

# FIELD EXPERIMENT FOR THE ESTABLISHMENT OF ARTIFICIAL ABALONE REEFS ALONG THE COAST OF TANEGASHIMA

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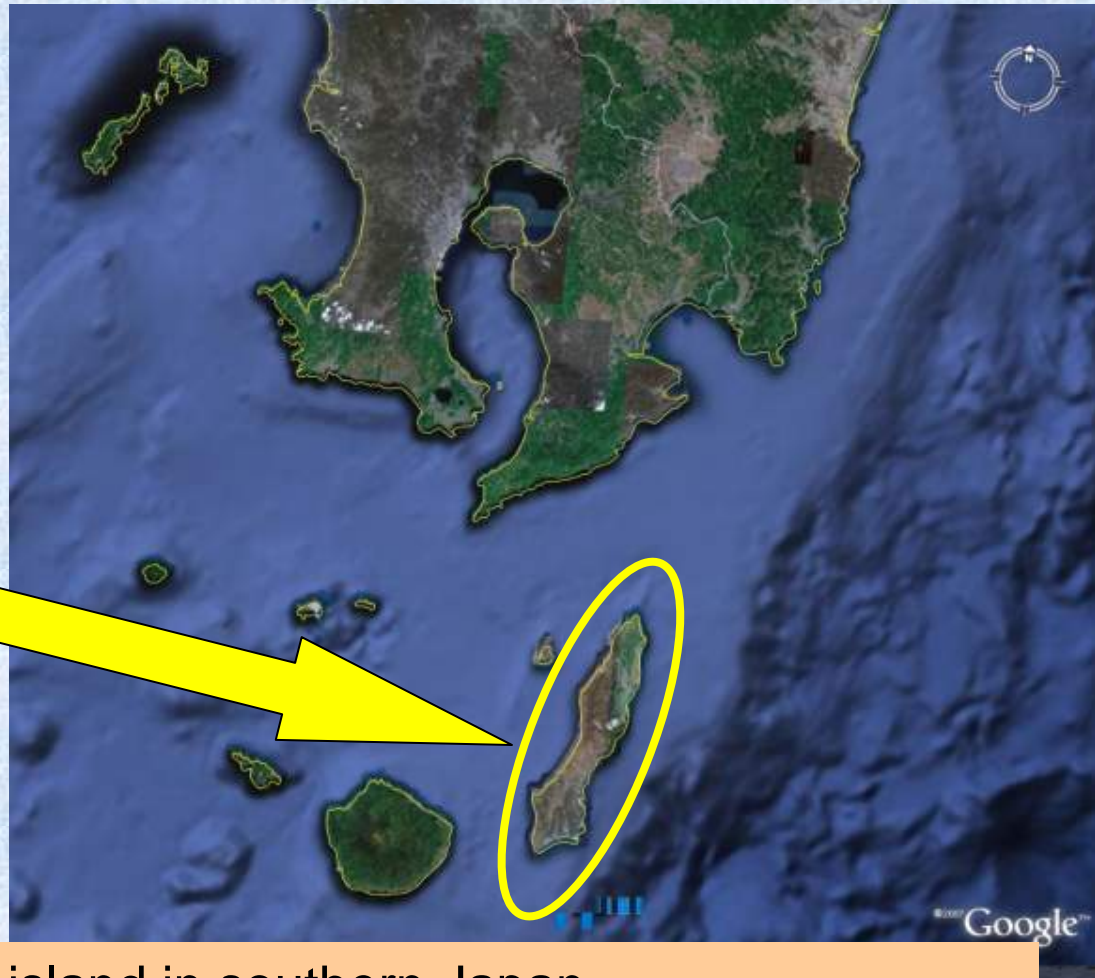
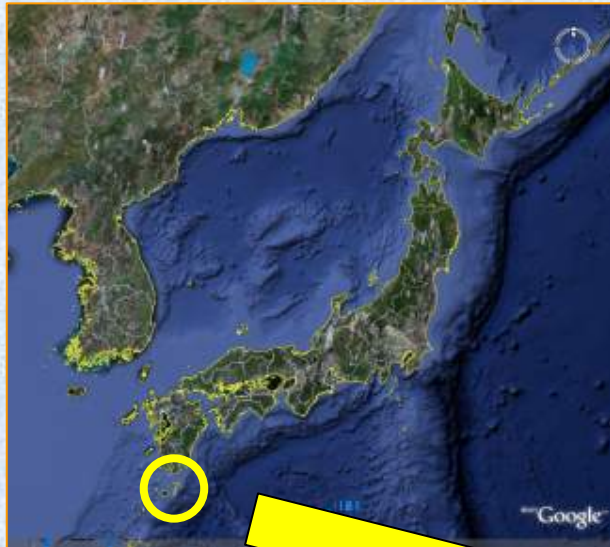


