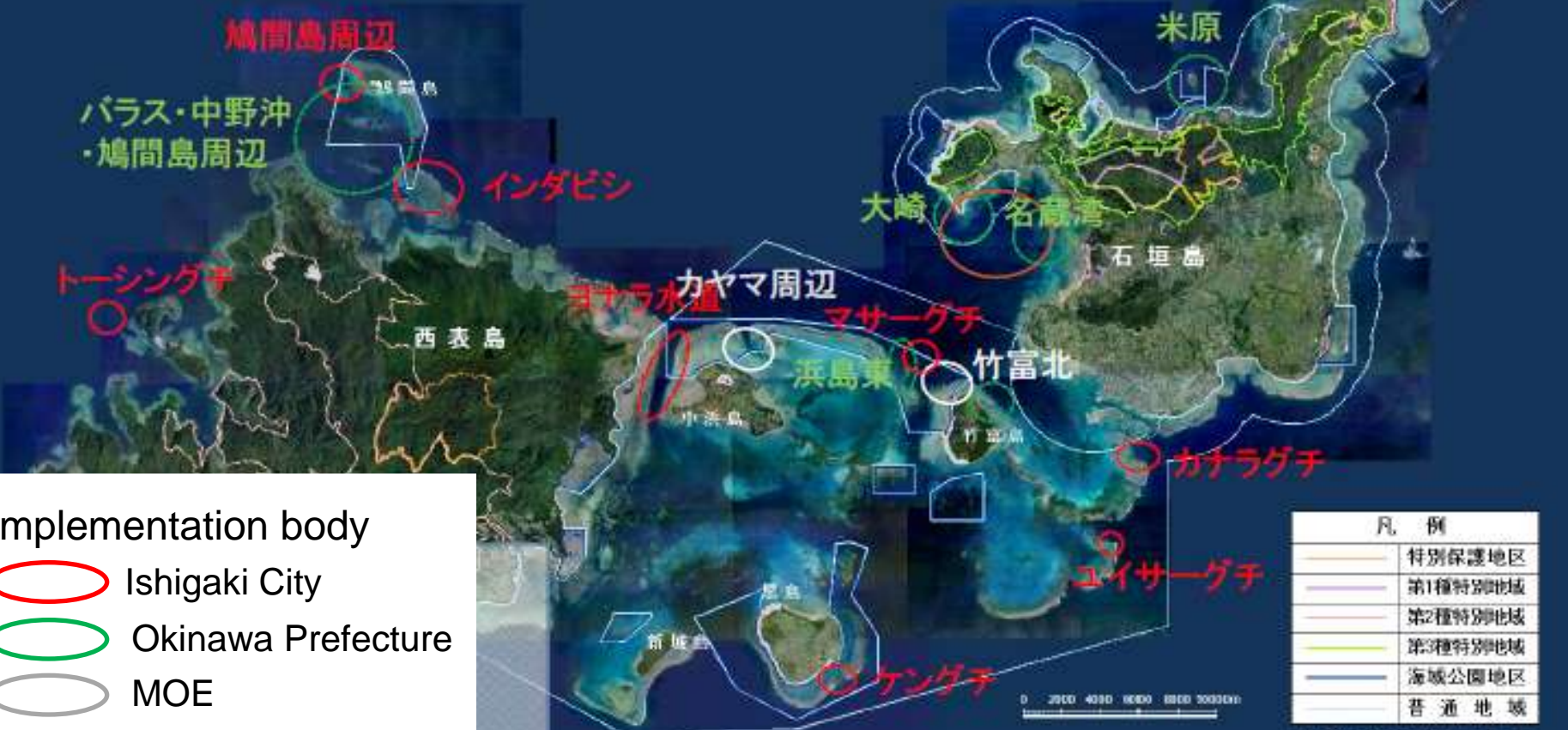
# Mitigation of Threatening Factors

## 1) Control of the Crown-of-thorns Starfish

The crown-of-thorn starfish control map  
Developed by MOE, Okinawa Prefecture and  
Ishigakki City



波照間島



Implementation body

- Ishigaki City
- Okinawa Prefecture
- MOE

凡 例	
	特別保護地区
	第1種特別地域
	第2種特別地域
	第3種特別地域
	海城公園地区
	普通地域

0 2000 4000 6000 8000 10000m

平成24年3月27日告示

# Mitigation of Threatening Factors

## 1) Control of the Crown-of-thorns starfishes

MOE, collaborating with Yaeyama Fisheries Cooperatives, Ishigaki Island Marine Leisure Cooperatives and others, removed crown-of-thorn starfishes a total number of 54,881 (2005-2013).

