

# Sekisei Lagoon



**Designation:**  
Iriomote-Ishigaki National Park  
**Location:** Ishigaki, Okinawa Prefecture; Taketomi, Yaeyama-gun, Okinawa Prefecture  
**Year Initiated:** 2002

**Sekisei Lagoon Nature Restoration Committee (as of March 2009)**

The Committee works on restoration of coral reef ecosystems by reducing red clay erosion and other negative environmental impacts on corals and rehabilitating coral communities, as well as preservation of high quality coral reefs.  
Date Established: 27 Feb. 2006  
Members: 80  
Date Issued the Overall Plan: 1 Sep. 2007  
Date Issued the Implementation Plan: 13 Jun. 2008  
(Project, sponsored by MOE)



Giant manta (*Manta birostris*)



Clown anemone fish (*Amphiprion ocellaris*)

**Goal**  
**Long-term Goal: Restore the rich coral reef ecosystem that existed at the time of park designation in 1972**  
**Short-term Goal: Eliminate the negative environmental impacts on corals to stop further degradation**

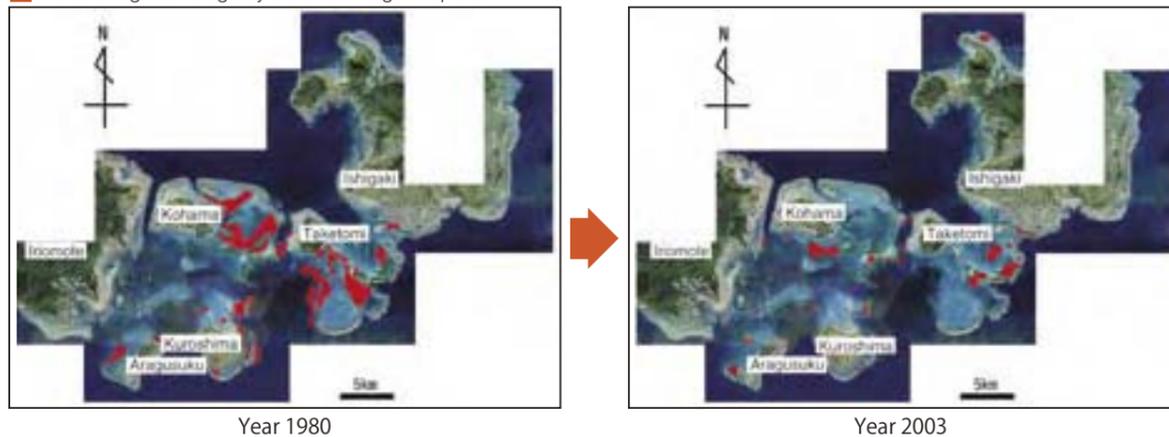


Sekisei Lagoon, located between Ishigaki and Iriomote of Yaeyama Islands, is the largest coral reef sea in Japan and was designated as the Iriomote National Park in 1972. The Yaeyama sea including the Lagoon is highly diverse in coral reef communities, with more than 360 reef-building coral species. Such a high-latitude sea supporting a large number of coral species is extremely invaluable in Japan and the world. The sea also greatly contributes to the regional economy by providing various opportunities for resource use from diving to fisheries.

However, corals in the Lagoon have extensively diminished since park designation because of various reasons: terrestrial runoffs of red clay and wastewater; coral bleaching due to high water temperatures; and outbreaks of the predatory crown-of-thorns starfish (*Acanthaster planci*). Initial efforts have been made to reduce terrestrial runoffs to help the natural recovery of coral ecosystem health. Studies on coral distribution and techniques for reef rehabilitation are also in progress.

### A decline of corals in Sekisei Lagoon

Areas of high coverage by the branching *Acropora*



### Related Web Sites

Sekisei Lagoon Portal Web Site: <http://sekiseisyoko.com/szn/>

## Approaches

- ▶ Rehabilitate coral communities by inducing settlement of larvae that are developed in synchronous spawning and by culturing the settled larvae for transplantation →①
- ▶ Reduce terrestrial runoffs

Reef rehabilitation and studies on regeneration dynamics and diversity are underway based on the promotion plan, "Sekisei Lagoon Nature Restoration Master Plan." In the sites where natural recovery is limited because of poor larvae supply or insufficient juvenile recruitment, manufactured settlement devices are used. To promote sustainable fisheries and recreations in the Lagoon, social studies, outreach program development, and web site construction to disseminate information have been implemented.



Restoration Area



### Predation damage by the outbreak of crown-of-thorns starfish

Corals in the Yaeyama area were utterly destroyed by the 1980s outbreak. Although reefs are in the gradual recovery, a field survey in 2003 found increasing populations of crown-of-thorns starfish in the Lagoon.



### Coral bleaching due to elevated sea temperatures

Coral bleaching is the whitening of corals by the loss of zooxanthellae residing within corals because of stresses from extremely low or high sea temperatures. If zooxanthellae loss is prolonged, the coral host eventually dies.



### Red clay and other terrestrial runoffs

Turbid-water runoffs from uplands to the sea occur in heavy rains, accumulating fine-grained sediments in the sea bottom, which in turn disturbs corals.

## ① Rehabilitating coral communities - constructing substrates for larvae settlement

Settlement devices, with each forming like a spinning top, are placed on the sea floor before synchronous spawning. After rearing juveniles on the devices for 1.5 to 2 years, coral-bearing devices are transplanted to rehabilitation sites. This method using settlement devices has the following advantages: existing coral communities remain undisturbed; various species can be simultaneously re-established; large-scale restoration can be done; and a standard protocol can be developed. In 2006 about 73,000 settlement devices were installed at five sites in the Lagoon.



Settlement devices



Installing settlement devices on the sea floor prior to synchronous spawning



Selecting coral-bearing devices



Implanting the devices to the sea bed



Coral colonies grown on a settlement device