*Tokobushi*  
(*Haliotis diversicolor diversicolor*)



Artificial reefs

# Tanegashima, JAPAN



The Tanegashima is an island in southern Japan. It is a long low stretch of land, 57.5 kilometers from north to south, and 5–12 kilometers from east to west. The climate of Tanegashima is subtropical region.

# Fishery in Tanegashima



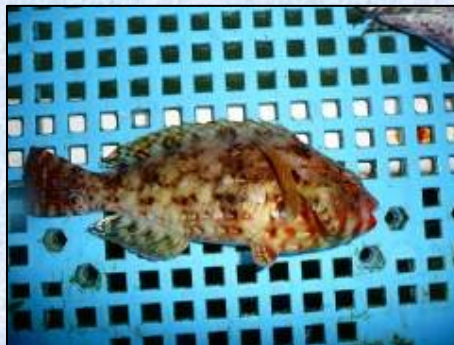
## Fishing methods

Diving

Set net

Gill net

Long line



# Fishing season of abalone



Fishing season of abalone: May – July  
Most expensive species in Tanegashima  
A valuable commercial fishing species

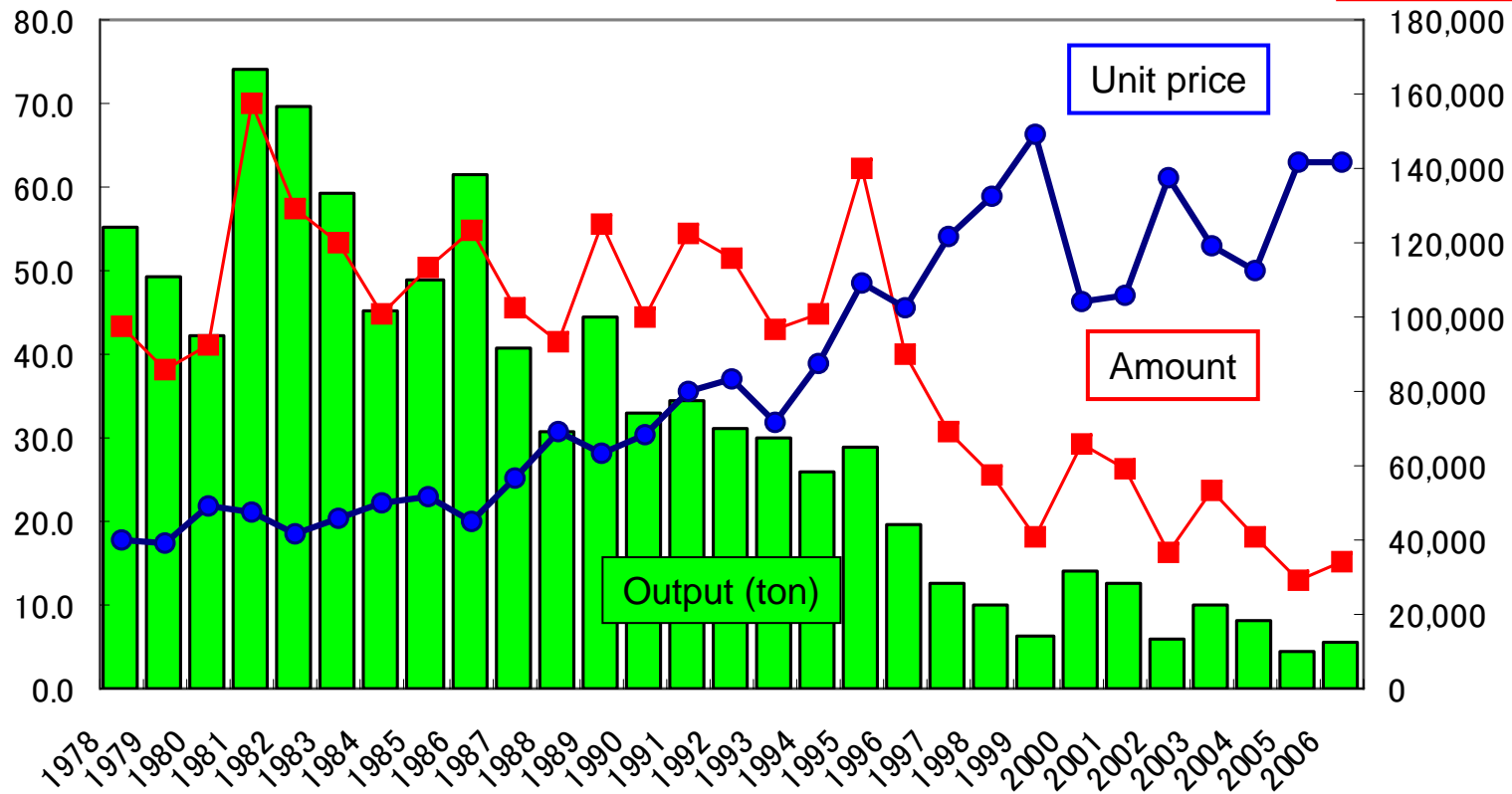


# Abalone fishery

Unit price (¥100/kg = 1US dollar/kg)

Output (ton)

Amount  
(¥1000)



Juveniles of the abalone has been released every year since 1980.  
More than 200,000 juveniles were released every year in this five years.

# Abalone local dishes in Tanegashima



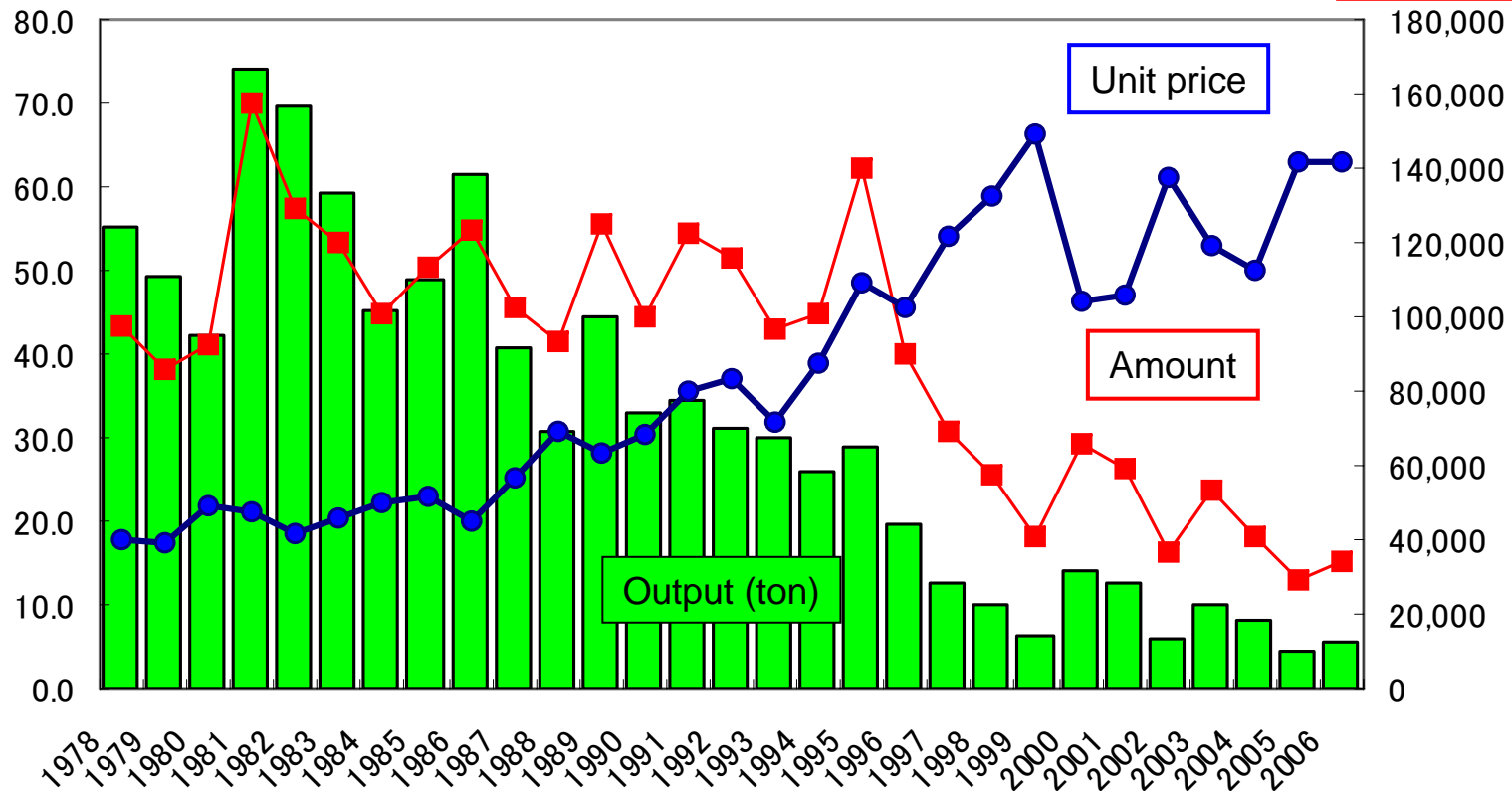
More than 90% of Abalones caught in Tanegashima are consumed in Tanegashima. Abalone is important ingredient for making local dishes in Tanegashima.