Intensive extermination of the starfishes has been done in the areas identified.

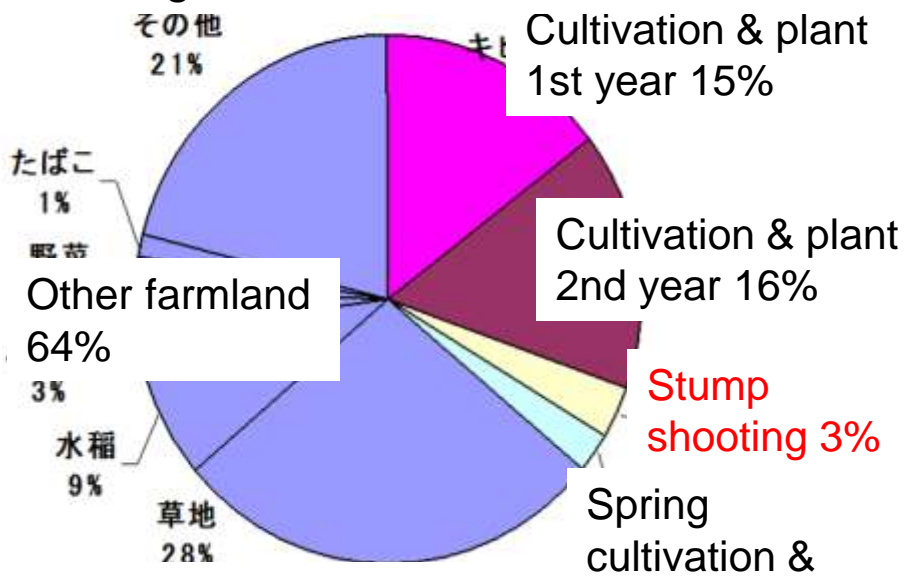


Captured starfishes were measured at a shore, then transported to a composting center to be used as fertilizer material.

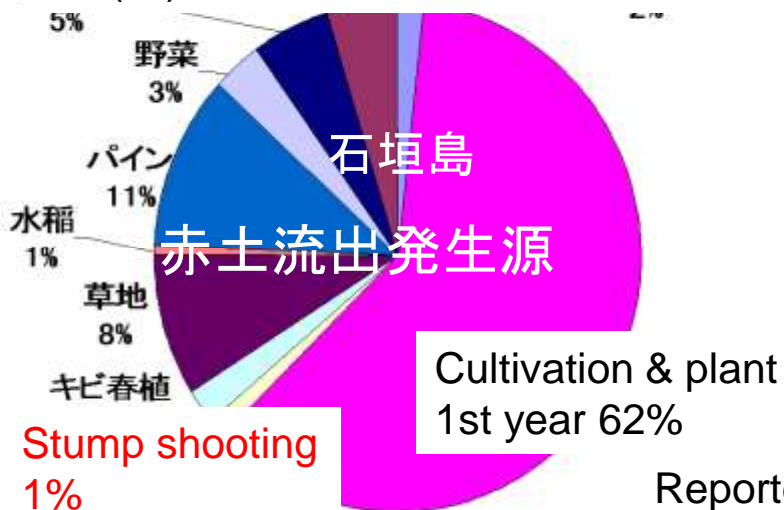


# 2) Measure to Prevent Red Clay Run-off

Comparison of farmland area (5,500ha) in Ishigaki Is. 2008



Estimated amount of red clay run-off (%)



