

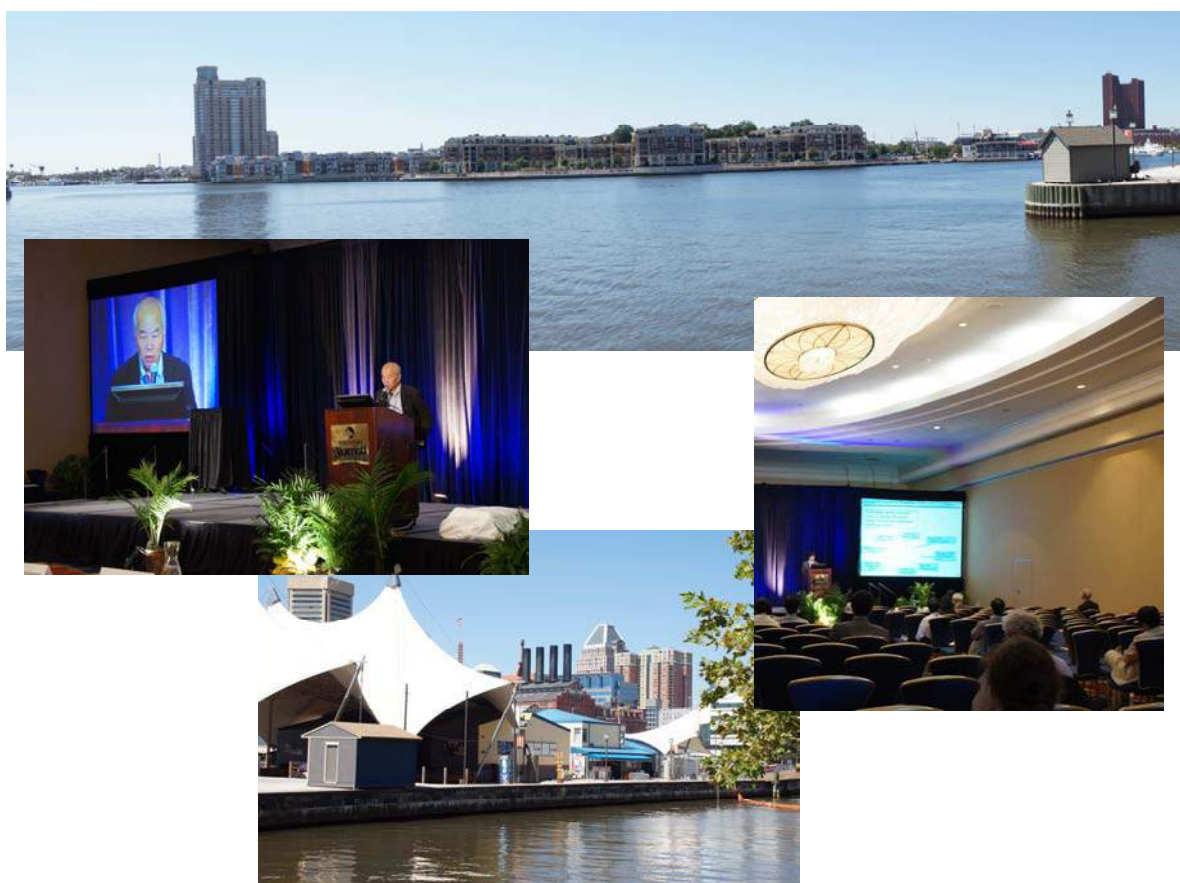
9th International Conference on The Environmental Management of Enclosed Coastal Seas (EMECS 9)



Satoumi Session

Disseminating the Concept of Satoumi Internationally

Session Report



International EMECS Center







9th International Conference on The Environmental Management of Enclosed Coastal Seas (EMECS 9)

Satoumi Session

Disseminating the Concept of "Satoumi" Internationally

28 August, 2011

Venue: Baltimore Marriott Waterfront, USA
Room: Grand Salon V

Organizer: International EMECS Center, JAPAN

Supported by:
The Asia-Pacific Network for Global Change Research
(APN) - JAPAN

Oyster Beds (Hiroshima Pref., Japan)





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Preface

Satoumi Special Session was held under the theme “Disseminating the Concept of Satoumi Internationally” at EMECS 9 in Baltimore in 2011 and this session was led by various experts from around the world.

Satoumi is a traditional Japanese ecosystem that used to be found in small bays throughout Japan in days gone by, but regulations and taboos in their communities were rarely formalized, and were liable to lose much of their effectiveness as a result of rapid environmental changes stemming from drastic economic development.

Water quality, once polluted by domestic and industrial waste, has improved to some extent due to painstaking efforts to reduce water pollution by restorative regulations, but damaged ecosystems and living resources have not yet fully recovered.

The successful introduction of Satoumi through human interaction is expected to improve the impoverished ecosystem and to provide greater biological diversity as habitats, greater biological production and fishing grounds.

The concept of Satoumi is gradually being recognized not only in its homeland of Japan but also at international meetings held in both western and Asian countries. The new concept of Satoumi was introduced for the first time outside Japan at EMECS 7, which was held in Caen, France in 2006. It attracted attention in the review session as a “symbiosis among human communities and coastal/marine areas - a more rational vision of co-existence”.

Subsequently, a Satoumi Workshop was held at EMECS 8 in Shanghai, China in 2008, which deepened the concept through the exchange of information on many similar cases throughout the world of community-based practices for sustainable coastal management such as Integrated Coastal Management (ICM), Ecosystem-Based Management (EBM) and Community-Based Management (CBM).

We believe that this session was a valuable opportunity for the researches, policy makers, governmental officials and members of NGO around the world. It is our expectation that the concept of Satoumi will be spread out of the world and that environmental conservation and restoration activities related to enclosed coastal seas will be promoted.

We wish to express our sincere gratitude to everyone who contributed so much to this session, especially Professor Tetsuo Yanagi and Dr. Osamu Matsuda who have developed a plan for this session.

International EMECS Center
March 2012, Kobe, Japan

1 Outline

Theme

Disseminating the Concept of "Satoumi" Internationally

Date

August 29, 2011

Venue

Baltimore, Maryland USA Baltimore Marriott Waterfront

Organizer

International EMECS Center



Sponsors

Asia-Pacific Network for Global Change Research(APN)



EMECS9 Steering Committee



2 Program

Opening Address

Mr. Toshizo Ido The Governor of Hyogo Prefecture / Chairman of Board of Directors of
International EMECS Center (JAPAN)

Introduction

Prof. Tetuo Yanagi Convener of Session / Kyushu University (JAPAN) / Co-Chairs of Scientific
and Policy Committee of International EMECS Center

Part 1 : Activities in Asia

Chair : Dr. Yves Henocque, French Research Institute for Sustainable Use of the Sea (FRANCE)

Dr. Osamu Matsuda, Professor Emeritus, Hiroshima University (JAPAN)

*Evolution of Satoumi Frame during the Recent International Meetings in the Context of Sustainable
Coastal Management*

Mr. Takahiko Chino, Ministry of the Environment (JAPAN)

Satoumi Policy in Japan

Prof. Takeshi Hidaka, Kinki University (JAPAN)

Rules and Regulations Supporting Satoumi as Social System

Dr. Suhendar Sachoemar, Agency for the Assessment and Application of Technology (INDONESIA)

*Development of Sustainable Aquaculture as a Model of Satoumi and GAPURA to Improve
Productivity of Marginal Brackishwater Pond in the Northern Coastal Area of Karawang, West Java,
Indonesia*

Dr. Hideki Kokubu, Mie Prefecture Fisheries Research Institute (JAPAN)

*Evaluation of Tidal Flat Restoration Effect in the Coastal Unused Reclaimed Area by Promoting
Tidal Exchange with Public Involvement in Ago Bay, Mie Prefecture, Japan*

Part 2 : Views on Satoumi from the Perspective of Western Society

Chair : Dr. Osamu Matsuda, Professor Emeritus, Hiroshima University (JAPAN)

Dr. Yoshitaka Ota, University of British Columbia (CANADA)

Small Coasts, Large Issues - Can Communities Protect their Coasts?

Prof. Wayne Bell, Center for Environment & Society, Washington College (USA)

Historic and Contemporary Land Use on the Chesapeake Bay Watershed: the Relationship of Working Landscape to the Satoumi Perspective

Dr. Yves Henocque, French Research Institute for Sustainable Use of the Sea (FRANCE)

Enhancing Social Capital for Sustainable Coastal Development: Is Satoumi the Answer?

Dr. Marjo Vierros, United Nation University (JAPAN)

The Role of Satoumi in Implementing the Convention on Biological Diversity and Other International Commitments

Prof. Erdal Özhan, Mediterranean Coastal Foundation (TURKEY)

A Comprehensive Regional Effort to Enhance Integrated Coastal Management in the Mediterranean and the Black Sea Countries: The PEGASO of EU FP7

Dr. William Dennison, Vice President for Univ. MD Center for Environmental Science

(Substitute for Catherine E. Wazniak, et al., Maryland Department of Natural Resources Tidewater Ecosystem Assessment Program and University of Maryland) (USA)

Early Detection of Coastal Ecosystem Response to Management Actions

Part 3 : General Discussion

Chair: Prof. Tetsuo Yanagi, Kyushu University (JAPAN)

3 Summary

Satoumi is attracting attention from the standpoint of preserving both fishery resources and the environment. Plans for its creation are being formulated, and information about Satoumi is being communicated in an effort to encourage its spread internationally as well. In the special session held at EMECS 8 (8th International Conference on the Environmental Management of Enclosed Coastal Seas), there was a common recognition that Satoumi can be an effective tool for coastal zone management in Asia. This session was held in a further effort to establish the concept of Satoumi internationally, as well as to share information on the status of Satoumi activities in Asia and coastal zone management activities in Europe and the United States, and to disseminate information about the Satoumi concept to the West.

The Satoumi Session was held on August 29 from 12:20 to 3:00 p.m. and from 5:15 to 6:40 p. m. The session was convened by Dr. Tetsuo Yanagi, professor at Kyushu University. It began with words of welcome from Mr. Toshizo Ido, governor of Hyogo Prefecture and president of the International EMECS Center. Next, Dr. Yanagi outlined the aims of the session and emphasized his desire to discuss the science and technology involved in creating Satoumi and the management of Satoumi.

Convener : Prof. Tetsuo Yanagi, Institute of Applied Mechanics, Kyushu University (JAPAN)/

Co-Chairs of Scientific and Policy Committee of EMECS Center

Part 1 : Activities in Asia

Chair : Dr. Yves Henocque, French Research Institute for Sustainable Use of the Sea (FRANCE)

Presenters : Dr. Osamu Matsuda, Professor Emeritus, Hiroshima University (JAPAN)

Mr. Takahiko Chino, Office of Environmental Management of Enclosed Coastal Seas,
Water Environment Management Division, Environmental Management Bureau,
Ministry of the Environment (JAPAN)

Prof. Takeshi Hidaka, Kinki University (JAPAN)

Dr. Suhendar Sachoemar, Agency for the Assessment and Application of Technology
(INDONESIA)

Dr. Hideki Kokubu, Mie Prefecture Fisheries Research Institute (JAPAN)

Part 2 : Views on Satoumi from the Perspective of Western Society

Chair : Dr. Osamu Matsuda, Professor Emeritus, Hiroshima University (JAPAN)

Presenters : Dr. Yoshitaka Ota, University of British Columbia (CANADA)

Prof. Wayne Bell, Director of the Center for Environment and Society, Professor of
Biology and Environmental Studies, Washington College (USA)

Dr. Yves Henocque, French Research Institute for Sustainable Use of the Sea (FRANCE)

Dr. Marjo Vierros, United Nation University (JAPAN)

Prof. Erdal Ozhan, Mediterranean Coastal Foundation (TURKEY)

Dr. William Dennison, Vice President for Univ. MD Center for Environmental Science
(Substitute for Catherine E. Wazniak, et al., Maryland Department of Natural
Resources Tidewater Ecosystem Assessment Program and University of Maryland)
(USA)

Part 3 : General Discussion

Chair : Prof. Tetsuo Yanagi, Institute of Applied Mechanics, Kyushu University (JAPAN)

Part 1 focused on Satoumi as seen from Japan and other parts.

The first presentation was given by Dr. Osamu Matsuda, professor emeritus of Hiroshima University in Japan, on the deployment of frameworks for Satoumi at recent international conferences on sustainable coastal zone management. He discussed the trends and achievements at the EMECS Conferences, Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), the Convention on Biological Diversity (CBD-COP10) and the Satoyama-Satoumi Sub-Global Assessment (SGA). In the discussions at these conferences, it was reported that the Satoumi concept has been recognized (1) to have things in common with other management techniques such as community-based management (CBM), ecosystem-based management (EBM) and integrated coastal management (ICM), (2) to be an active conservation method that makes use of human labor, and (3) to be a bottom-up effort that strives for sustainable use and the preservation of marine ecosystem services. Satoumi has developed as a sustainable coastal zone management method that strives to maximize a balance of various ecosystem services. Moreover, Prof. Matsuda pointed out that Satoumi has the potential of being a sustainable coastal zone management method that focuses not only on the fishing industry but on the health and safety of humans, and, further, that it may become a tool that can achieve several of the Aichi Biodiversity Targets adopted at CBD-COP10.

Next, Mr. Takahiko Chino of the Office of Environmental Management of Enclosed Coastal Seas, Water Environment Department, Environmental Management Bureau, Ministry of the Environment in Japan spoke about policies in Japan relating to Satoumi. Up to now, water quality has been improved by total pollutant load controls and other policies. However, these did not extend to resolving the various problems currently faced by enclosed coastal seas, such as reduction of tidal flats, eutrophication due to distorted material circulation, and reduction of biodiversity. As a result, Mr. Chino said, the government

began working on providing assistance for the creation of Satoumi as a single policy tool, and to this end assistance was provided for activities in eight locations throughout Japan as models for Satoumi creation. To make it easy to initiate Satoumi activities in the future, the activities were divided into categories such as integrated river basin activities, urban activities, fishing village activities and experience-based activities, so Satoumi creation manuals could be prepared and information could be shared via the Satoumi Net website and other mechanisms. As this information is provided on the Internet in English as well, it can be shared with countries around the world that are facing the same kinds of issues, in order to help preserve and restore ocean environments worldwide.

Professor Takeshi Hidaka of the School of Humanity-oriented Science and Technology, Kinki University, Japan gave a presentation entitled “Rules and Regulations Supporting Satoumi as a Social System.” The social systems in Japan relating to Satoumi are made up of the traditional fishing industry rights system, the rules established as a result of negotiations among users, and autonomous environmental protection activities conducted by NPOs. As fishery operators have the right and obligation to protect and manage fishing rights zones in cooperation with one another, the fishing rights system can also be thought of as the prototype for Satoumi. On the other hand, the elements of the modern Satoumi are fishing rights, recreation and other non-fishing use, autonomous environmental protection activities, joint efforts at environmental protection and rule-creation (to eliminate conflicts among these rights). These are effective for Satoumi in comparatively small regions, but the management of large seas such as the Seto Inland Sea as a Satoumi poses a problem. In order to link small Satoumi together to form a larger Satoumi, an intermediary organization must play an important role in coordinating among the local organizations (made up of various entities) that are in charge of Satoumi management in smaller Satoumi and the governments that have greater responsibilities for larger Satoumi.

Dr. Suhendar Sachoemar of Indonesia spoke about the development of a sustainable aquaculture model that employed an integrated multi trophic aquaculture using tilapia, giant black tiger prawns, seaweed *Gracillaria* and green mussels in a marginal brackish water aquaculture pond in the coastal area of Karawang, West Java. The aim was to achieve the Satoumi and Indonesian Gapura concepts to create a model for sustainable coastal zone management. Dr. Sachoemar said he wants to expand this successful case study throughout the region and improve productivity, and also to minimize organic wastes through the use of a bio-recycling system for aquaculture.

Dr. Hideki Kokubu of the Mie Prefecture Fisheries Research Institute gave a report on tidal flat restoration with citizen involvement in Ago Bay, Mie Prefecture. In Ago Bay, the tidal flats deep in the

interior of the bay were reclaimed to create cultivated land. In recent years, however, most of these areas have not been cultivated and have been left as marshland and so on. The cause of environmental degradation in Ago Bay was thought to be the loss of these tidal flats. To restore the tidal flats and the environment of the bay, the floodgates that were installed at the time of reclamation were opened to allow seawater into the marshland on the inside of the floodgates. This was done to provide seawater exchange and improve the bottom sediment in the marshland, in order to ensure smooth material circulation between land and water and thereby improve the environment of the bay. When the project was implemented, a Council for Nature Restoration of Ago Bay Area was established based on citizen involvement, and projects such as the release of bivalves, creation of seaweed beds and the holding of environmental learning classes were implemented. As a result of assessment conducted through monitoring in each season, it was determined that the number of species was gradually increasing and the bottom sediment was gradually improving. It is anticipated that continuation of these activities will further improve biological productivity in the future.

The theme of Part 2 was Satoumi as seen from Western Nations.

Part 2 of the session began with a presentation by Dr. Yoshitaka Ota of the University of British Columbia in Canada entitled “Small Coasts, Large Issues – Can Communities Protect Their Coasts?” The session reported on coastal zone management from both a regional and global perspective. On the regional scale, the presentation touched on the coastal zone issues resulting from the Great East Japan Earthquake and the dramatic reduction in the number of fisheries operators, and noted that small coastal zones faced major issues. With regard to fisheries operators, Dr. Ota spoke about activities to restore the Eelgrass beds in Hinase-cho in Okayama Prefecture, and he pointed out the common aspects with the approach to ocean space planning adopted in places around the world. He noted that, on a regional scale, the Satoumi approach is the main method for the preservation of biological productivity and the sustainable use of coastal zone resources (primarily by fisheries operators), while on a global scale an understanding of the standpoint of governance of coastal zones on a comprehensive global scale is needed. He also noted that the sustainable use of ocean resources will require innovative and bottom-up management techniques on the local level, in addition to scientific research and management response on a global scale.

Professor Wayne Bell of Washington College spoke about the historical changes in Chesapeake Bay that led to the formation of the current river basin landscape, and about the relationship between what he called the “working landscape” and the Satoumi perspective. Professor Bell noted that human beings have

had ties to the Chesapeake Bay river basin for at least 10,000 years, and that people have managed these lands for the benefit of their communities and the lands in turn have influenced the nature, well-being, and culture of those communities. He called this relationship a “working landscape” and said that the most successful environmental policies are those implemented to keep the landscape truly “working” for the mutual benefit of the natural resources and the human communities that share the system together. He went on to say that Satoumi is a key perspective that links the “working landscape” of a watershed with the management of its associated coastal sea, in a manner that maximizes aquatic productivity and biodiversity with human interaction.

Dr. Yves Henocque of the French Research Institute for Sustainable Use of the Sea (IFREMER) gave a presentation entitled “Enhancing Social Capital for Sustainable Coastal Development: Is Satoumi the Answer?” He noted that social capital and natural resource management are closely related, and that networks, norms and trust are effective for the achievement of common objectives and lead to common efforts, and that common efforts are related to the Satoumi concept in that they are a multifaceted and reciprocal approach. With regard to the relationship with natural resources, in the Western concept, nature is seen as something separate from human beings that is often sacrificed for human needs. Ecological issues are the result of human encroachment into nature, and in this way the relationship is both passive and active. In the Eastern approach, particularly that of Japan, human beings and nature have a close relationship, and for both sides this is an active relationship of coexistence. This thinking supports the approach of Sato-yama and Satoumi. The adaptive joint management of Sato-umi that is based on the experience at the local level must be raised to management techniques on the national level. In Japan, it is essential to create diverse social capital in functional and systematic planning through the coupling of marine ecology zones at the prefectural level (which is midway between the municipal level and the national level). To this end, Dr. Henocque said, discussions should be held at all levels to create common rules (in other words, appropriate institutional arrangements) for Satoumi as a common space.

Dr. Marjo Vierros of the United Nations University Institute of Advanced Studies gave a presentation entitled “The Role of Satoumi in Implementing the Convention on Biological Diversity.” She said that many traditional cultures have an overall understanding of coastal zones, and that people are members of the system in the same way as land, ocean, fresh water and air. Satoumi is a traditional management technique that has similarities with other coastal zone management techniques throughout the world. The basic approach of the Convention on Biological Diversity (CBD) is an ecosystem approach. However, the Satoumi approach recognizes that land, ocean and the human community have a complex relationship and embraces the importance of different areas such as science, culture and spirit, and this ecosystem

approach is implemented at the community level based on an understanding of the social and cultural background of the community and the need to stimulate biological productivity. The approach of biodiversity must be incorporated in activities in various areas in the implementation of CBD, but the priority issues are different in each area. Satoumi has the flexibility to adapt to these priority issues, and it provides a mechanism for communication and cooperative action in each area. In this sense, Satoumi can be said to provide a culturally-appropriate way to implement CBD provisions on coastal and marine biodiversity. Furthermore, in addition to CBD, the Satoumi approach is also thought to be capable of playing a role in the response to the Ramsar Convention and the UNESCO Man and Biosphere Programme and so on. Future approaches with regard to Satoumi might include integration of science and local (traditional) knowledge, combination of Sato-yama and Satoumi, expansion of Satoumi to include offshore areas, and adaptive management with Satoumi. Moreover, Dr. Vierros also noted that Satoumi must provide ecosystems and communities with the flexibility to deal with the effects of climate change, and must incorporate adaptive management.

Professor Erdal Özhan, chair of the Mediterranean Coastal Foundation (MEDCOAST), participating from Turkey, gave a talk entitled “A Comprehensive Regional Effort to Enhance Integrated Coastal Management in the Mediterranean and the Black Sea Countries: The PEGASO Project of EU FP7.” PEGASO stands for “People for Ecosystem based Governance Assessing Sustainable Development of Ocean and coast.” The Integrated Coastal Zone Management (ICZM) Protocol for the Mediterranean was approved in 2008. This project is being promoted by governments in the Mediterranean and Black Sea coastal zones, international organizations, NGOs, universities, research institutions and other entities as part of the Seventh Framework Programme being implemented by the EU, in order to promote integrated coastal zone management in the Mediterranean and the Black Sea. The project will be implemented from February 2009 through January 2014 and will be promoted in the form of seven packages: “Project management”, “Shared ICZM governance platform for Mediterranean and Black Sea basins”, “Enabling a shared information infrastructure for Mediterranean and Black Sea basins”, “Multi-scale tools, methods and models for integrated assessment”, “Collaborative applications at various scales (CASES) and integrated regional assessment for Mediterranean and Black Sea basins”, “Building and enhancing capacity through training and fostering knowledge exchange” and “Dissemination.”