# Abalone fishery

Unit price (¥100/kg = 1US dollar/kg)

Output (ton)

Amount  
(¥1000)

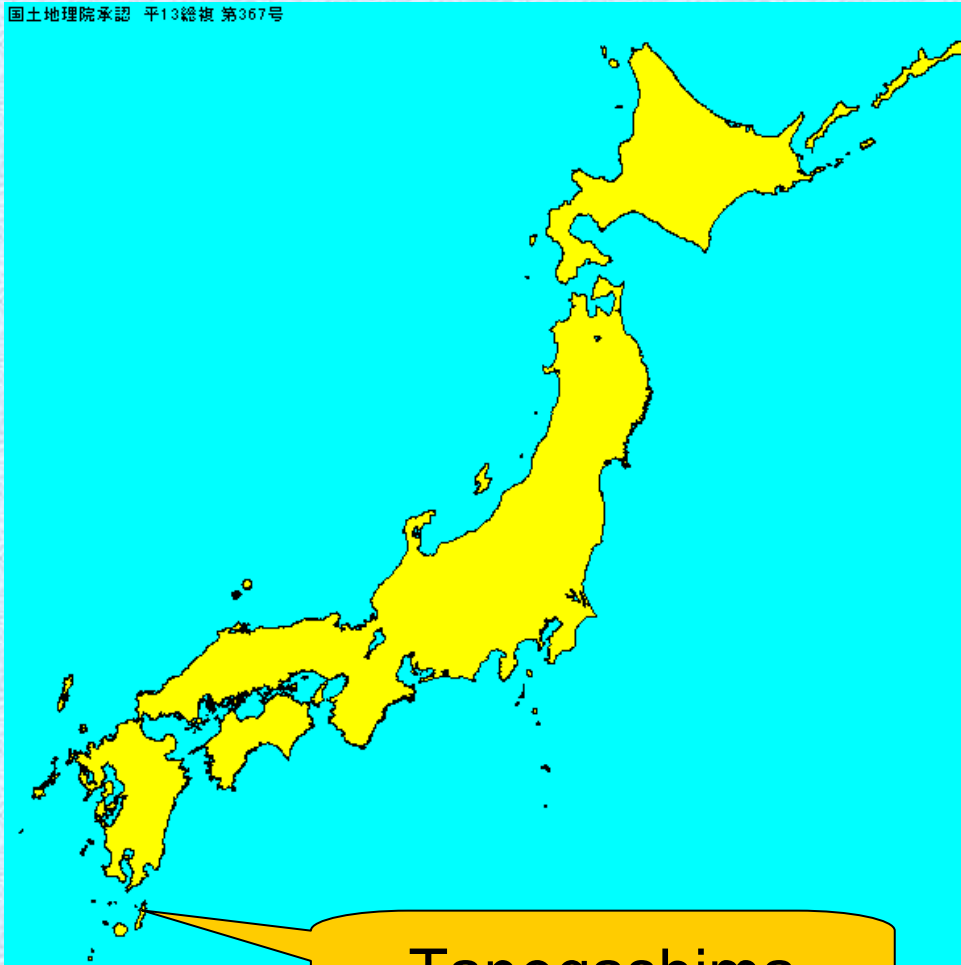


One of the reasons for the decrease in fishing of abalone is thought to be reduced habitat size because of the covering of rock surfaces with sands and stones.

# Research field

Artificial habitats for abalones were developed by mining the rocky coastal area in 1993-1994.

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Tanegashima





# Research field

Artificial habitats for abalones were developed by mining the rocky coastal area in 1993-1994.

Most of the seabed in the present was covered with sand and small stones, making the habitat unsuitable for abalones.



Seabed of artificial habitat for abalones

# Restore the habitat of abalone by placing concrete blocks on the seabed



Hexagonal and wavy shape, lightweight

Size: Length 49cm × width 42cm × height 25cm

Submerged weight: Approximately 30kg

- (1) The small gap between the block and seabed would provide a habitat for the abalones.
- (2) Algae, which is the diet of abalones, would grow on the block surface.
- (3) Small and lightweight block with an aim to increase the efficiency of catching abalones just by turning the blocks.

Artificial reef

Fishing gear

# Research field



High tide  
Depth: about 3m



Low tide  
Depth: about 0.5m

- 1) The depth of the research field is between about 0.5m and 3m.
- 2) The seabed of the research field is flat.

# Put artificial reefs on the seabed (March 2005)



Artificial reefs for habitat of abalones were developed by placing 300 pieces of the concrete blocks on the seabed.

# Release juveniles (June 2005)

Abalone juveniles (1 year old)

Shell length: 24.1mm

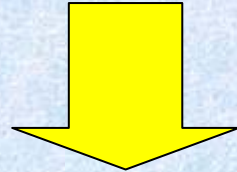
Shell weight: 1.9g



10 juveniles per 1 block were released, total 3,000 juveniles were released by scuba divers.

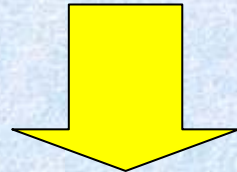
Putting artificial reefs on the seabed in the research field (March 2005)

Releasing abalone juveniles by scuba divers (June 2005)



Research (July, December 2005)

Catching abalones and releasing abalone juveniles by scuba divers (May 2006)



Research (July, October, December 2006)

Catching abalones and releasing abalone juveniles by scuba divers (May 2007)



Research (October, December 2007)

Catching abalones and releasing abalone juveniles by scuba divers (June 2008)

The progress in the growth and survival of the abalones and the algal growing on the artificial reefs were regularly monitored for 3 years.

# Research in the field experiment



Scuba divers turn all of concrete blocks to account the number of abalones on the bottom side.

