

**Yoshihiro SUENAGA**

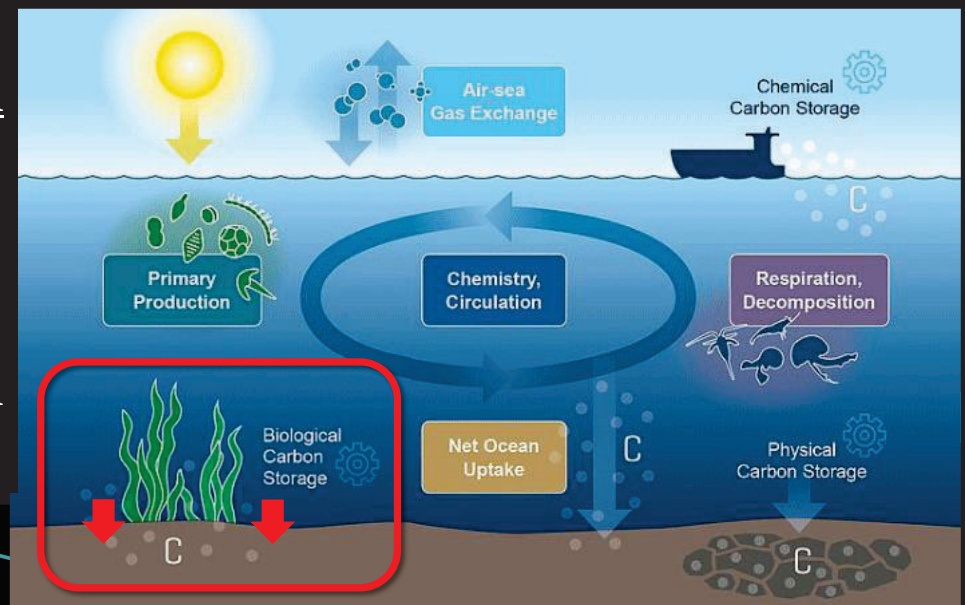
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Kagawa University*

# Development of Seaweed Bed Creation Reefs and Contribution to Blue Carbon

**1** What is blue carbon  
and carbon sequestration

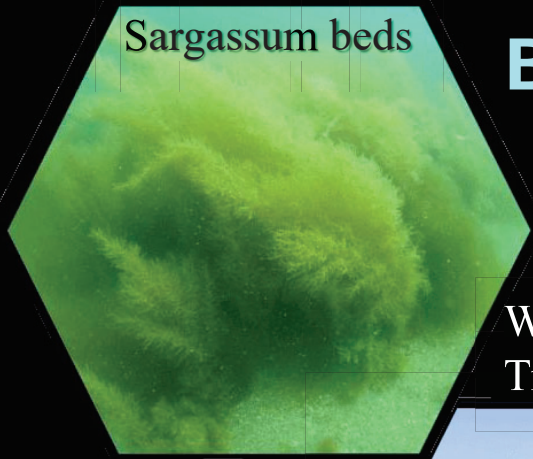
**2** function of seaweed  
bed building reefs

**3** Calculation of carbon  
sequestration and annual  
changes



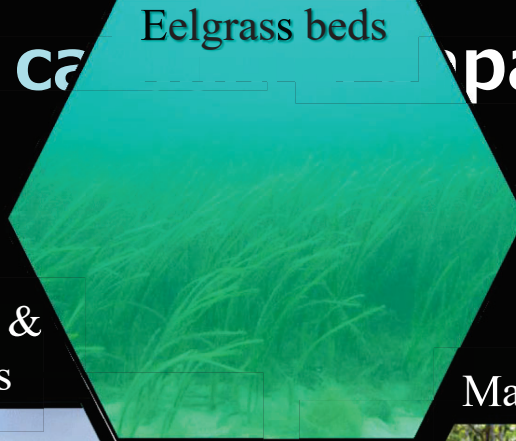
**New option for carbon sink  
measures in a report by the United  
Nations Environment Programme  
(UNEP) in October 2009**