Two ways in sugarcane shooting



Support to sugarcane stump shooting by Sekisei Lagoon-syouko Coral Reef Fund

Fund to stump management machine rental fee from 2010 to 2012

18 farmers, 13.85ha, (1.42 million JPY)

Reported by Hoshikawa at the Assembly meeting January, 2014

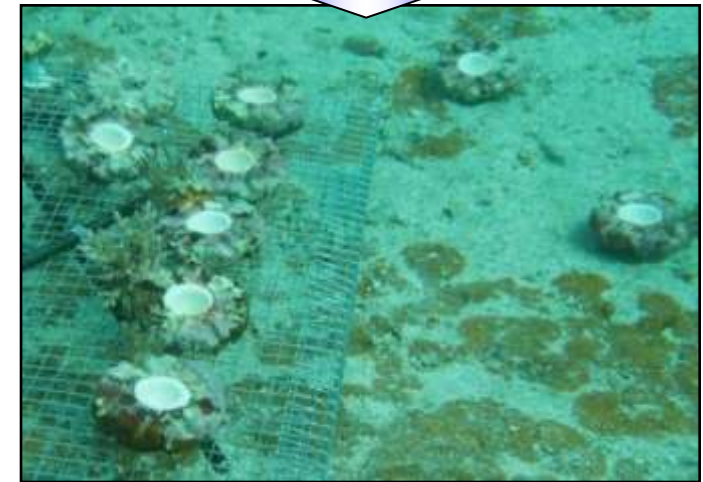
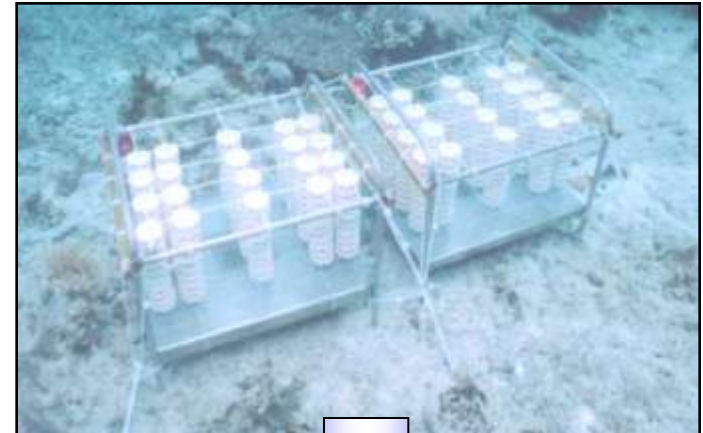
# Coral Transplantation Techniques by sexual reproduction

Basic Idea: *Enhance coral communities resilience.*

(1) Coral settlement devices



(2) Devices set up on the sea floor.



(4) Transplanted coral for the regeneration  
Spawning of transplanted corals first observed in 2010

(3) Coral settled on a device was kept on the sea floor until growing enough for transplantation.

## 2. Restoration of coral communities

### **Purpose:**

Enhance natural resilience of coral communities in the degraded area.