In place of Ms. Catherine E. Wazniak of the Maryland Department of Natural Resources, Dr. William Dennison of the University of Maryland Center for Environmental Science gave a presentation entitled “Early Detection of Coastal Ecosystem Response to Management Actions.” Dr. Dennison reported that the cumulative sum control technique (CuSum) was applied to evaluate data from the Atlantic coastal

zone in Maryland, enabling early detection of environmental changes. Case studies in which this technique was applied revealed that it was capable of detecting even small improvements that previously could not be detected in ordinary assessments. The CuSum inflection points or trends matched human-induced changes and activities, and also matched climatic phenomena and fluctuations, enabling latent change factors in river basins to be identified. As a result, assessments of management activities could be made more quickly, and the potential for further improvement was indicated.

Part 3 featured a summing-up of Parts 1 and 2 by the session chair of Prof. Tetsuo Yanagi, Kyushu University.

At the beginning of the session, Prof. Yanagi had noted that he wanted to discuss two issues at today's workshop. With regard to the first, the natural science aspects, he said there had been presentations on successful case studies from Japan and Indonesia regarding what type of human involvement will increase biodiversity and biological productivity. One of these was the presentation by Dr. Hideki Kokubu of the Mie Prefecture Fisheries Research Institute, who gave an example of how the removal of coastal levees resulted in increased biodiversity and biological productivity. He said this was similar to the example of dam removal. Prof. Yanagi said that this type of case study would be good to expand to coastal zones throughout the world. The other case study was the presentation by Dr. Suhendar Sachoemar of Indonesia, on a successful experiment in which increasing the biodiversity of a brackish water aquaculture pond itself resulted in the achievement of both zero emissions and improved water quality as well as high biological productivity, and he said that this is important technical data that should be spread worldwide. With regard to the other major issue that he wanted to discuss, that of management, Professor Yanagi said that Dr. Yves Henocque and Prof. Takeshi Hidaka had given impressive presentations. Prof. Hidaka had showed how a successful example of small-scale management at the fishing village level should be scaled up to the regional, national and international levels. In addition, Prof. Özhan had introduced a topic for future research, and Dr. Marjo Vierros had discussed what should be done to build on international workshops on Satoumi and implement Satoumi into a successful example of integrated coastal management. Finally, Prof. Yanagi proposed that the achievements of the workshop be made available on the website together with the presentation files of the presenters. With this, the session came to a close.

4 Opening Address

Mr. Toshizo Ido

The Governor of Hyogo Prefecture

Chairman of Board of Directors of International EMECS Center (JAPAN)

Good morning everyone.

I would like to extend everyone my heartfelt thanks for your participation in the Satoumi session, a special session of the EMECS 9 today.

I am sure you have heard the word Satoyama before. Satoyama is a space located in rural Japan where forest resources are prevented from depleting, and the constant blessings of nature are offered to human through human activities such as firewood collection and charcoal burning.

In short, Satoumi is the marine version of Satoyama. Satoumi creation is about how to make our neighborhood oceans equipped with abundant and versatile ecosystem.

As Hyogo Prefecture is faced with the Seto Inland Sea, a largest enclosed coastal sea in Japan, we are endeavoring to restore the sea as Satoumi.

Once called the “Sea of Fertility,” the Seto Inland Sea was forced to change its name to “Moribund Sea” in the second half of the 1960s as the water quality pollution escalated due to the industrialization of the coastal areas. Gradually, the water quality rehabilitated, but there remains lingering issues such as a plummeting fisheries catch, deterioration of the bottom materials, etc. In light of this, as we aim to restore the sea as Satoumi with high productivity and versatile biodiversity, we are requesting the national government to make necessary legal provisions, creating seaweed beds and tidal flats, and improving the environment of the bottom materials.

Today, we will be sharing information and knowledge concerning Satoumi from various perspectives.

During the part 1, the theme will be Activities in Asia. There will be presentations on initiatives taken in Satoumi creation in Japan and in the whole of Asia.

During the part 2 under the theme of Satoumi from the Perspective of Western Society, there will be evaluations on differences and similarities between coastal management activities in Asia and the western countries. The part 3 will be the full session on Satoumi creation based on the outcomes of both part 1 and 2.

It is the obligation of us, the current generation, to pass on the rich global environment to future generations. I have high hopes for today’s sessions that the understanding on the concept of Satoumi will be strengthened and lead to the enhancement of the circle of Satoumi creation.

5 Presentations

Introduction

Prof. Tetsuo Yanagi

Convener of Session

Satoumi

Coastal sea with high biodiversity and high productivity systems under adequate human interactions

Indigeneous habitat restoration in tidal flats, eel grass beds, coral reef and mangrove ecosystem by fishermen's union, NGOs and other stake holders



Increase of fish production

Ishihimi in Okinawa, Japan



Attached biota to the rock surface

Small fish between rocks

Fish feeding such biota

Different ecosystems in the coral reefs or tidal flats with Ishihimi and those without Ishihimi

Low biodiversity without Ishihimi

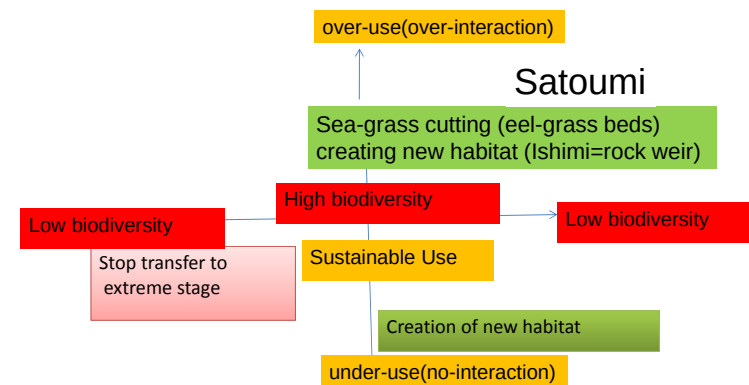
Stopping the transfer to the extreme stage (climax)



Low biodiversity without human interaction

Fish do not use the central part of sea-grass bed but use the boundary between sea-grass bed and open space. It is useful for human to create the space (gap) in sea-grass bed in order to increase the fish use of sea-grass bed.

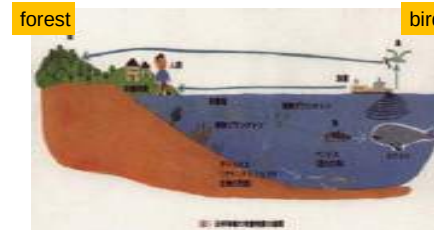
Biodiversity and human interaction



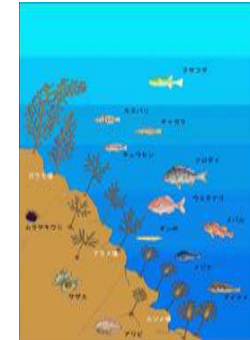
High biodiversity can result in High primary productivity

- 1) Ishihimi : increase of surface area
increase of attached diatom
increase of primary production
- 2) sea-grass beds (eel grass bed):
artificial cut of old eelgrass
young eelgrass has the largest growth rate
increase of growth rate for total sea grass beds
increase of primary production

Comprehensive material cycling
supports and is supported by high biodiversity



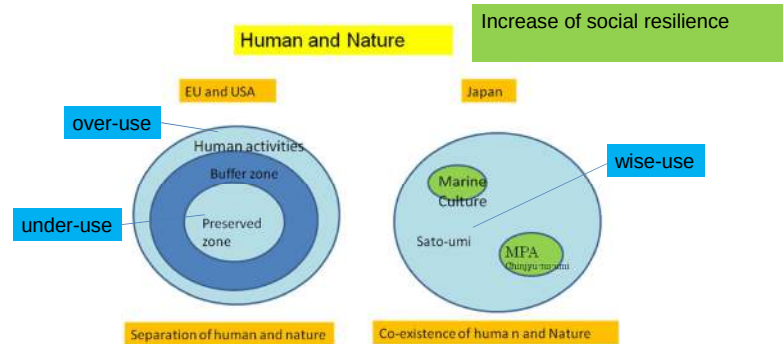
Thick, long and smooth material cycling
(Comprehensive material cycling)



High biodiversity

Increase of ecological resilience

Human and Nature in the western countries and eastern countries



We cannot separate human and nature in the area, where the population density is very high, such as Japan, East Asia and Southeast Asia.

General Discussion on “Creation of Satoumi”

- **Science and Technology**
Habitat for marine biota: Artificial reef, Ishihimi (Tidal stone weir),
Tidal flats, Sea-grass beds, Coral reef
Local (indigenous) wisdom – heterogeneity of environment +
Scientific knowledge
Resilient ecosystem
- **Management**
Commons; fishermen, stakeholders, managers, scientists -
agreement
Local (indigenous) wisdom – heterogeneity of culture
local community, local government, central government –
compensatory

Part 1 : Activities in Asia

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Evolution of *Sato-Umi* Frame during the Recent International Meetings in the Context of Sustainable Coastal Management

Osamu Matsuda

Hiroshima University, Japan

The concept of *Sato-Umi* and related activities originated in Japan are gradually gaining ground not only in Japan in particular of more or less polluted enclosed coastal seas, where ecosystem and living resources were deteriorated. *Sato-Umi* is aiming at well-balanced sustainable management of coastal seas not only in water quality but also in ecosystem and ecosystem services. Although original definition of *Sato-Umi* was given by Yanagi in 1998 focused on the importance of biological production and diversity under human interaction, varieties of discussion on *Sato-Umi* frame have been developed after that both in domestic and international meetings. Major points of discussion so far done were on the relationship between the concept of *Sato-Umi* and already proposed related concepts such as ecosystem based management (EBM), community based management (CBM) and integrated coastal management (ICM). In the present study, discussions on *Sato-Umi* were reviewed from the view point of international context. The first presentation on *Sato-Umi* by the preset author in the international meeting was made in 2005 at the PEMSEA meeting held in Korea, where strong interest in *Sato-Umi* was given by Asian participants. In 2006, at EMECS7 held in Cean, France, concept of *Sato-Umi* and related local activities were introduced by Yanagi and Matsuda, respectively, with other case studies in Japan. At the reviewing session of EMECS7, *Sato-Umi* was highly evaluated as symbiosis among human communities and coastal area. In 2008, at EMECS8 held in Shanghai, China, specialized *Sato-Umi* Session was held and case studies in many countries were introduced and discussed. In 2009, at East Asian Seas Congress which was held in Manila, Philippines by PEMSEA, International *Sato-Umi* Workshop was successfully organized in the frame of indigenous approaches to habitat protection and restoration. In October, 2010, Convention of Biodiversity (CBD) COP10 was held in Nagoya, Japan when International *Sato-Umi* Workshop was held as an official side event of COP10 in relation to biodiversity. During these discussions, originality of *Sato-Umi* became more clear as bottom-up type of local initiative with special reference to the maximization of ecosystem services and integrated coastal and river basin management.

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EMECS9

Satoumi Session

-Disseminating the Concept of "Satoumi" Internationally-

Evolution of Satoumi Frame during the Recent International Meetings in the Context of Sustainable Coastal Management

Osamu Matsuda
Hiroshima University, Japan

29 August, 2011 (Baltimore, USA)

Outline of the Topic

The straightforward definition of Satoumi is "coastal sea where adequate human interaction increased both biodiversity and productivity" first proposal by Dr. Yanagi in 1998.

$Satoumi = f(biodiversity \cdot productivity \cdot human\ interaction)$

But, meaning of the term Satoumi has evolved not only in Japan but also during the course of international discussion with particular emphasis on sustainable coastal management.

And how?

*note: Satoumi = Sato-Umi

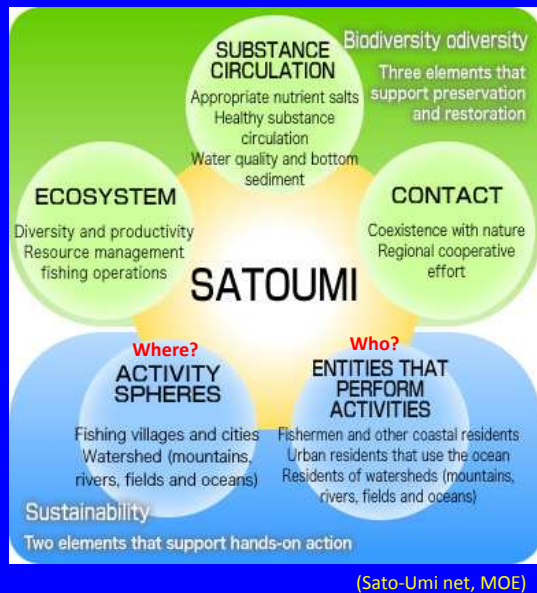
What characterize Satoumi?

5 important components of Satoumi:

3 objectives to be improved or restored

and

2 indicators on activities



Context of Recent International Discussion on Satoumi

EMECS: Environmental Management of Enclosed Coastal Seas (2006 -)

PEMSEA: Partnerships in Environmental Management for the Seas of East Asia, EAS-Congress (2005 -)

CBD: Convention on Biological Diversity (2010 -), CBD-COP10 was held in 2010 at Nagoya, Japan. The year of 2010 was IYB (International Year of Biodiversity)

SGA: Satoyama-Satoumi Sub-Global Assessment by UNU-IAS as follow-up program of United Nations-Millennium Ecosystem Assessment (MA) (2007 -)

EMECS 2006

Sato-Umi in EMECS7 (2006): Caen, France Session: New Concepts and Experiences

Presentations

- "Sato-Umi": New concept for the coastal sea management (by Dr. T. YANAGI)
- Proposal for the restoration of the Seto Inland Sea, Japan based on a new concept of "Sato-Umi" with special emphasis on biological diversity and productivity (by Dr. O. MATSUDA)
- Case studies from Ago Bay etc.



25 countries,
>350 participants



Some messages from Session 3
OUTCOME of EMECS7

- Symbiosis among human communities and coastal/marine areas – a more rational vision of co-existence (Satoumi)

Concept of "Sato-Umi" was highly evaluated at the conclusive review of EMECS7 held in France in 2006 (Prof. Ozhan)

- Key players in action (football team at work), essential steps in implementation

Natural system + social system + economic and administrative components

Cf. "Tsunami"

EMECS 2008

Sato-Umi in EMECS8 (2008): Shanghai, China "Harmonizing River Catchment and Estuary"

(about 470 participants from 37 countries)



Sato-Umi Session was held in EMECS8. "Shanghai Declaration" adopted Sato-Umi as new concept promoting positive interaction between humankind and coastal seas.

Chair: Prof. T. YANAGI and
Dr. Wong-Keun CHANG

A half-day session with 80 participants:
8 invited speakers, 6 oral presentations,
12 poster presentations.

OUTCOME of EMECS8

Brief summary:

- Sato-Umi is not only concept of natural science but also social and cultural concept.
- Sato-Umi is a new paradigm for current lifestyle.
- Sato-Umi should be developed towards a useful method for solving the worldwide coastal problems



EMECS8 Session 7
International Workshop

Sato-Umi

New Concept
that Increases

Biological Productivity and Biodiversity



Opener Photo: (Haruhisa Itoh, Japan)



OUTCOME of PEMSEA

Concept and information on "Sato-Umi" was given by O. Matsuda

- Concept of "Sato-Umi": Coastal sea under the harmonization of sustainable wise use with conservation of appropriate natural environment and habitat conditions.
- "Sato-Umi" provides higher biological diversity as habitat and higher biological production as fishing ground. "Sato-Umi" is also suitable site for demonstrating multi-functional roles of fisheries.



Strong interest was shown on Sato-Umi by the participants from Asian countries from the viewpoint of community-based participatory coastal management.

Photo (from left): Manila Bay, Bohai Sea, Masan Bay, Dr. Chua (PEMSEA), Seto Inland Sea, Jakarta Bay (Workshop in Masan, Korea)

PEMSEA 2009

EAS-Congress 2009 was held in Manila, Philippines "Sato-Umi" was discussed in the ICM frame"

Participants: 1600 from 43 countries and 36 international organization
PEMSEA members: 14 states and non-states partners



Sato-Umi Workshop in EAS-Congress 2009

(Co-organized by PEMSEA and EMECS, Nov. 24)

Indigenous Approach to Habitat Protection and Restoration: Experiences in Sato-Umi and other Community Initiatives

Chair: O. MATSUDA
Co-chair: T. YANAGI and Anne MCDONALD



About 100 participants

Part 1: Sato-Umi concept and its application in Japan
Part 2: Indigenous knowledge and community based approaches in Asian countries (7 case studies)
Part 3: Discussion Panel

OUTCOME of PEMSEA

Brief Summary of Sato-Umi Workshop

- Sato-Umi is now incorporated in governmental policy and entered into new implementation stage in Japan.
- There are many similar indigenous community based ecosystem managements in Asian countries.
- Existing local knowledge similar to Sato-Umi in Asia is valuable as possible global wisdom.



Staff and presenters of the workshop

CBD & IVB 2010

Seminar and Public Forum on Biodiversity and Marine Sustainability
April 15-16, 2010 in Kanazawa, Japan



CBD 2010
CBD-COP10: 10th Meeting of the Conference
of the Parties of the Convention



Life in harmony,
into the future

COP10/MOP5
AICHI-NAGOYA JAPAN 2010
Oct.11-29



Nagoya Congress Center



ca. 13,000 participants



More than 113,000 people
joined related activities

Global Communication as OUTCOME of CBD

- ① International Satoumi Workshop (MOE, Japan): as official side-event (Oct. 21)
- ② Satoumi and the Management of Marine and Coastal Biodiversity (UNU-IAS, SCBD), Launching CBD Technical Report on Satoumi, as official side-event (Oct.19)
- ③ Informal Meeting on Sustainable Ocean Initiative (SOI) : UNU-IAS, SCBD), (Oct.24)
- ④ Marine Biodiversity Forum in NOWPAP, (Oct.16)
- ⑤ Summary Report of Satoyama-Satoumi SGA in Japan

COP 10 Side Event

The Role of SATO-UMI in Preserving Biodiversity

Satoumi, Japan's Secret Weapon for Biodiversity

Livably, Satoumi means sea around a village, and refers to the small ecological system (natural or artificial) of Japanese coastal areas. A small fishing village, for example, might protect their limited resources by establishing their own regulations and laws regarding water fish stocks or the maintenance of sea areas in the vicinity of their village. Although this essentially community-based approach could be found in small bays throughout Japan, their community regulations and laws were never codified and so far most of their effectiveness with the rapid social and environmental changes stemming from post-war industrialization of coastal areas is almost nonexistent. To restore the Satoumi approach has been in evidence since 1980 however, with the advancement of working leading edge technologies to traditional ecological knowledge and norms. The need to restore several successful examples of coastal management using the Satoumi approach with its concept array of high biodiversity and high productivity while appropriate human interaction.

Date and Time
October 21, 2010 (Thursday)
1:15 - 2:45 p.m. (90 minutes)

Venue
Nagoya Congress Center Bldg. 2, Room 211B
Aichi International Conference Center Nagoya 466-0898, JPN. TEL: +81-52-881-7711

Participants
Maximum No. of Attendees: 100 (Free admission, first-come, first-served basis).
Admission: Free of Charge.
Since the venue is within the COP10 conference venue, attendance is limited to registered conference attendees.

Sponsored By
Office of Environmental Management of Inland Coastal Seas, Water Environment Management Division, Environmental Management Bureau, Ministry of the Environment.

Program

Theme: The Role of SATO-UMI in Preserving Biodiversity
Venue: Nagoya Congress Center Bldg. 2, Room 211B
Program:

1:15 - 1:30 p.m.
Introductory video on Satoumi

1:30 p.m.
Opening ceremony
(Yoshitaka Ota, Ocean Policy Research Foundation)

1:35 - 2:30 p.m.
The Role of SATO-UMI in Preserving Biodiversity
 (1) Tatsuo Yanagi (Professor, Kyoto University): Biodiversity and Satoumi (Shimizu (Shimizu) and Shogase (Shogase))
 (2) Osamu Matsuda (Professor Emeritus, Hiroshima University): Satoumi Creation in Age Bay
 (3) Anne McDonald (Director, The United Nations University-Institute of Advanced Studies Operating Unit Inland/Nagasaki (OUIK)): Satoumi and Our Daily Lives: The Debate at the Convention on Biological Diversity
 (4) Ministry of the Environment Supporting Activities for the creation of Satoumi in Japan

2:30 - 2:45 p.m.
Group discussion

Language
English

For More Information
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Access
Nagoya Congress Center Bldg. 2, Room 211B

5-minute walk from Nishi-Tokai Station on the Meitetsu subway line
5-minute walk from Hibiya Station on the Meitetsu subway line
Attendees using the JR or Meitetsu line should change to the subway at Kanagawa Station.

● Aichi Nagoya COP 10 CBD Promotion Committee website: <http://www.cop10.go.jp/aichi-nagoya/index.html>
 ● COP 10 page on the Convention on Biological Diversity (CBD) website: <http://www.cbd.int/cop10/>



Draft of CBD Technical Series Report on Satoumi distributed at CBD-COP10

This contains case studies from Satoumi of Shiretoko, Hokkaido to Satoumi in coral reef of Okinawa and synthesis.

Final version will be published by the secretariat of CBD in near future.

OUTCOME of CBD CONTEXT

BIOLOGICAL AND CULTURAL DIVERSITY IN COASTAL COMMUNITIES

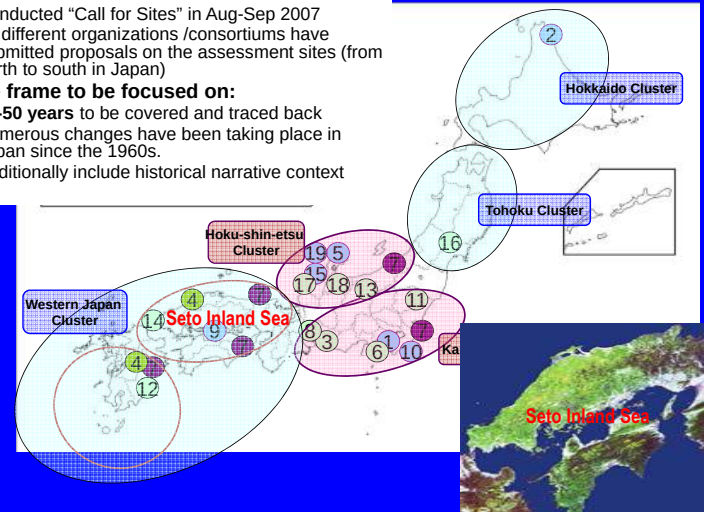
Exploring the Potential of *Satoumi* for Implementing the Ecosystem Approach in the Japanese Archipelago

DRAFT
Submitted to the
Secretariat of the Convention on Biological Diversity
04 October 2010



Scope of the *Satoyama-Satoumi* SGA in Japan

- Area to be examined:
 - Conducted "Call for Sites" in Aug-Sep 2007
 - 19 different organizations / consortiums have submitted proposals on the assessment sites (from north to south in Japan)
- Time frame to be focused on:
 - 40-50 years to be covered and traced back
 - Numerous changes have been taking place in Japan since the 1960s.
 - Additionally include historical narrative context





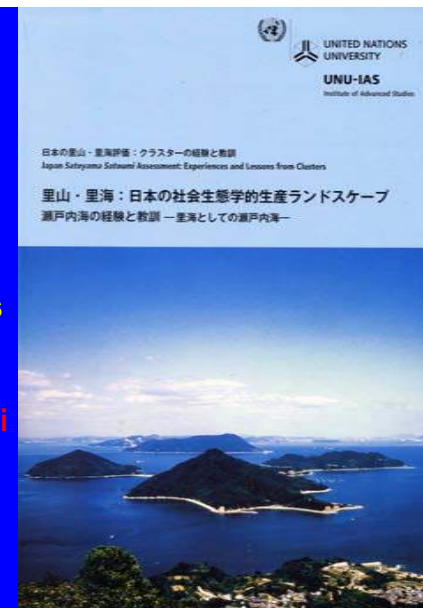
Cluster meeting of *Satoyama-Satoumi* SGA in Japan held in Kyoto. Results of assessment were reported in CBD-COP10 (Nagoya, 2010)

OUTCOME of SGA

SGA Cluster Report

Japan *Satoyama Satoumi* Assessment: Experiences and Lessons from Clusters (6 volumes)

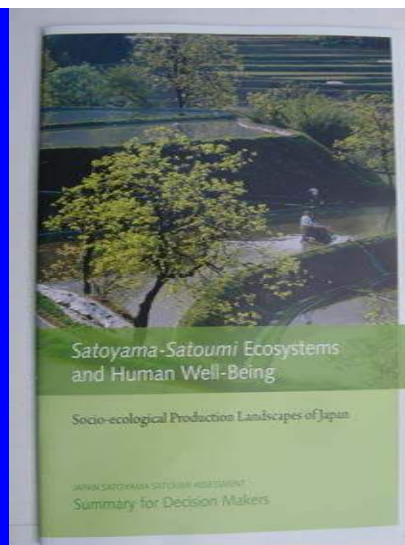
Seto Inland Sea as *Satoumi*
United Nations University
(2010), 170 pp.