Sargassum beds



## Blue carbon Japan

Eelgrass beds



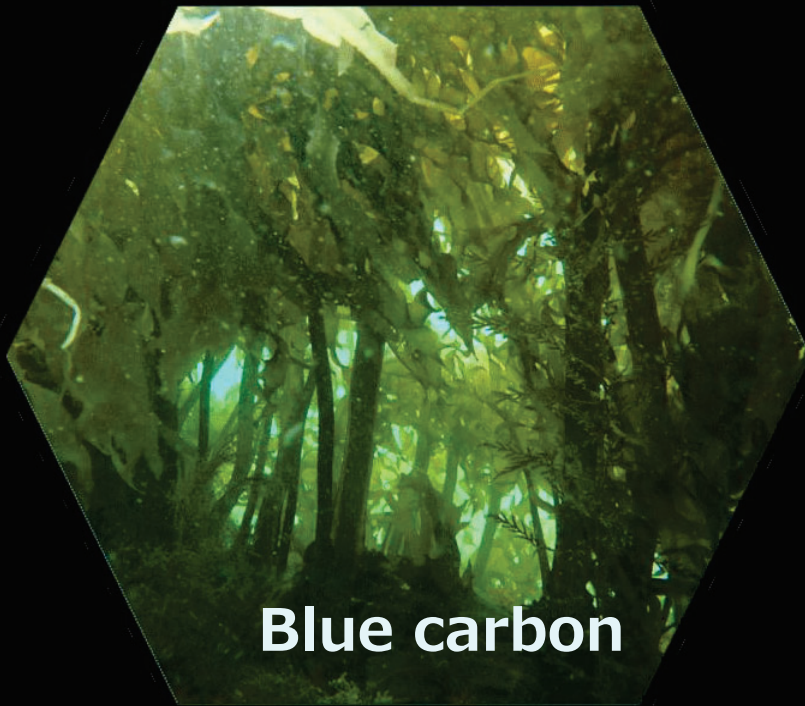
Wetlands &  
Tidal flats



Mangrove forest



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Blue carbon

Capacity is large but fragile

The CO<sub>2</sub> absorption capacity of Blue carbon ecosystems:

CO<sub>2</sub> absorption rate per unit area (absorption/year) is 3 times higher than Green carbon ecosystems.

## Green carbon



Green carbon

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# Importance of coastal areas

Food supply

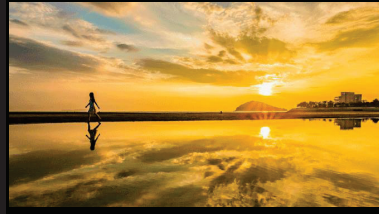


Coastal protection



Global warming mitigation

Tourism and recreation



Education



Research



A place for daily relaxation



# Importance of seaweed bed

Nursery for juvenile fish

Water purification



Diverse species (among the foliage)