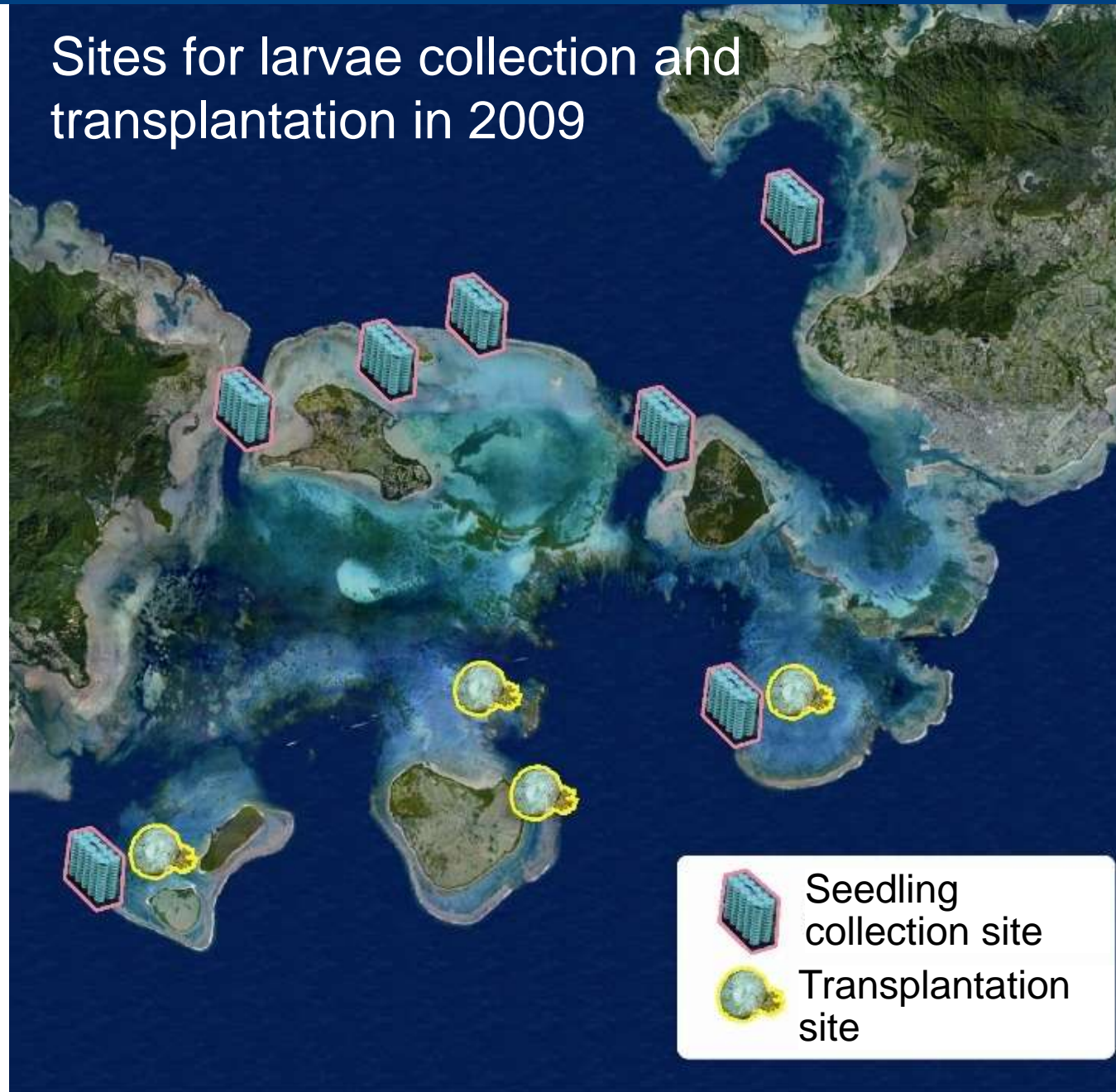
### **Sites for collection and Transplantation:**

Coral larvae were collected in the northern area of the lagoon with high coral reef coverage, and transplanted to the southern area where coral communities were degraded.

### **Outputs:**

Cumulative number of transplanted corals:  
**43,857** (area: 4,039 m<sup>2</sup>)  
(2004-2013)

### Sites for larvae collection and transplantation in 2009



# 3. Coral Reef Monitoring

Simplified methods for long-term monitoring, being conducted since 1983

Spot check: 15 minutes observation by snorkeling at a fixed site (50m x 50m)  
(This survey is being conducted by “Monitoring Sites 1000 Project”, BCJ-MOE)