OUTCOME of SGA

Satoyama-Satoumi SGA Key Findings

1. Mosaic composition of ecosystem is essential
2. Drop in resiliency over the last 50 years is serious
3. Consequences for humans and biodiversity is significant
4. Integrated approaches with citizen participation are increasing over the past 10 years



"Summary for Decision Makers"

Some characteristics of *Satoumi* derived from recent international discussion

1. Partial affinity with other coastal management frames:
Community Based Management (CBM)
Ecosystem Based Management (EBM)
Integrated Coastal Management (ICM)
2. *Satoumi* as active type of conservation
Compared with passive conservation such as "no take zone"(preservation), TPLC, landfill control etc, *Satoumi* aims at positive effect of human activities (Berque and Matsuda)
3. *Satoumi* as bottom-up approach for conservation and sustainable use of marine ecosystem services

Conclusive Remarks

During recent 50 years, shallow areas, in particular of tidal flat and sea grass bed have been drastically lost in Japan mainly by land based human activities.

Under these conditions, Satoumi activities evolved in Japan firstly as bottom-up type of multi-sectoral approach for restoration of habitat and biodiversity.

During the course of recent international discussion, Satoumi has further evolved as one of effective tools for sustainable coastal management in which Satoumi is aiming at well balanced maximization of various ecosystem services. Satoumi has enough possibilities for the sustainable coastal management in which not only fisheries but human well-being are more focused. Satoumi can be a tool for achieving some of "Aichi biodiversity targets" adopted in CBD-COP10 (2010).



"Better life through wise and sustainable coastal management with Satoumi"

Healthy Satoumi for Next Generation!
Thank you for your attention

Sato-umi Policy in Japan

T. Yamada, H. Hashimoto and Y. Muroishi -- presented by **Takahiro Chino**

Office of Environmental Management of Enclosed Coastal Seas, Water Environment Management Division, Environmental Management Bureau, Ministry of the Environment, Tokyo, Japan

In Japan, Sato-umi is defined as a coastal zone where the livelihood of human beings and the blessings of nature coexist harmoniously with coastal area eco-systems. Sato-umi has long been important in supporting fisheries, transport and culture, while helping to integrate management of land and coastal sea areas and preserve high productivity and biodiversity in the wake of the human interaction. Sato-umi has become rooted in Japan since “Becoming a Leading Environmental Nation in the 21st Century” and “The National Biodiversity Strategy of Japan” made it national policy. “The Basic Plan on Ocean Policy” describes the embodiment of the concept of Sato-umi in the conservation and management of fishery resources. The Ministry of the Environment (MOE) in Japan began supporting Sato-umi activities in 2008, based on a national strategy and policy, in order to achieve public consensus for marine environmental conservation and preserve high productivity and biodiversity in coastal sea areas. MOE projects to support Sato-umi Creation comprise the following.

- 1) Support of local activities for Sato-umi Creation (Model Project)
- 2) Execution of Sato-umi Creation plans
- 3) Execution of a Sato-umi Creation manual
- 4) Selection of examples of activities for advanced Sato-umi Creation
- 5) Construction of a website, “*Sato-umi Net*”
- 6) Publication of pamphlets, leaflets etc.
- 7) Holding of symposia

Such efforts by the Ministry of the Environment, in combination with efforts by local public organizations, environmental groups and local residents, have improved the awareness of Sato-umi and increased the momentum for Sato-umi creation activities in local areas. Moreover, the 10th Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 10), which was held in Japan in October 2010, included a COP 10 Side Event entitled, “*The Role of SATO-UMI in Preserving Biodiversity*”, at which an exchange of views was held regarding the importance of Sato-umi as a venue for the provision of ecosystem services and the coexistence of human beings with nature etc. Efforts to promote the creation of Sato-umi in Japan will be continued, and information on Japan's Satoumi activities will be provided both domestically and internationally in an effort to help preserve coastal zone environments.

Contact Information: T. Yamada, Office of Environmental Management of Enclosed Coastal Seas, Water Environment Management Division, Environmental Management Bureau, Ministry of the Environment, Japan 1-2-2, Kasumigaseki, Chiyoda-ku, Tokyo 100-8975, Japan, Phone: +81-3-5521-8320, Fax: +81-3-3501-2717, Email: mizu-hesasei@env.go.jp

Sato-umi Policy in Japan

Office of Environmental Management of Enclosed Coastal Seas,
Water Environment Department, Environmental Management Bureau,
Ministry of the Environment (MOE), JAPAN

TAKAHIKO Chino

1

Environmental Policies of Enclosed Coastal Seas in JAPAN

1950-70's

- Development by high economic growth and expansion of industrial activity
- Water pollution by plant effluent and living drainage
- Loss of Shallow zone by reclamation
- Frequent occurrence of large-scale red tide
- Frequent occurrence of oil spill



Environmental administration

Restrict laws were enacted

1967 Basic Law for Environmental Pollution Control

1970 Water Pollution Control Law

1971 Environment Agency was established

1972 Nature Conservation Law

1973 Interim Law for Conservation of the Environment of the Seto Inland Sea

1978 Total pollutant load control (TPLC) was adopted for COD

2

Environmental Policies of Enclosed Coastal Seas in JAPAN

1980-90's

- Continuous occurrence of red tide
- Generation of anoxic water
- Occurrence of large-scale oil spill
- Collection of sea gravel



1990's-

- Creation of environments to pass on to future
- International contributions



Environmental administration

1993 Basic Environmental Law

1993 Nitrogen and Phosphorus were added to the effluent standard

1994 NOWPAP was established

2000 EMECS was established

2000 Basic Plan for Conservation of the Environment of the Seto Inland Sea

2001 Reorganized as Environment Ministry

2001 Nitrogen and Phosphorus were added to TPLC

2004 WEPA was established

3

Current problems of enclosed coastal sea

Increases of effluent pollution load

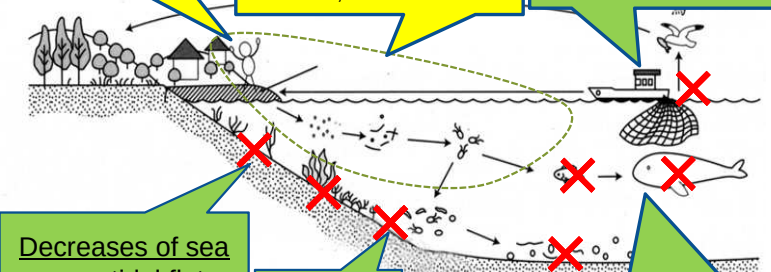
Coastal environment deteriorate due to eutrophication
• Red tide, anoxic water etc.

Reduce material circulation function
• Decline fishing village
• Decline in fishery

Decreases of sea grass, tidal flats
• Landfill, extraction of gravel and sand etc.

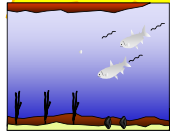
Decreases of benthos

Degradation of biodiversity, number of living thing
• Degradation of bio-habitat



Introduction of New Concept 'Creation of SATO-UMI'

Enclosed coastal seas face devastation



Policy on New Concept

Becoming a Leading Environmental Nation Strategy in the 21st Century (2007)

➢ Creation of Sato-umi rich in natural bounties listed

Basic Act on Ocean Policy (2008)

➢ Materialized of Sato-umi concept and describing of importance

The Fourth National Biodiversity Strategy (2010)

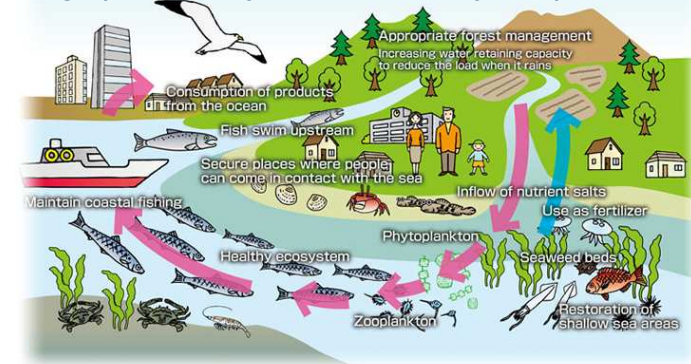
➢ preservation and revitalization of Sato-umi was ranked as an important objective

The activities begin under 'Creation of SATO-UMI'

5

Concept & Image of Sato-umi

Coastal zone where land and coastal zone are managed in an integrated and comprehensive manner by human hands, with the result that material circulation functions are appropriately maintained and both high productivity and biodiversity are preserved.



6

Viewpoint of Sato-umi Creation

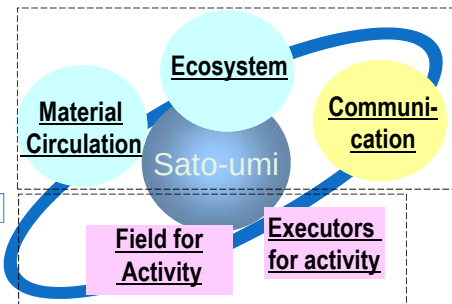
Viewpoint of Sato-umi Creation = Component of Sato-umi Creation

Diversity

Three elements that support conservation and restoration

Sustainability

Two elements that support implementation



- Sato-umi is not only a spatial concept but also a concept generated among the human activities.
- Sato-umi is able to possess sustainability by being combined with lifestyle habits etc.
- Activity for creation of Sato-umi is a participation-and-cooperation type tool which is applicable to the comprehensive management of coastal area.

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MOEJ Sato-umi Creation Support Project

- (1) Support of Activities for Sato-umi Creation (Model Project)
- (2) Preparation of Standard Sato-umi Creation Plans for Each Type of Activities
- (3) Establishment of Sato-umi Creation Manual
- (4) Selection of Examples of Advanced Sato-umi Creation Activities
- (5) Construction of a Sato-umi Website
- (6) Publicity Activities (Pamphlet, Leaflet, Symposium)
- (7) Provision of Information Overseas

8

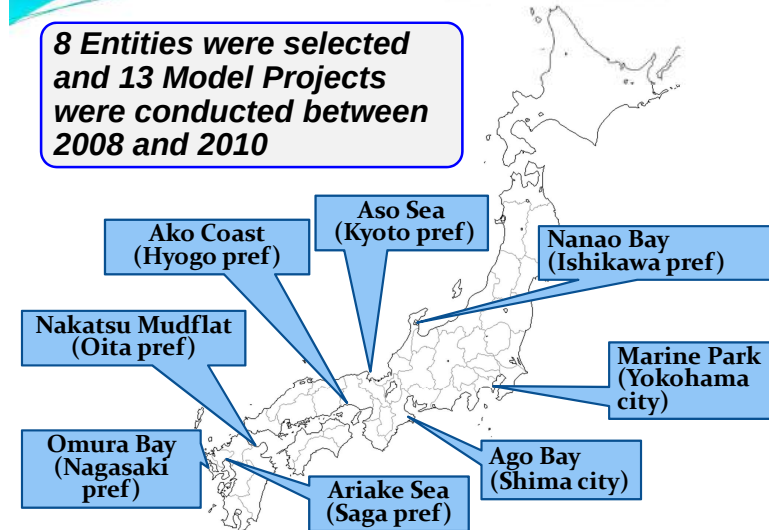
(1) Support of Activities for Sato-umi Creation (Model Project)

MOEJ support model activities addressing environmental conservation and human coexistence within coastal sea areas in partnership with local governments.

9

Model Projects to Support Sato-umi Creation

8 Entities were selected and 13 Model Projects were conducted between 2008 and 2010



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Model Projects to Support Sato-umi Creation

Omura Bay (Nagasaki pref)

- Environmental education (Indian porpoise watching)
- Holding of a seminar on the approach to local partnerships



Nanao Bay (Ishikawa pref)

- Establishment of a steering committee
- Survey of local resident opinion
- Start of Sato-umi monitoring
- Holding of Hands-on activities, workshops and seminars



Ako Coast (Hyogo pref)

- Establishment and operation of specialist committee
- Holding of discussions with relevant local entities
- Study of water quality at the site and marine life habitation status



Nakatsu Mudflat (Oita pref)

- Survey of bottom sediment around sasahibi.
- Holding of monitoring sessions to commune with the ocean
- Pamphlet prepared



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(2) Preparation of Standard Sato-umi Creation Plans for Each Type of Activities

The purpose is to enable Sato-umi creation activities to be initiated easily by selecting the category to which the target activities belong.

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Standard Sato-umi Creation Plan for Each Type of Activities

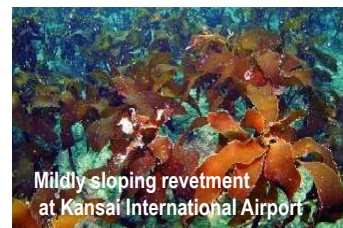
■ Integrated River Basin Activities

Activities that consider the entire area from forest to ocean as an integrated whole



■ Mitigation Activities

Activities to restore lost environments due to urban development, etc.



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Standard Sato-umi Creation Plan for Each Type of Activities

■ Urban Activities

Activities to preserve and restore seaweed beds and other shallow ocean near urban areas



■ Environmentally "Sacred" Ocean Activities

Activities to create environmentally "sacred" precincts by establishing "no-fishing" zones and seasons



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Standard Sato-umi Creation Plan for Each Type of Activities

■ Experience-based Activities

"Hands-on" activities conducted in urban neighborhoods by city residents



■ Fishing Village Activities

Activities conducted as part of fishing activities, with fishing villages playing a leading role



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(3) Establishment of Sato-umi Creation Manual

The Manual includes,

- matters that should be considered in advance
- efforts that should be implemented
- desirable results and other information

This information is helpful when conducting new Sato-umi creation activities in the future.

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Framework for Sato-umi Creation Manual

Chapter 1 : Introduction

Background, role, overview of content etc.

Chapter 2 : What is a Sato-umi?

Need for conservation and restoration of ocean environments, Sato-Umi and Satochi Satoyama etc.

Chapter 3 : Sato-umi Creation Activities

Describes the type of activities that constitute Sato-umi creation

Chapter 4 : Advance preparations Before Initiating Sato-umi Creation

Study the range for Sato-umi creation activities,
Implementation of preliminary survey and organizing of issues

Chapter 5 : Approach to Sato-umi Creation:

Establishment of Sato-umi Creation Plan

Establish objectives, Select activities, Study promotion organization,
Establish Sato-Umi Creation Plan

Chapter 6 : Evaluation and Review of Sato-umi Creation Activities

Evaluation of nature(monitoring) and social valuation,
Review of activities

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(4) Selection of Examples of Advanced Sato-umi Creation Activities

MOEJ selected advanced Sato-umi activities that are of help to other groups conducting activities in other regions .

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Activity at a Fishing Village in Iyo-Nada

The creation of forests is being promoted, together with coastal clean-ups performed by local fishermen and NPOs with the participation of the general public.

It is expected to promote wide ranging awareness and education relating to the sea environment.



Explaining how to create marine forests



Thriving eelgrass



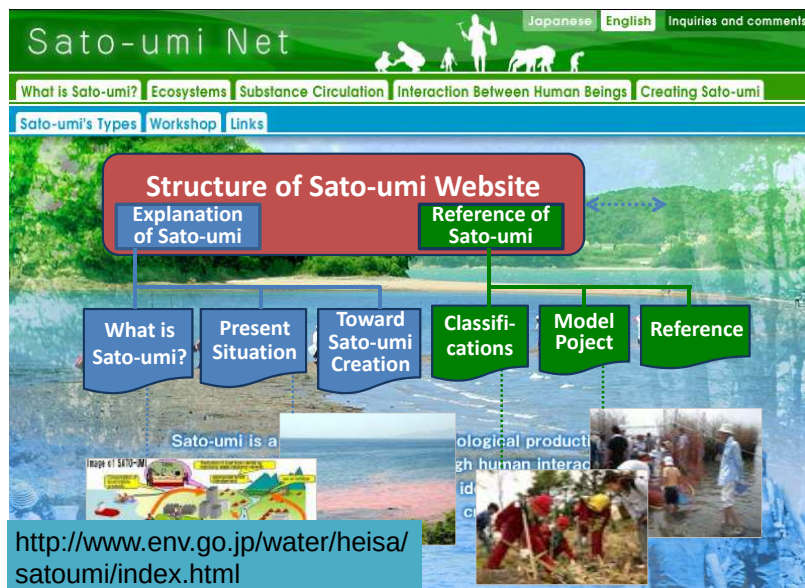
Participation by elementary school children

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(5) Construction of a Sato-umi Website “ Sato - umi Net ”

In order to make information on Sato-umi widely available to Internet users in Japan and other countries, a Sato-umi website was created.

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(6) Publicity Activities (Pamphlet, Leaflet, Symposium)

Pamphlets, leaflets and symposium relating to Sato-umi creation

Those efforts will be made to:

- publicize the Sato-umi concept,
- educate the general public regarding Sato-umi creation,
- provide information both at home and abroad.

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Sato-umi Pamphlet ,Symposium

Sato-umi Symposium in each area

Sato-umi pamphlet



Sato-umi Symposium in Shima (Lecture)

Sato-umi Symposium in Nanao Bay (Panel Discussion)

Sato-umi Symposium in Ako (Musical by pupil)

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(7) Provision of Information Overseas

An International Sato-umi Workshop were held at the 10th Conference of the Parties to the Convention on Biological Diversity (COP 10).

More information on efforts to create Sato-mi in Japan should also be provided to other countries.

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Provision of Information Overseas

'International Sato-umi workshop' as a side-event on COP10, which was held at Nagoya in 2010



Conclusions

- Sato-umi constitutes a useful approach from the standpoints of marine biodiversity preservation and fishery resource management as well
- There are limits to what the government alone can do to restore ocean environments, so joint efforts with local residents and organizations of various types are needed



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Future Unfolding

JAPAN

Output of the Project to Support Sato-umi Creation

Sato-umi Creation Manual

Standard Sato-umi Creation Plan

Example of advanced Sato-umi Creation

Pamphlet & Leaflet

Sato-umi Website & Sato-umi Data Network

International Workshop

Countries in the World

Needs & Problems of Creation of SATO-UMI

Sato-umi Information Sharing

Preservation & restoration of environment of seas all over the world

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Thank you for your listening.



MOEJ is waiting for your comments to;
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Rules and Regulations Supporting Satoumi as Social System

Takeshi Hidaka

School of Humanity-oriented Science and Technology, Kinki University, Japan

In Satoumi, its bio-diversity is maintained or enhanced in spite that Satoumi is common property. In order to protect and maintain bio-diversity, the system to control and manage co-use of common property is needed. In Japan, the social system supporting Satoumi consists of Japanese traditional fishing right institution, self imposed rules formed through negotiation between users and spontaneous activities to protect the sea environment by NPOs. Details of actual systems are diverse depending on each situation and have improved along with the times.

Out of the Japanese fishing right institution, common fishing right deeply connects with Satoumi. Common fishing right is a privilege to fish exclusively within a designated area as fishing right ground. A fisherman's cooperative association (FCA) authorized by local government have rights and duties claims to control and manage there and set up rules and regulations autonomously to do so. According to them, member fishers use fishing right ground commonly. Therefore, the Japanese common fishing right institution is a proto-type of Satoumi.

While diverse use other than professional fishing had increased in the 1980th, it had become harder and harder for the common fishing right institution to control and manage them. To resolve the conflict between conventional uses and new recreational uses, voluntary self regulations were formed through negotiation among these users. The self-regulation includes rules and regulations to which are consented by relevant users improved based on common fishing right. These are called local rules of coastal zone and supported through some judicial precedents.

On the other hand, in the 2000th, some fishers and non-fishers have started voluntary initiatives as NPOs to protect the sea environment. They are interested in the sea environment itself more than fisheries resources. While FCAs and fishers have protected the value of fishing ground and fisheries resource, NPOs seem to create the value of the environment itself.

At present, more controversial issue is how to manage wider sea area like Seto-inland Sea as Satoumi. In wider Satoumi, responsibility and functions of government becomes more important differently from smaller Satoumi, where users' responsibility is heavy. In that case, an intermediary organization integrating wider Satoumi and smaller Satoumi will become more important.