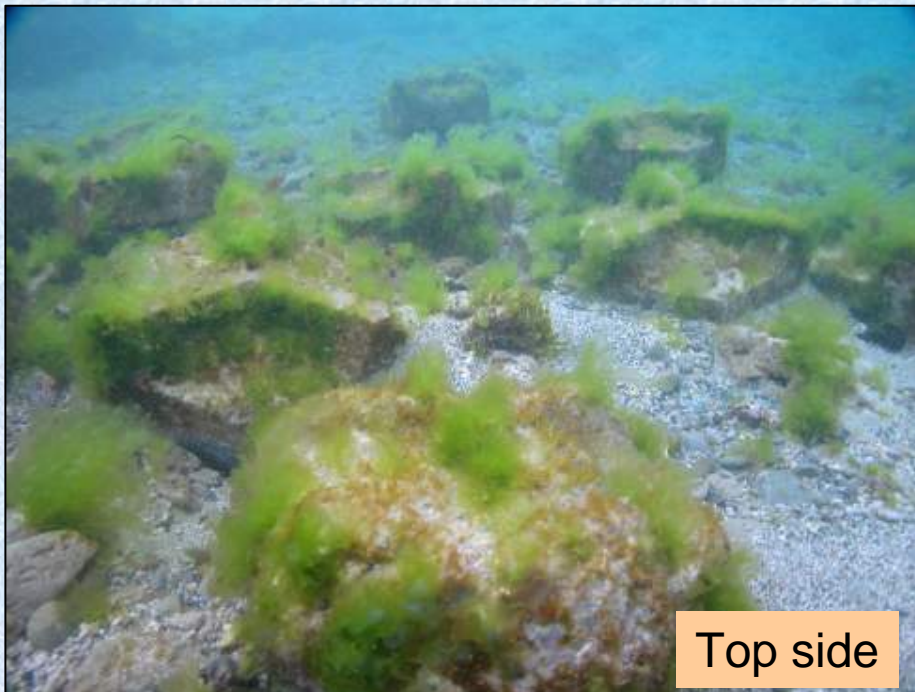


Take some abalones as sample, measure shell length.

# Result of research



It was observed that algae were grown on the top side of the concrete blocks, abalones inhabit on the bottom side of that.