Sediment stability

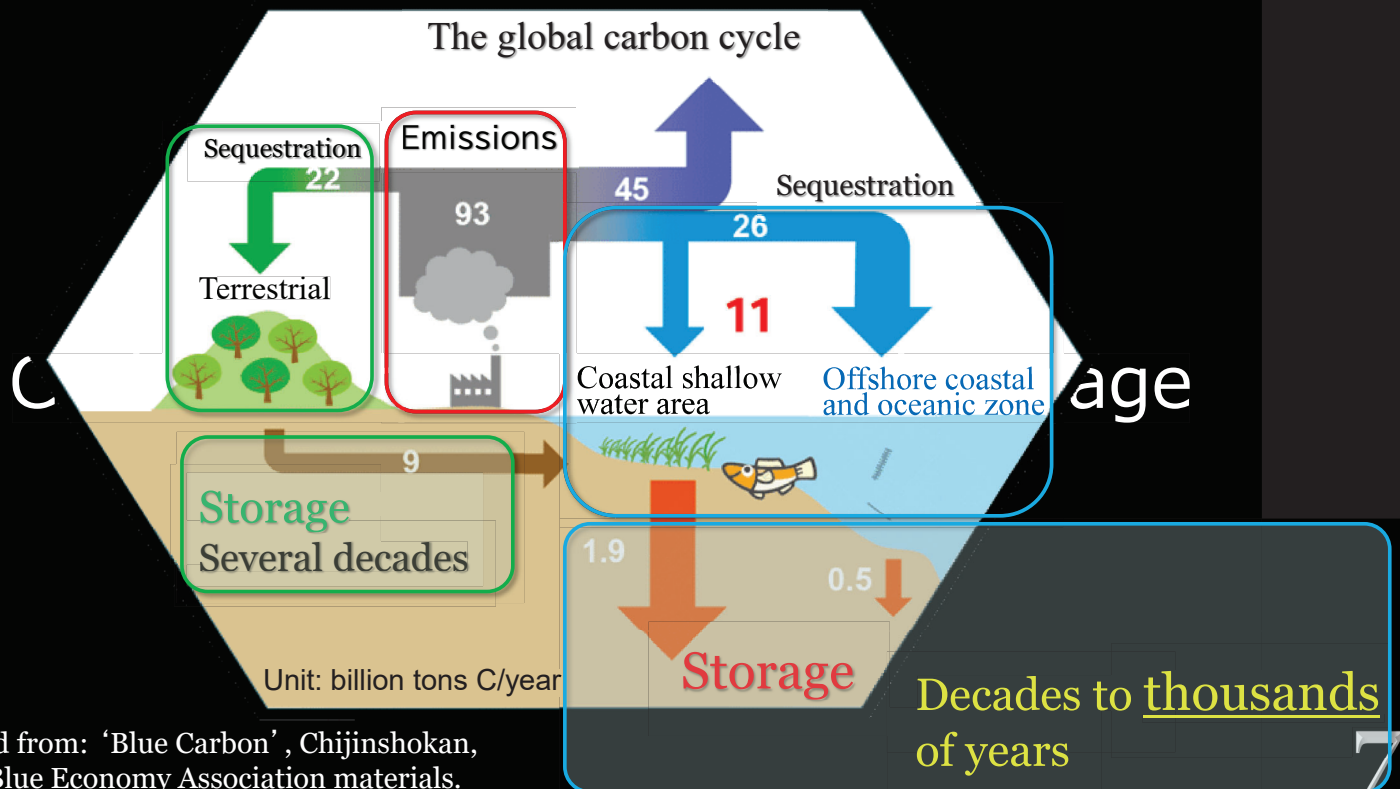


Spawning grounds for aquatic life



Abundant benthic fauna



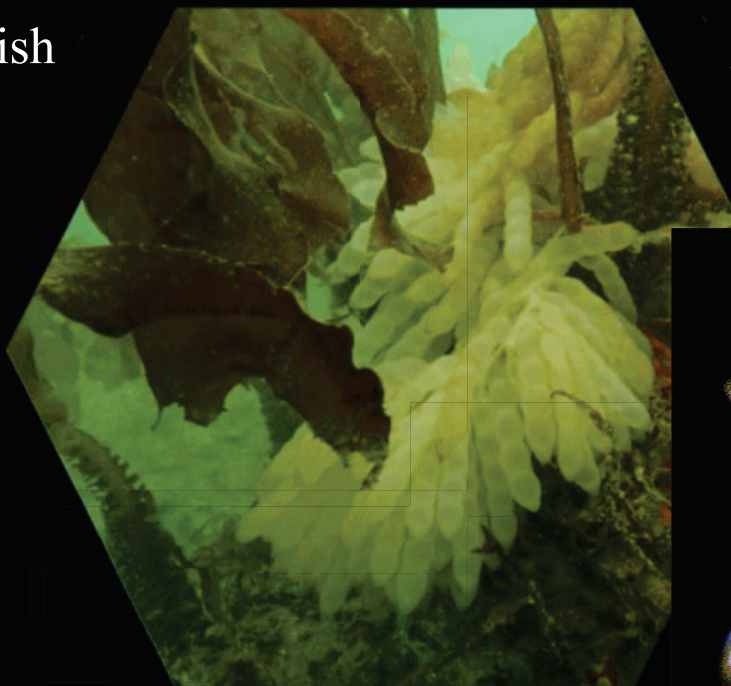