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Rules and Regulations Supporting Satoumi as a Social System

Takeshi Hidaka
School of Humanity-oriented Science
and Technology, Kinki University,
Japan

1

Agendas

1. Attributes and challenges of Satoumi
2. Fishing right institution as prototype Satoumi
3. Change of circumstances and emergence of new Satoumi
4. Governance structure of new Satoumi
5. Conclusion

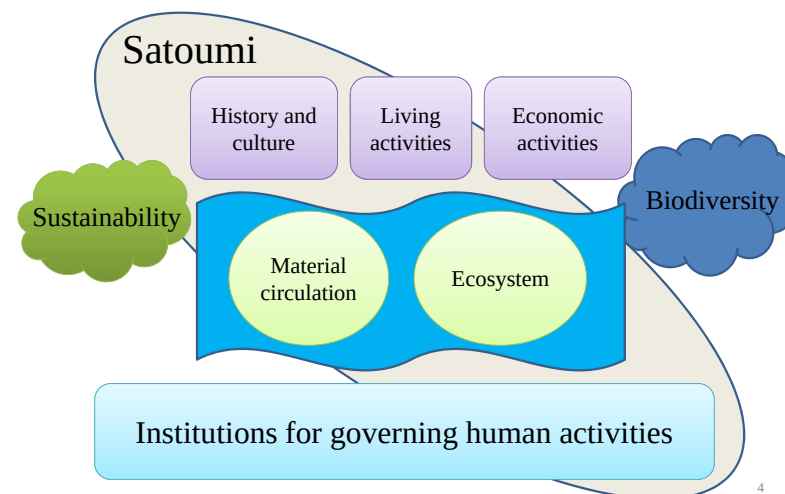
2

Definition of Satoumi

- The basic concept of Satoumi is the coastal sea with high bio-diversity and bio-production under the moderate human interaction.
(T.Yanagi 1998)
- Satoumi is defined as a coastal zone where the livelihoods of human-beings and nature harmoniously coexist with coastal area eco-systems.
(Ministry of the Environment, Japan)

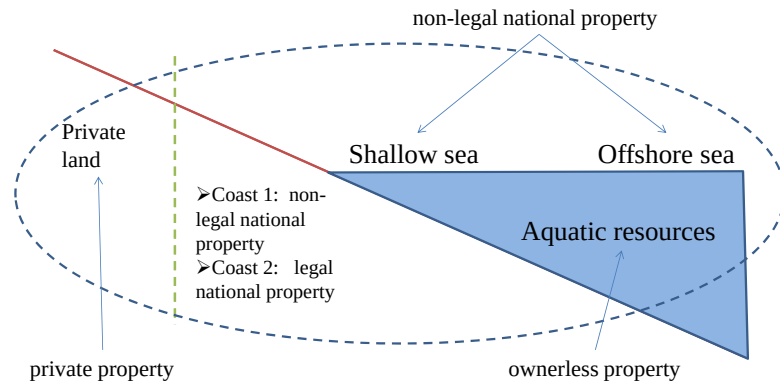
3

Structure of Satoumi



4

Complexity of ownership



5

Legal framework of coastal zone management

category	Type of property	Property right owner	user
Sea	Non-legal national property	Government (FCA)	Anyone (Fishers)
Aquatic resources	Ownerless property	None (FCA)	Anyone (Fishers)
Coast 1	Non-legal national property	Government	Anyone
Coast 2	Legal national property	Government	Anyone
Private land	Private property	Owner	Owner

Access rule ⇒ free/open or closed
Appropriating rule ⇒ loose or tight

6

Design principles illustrated by long-enduring CPR institutions

1. Clearly defined boundaries
2. Congruence between appropriation and provision rules and local conditions
3. Collective-choice arrangements
4. Monitoring
5. Graduated sanctions
6. Conflict-resolution mechanisms
7. Minimal recognition of rights to organize
8. Nested enterprises

(E. Ostrom 1990, Governing the Commons, p.90)

7

Challenge of the Commons

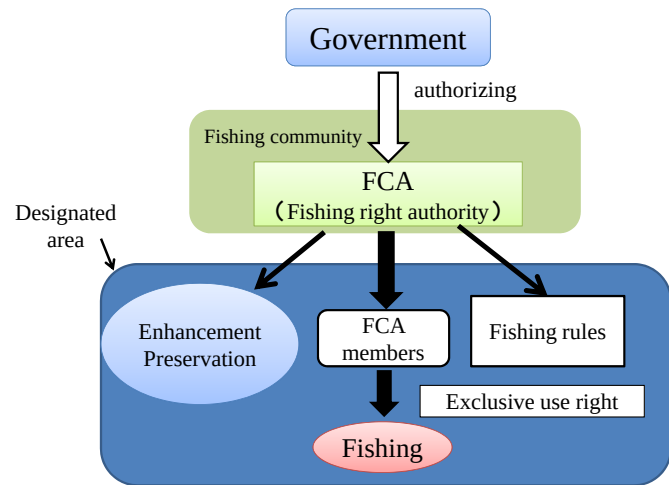
	Tight rules	Loose rules
Closed access	Use by specific members having tight rules → Traditional Commons	Use by specific members having loose rules
Open access	Use by non-specific members having tight rules → Contemporary Commons	Use by non-specific members having loose rules → Tragedy of Commons

Expanding spatial scales
Expanding temporal scales
Expanding cognizance
Increasing differences among users

→ Size Heterogeneity

8

Outline of fishing right system



9

Characteristics of fishing right institution

- Japanese fishing right system was formed through institutionalizing traditions and custom laws of coastal zone managed by coastal communities.
- Fishing right is granted to the Fisher's Cooperative Association(FCA) as a representative of coastal community by prefecture government.
- The FCA has responsibility and duty to manage fishing and preserve fishing resources within the designated area.
- A member of the FCA has right to exclusively access the fishing ground and catch particular fishing resources with using designated fishing gear.

10

Changes of social circumstances

1. Emergence of conflict between commercial fisheries and non-commercial activities in the 1990s
 - Recreational fishing
 - Water activities which don't use aquatic resources
2. Increase of voluntary activities concerning the coastal environment since the 1990s
 - Rising interest about biodiversity and sustainability
 - Increasing voluntary activities like NPO
3. Depletion of representativeness of FCA for fishing communities
 - Thinning kinship with individual fishing community by FCA amalgamation
 - Decreasing ratio of fishers and their relatives among fishing community

11

Conflict between commercial fisheries and non-commercial activities

- Reasons of conflict
 - Confusion about property right of sea
 - Unintentional illegal fishing
 - Local vs. nonlocal, minority vs. majority, custom vs. fairness
- Recent court cases
 - Osezaki case (2000) between fisheries and scuba diving
 - Ieshima case (2002) between fisheries and recreational fisheries
 - Miyako case (2002) between fisheries and scuba diving
- Implication for solution indicated through court cases
 - Importance of local rules or agreement negotiated among participants
 - Legitimacy of custom and local rules

12

Additional conditions to design principles

- Non-commercial users and relevant stakeholders participate rulemaking process.
- Local rules include other resources than fishing right resources and are fair for all participants.
- Management system includes adaptive mechanism reacting to changes of natural and social circumstances.

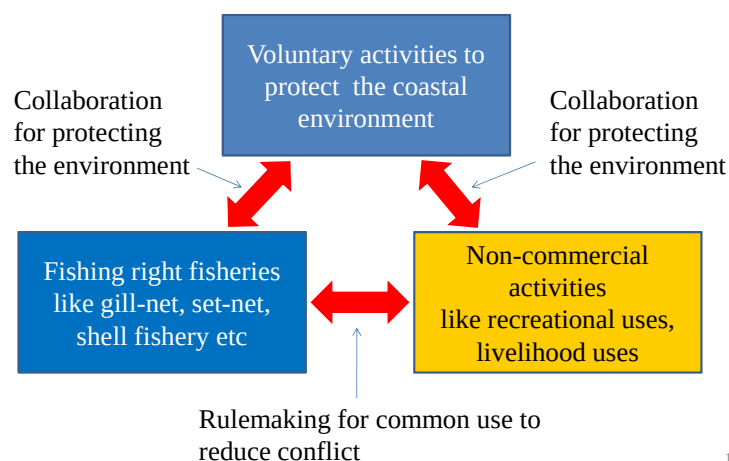
13

Increase of voluntary activities for the coastal environment

- Emergence of voluntary activities
 - Clean-up activities on the coastal area from the 1990s
 - Han-Shin Awaji Earthquake disaster in 1995
 - The Nakhodka oil spill incident and disaster in 1997
- Increasing concern about the coastal environment like tidal flats, sea-grass beds, pine forests, etc

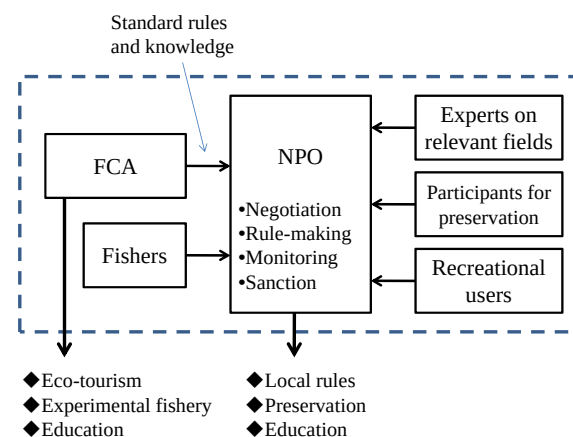
14

Components of Satoumi management



15

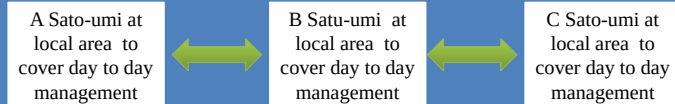
Management scheme for contemporary Satoumi as new local community



16

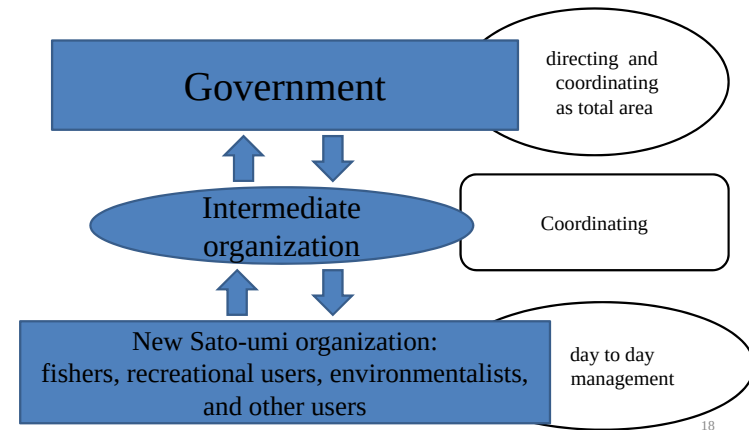
Political regime for governance

Satoumi at wider area to cover material circulation in as political regime by government



17

Governance framework for Satoumi



18

Conclusion

◆ New local communities

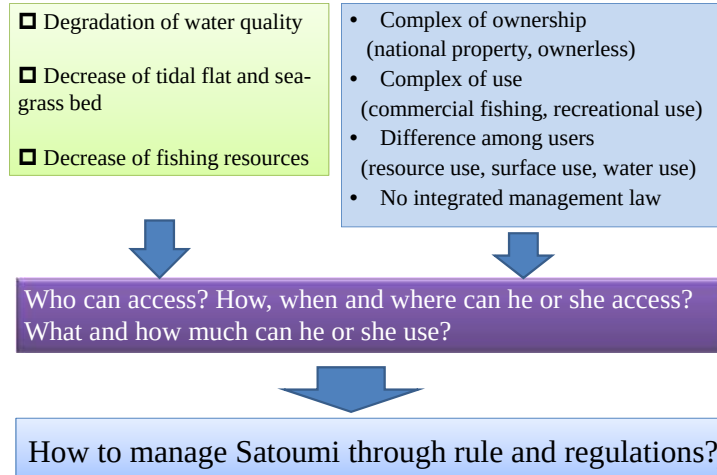
- Satoumi is transporting from traditional Satoumi based on fishing right institution to contemporary Satoumi managed by new local communities.
- New local communities consist of diverse users: commercial fishermen, non-commercial users and environmentalists.
- They often compose NPO to engage in negotiation, monitoring, preservation and other day to day management.

◆ Layered structure for governance

- Upper level Satoumi is managed by government.
- Lower level Satoumi is managed by new local communities.
- Intermediated organizations connect upper and lower level governance.

19

Challenges of Satoumi



20

Development of Sustainable Aquaculture as a Model of Satoumi and GAPURA to Improve Productivity of Marginal Brackishwater Pond in the Northern Coastal Area of Karawang, West Java, Indonesia

Suhendar I Sachoemar¹ and **Tetsuo Yanagi²**

¹Agency for the Assessment and Application of Technology (BPPT), Jakarta, INDONESIA

²Research Institute for Applied Mechanics (RIAM), Kyushu University

A sustainable model of aquaculture by applying an integrated multi tropic aquaculture using Tilapia, Giant Black Tiger Prawn, seaweed Gracillaria and Green mussel was developed to improve the productivity of the marginal brackishwater pond in the northern coastal area of Karawang, West Java. This program was designed to implement the SatoUmi and Indonesian Gapura concept to recommend an appropriate model for sustainable coastal management. The 4 (fourth) treatment of the experimental pond with 3 replications was designed to understand the productivity performance as well as their ecosystem stability (water quality). The result shows that the productivity of pond containing 4 commodities i.e. Tilapia, Giant Black Tiger Prawn, seaweed Gracillaria and Green mussel was the most productive and their water quality was stable (DIN=1.21; DIP=0.15; Sulfide=0.02; Iron=0.39), followed by pond containing Tilapia, Giant Black Tiger Prawn and seaweed Gracillaria with water quality (DIN=2.09; DIP=0.74; Sulfide=0.03; Iron=0.53), Tilapia and Giant Black Tiger pond with water quality (DIN=2.15; DIP=0.21; Sulfide=0.03; Iron=0.21), and Tilapia only pond with water quality (DIN=1.09; DIP=0.33; Sulfide=0.03; Iron=0.12). To recover the marginal pond in the northern coastal area of Karawang, an integrated sustainable aquaculture model by using multi tropic aquaculture was recommended to be developed within this area to improve their productivity and minimize the organic waste as used in an intensive aquaculture through bio recycle system.

Contact Information: Suhendar I Sachoemar, Agency for the Assessment and Application of Technology (BPPT), BPPT II Bld, 16 Fl. JL. M.H. Thamrin No. 8, Jakarta 10340 INDONESIA, Phone: 62-21-3169561, Email: suhendarsachoemar@yahoo.com

Development Sustainable Aquaculture As a Model of Sato Umi and Gapura To Improve Productivity of Marginal Brackishwater Pond in the Northern Coastal Area of Karawang, West Java-Indonesia

Suhendar I Sachoemar¹ and Tetsuo Yanagi²

(suhendarsachoemar@yahoo.com;tyanagi@riam.kyushu-u.ac.jp)



1. Agency for the Assessment and Application of Technology (BPPT), Indonesia
2. Research Institute for Applied Mechanics (RIAM), Kyushu University, Japan

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1

BACK GROUND

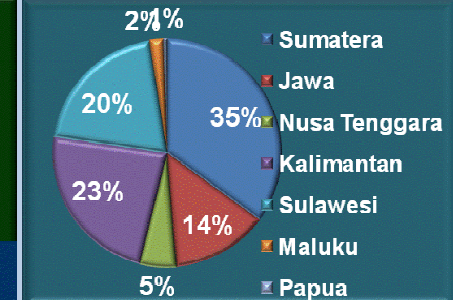
❑ Indonesian Brackish
Water Pond Area :
1,2 Million Ha

❑ Utilization : 37,5 %

**Productivity of Shrimp
➡ LOW (Declined)**

❑ 1980-1990 : > 4 ton/ha

❑ > 1990 : < 1 ton/ha



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2

PROBLEM IDENTIFICATION

**High Natural
Resources
Exploitation**

**Environment
Degradation**

**Shrimp Culture
Intensification**

**Decreasing Carrying Capacity
and Productivity**

**Development of technology adaptive to
the environment change**

- ✓Creating new strain of fish : Saline Tilapia
- ✓Application Technology of the "INTEGRATED
MULTI-TROPHIC AQUACULTURE (IMTA)"
- ✓Enrichment biodiversity (product diversification)
- ✓Mangrove reforestation and Coastal Restoration

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Basic Concept

Sato Umi

- ❑ Harmonization Nature and Human with mutualism symbiosis spirit
- ❑ Stabilization of the environment and the availability of the natural resources
- ❑ Encouraging high productivities and biodiversities ecosystem
- ❑ Sustainable utilization of the natural resources
- ❑ Stabilization and sustainability of the human welfare

**Harmonization,
Stabilization,
Rehabilitation,
Restoration,
Reforestation,
Adaptation,
Education**

**Improving
Environment,
Natural Resources,
Product Diversity,
Coastal Communities**

Gapura

**Development Action
Program for Northern
Coastal Area of West Java**

- ❑Environment and natural resources degradation due to the rapid deforestation of mangrove and high exploitation by intensified shrimp culture.
- ❑Low productivity and biodiversity
- ❑Decreasing of carrying capacities and multi variance of fish diseases
- ❑Human poorness and limited field work

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4

Material cycling in Sato-umi (Yanagi, 2009)

Thick, long and smooth material cycling
(Comprehensive material cycling) must be established
in Sato-umi for high productivity and high bio-diversity.



BIORECYCLING SYSTEM ON THE INTEGRATED MULTITROPIC AQUACULTURE (IMTA) TECNOLOGY-ZERO WASTE SYSTEM

Future Aqua
Farms



OBJECTIVE OF GAPURA

- ✓ Increasing field work to improve the welfare of coastal community
- ✓ Accelerate rehabilitation of the coastal ecosystem
- ✓ Improving infrastructure facilities
- ✓ Increasing the diversity product of fisheries, added value and their competitiveness.
- ✓ Increasing production and productivity of fisheries commodities : Shrimp/Prawn, Milk fish, Seaweed, Tilapia, and Oyster

APPROACHING ACTION OF GAPURA

1. **Improving business system** of the aquaculture, post harvest , marketing and financial support .
2. **Environmental Rehabilitation**, Harmonization of the nature and human activities
3. **Institutional Approach** , Involving individual, organization and economic institution in relation of the input and output production
4. **Involving of Local Wisdom**
5. **Welfare Approach**
6. **Regional Approach**, GAPURA should be oriented to stimulate the regional growth

INDONESIAN LOCAL WISDOM

1. Panglima Laot (Aceh),
2. Rumpon (Lampung),
3. Kelong (Riau),
4. Awig-awig (Bali and Lombok),
5. Rompong (South Sulawesi),
6. Sasi (Maluku).

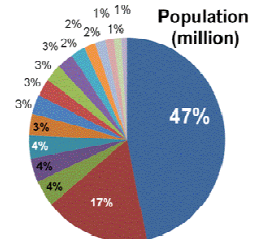
National Regulation :
Law No. 32 of 2009 :
Environmental
Protection and
Management



DISTRIBUTION OF INDONESIAN ETHNICS



Indonesian Ethnics : 1128
(183,875 million, 300 groups)
Source : BPS, 2010



■ Jawa ■ Sunda
■ Tionghoa ■ Melayu
■ Madura ■ Batak
■ Minangkabau ■ Betawi
■ Suku Bugis ■ Arab
■ Banten ■ Banjar
■ Bali ■ Sasak
■ Makassar ■ Cirebon

SITE LOCATION



Indonesia

Seribu Island

Java Sea

Jakarta Bay

**Northern Coast
Karawang**

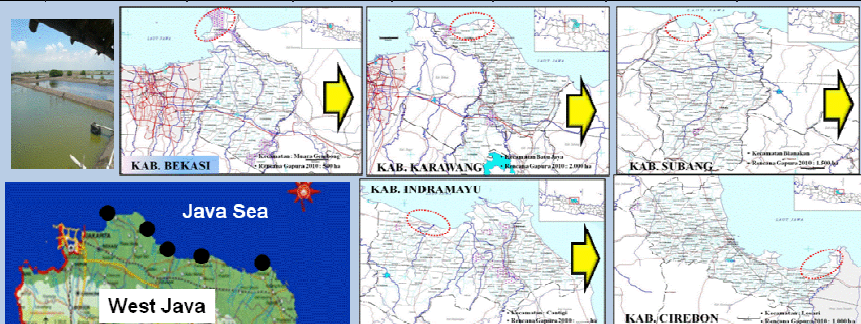


COASTAL AND BRACKISHWATER POND PROFILE



POTENTIAL AREA OF BREACKISH WATER POND

No	DISTRICT	BRACKISH WATER POND (Ha)	BRACKISH WATER POND UTILIZATION (Ha)				MARINE CULTURE (Unit)
			PRAWN	MILK FISH	SEAWEED	OTHERS	
1	Bekasi	9,970	1,994	4,985	1,496	1,496	74
2	Karawang	*12,079	2,416	6,040	1,208	2,416	
3	Subang	7,115	1,423	3,558	712	1,423	
4	Indramayu	**18,028	3,606	9,014	1,803	3,606	500
5	Cirebon	5,193	1,039	2,597	519	1,039	700

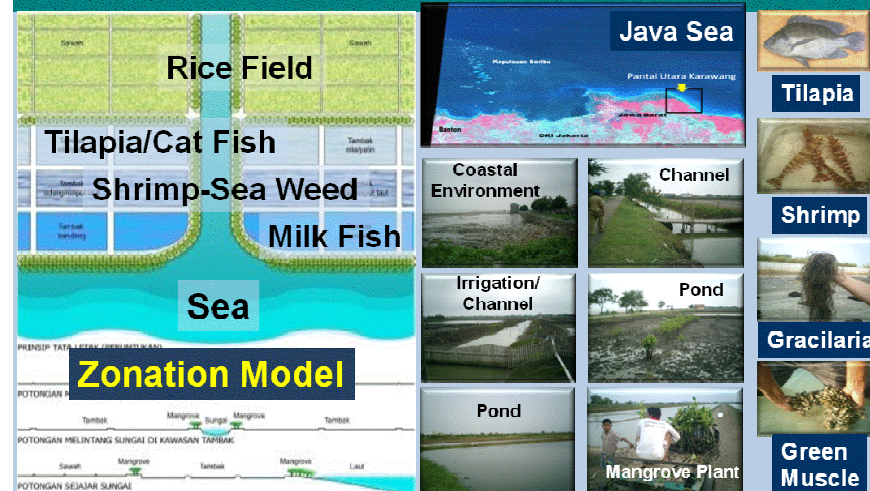


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13

ZONATION MODEL OF THE DIVERSITY PRODUCT of GAPURA AND ENVIRONMENTAL SITUATION



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Water Quality Profile of the Coastal Sea

Physic

Stations	Temp. (C)	Salinity (ppt)	Turbidity (mg/l)	Trans. (m)	DO (mg/l)	Depth (m)	pH
Offshore	30.9	31.5	10.3	2.0	6.0	3.9	8.0
Middle	31.2	31.0	46.0	1.4	5.7	2.5	8.0
Onshore	31.7	30.6	47.0	0.8	5.5	1.3	8.0

Chemical

Stations	Ammonia (mg/l)	Nitrate (mg/l)	Phosphate (mg/l)	Silica (mg/l)	Sulfide (mg/l)	Iron (mg/l)
Offshore	0.04	2.5	0.11	1.0	0.01	0.05
Middle	0.03	2.2	0.04	1.0	0.02	0.06
Onshore	0.13	1.8	0.10	2.2	0.04	0.12