Observation items

Coral: Coverage, Growth type, Recruitment, Bleaching

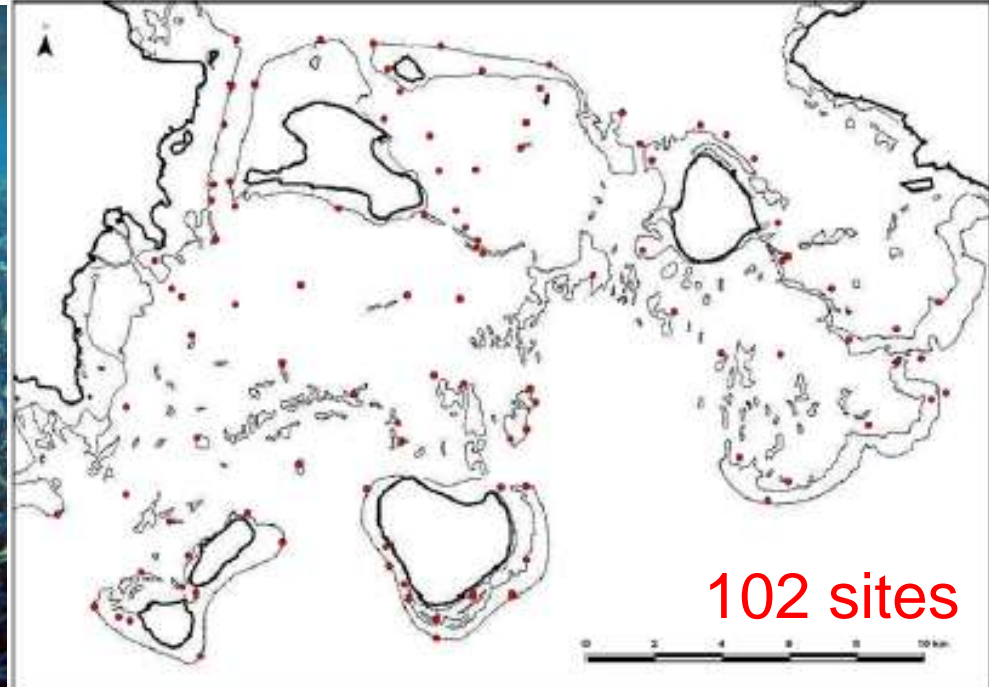
Crown-of-thorns starfish: Number, Dominating size, Predation