## Functions and effects of seaweed bed building reefs.

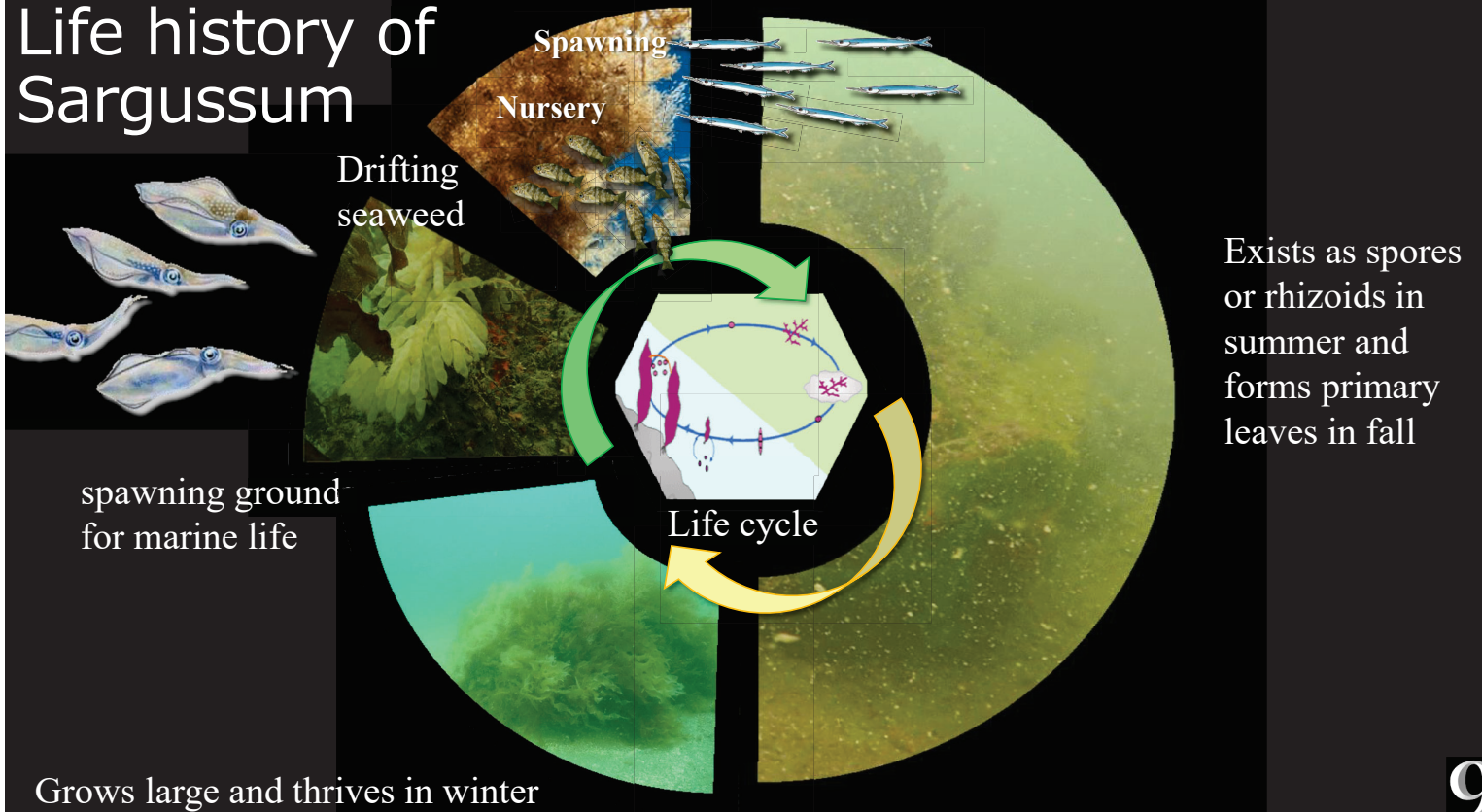
Nursery for juvenile fish

Diverse species  
(among the foliage)