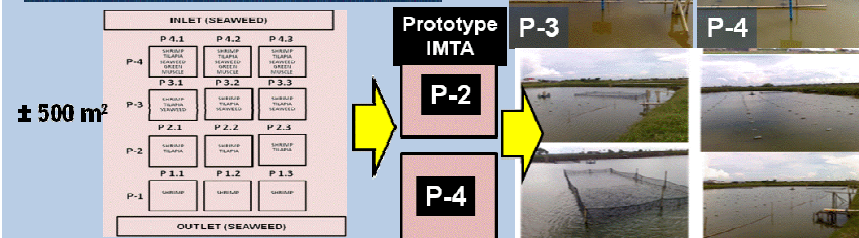
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EXPERIMENTAL DESIGN INTEGRATED MULTI-TROPIC AQUACULTURE (IMTA) : Bio-recycling-System

- P-1 : Shrimp Pond
- P-2 : Shrimp and Tilapia Pond
- P-3 : Shrimp ,Tilapia and Seaweed Pond
- P-4 : Shrimp ,Tilapia , Seaweed and Green Muscle Pond



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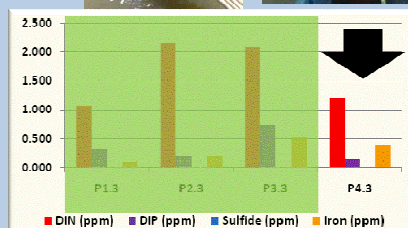
PHYSICAL-CHEMICAL Water Quality Profile of the Treated Brackish water Pond

Physical

Treat ment	Temp (°C)	Salinity (ppt)	pH	DO (mg/l)	Turb. (NTU)	TSS (mg/l)	BOD ₅ (mg/l)
P-1	30.81	24.94	7.92	6.02	121.83	36.5	1.66
P-2	30.77	23.11	7.87	6.16	127.46	22.33	0.71
P-3	30.92	22.48	7.90	6.43	157.08	22.83	0.24
P-4	30.94	22.91	7.91	6.47	177.67	18	1.18

Chemical

Treatment	DIN (ppm)	DIP (ppm)	Sulfide (ppm)	Iron (ppm)
P1.3	1.081	0.33	0.03	0.12
P2.3	2.154	0.21	0.03	0.21
P3.3	2.086	0.74	0.03	0.53
P4.3	1.207	0.15	0.02	0.39



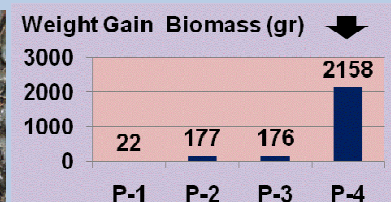
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Variability Product and Average Total Biomass of the Treated Farm in Brackish water Pond

Treatment	Black Tiger Shrimp		Tilapia		Sea Weed		Green Muscle		Total Biomass		Weight Gain Biomass
	T-0	T-3	T-0	T-3	T-0	T-3	T-0	T-3	Total T-0	Total T-3	
	(gr)	(gr)	(gr)	(gr)	(gr)	(gr)	(gr)	(gr)	(gr)	(gr)	(gr)
P-1	0.1	21.7							0.1	21.7	21.6
P-2	0.1	8.0	18.7	187.6					18.8	195.6	176.8
P-3	0.1	8.1	27.4	238.7	43.1				70.7	246.8	176.1
P-4	0.1	34.2	29.4	159.0	44.4	2048.0	66.6	57.7	140.6	2298.8	2158.3

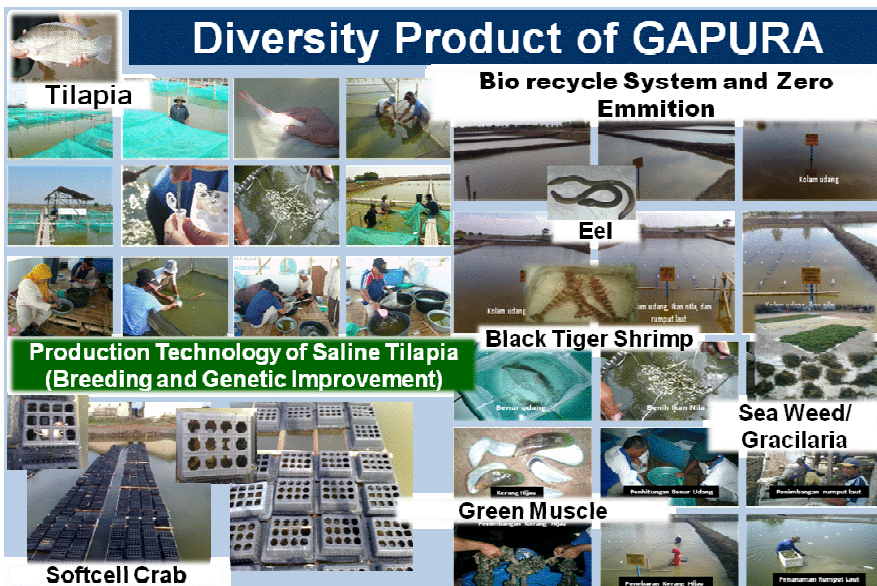


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Diversity Product of GAPURA



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Dissemination Activities

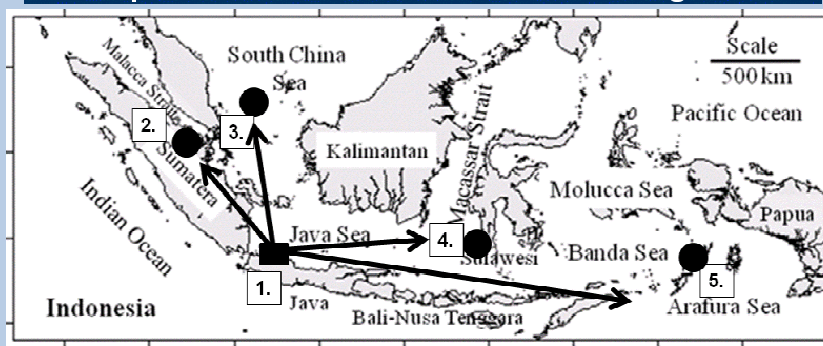


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Expansion Dissemination Program



1. Karawang



2. Kampar



3. Anambas



4. Bantaeng



5. Tual



Thank You

Evaluation of Tidal Flat Restoration Effect in the Coastal Unused Reclaimed Area by Promoting Tidal Exchange with Public Involvement in Ago Bay, Mie Prefecture, Japan

Hideki Kokub and **Hirokatsu Yamada**

Mie Prefecture Fisheries Research Institute, JAPAN

Ago Bay is located in Ise-Shima National Park, Mie prefecture, Japan. This bay is famous for cradle of pearl culture and it has been continued for more than 100 years. However, recently in Ago Bay, nutrient loads increased due to domestic loads and pearl culture. At the same time, natural purification capacities also decreased due to the land reclamation. Accordingly, excess nutrient loads accumulated into the bay bottom, causing red tides and hypoxia to occur every year. It is considered that one of the major causes of these phenomena is a stagnation of the material circulation between sea and land by reclamation of coastal shallow area including tidal flats and sea glass beds. The reclaimed coastal areas were estimated by the multi-spectrum aerial picture analysis. In detail, for more than 50 years ago, approximately 70% of tidal flats and shallow areas were reclaimed for constructing rice fields around the Bay. But now these reclaimed areas were given up cultivation and changed to fallow fields and unused wetlands. Therefore, for the environmental restoration of Ago Bay, it is necessary to enhance the biological productivity and natural purification capacity which these areas provided, and to recover a smooth material circulation around the shallow area. In this study, attempts were made to enhance the biological productivity, by promoting tidal exchange between an unused reclaimed area and outer sea through the open of the floodgate on a dyke with public involvement.

1) Present State of Unused Reclaimed Area

More than 100 years ago, there were about 269 ha of tidal flats in Ago Bay occupying about 10% of the sea surface area. The total reclaimed areas are about 185ha, however most of these areas were given up cultivation and changed the hypertrophic unused wetland. Such areas are up to about 154ha. The sediments of unused wetlands are too muddy and contain high organic matters, because the dykes which were constructed for reclamation, lead to accumulation of the nutrient and organic matter run off from the land. In these wetlands, the abundance and diversity of benthos are quite poor.

2) Effects of Tidal Flat Restoration

Tidal flat restoration was carried out from Apr. 2010 by opening the floodgates on the concrete dike, which was constructed for reclamation. The restoration site is about 2ha and located in the inner part of the bay (Ishibuchi in Shima city). Clam stocking, seagrass planting, and environmental education were carried out with public involvement. Improvements were evaluated by monitoring sediment quality, benthic abundance and species diversity every season. Before the restoration, only 6 species of macro faunas (*Chironomidae*, *Hediste diadroma*), which lives in brackish water, were found. After the opening of the floodgate, the macro faunas was changed from brackish to saltwater and the number of species gradually increased. After 6 months, 22 kinds of juvenile fish (*Goby*, *Lateolabrax japonicus* and *Mugil cephalus*), migratory macro faunas (*Hemigrapsus penicillatus*, *Batillaria zonalis*) and small clams were found in the restoration tidal flat. At the same time, the COD and AVS in sediment decreased too. These results indicate that the sediment status in the restoration site were gradually changed to the aerobic condition by promoting the decomposition of the hypertrophic sediment through the tidal exchange.

Further enhancement of the biological productivity will be expected through continuous tidal exchange near the future. This method would lead to wise use of the coastal environment and to enhance the biological productivity around the unused reclaimed areas.

Contact Information: Hideki Kokubu, Mie Prefecture Fisheries Research Institute, 3564-3 Hamajima, Hamajima-cho, Shima-city, Mie 517-0404 JAPAN, Phone: +81-599-53-0016, Fax: +81-599-53-2225, Email: kokubh00@pref.mie.jp



Evaluation of Tidal Flat Restoration Effect in Coastal Unused Reclaimed Area by Promoting Tidal Exchange with Public Involvement in Ago Bay, Mie Prefecture, Japan

Hideki Kokubu & Hirokatsu Yamada
Mie Prefecture Fisheries Research Institute



Geographical Features of Ago Bay

MIE FISHERIES RESEARCH INSTITUTE



Area : 26km²
Coast : 140km
Depth: Max: 40m, Bay mouth: 12m
Width of bay mouth : 1.7km

里海
[Sato-umi]



Environmental Deterioration in Ago Bay

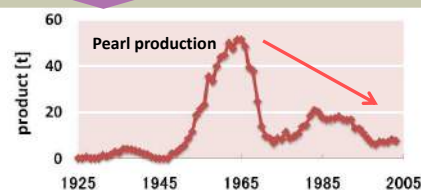
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- Increase in domestic load
- Increase in nutrient load from pearl culture
- **Decrease in tidal flats due to land reclamation**

Excess of nutrient load over natural purification capacity

Red tide & Hypoxia

Decrease in fisheries production



Reclamation of the tidal flats and the shallow area

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- : Existent tidal flat : 84 ha
- : Reclaimed area : 185 ha

About 70% of tidal flat and shallow area were reclaimed



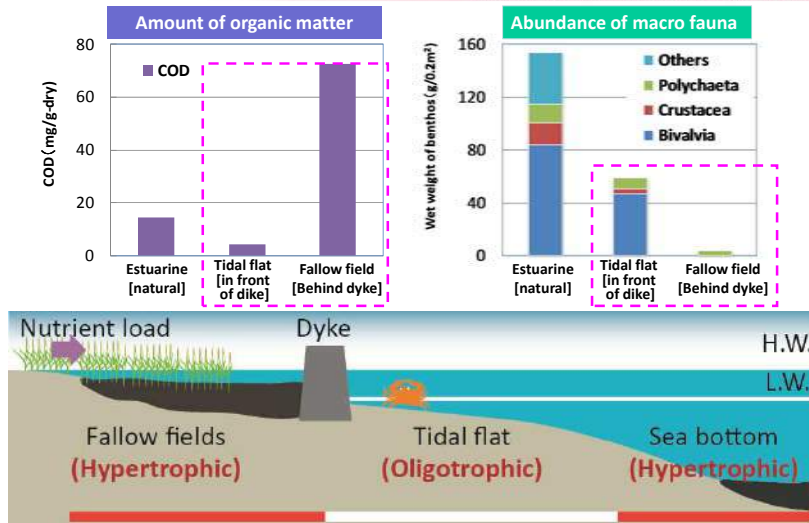
Bay area : 2710 ha

Natural tidal flat was reclaimed



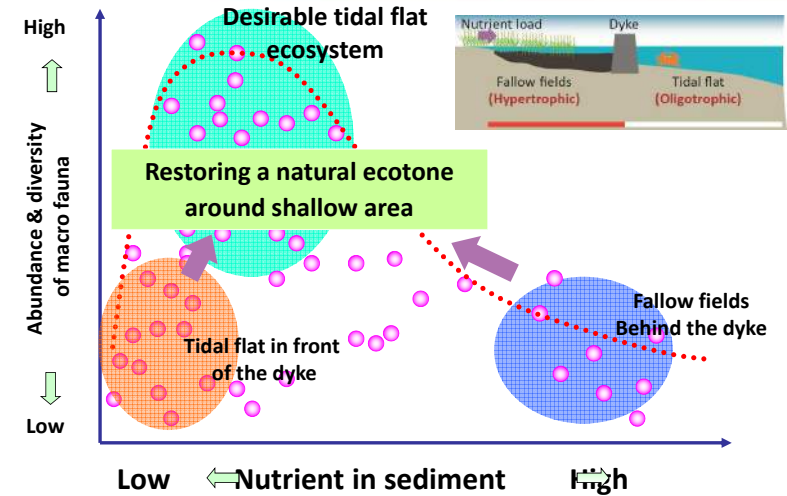
Characteristic of Sediment Quality and Macro Fauna in Shallow Area

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Restoration Concept of Shallow Area in Ago Bay

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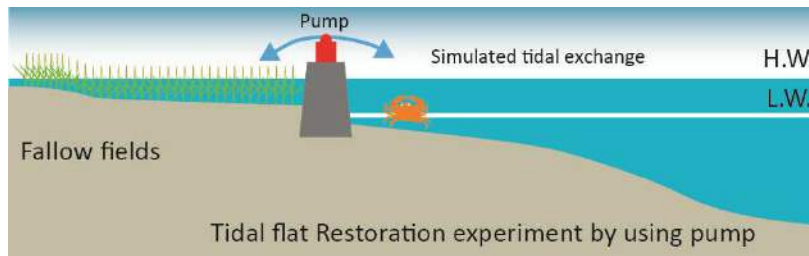


Feasibility Study | Small Scale Experiment

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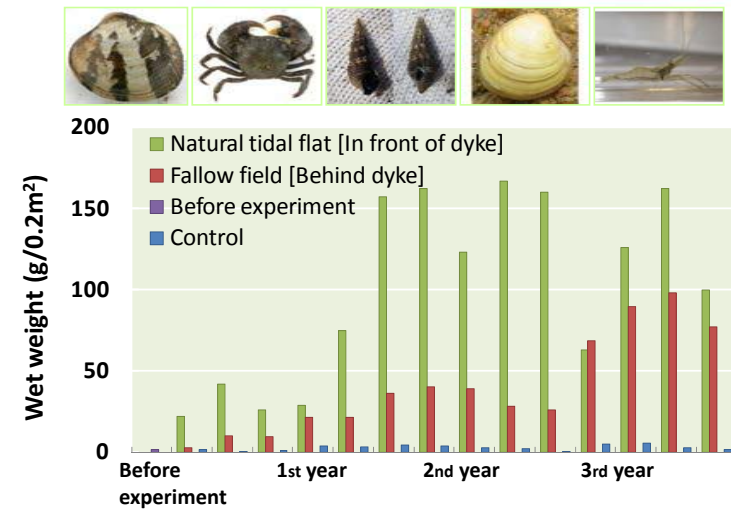
Monitoring (for 3years)

- Macro fauna
- Sediment quality



Results | Changes of macro fauna

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Enhancement of Biological Productivities around Tidal Flat

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Reclamation of tidal flat impacted in a biological productivity around tidal flat.

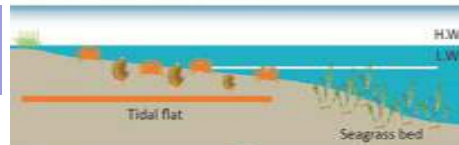


Restoring a natural ecotone around shallow area



Enhancement of biological productivities around tidal flat

- Past (more than 100 years ago)



- Present



- Future



Tidal Flat Restoration Project

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Tidal flat restoration project was started from Apr. 2010



Opening the floodgate on the concrete dike

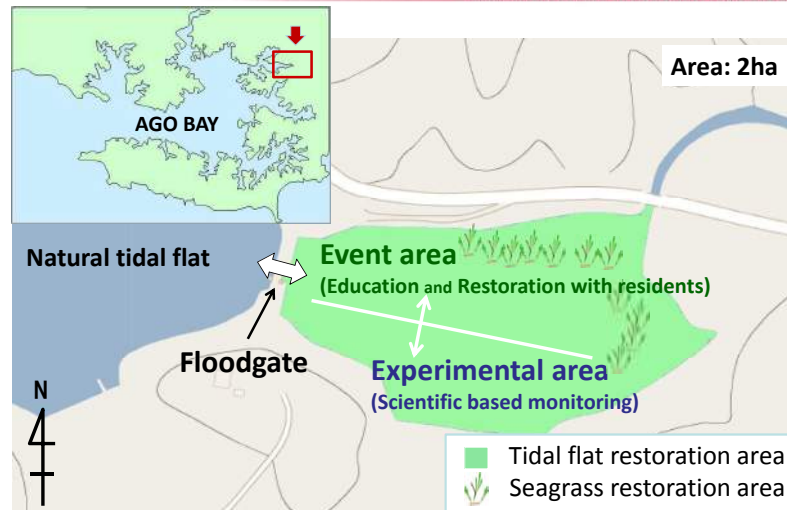


Promoting the water exchange between sea and fallow field



Outline of Tidal Flat Restoration Area

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Problems of Tidal Flat Restoration in Ago Bay

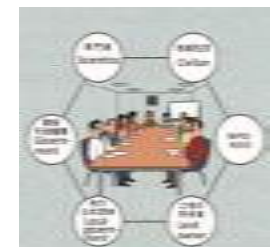
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Problems

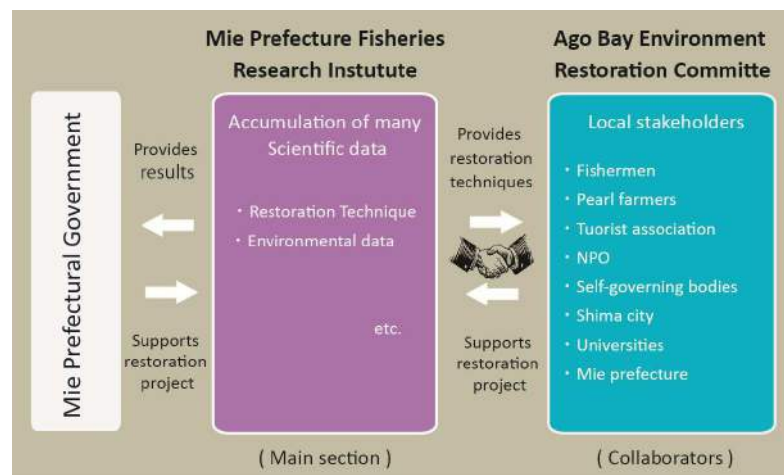
- Poor communication between governmental division
- Protection against disasters
- Ownership of fallow fields

Importance

- Collaboration with government and local civilian
- Promotion mutual understanding for tidal flat restoration



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Environmental education



Nature-based tourism



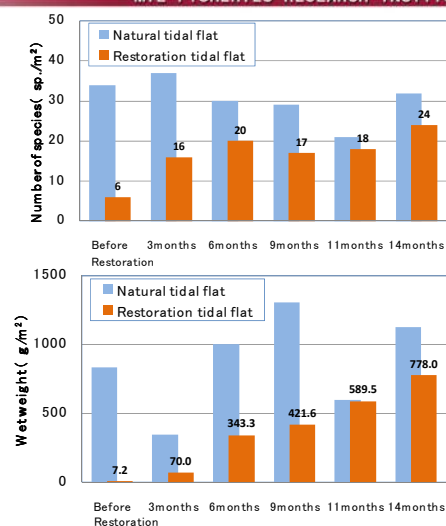
Clam stocking



Seagrass planting

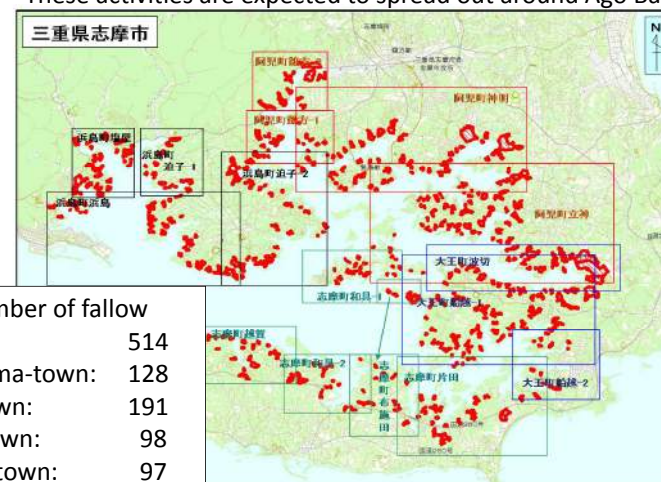


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These activities are expected to spread out around Ago Bay



Total number of fallow fields :	514
Hamajima-town:	128
Ago-town:	191
Daio-town:	98
Shima-town:	97



Collaboration with Shima City

MIE FISHERIES RESEARCH INSTITUTE

These activities of the tidal flat restoration were specified clearly in the Master Plan of Shima City!



[5 tidal flats will be restored for 5 years]

The tidal flat restorations are expected to spread out around Ago Bay



Restoration event in Ishibuchi, Nov. 13th, 2010.

THANK YOU FOR YOUR ATTENTION!



Part 2 : Views on Satoumi from the Perspective of Western Society

Small Coasts, Large Issues - Can Communities Protect their Coasts? ----- 57

Dr. Yoshitaka Ota, University of British Columbia (CANADA)

*Historic and Contemporary Land Use on the Chesapeake Bay Watershed: the
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Prof. Wayne Bell, Center for Environment & Society, Washington College (USA)

*Enhancing Social Capital for Sustainable Coastal Development: Is Satoumi the
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(FRANCE)

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Dr. Marjo Vierros, United Nation University (JAPAN)

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the Mediterranean and the Black Sea Countries: The PEGASO of EU FP7* ----- 85

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Dr. William Dennison, Vice President for Univ. MD Center for Environmental
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(USA)

Small Coasts, Large Issues - Can Communities Protect Their Coasts?