Top side



Bottom side



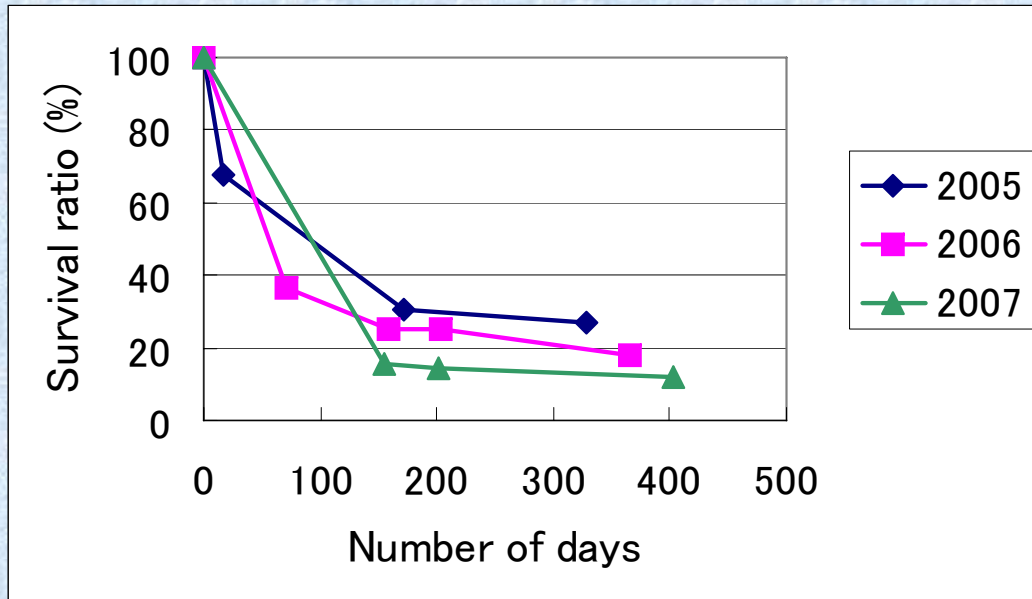
# Artificial reefs



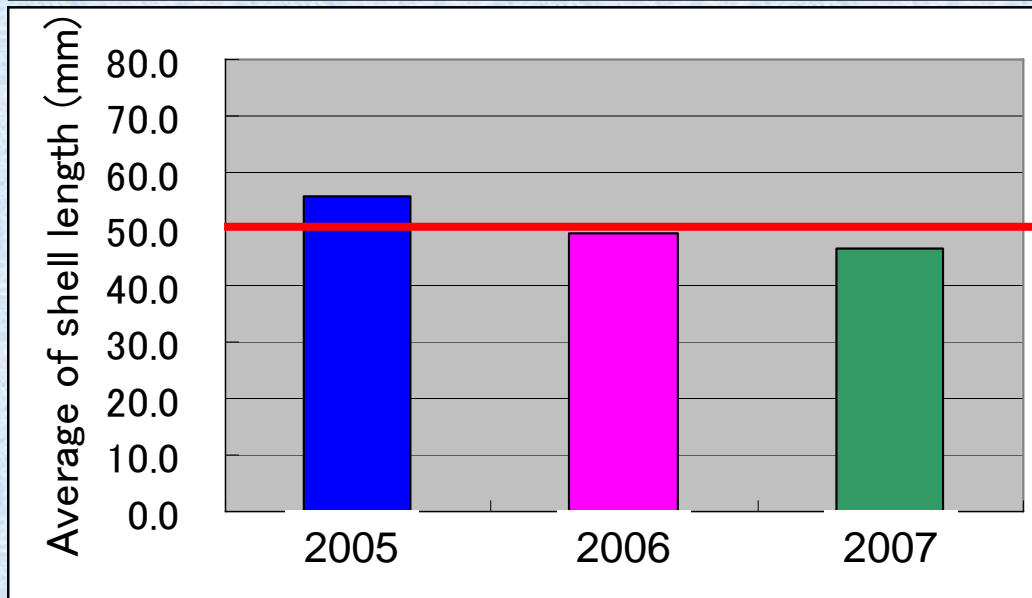
# Artificial reefs



# Result of research



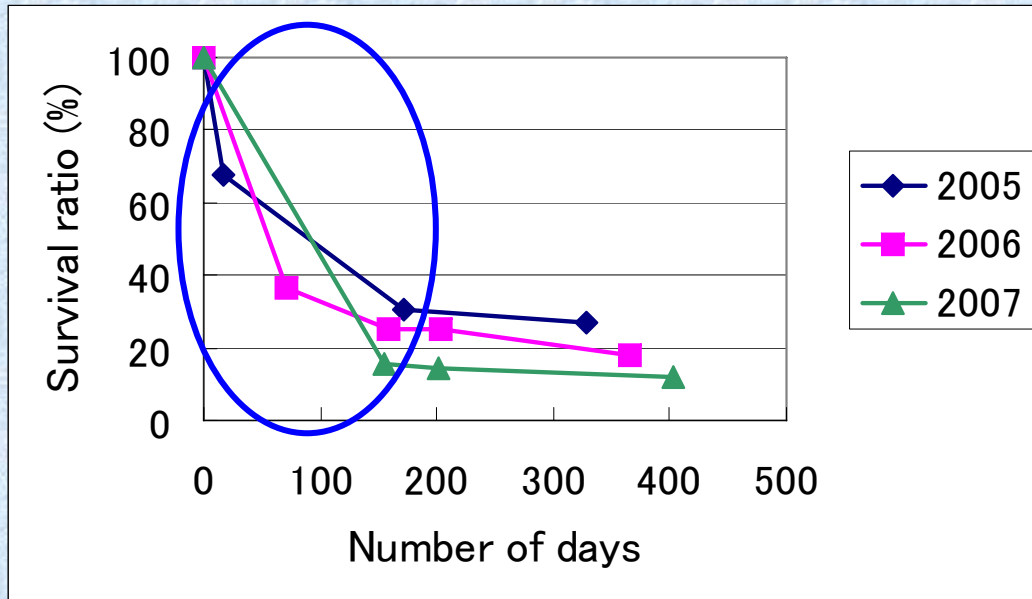
It was founded that survival ratios of abalones were decrease about 3 months after releasing juveniles, and approximately 12.1% and 26.9% about 1 year after releasing juveniles. About half number of abalones grown up to the commercial size for about 1 year