Spawning grounds  
for aquatic life



# Life history of Sargassum



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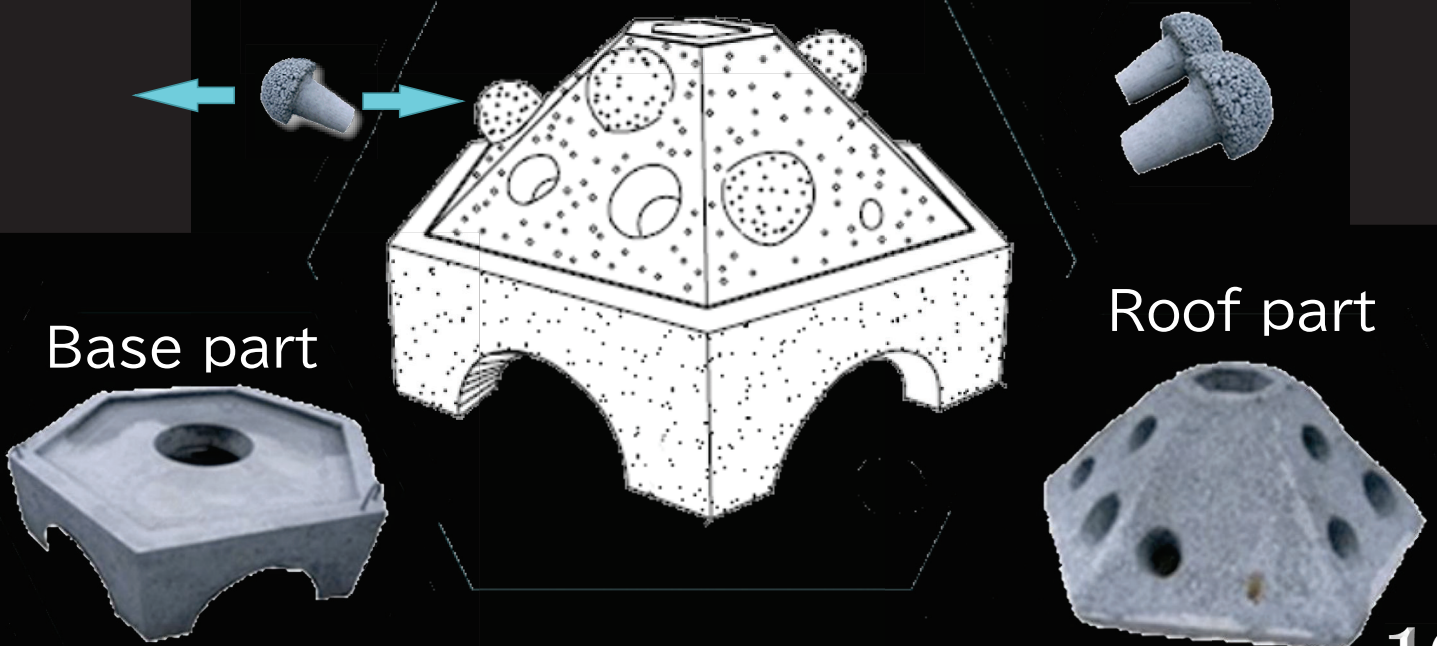
## Marinemash overview

### **Marinemash**

Protrusion part

Base part

Roof part



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# Functions of Marinemash

Porous material

Plankton and fry

Small and complicated wakes

Current  
direction

Wake

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Kagawa University and experimental site (Aji Marine Station, Seto Inland Sea Regional Research Center)

Okayama

E134°

Harima sea

Follow-up studies of seaweed bed building reefs (currently 80 reefs at 2 sites)

Kamano fishing port

Survey area (WD < 10m)

Tidal velocity  $\leq 2\text{kt}$

Site A

Site B

Site A

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# Estimating Carbon Sequestered by Marinemash