Yoshitaka Ota

NF-UBC Nereus Program, Fisheries Centre, Univ. of British Columbia, Canada

How can coastal communities protect their environment while maintaining economic activities that use marine resources sustainably? This question can be addressed by investigating either national or regional approaches in marine policy that successfully promote the sustainable use of coastal ecosystem services. It can also be answered through the analysis of case studies on local coastal management schemes, which describe the innovative hands-on approaches of coastal communities to conserve or restore their environment. These community-based management schemes are often culturally sensitive and bottomup, due to the nature of their operational structure, which is either grassroots or indigenous. The greater challenge has amounted to arguing the continued relevance of the 'community' brand of coastal management in the face of increasing vocal (and fashionable) alternatives that try to make sense of the unity and diversity of coastal living and environment. However, both studies on policy approaches and those of community case studies can only offer limited answers to the question, providing perspectives that are either too area specific or artificial. This paper will discuss ways to advance sustainable coastal management locally and globally. To look locally, it proceeds through a discussion of the way Satoumi is utilized to mainstream the idea of conserving biodiversity and sustainable use of coastal and marine resources to the work of production sectors, mainly fishers communities, and argues the benefits of the Satoumi approach in comparison to other contemporary coastal management schemes, such as Marine Spatial Planning. To look globally, it argues the need for a comprehensive understanding of global coastal governance outlook and introduces newly establish marine initiative, the NF-UBC Nereus Program. The paper concludes that both the local and global matter: Sustainable use of ocean resources requires both innovative local, bottom-up management approaches as well as global-scale coordinated scientific research efforts and large-scale management responses.

Contact Information: Yoshitaka Ota, NF Senior Research Fellow, NF-UBC Nereus Program, Fisheries Centre, Univ. of British Columbia, 326-2202 Main Mall, BC, Canada, Phone: +1-604-822-6027, Email: ota1205@gmail.com

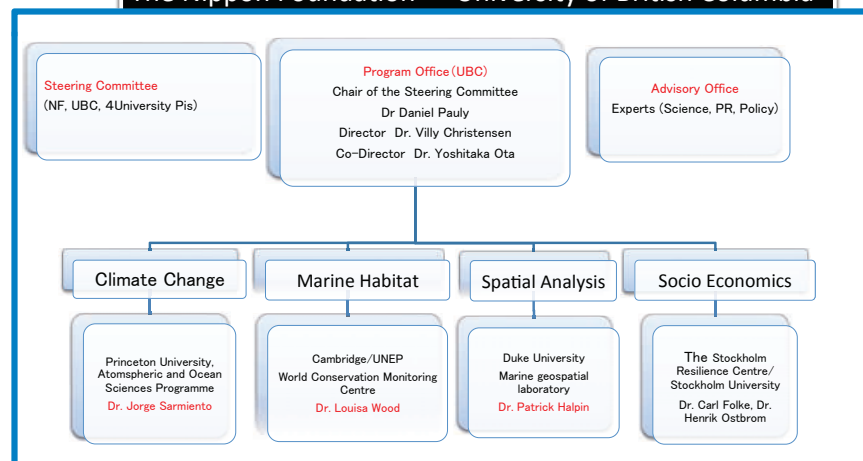
Introducing Satoumi Small coasts large issues

Yoshitaka Ota (Nereus program, UBC),
Masaya Torii (Okayama Prefecture)
Shio Segi (Ocean Policy Research Foundation)
Takehiro Tanaka (Kaiyoukensetu Ltd.)



2011-19 NF-UBC Nereus Program

The Nippon Foundation University of British Columbia



Nereus Senior Research Fellow: 2 years post doc, 5 fellows per one term

Nereus Research Fellow: 3 years PhD, 5 fellows per one term

Recovery of Northeast Japan



Recovery of Northeast Japan



Recovery of Northeast Japan



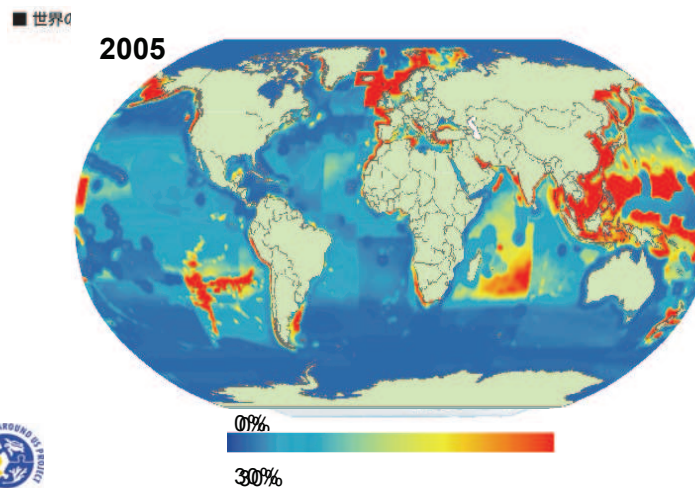
Recovery of Northeast Japan



Recovery of Northeast Japan

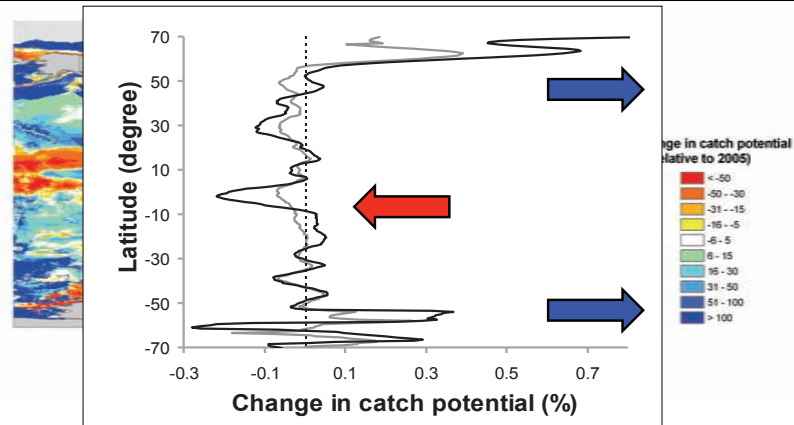


Small Coasts Large issues: Fisheries



Small Coasts Large issues: Climate change

- High latitude regions are projected to gain in catch potential while regions in the tropics may suffer from losses.



Source: Cheung *et al.* (in press) Global Change Biology

Small Coasts Large issues: Small-scale fisheries

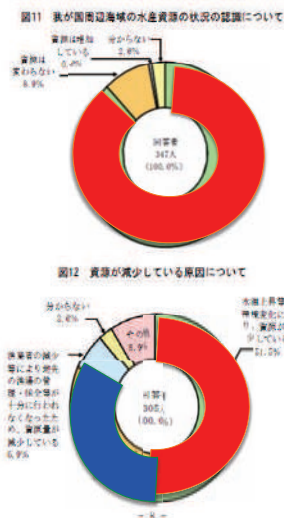
- The small-scale fisheries provide **about half of the world's fisheries production**
- Around 90 percent of the 38 million people** recorded globally are small scale fishers
- The small-scale sector employs 25-27 million fulltime and parttime fishers in developing countries. **Another 68-70 million people** are employed in post-harvest activities and the small-scale sector hence provides over 90 percent of all fisheries jobs. About **half the total workforce are women**
- The global marine smallscale sector production (here estimated to be about 30 million tonnes) is **almost entirely used directly as food while up to half the catch of the large-scale sector** (50-60 million tonnes) is processed into fish meal and oil, typically used for animal feed products (20-30 million tonnes/year)



The data has been collected by Govender, R. at UBC Fisheries Centre

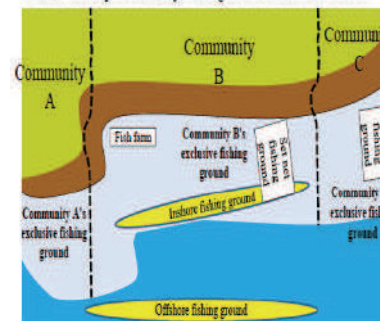
Small Coasts Large issues: Japan

水産物自給率の推移



Coastal Fisheries management in Japan

Basic Concept of Fishery Management in the Edo Period



1267 (864 Inland, 142 offshore)
Fisheries Cooperative Association

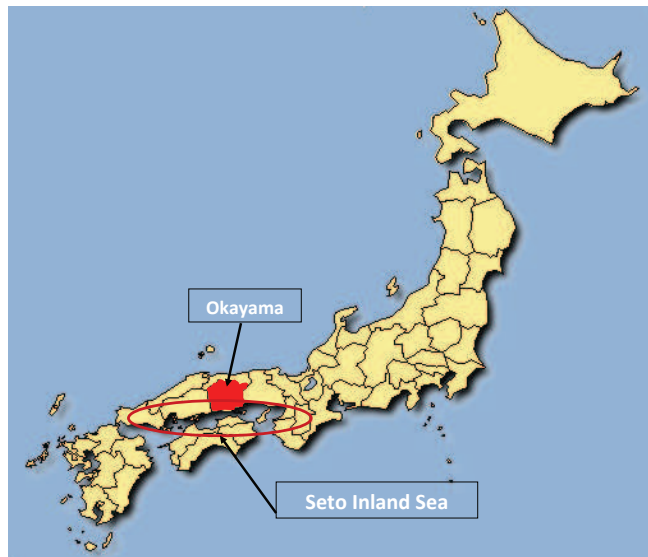
Gear restriction, Closure of fishing Ground

75% are operating at a loss

Fishers population has been declined

Source: Compiled by the Fisheries Agency based on the "Guide to the Fishery Act" (Seizudo Shuten) by Yoshiyuki Kaneda.

Okayama Prefecture



Satoumi -background

Seto Inland Sea

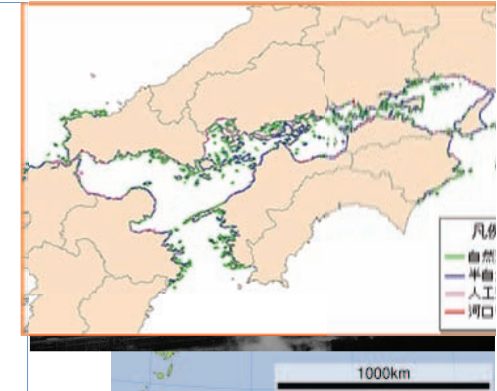
- Post war Rapid coastal development

- Only 37% of the coast line is natural(53% nationally)/

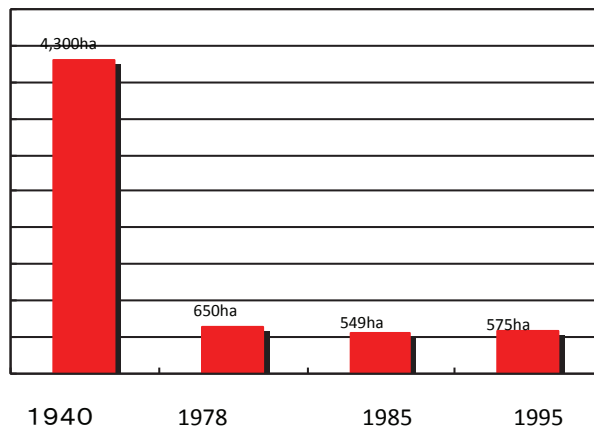
Interim Law for Conservation of the Environment Of the Seto Inland sea (1973)

Red tide/Eutrophication

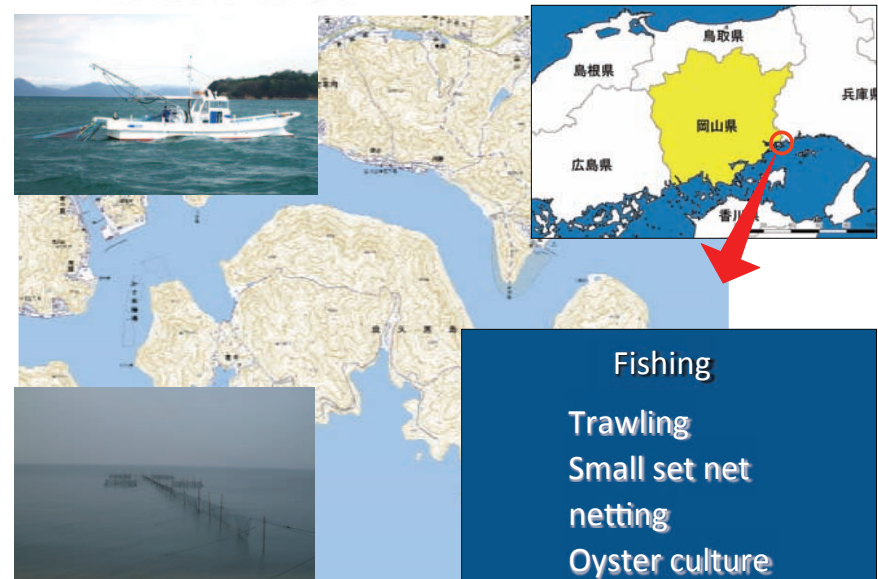
Seto-inland sea environment protection plan (1978, 1990)



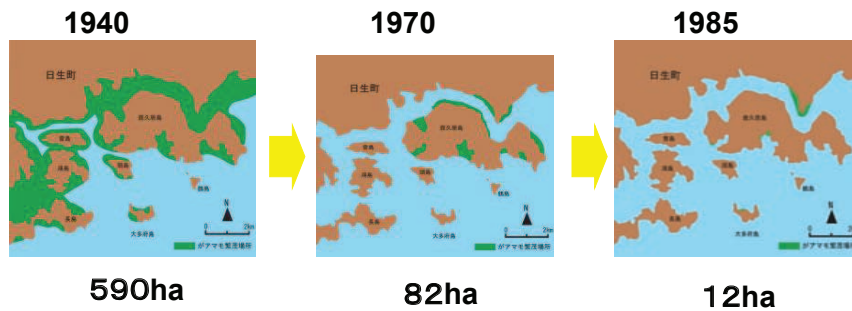
Change of eelgrass bed marine area



Hinase area



Eelgrass bed in Hinase

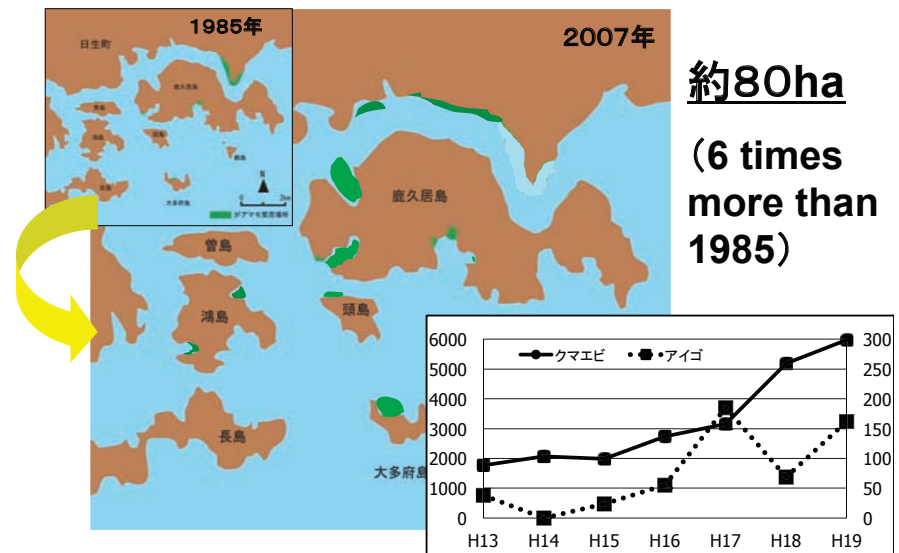


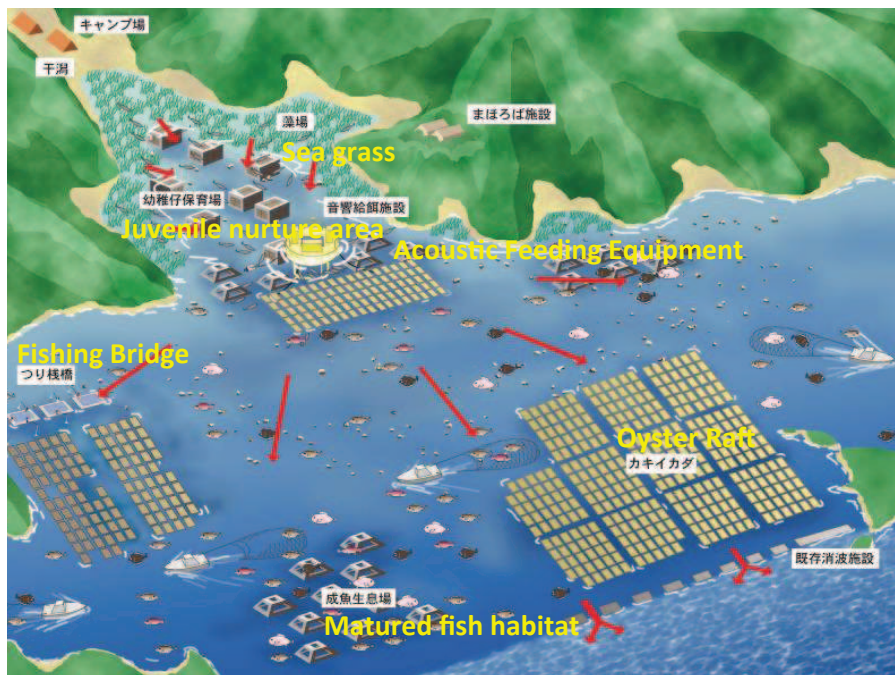
Hinase Fishers' Eelgrass restoration initiative

年 度	内 容
1979～	<u>Fishers asked for scientific advice from a local research institute in Okayama on Eelgrass bed restoration</u>
1985～2011 (continues)	Fishers started the local initiative Of eelgrass bed restoration



現在の日生町地先におけるアマモ場分布図





Marine Spatial Planning

Norway	1,400,000 km ²
--------	---------------------------

China National Marine Functional Zoning

アメリカ

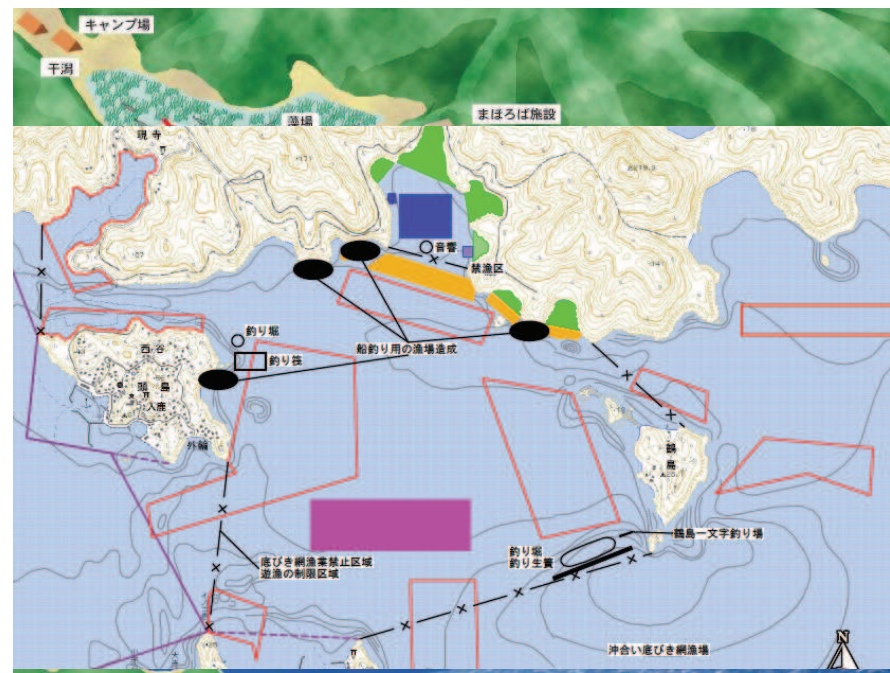
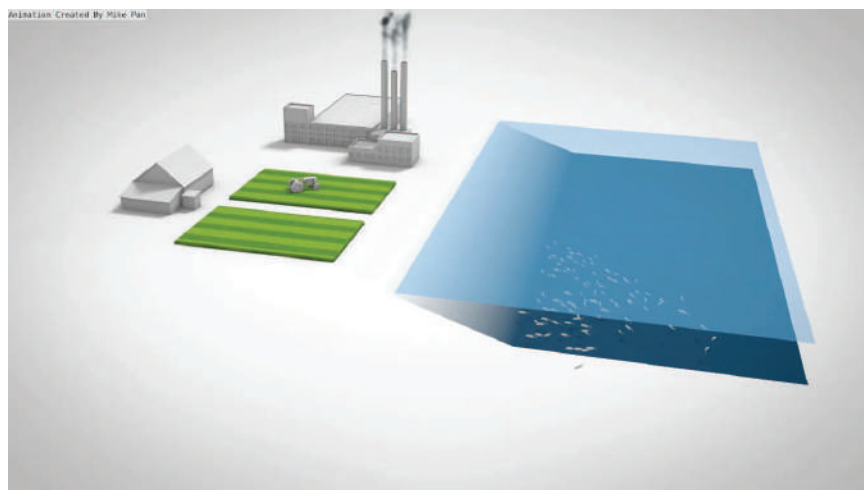
1. [Wave Energy Usage in Oregon](#) ?
2. [Massachusetts Ocean Plan](#) !
3. [Ocean Special Area Management Plan for Rhode Island](#) !
4. [Florida Keys National Marine Sanctuary](#) !
5. [California Marine Life Protection Act Initiative](#) !
6. [Pilot Project for San Pablo Bay, California](#) ?