Other organisms: Coral eating snails, Large sized coral-dwelling fishes

Physical factors: Topography, Substratum, Depth, SPSS

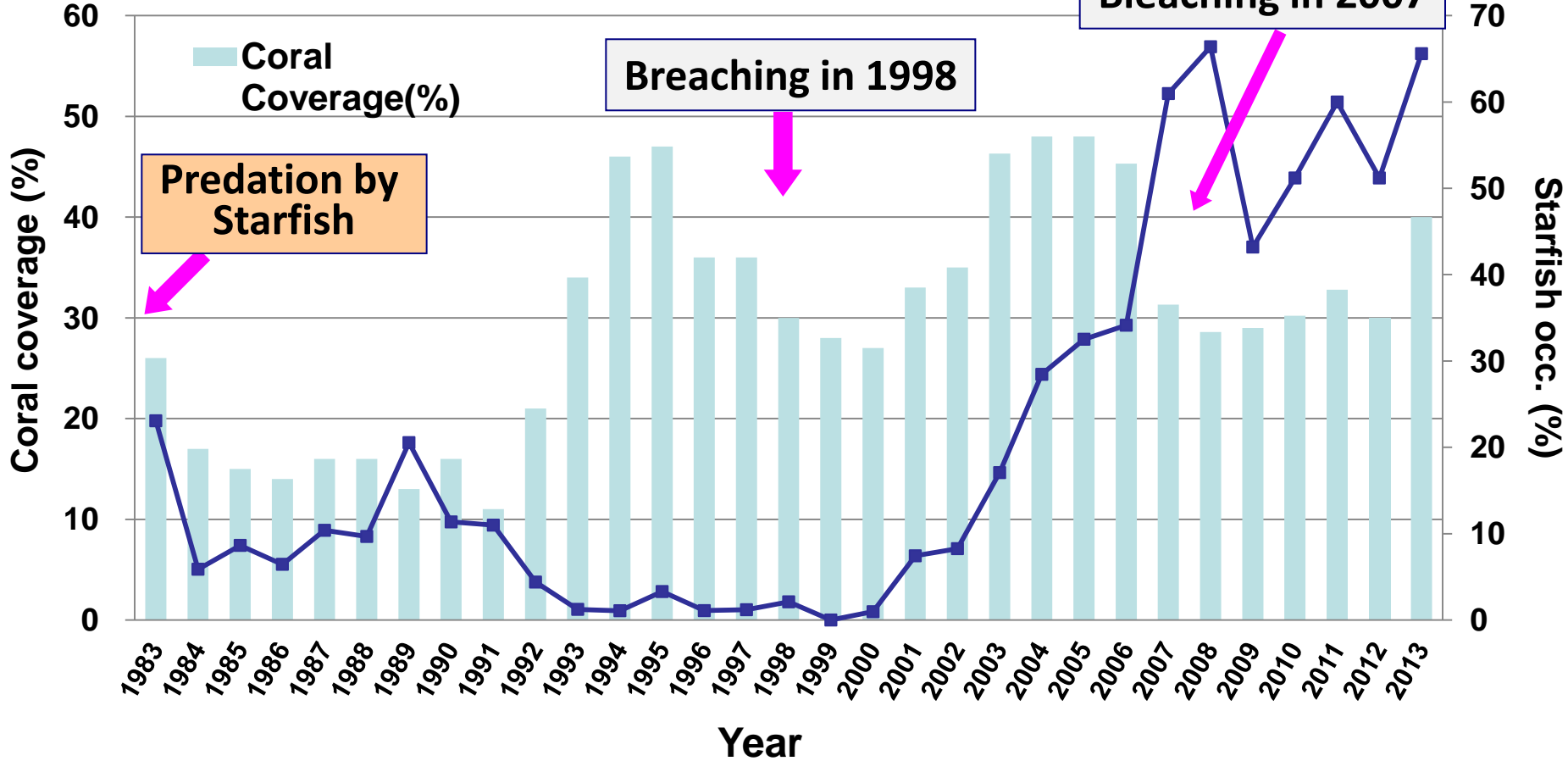


Photo by Kenji Kaiwara



# Changes in Coral Cocerage and Occurrence of the Crown-of –thorns Starfish

Changes in coral cocerage and frequency occurrence of the crown-of-thorns starfish *Acanthaster planci* from



# Communication, Education and Public Awareness

## Education for Children: “Waku-Waku Sango Ishigaki-jima Project”

*Excited with Coral!!*

Organized by 5 organizations collaborating with NGOs, national and local governments and local communities, aiming Ishigaki to be an island in which students can learn and observe coral reef, targeting by 2014 to provide education programs for all 21 schools in Ishigaki Island.



サンゴ元気で島ハッピー

## Activities

### Coral Observation

By Yaeyama Fishery Cooperation,  
Coral cultivation research group

### Deaiwa Sango-sho Diversity

By Yaeyama Coastal Leisure Safety Council,



# Fund Raising: Sekisei-syouko Coral Reef Fund

Established in July 2009, to support activities for restoration of coral reef ecosystem in Sekisei Lagoon.

Managed by:  
NPO Sekisei-syouko Coral Reef Fund

Sekisei Lagoon Coral Reef Fund

Search

<http://www.strata.jp/sangokikin/>

Fund raising: 5,250,000 JYN

Grants (2010-): 14 projects  
4,200,000 JYN

Granted Projects:


- Crown-of-thorn starfish control
- Validation of acetic acid for killing the starfish
- Coral Watch Project
- Promotion of sugar cane cultivation by stump shooting

# Conclusion

To achieve the restoration of coral reef ecosystem in Sekise Lagoon effectively,

We have to

- Develop an appropriate framework, considering the scale of the ecosystem and the surrounding social activities, and various stakeholders including marine and terrestrial fields.
- Formulate an integrated project with a common goal and defined each member's activity and role, and an organization with functional and practical components.
- Build up networks among members under the project framework to facilitate collaboration and information sharing.
- Evaluate effectiveness of the project activities based on scientific information by scientific monitoring and other available information, and improve the project plan in response to the evaluation.



**Thank you for your attention!!**

**Please Visit Our Website!!**

Sekisei Lagoon Nature Restoration Committee:

<http://sekiseisyoko.com/>

International Coral Reef Research and Monitoring Center, MOE:

<http://www.coremoc.go.jp/>