[CO<sub>2</sub> sequestration/year]=



3.6tCO<sub>2</sub>/year

[Absorption coefficient ( tons CO<sub>2</sub>/ha/year)]

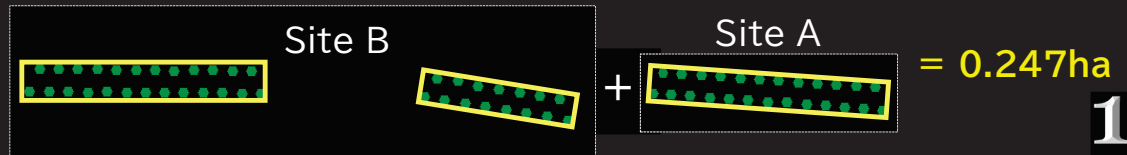
(Annual increase in carbon sequestered per unit area of ecosystem)



$$\left[ \text{Image 1} - \text{Image 2} \right] / \text{Area (ha)}$$

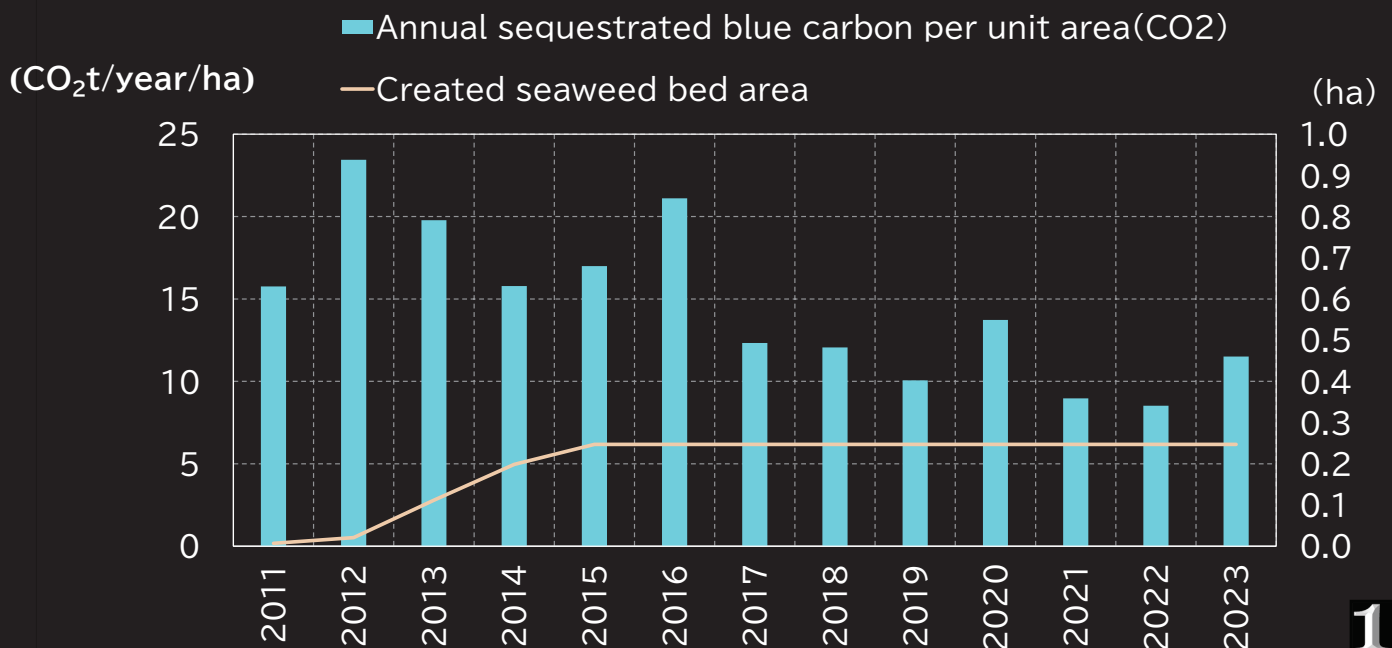
14.6tCO<sub>2</sub>/ha/year

x [Area of ecosystem in question (ha)]