Canada	325,000 km ²
--------	-------------------------

Belgium	3,600 km ²
---------	-----------------------

Concept of Marine Spatial Planning – MSP



Issues

- Statutory inconsistency on ridge to reef type management
 - stakeholders consensus, Industry incentive
- Unclear jurisdiction and no spatial tenure to local governments
 - Policy suggestion to transfer the management role to local governments
- Scientific expertise and monitoring (both scientific and local knowledge) and communication
 - Marine Spatial planning and visualisation

Science Communication Ecosystem Visualisation



Issues

- Statutory inconsistency on ridge to reef type management
 - stakeholders consensus, Industry incentive
- Unclear jurisdiction and no spatial tenure to local governments
 - Policy suggestion to transfer the management role to local governments
- Scientific expertise and monitoring (both scientific and local knowledge) and communication
 - Marine Spatial planning and visualisation

Historic and Contemporary Land Use on the Chesapeake Bay Watershed: The Relationship of Working Landscape to the Satoumi Perspective

Wayne H. Bell

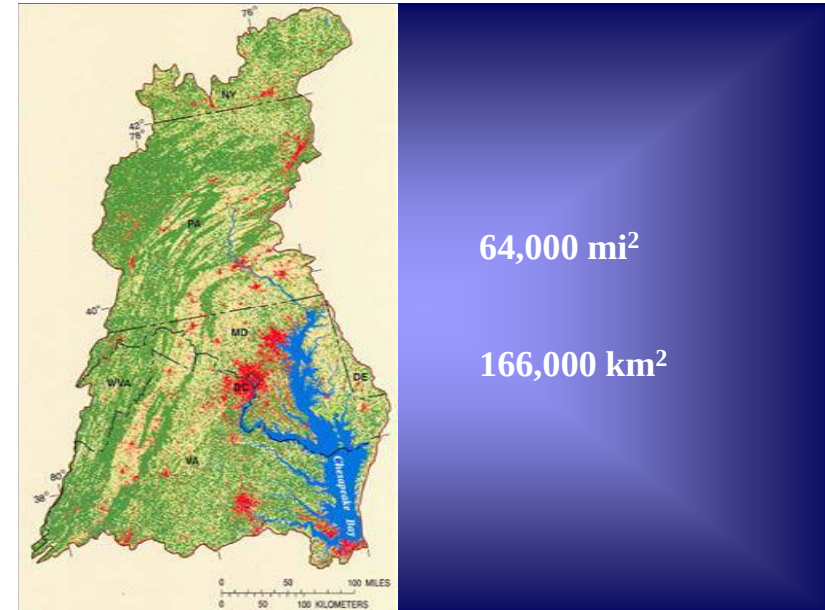
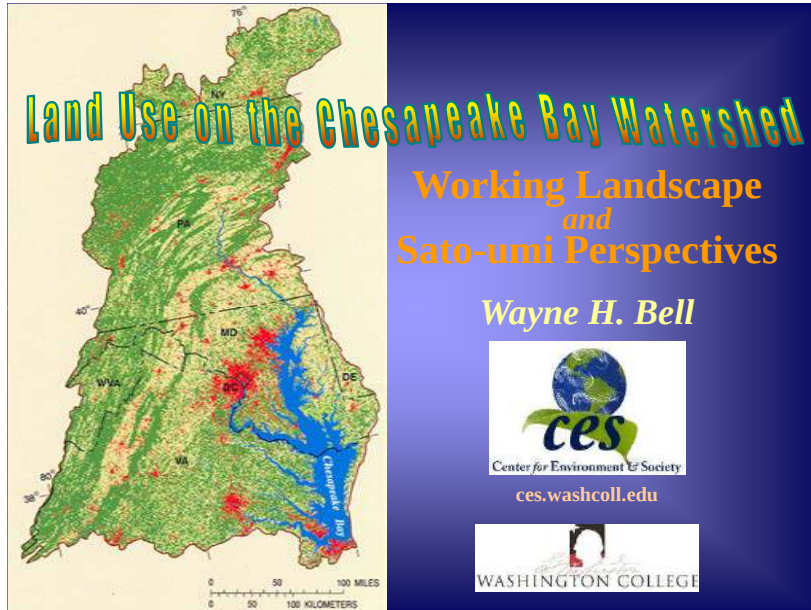
Senior Associate, Center for Environment & Society, Washington College, Chestertown, USA

The ratio of Chesapeake Bay watershed area to estuary volume, $166,400 \text{ km}^2 : 70 \text{ km}^3 = 2,400$, is more than an order of magnitude greater than that of any major coastal system on earth. It follows that the nature of land use on this watershed has a major influence on the ecology of estuary itself.

Humans have occupied the lands of the Chesapeake Bay watershed for at least 10,000 years. Evidence from recent archeological studies indicates that the peoples who lived here prior to European contact around 1500 used extensive burning to create and maintain a grassland/savannah landscape that fostered abundance of game and permitted extensive agriculture. Estimates differ, but perhaps 80% or less of the pre-contact watershed was forested. Early colonists and pioneers initially melded New World crops with Old World practices to develop a small-scale subsistence agriculture that persisted on the watershed for nearly 200 years. Introduction of the moldboard plow after 1700 promoted large-scale agriculture for cash grain crops that required extensive land clearing. By the time of the American Civil War around 1863 the Chesapeake Bay watershed was only 20% forested. As the soil lost its fertility and richer lands became available west of the Appalachian Mountains, wholesale abandonment of farmlands allowed the forest to return through the process of ecological succession. This, coupled with additional large-scale changes in farming practices and with governmental policies that encouraged the residential development of formerly rural lands, have created today's watershed landscape that is approximately 60% forested, 25% agricultural, 10% urban, and 5% lands in transition.

History now tells us that humans have been integrally associated with the Chesapeake Bay watershed since their arrival 10,000 years ago and continuing to present day. People have managed these lands for the benefit of their communities and the lands in turn have influenced the nature, well-being, and culture of those communities. We call this relationship a "working landscape" and suggest that the most successful environmental policies are those implemented to keep the landscape truly "working" for the mutual benefit of the natural resources and the human communities that share the system together. Satoumi is a key perspective that links the "working landscape" of a watershed with the management of its associated coastal sea in a manner that maximizes aquatic "productivity and biodiversity with human interaction."

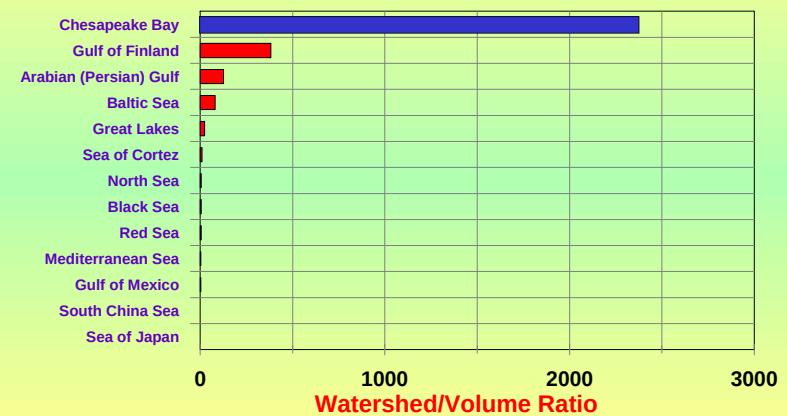
Contact Information: Wayne H. Bell, Senior Associate, Center for Environment & Society, Washington College, 101 S. Water Street, Chestertown, MD 21620 USA, Phone: 410-820-6002, Email: wbell2@washcoll.edu



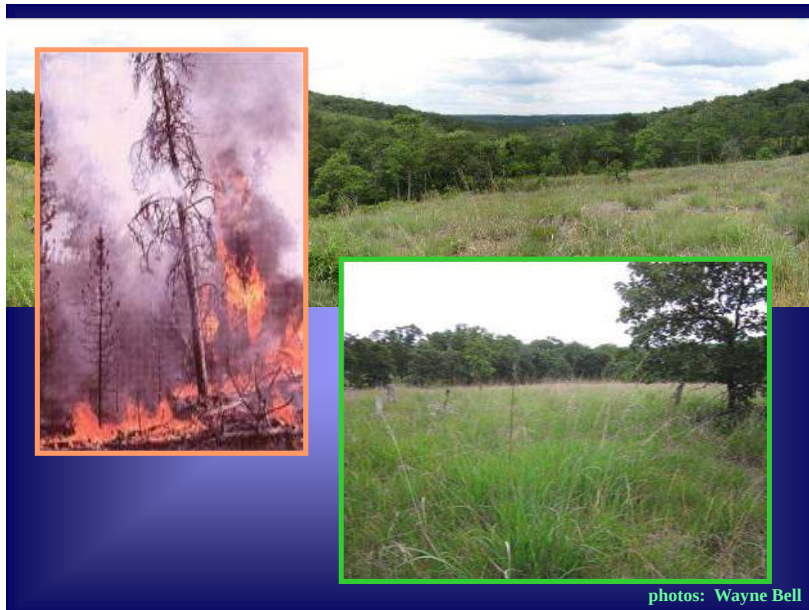
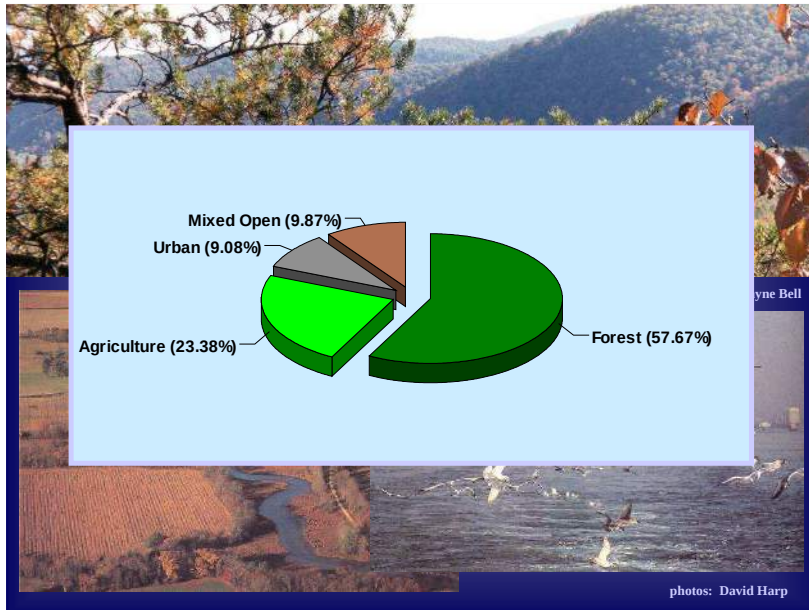
Coastal Sea	Mean Depth m	Volume cu. km	Watershed Area sq. km
Sea of Japan	1,752	713,000	349,528
South China Sea	1,060	3,907,000	3,223,870
Gulf of Mexico	1,512	2,332,000	5,836,494
Mediterranean Sea	1,500	1,738,000	5,480,000
Red Sea	558	251,000	883,189
Black Sea	1,150	530,000	2,528,884
North Sea	91	155,000	885,306
Sea of Cortez	818	145,000	1,454,775
Great Lakes	35	22,809	510,160
Baltic Sea	558	21,721	1,721,233
Arabian (Persian) Gulf	40	10,000	1,248,506
Gulf of Finland	37	1,098	419,200
Chesapeake Bay	6	70	166,400

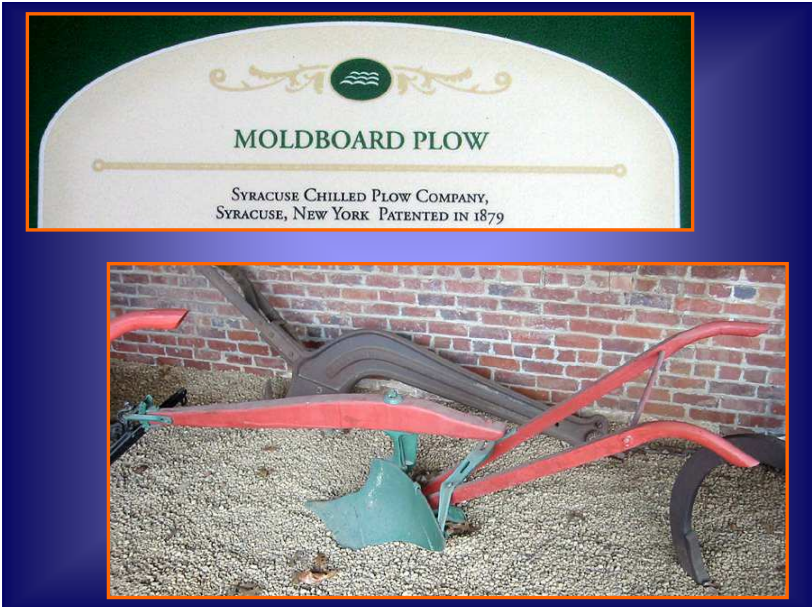
data courtesy R. Costanza and J. Bartholomew

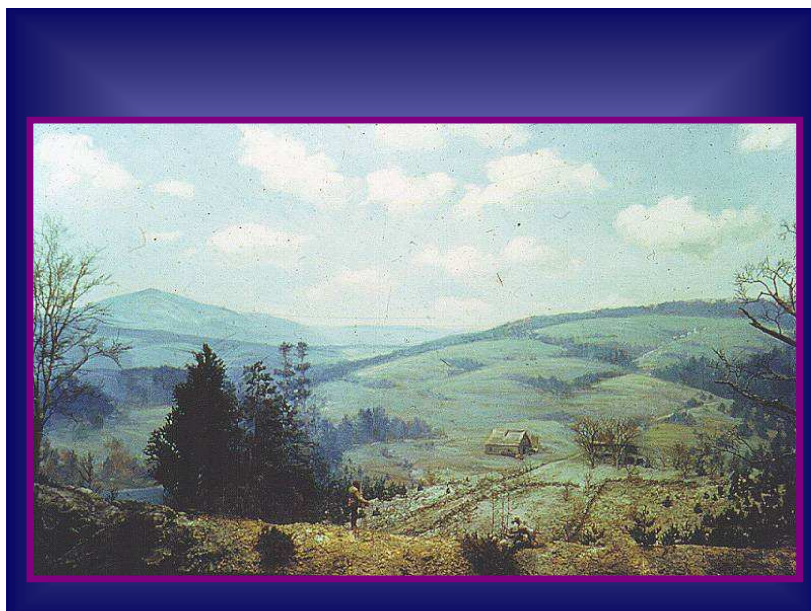
Relative Watershed Sizes (metric units)



data courtesy R. Costanza and J. Bartholomew





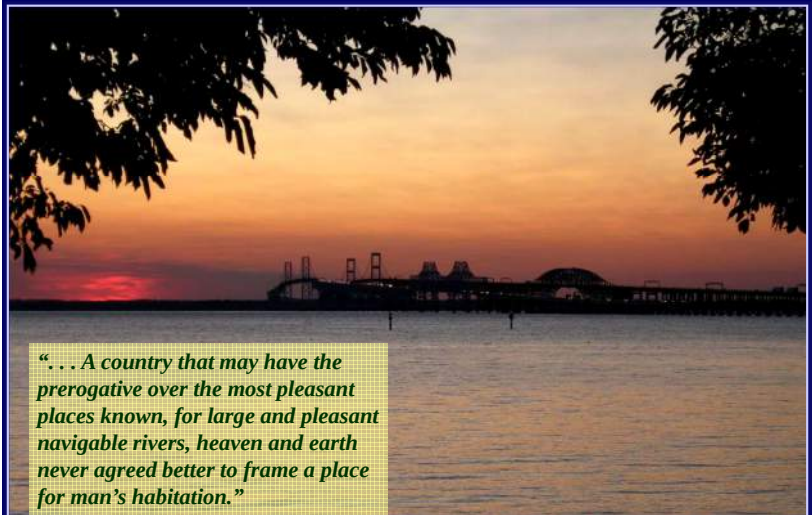




Welcome to Galena, Maryland



courtesy Kent County Planning Commission



"... A country that may have the prerogative over the most pleasant places known, for large and pleasant navigable rivers, heaven and earth never agreed better to frame a place for man's habitation."

Captain John Smith, 1612

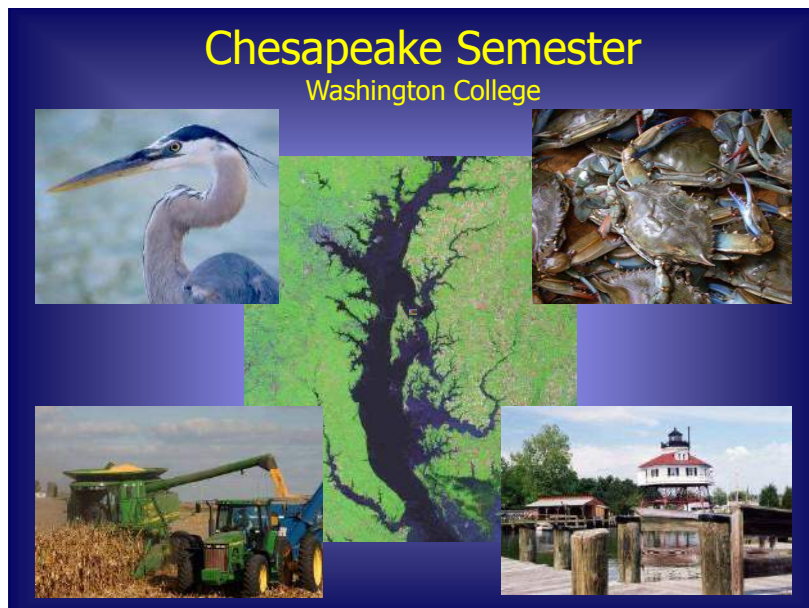


Best Management Practices are special techniques or devices used by farmers to control soil erosion, manage nutrients, and protect water quality.

Some of the following techniques are commonly used by farmers that comply with Best Management Practices:

- Crop Rotation
- Contour Farming
- Terracing
- Riparian Buffer
- Vegetated Filter Strips
- Grassed Waterway
- Nutrient Management
- Sediment Control Pond
- Wetland Creation & Enhancement
- Cover Crops
- Pest Management







Thank You

Enhancing Social Capital for Sustainable Coastal Development: Is *Satoumi* the Answer?

Yves Henocque

Theme Leader Nature & Society, French Research Institute for Sustainable Use of the Sea (IFREMER)

Social capital constitutes the cultural component of modern societies. Building social capital has typically been seen as a task for 'second generation' economic reform, but unlike economic policies and institutions, social capital is not created or shaped by public policy but is inherited throughout local communities successive generations. Enhancing social capital therefore is about promoting local knowledge deeply rooted into local communities' practices on land and at sea. In Japan, the culturally specific interaction of humans with nature has led to the emergence of specific socio-ecosystems called '*sato-yama*' on the land side and '*sato-umi*' on the coast and sea side. Here, characteristics of related local knowledge include information about a variety of components of these ecosystems like wild edible plants or seaweeds, and learning by doing practices like traditional rice cultivation or sea ranching. This knowledge has developed over centuries and has been handed down from generation to generation. There are actually other types of *sato-yama* and *sato-umi* which have been flourishing around the world though the latter (*sato-umi*) probably has no equivalent in other countries' coastal areas because of the unique Japanese fishing rights system. First largely ignored as a social capital, *sato-umi* has emerged as a new concept only a few years ago. In the frame of the recently adopted national ocean policy, it remains to be seen how such a social capital may be associated with integrated coastal zone management processes and tools for the sake of sustainable coastal development in Japan.

Contact Information: Yves Henocque, Theme Leader Nature & Society, French Research Institute for Sustainable Use of the Sea (IFREMER), 155 rue Jean-Jacques, Rousseau, 92138 France, Phone: 330610494157, E-mail: yves.henocque@ifremer.fr

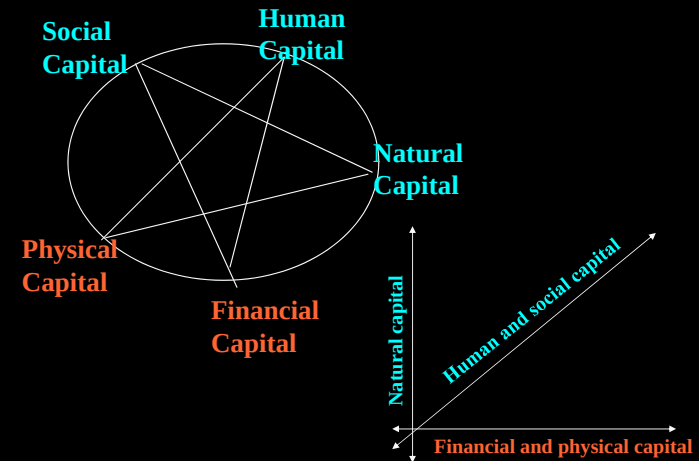
Views on Satoumi from the Perspectives of Western Society

Enhancing Social Capital for Sustainable Coastal Development; Is Satoumi the answer?

*Satoumi Session
EMECS 9 Conference
Baltimore, 27-31 August 2011*

Yves Henocque, Nature & Society, IFREMER

Social-ecological system: a sum of capitals



*Strong connection between
social capital and
natural resources management*

Networks – Norms – Trust

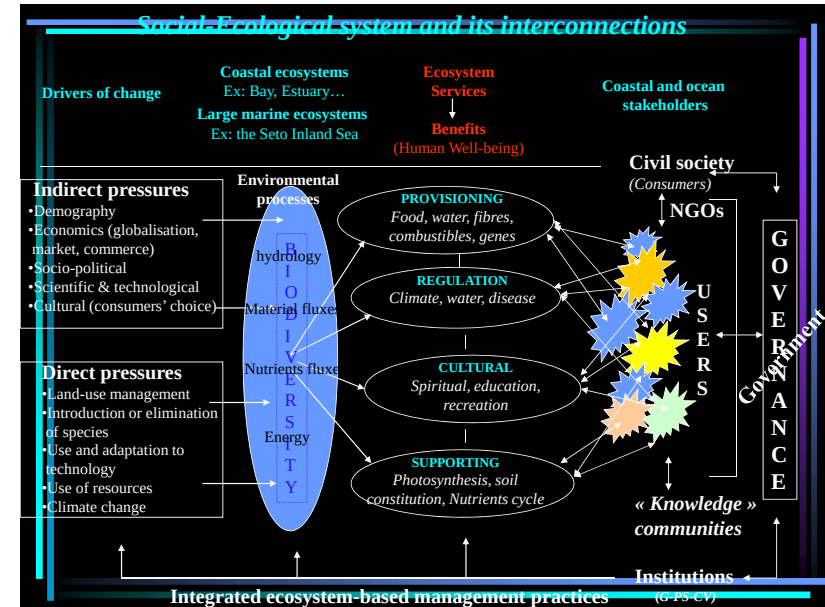
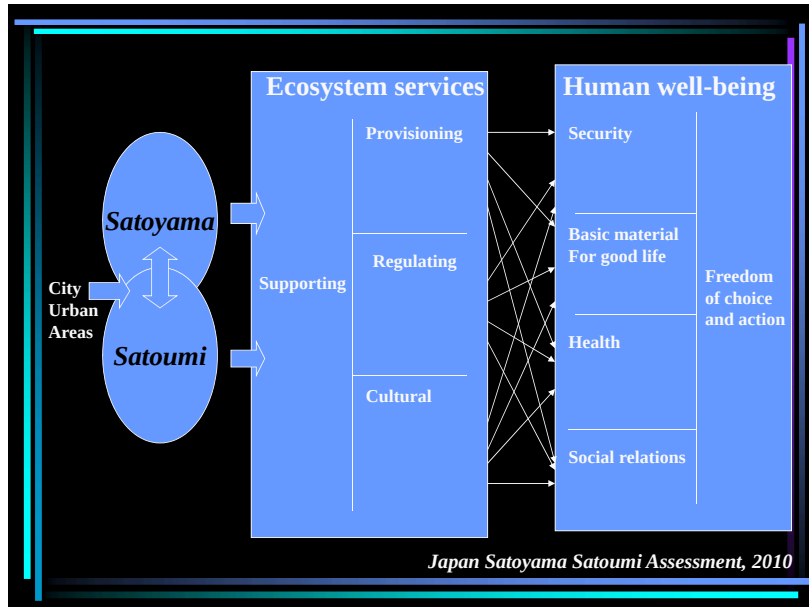
*the way these allow agents and institutions
to be more effective in achieving
common objectives*

—————→ *collaborative management*

Adaptive co-management

In a cross-scale and iterative approach

*About
Power sharing
Institution building
Trust building
Social learning
Problem solving
Good governance*



What relation to natural capital ?

In the Western world: nature is something separate from, and something victimized by, human beings...