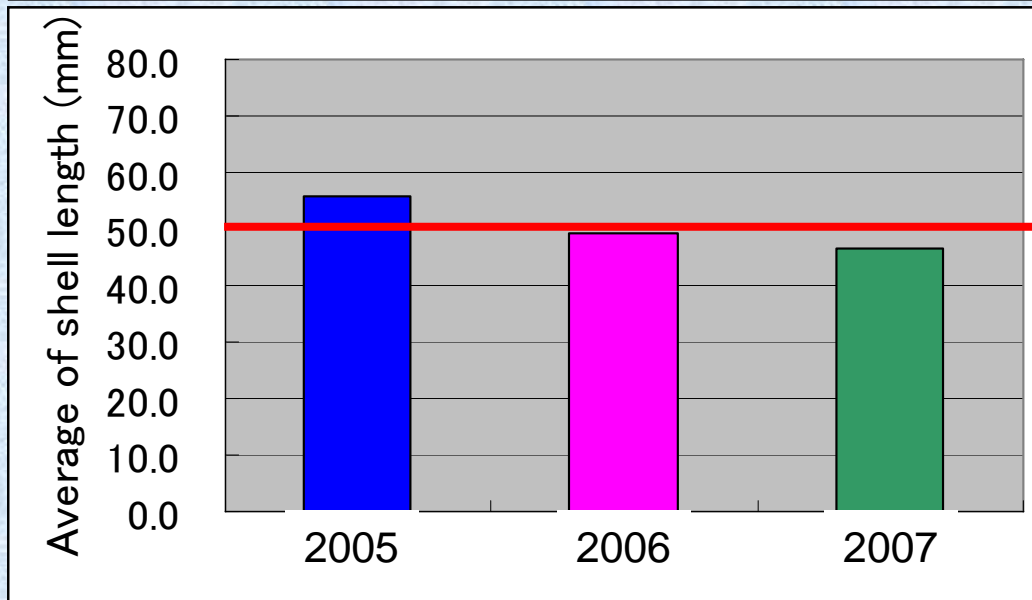
Commercial size:  
Shell length 50mm over



# Result of research



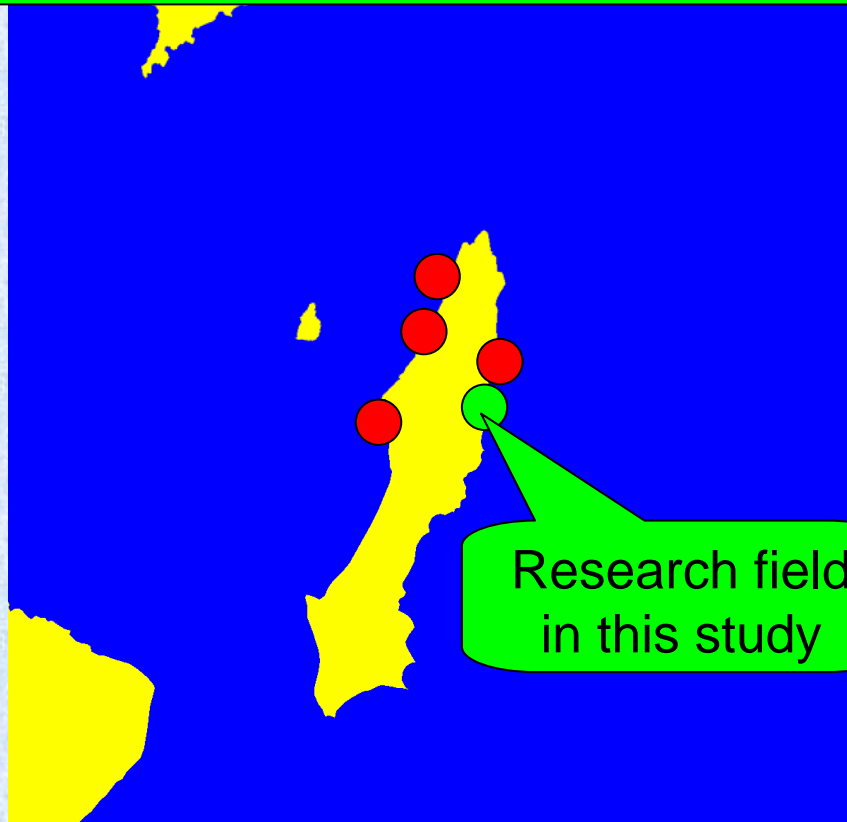
Problem to be solved:  
Decrease about 3 months  
after releasing juveniles



Commercial size:  
Shell length 50mm over



# Further development



Research field  
in this study

Artificial reefs developed in this study were developed in another 4 fields in Tanegashima. Our research is being continued now.



*Thank you very much  
for your kind attention!!*