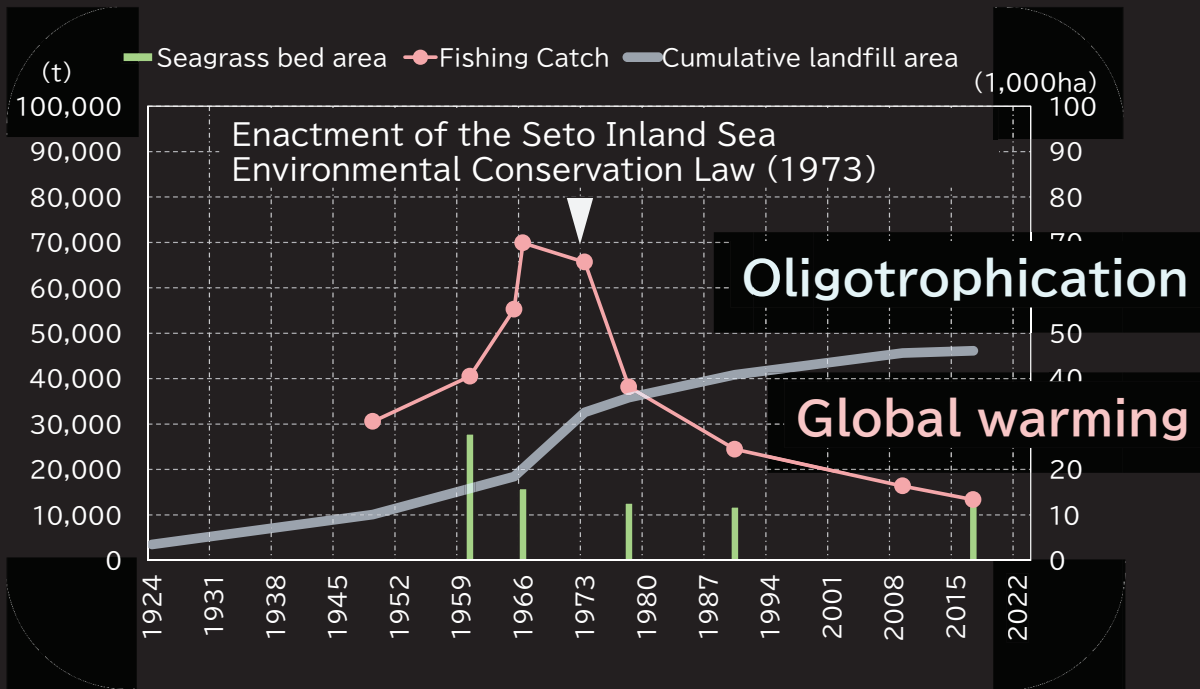
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## Carbon sequestrated by Marinemash



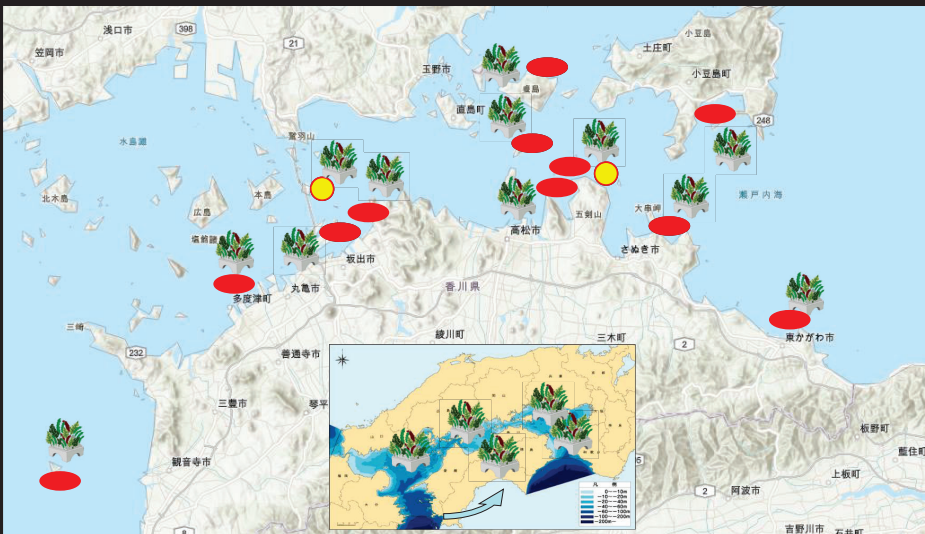
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# Key points for the regeneration of the Seto Inland Sea



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# Social Implementation Plan for the Bisan Seto Waters (Including Current Projects)



- Sites currently underway
- Target Area (in planning)

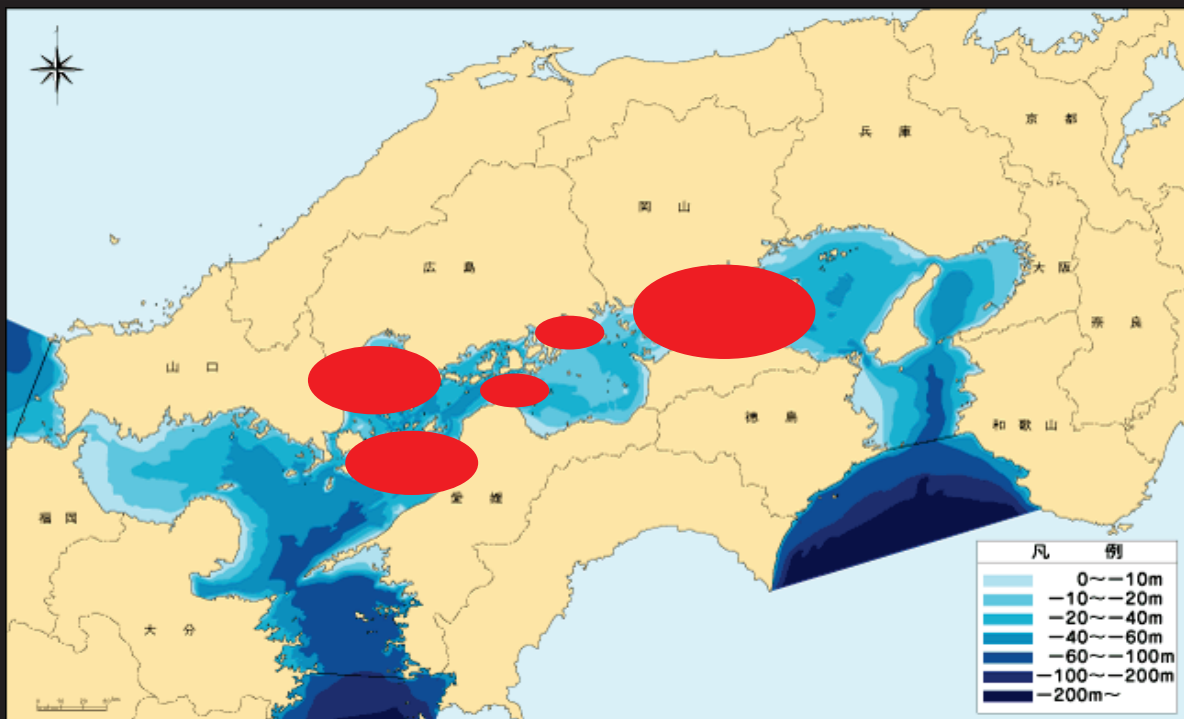
**If 1.74 hectares of seaweed beds are established per site over a period of 5 years, the creation of 13 sites will result in a total of 22.62 hectares of seaweed beds.**

(Assuming 200 structures per site with a production cost of 500,000 yen per structure.)

**This initiative will utilize both public works and private investment.**

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## Construction in other regions and wide-area development



Depth: 4.73m; Temp: 17C

Thank you for listening.