Ecological problems as consequences of human violations of nature (PASSIVE / ACTIVE)

‘stop’, ‘restrict’, ‘reverse’, ‘prevent’, ‘reregulate’, constrain’
 —————> Preventing the bad, not creating the good...

E.g.: is climate change a problem of pollution or a problem of evolution, or even revolution ?

In the Eastern world and particularly in Japan:

Intimate relation between man and nature

Both are ACTIVE, they cooperate
Work being one of the forms of cooperation



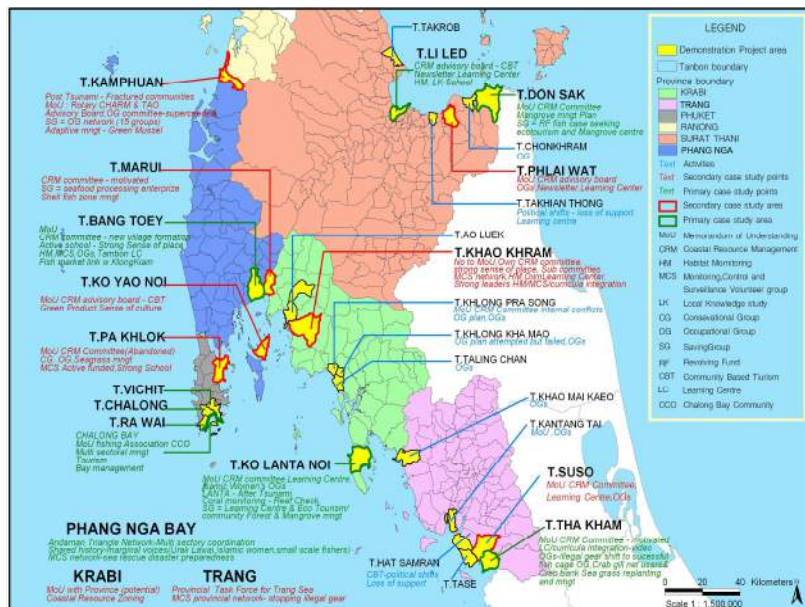
Underpinning the concept of Satoyama - Satoumi

Daisetz T. Suzuki, Zen and Nature

Daisetz T. Suzuki, Zen and Nature

FROM

LOCAL TO NATIONAL



Local projects or initiatives

Building the strength of local projects

ICZM
national
dialogue

*Spreading
the word
about local
resources
management*

Factors and conditions for spreading the word to other sites

**Maritime policy: a matter of ownership
a matter of networks
a matter of scale
a matter of nested governance**

BUILDING ON EXISTING SOCIAL CAPITAL AND FRAMEWORKS

National scale (EEZ)

Marine Ecoregions
Engagement of
Prefectures

Local scale
(municipalities)



EXISTING SOCIAL CAPITAL ?

A MULTIPLICITY OF
FUNCTIONING SCHEMES

FIND OUT HOW
TO CONNECT THEM

THE MORE DIVERSIFIED
OUR POLITICAL ECONOMY
THE MORE CERTAIN OUR FUTURE

PROVIDED
WE HAVE...

COMMON RULES

APPROPRIATE INSTITUTIONAL
ARRANGEMENT

PLACES TO MEET, DEBATE
AND SHARE *(at all scales)*

THANK YOU !



The Role of Satoumi in Implementing the Convention on Biological Diversity and Other International Commitments

Marjo Vierros and Anne McDonald

United Nations University, Institute of Advanced Studies, Yokohama, Japan

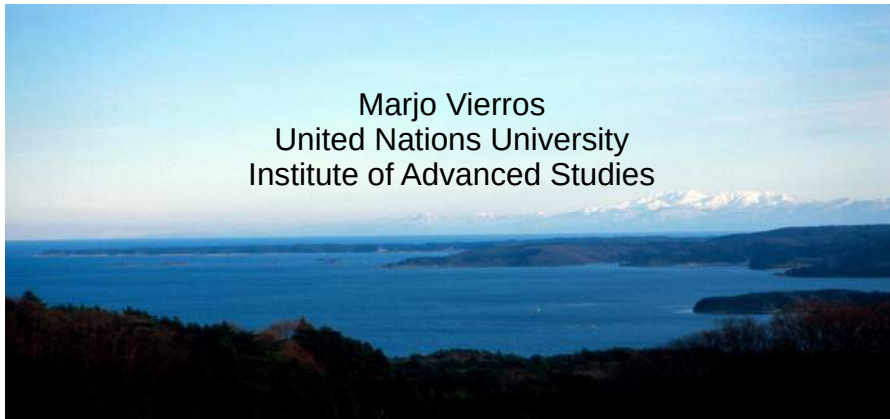
The presentation will discuss the role of satoumi in implementing the Convention on Biological Diversity (CBD) and other biodiversity-related international agreements. Satoumi both as a concept and a management strategy provides a culturally-appropriate method for implementing CBD provisions related to coastal areas, and is similar to other coastal management approaches undertaken around the world. On a very basic level, satoumi is an expression of the CBD ecosystem approach, which is considered the primary framework for action under the CBD. Satoumi's rootedness in traditional ecological knowledge and cultural history also provides a way to implement aspects of Article 8(j) on traditional knowledge, innovations and practices. Finally, satoumi is of particular relevance to the CBD programme of work on marine and coastal biological diversity (decision VII/5). Because these topics, and particularly the ecosystem approach, are central to many biodiversity and fisheries-related regional and global agreements, satoumi also provides a tool for meeting a range of international commitments, and can be used to harmonize implementation strategies.

The presentation will also discuss proposed new directions for satoumi-related research that are in keeping with the continuously evolving needs for implementing the CBD and other international agreements. These research directions include further strengthening the congruence between satoumi and the ecosystem approach by addressing connections between adjacent habitats and species, both upstream and further offshore from the immediate coastal zone. Satoumi also has a role to play in enhancing the ability of ecosystems and coastal communities to adapt to the impacts of climate change. However, the specific methods of how satoumi-related activities can contribute towards this goal may require further research.

Contact Information: Marjo Vierros, United Nations University – Institute of Advanced Studies (UNU-IAS), 6F International Organizations Center, Pacifico-Yokohama, 1-1-1 Minato Mirai, Nishi-ku, Yokohama 220-8502, Japan, Phone: +81-45-221-2300, Fax: +81-45-221-2302, E-mail: vierros@ias.unu.edu

The role of satoumi in implementing the Convention on Biological Diversity

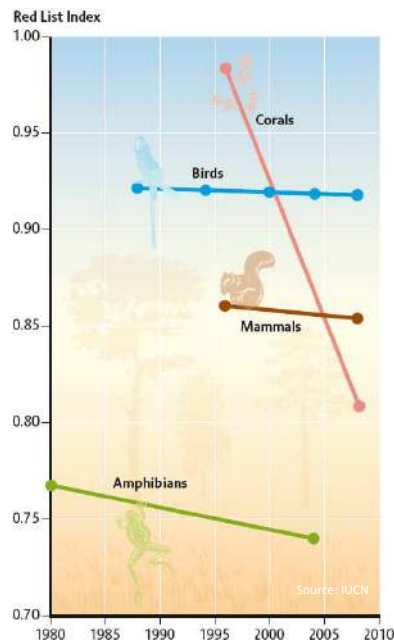
Marjo Vierros
United Nations University
Institute of Advanced Studies



The international context

Why the dialogue on satoumi is important:

- 2010 – International Year of Biodiversity
- The 2010 target to reduce the rate of biodiversity loss globally was not reached – new targets for 2020
- Biodiversity in marine and coastal areas continues to decline worldwide
- Cumulative drivers of biodiversity loss increasing
- Current management activities have not always been successful – need to consider new and innovative approaches



The 3rd Global Biodiversity Outlook (GBO-3) released in 2010:

- Increasing pressures on biodiversity (pollution, climate change, overfishing, ocean acidification...)
- The Red List Index (RLI) for all these species groups is decreasing.
- Coral species are moving most rapidly towards greater extinction risk

The Convention on Biological Diversity (CBD)

- CBD first comprehensive convention to address biodiversity
- Dates from 1st Rio Conference in 1992, almost universal membership
- Objectives: Conservation and sustainable use of biodiversity, equitable sharing of benefits arising from its utilization
- CBD = framework convention
- CBD lays out general provisions, goals and targets (what needs to be achieved)
- Countries implement those provisions in a way that is appropriate for their national circumstances
- **This has often proved to be difficult**

CBD, satoumi and reducing biodiversity loss

- This talk addresses three general areas where satoumi implements the CBD:
 1. Taking into account interconnections between coastal areas, watersheds and oceans, including the people who inhabit them (ecosystem approach)
 2. The need to integrate biodiversity concerns into the work of all economic sectors (mainstreaming)
 3. The need to provide for both conservation and sustainable use, and to take into account the local cultural, social and economic context in management (livelihoods and bottom-up approaches)

Many traditional cultures have a holistic understanding of the coast

- Land, sea, freshwater and atmosphere are interconnected and part of one system. People are also part of this system.
- Northern Australia Sea Country: Mixing of fresh water and seawater (Ganma); Flow of water connects different places and people (Gurruṯu)



Yolngu sea country – livingknowledge.anu.edu.au

Holistic management systems



- Hawaii ahupua'a, Japan satoumi
- Different from western sectoral management
- Ecosystem approach, ICM/IMCAM, integrated watershed management

CBD Ecosystem approach

- Ecosystem approach is the primary framework for action under the CBD
- Described as:

*A strategy for the **integrated management of land, water and living resources** that promotes **conservation and sustainable use** in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. It is based on the application of appropriate **scientific methodologies** focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. **It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.***

- 12 principles, and 5 points of operational guidance

Ecosystem approach and satoumi

Some ways in which satoumi implements the ecosystem approach:

- Recognizes the intricate connections that exist between land and sea, as well as human communities
- Encompasses priorities of different sectors, as well as scientific, cultural and spiritual values
- Implementation generally on community level with government support
- grounded in an understanding of the local socio-cultural context and focuses on restoring ecological services and enhancing livelihoods

The ecosystem approach

- The CBD ecosystem approach recognizes that **there is no single correct way to implement it**, as it as it depends on local, provincial, national, regional or global conditions.
- Methods and tools depend on the specific problem addressed
- Species management programs, habitat restoration, marine protected areas, and fisheries management measures can all be undertaken as components of the ecosystem approach, as needed.

Satoumi and sectoral integration

- Integrating biodiversity concerns into the work of sectors (coastal development, fisheries, shipping) has been a key challenge in implementing the CBD
- Different ministries and organizations have different priorities
- Satoumi is flexible enough to accommodate those priorities
- Implementation of satoumi-related projects provides a mechanisms for sectors to communicate, discuss priorities and work together

Satoumi and CBD provisions on marine and coastal biodiversity

Some ways in which satoumi implements the CBD programme of work on marine and coastal biodiversity:

- Coastal and riverbasin management
- Sustainable fisheries and aquaculture
- Restoration of seagrass beds
- Sharing of costs and benefits: fishermen reforestation of watersheds

Satoumi provides a culturally-appropriate way to implement CBD provisions on coastal and marine biodiversity

Broader international relevance of satoumi

- The role of satoumi in implementing provisions of international conventions goes beyond the CBD
- Ramsar Convention on Wetlands: Wise (sustainable) use of wetlands
- The UN Framework Convention on Climate Change: Provisions related to adaptation
- Others: the UNESCO Man and Biosphere and World Heritage conventions, the Convention on Migratory Species and Regional Seas Conventions.

Some possible future research directions

- Integrating scientific and local (traditional) knowledge in implementation of satoumi
- Linking satoyama and satoumi
- Extending satoumi further offshore
- Satoumi and adaptive management

Integrating scientific and local knowledge

- Satoumi relies on a high level of scientific research and monitoring
- At the same time, the local knowledge of fishermen and coastal communities is also respected
- Integrating science (numerical and data-based) with local knowledge (anecdotal and qualitative) is difficult, and is a subject of much interest internationally

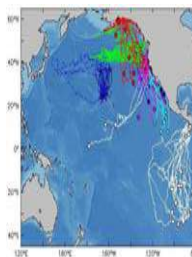
Creating connections between satoyama and satoumi in management



- Satoumi is based on an understanding of the connections between the land and the sea
- Thus, activities undertaken through satoyama affect satoumi areas further downstream
- Understanding these intricate connections, and coordinating management approaches is important for the success of satoumi

Extending satoumi further offshore

- Fish and other marine species migrate from coastal areas to further offshore during different stages of their life history
- Thus, the success of satoumi also depends on being able to extend or link management of coastal areas to those further offshore
- Dealing with this challenge may require different methodologies and data collection



Tagging of Pacific Predators (TOPP) project, UCSC

Satoumi in a time of change

- Management of natural resources is always undertaken in a context of uncertainty (there is never enough data)
- We are also facing unprecedented challenges with future climate change
- How can satoumi help coastal ecosystems and human communities become more resilient to impacts of climate change?
- How will satoumi practitioners learn from their experiences (both successes and failures) and adapt their management approaches as needed (adaptive management)?

In closing...

- Satoumi is a culturally appropriate way to implement provisions of the CBD and other international conventions
- While more work is still needed, satoumi shows great promise as a tool to achieve more resilient coastal ecosystems and human communities
- The lessons from its application should be widely shared, both nationally and internationally

THANK YOU!

Early Detection of Coastal Ecosystem Response to Management Actions

Catherine E. Wazniak¹, Carol McCollough¹, Walter Boynton², Matthew Hall¹ and Eva Bailey²

¹Maryland Department of Natural Resources Tidewater Ecosystem Assessment Program, Annapolis, MD, USA

²University of Maryland Chesapeake Biological Laboratory, Solomons, MD, USA

The ability to detect ecosystem response to management actions is the goal of coastal monitoring programs. Moreover, the ability to detect change early is needed as a valuable assessment tool for managers. Typical methods to evaluate ecosystems include trend analyses and current status of conditions. Trend analyses require many years of data collection and often a high magnitude of change to be significant. Status analyses often rely on established thresholds levels, and a change in category, either better or worse, requires sizeable changes in concentration in relation to these thresholds. Therefore, an indicator of integrated ecosystem response that can track changes and respond in a timely fashion is a valuable tool. This presentation compares results from the Maryland Coastal Bays standard status and trend analyses to new signal of change techniques, including CUSUM and duration of dissolved oxygen criteria exceedances. The CUSUM technique allows for the detection of change from the long term mean in a variety of nutrient and water quality parameters collected monthly. Duration of DO criteria exceedances are calculated from *in situ* continuous monitoring data and allow for evaluation of habitat conditions. The combination of these two techniques shows improving conditions that have not yet been detected in standard status and trend analyses. In the case study presented, conditions in Bishopville Prong, a tidal tributary to the St. Martin River in the Maryland Coastal Bays watershed, are showing improvement based on the new methods, although the status (degraded) and trends show no change. This ability to show improvement in habitat conditions sooner is important to managers, to demonstrate to policymakers and stakeholders that management actions are producing positive effects that may not be readily observed using standard methods.

Contact Information: Catherine Wazniak, MD-DNR, TEA, 580 Taylor Avenue D-2, Annapolis, MD 21401 USA,

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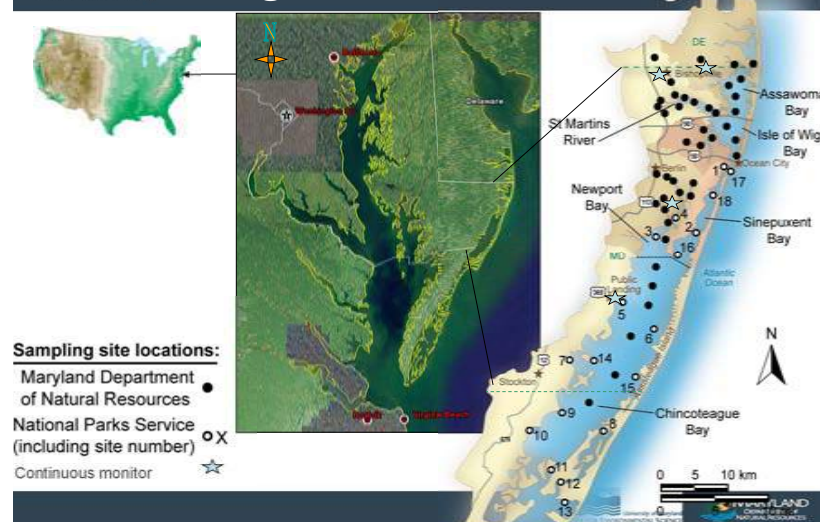
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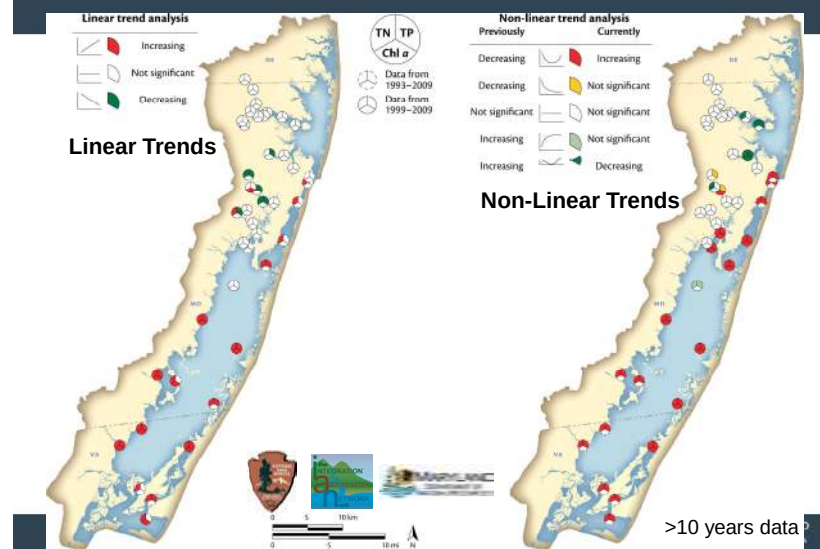
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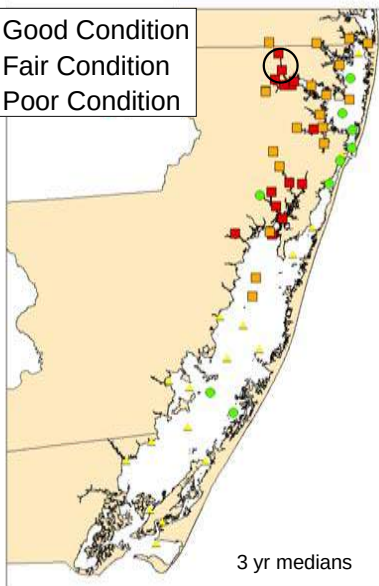
Satoumi



Many areas have no trend



- Good Condition
- ▲ Fair Condition
- Poor Condition



Current Status

Water quality index (chl, DO, TN, TP) show areas with no trends are degraded.

3 yr medians



Bishopville Management Actions

1989	removal of Selbyville WWTP, Del
1992	Little land use change after 92
1997 - 2002	sewer hookups in Selbyville additional 26,000 gpd (~87 edu @300g per edu)



Two methods to track ecosystem

- Cumulative sum, Cusum, of nutrients
- Dissolved oxygen criteria assessment



CuSum analyses

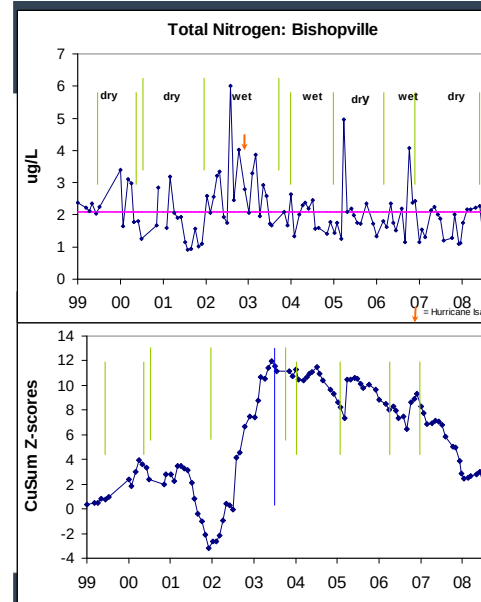
A technique for detecting the magnitude and timing of changes in means within an extended time series.

A change in the underlying mean will be reflected as a simultaneous change in the slope of the CuSum graph.

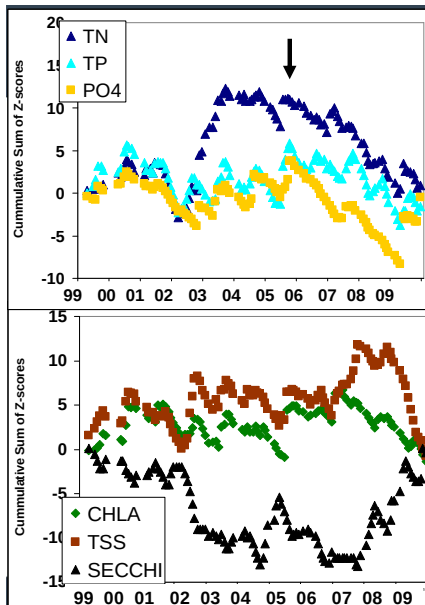


Benefits of the CuSums approach

- Match anthropogenic changes / activities to inflection points or trends
- Match climatological events / trends to inflection points or trends
- Identify potential drivers within watersheds.



Cusums indicate improvement Bishopville Prong

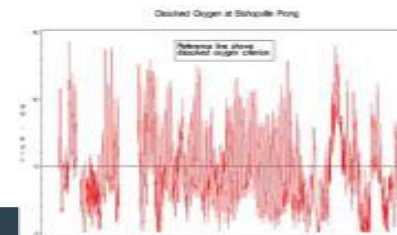


- Not all parameters show improvement

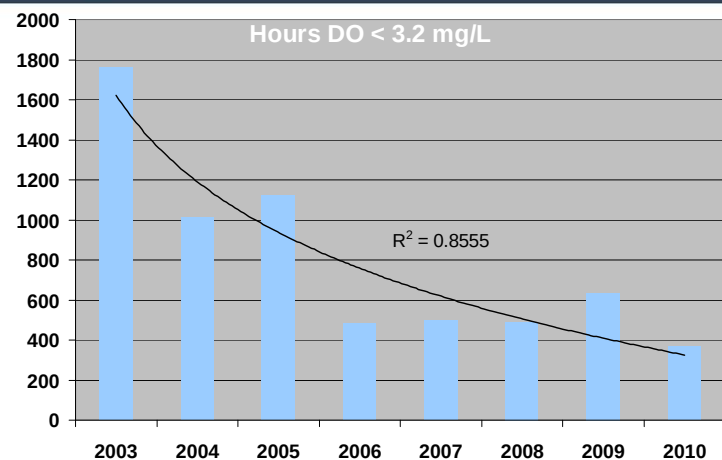


Dissolved Oxygen Assessment

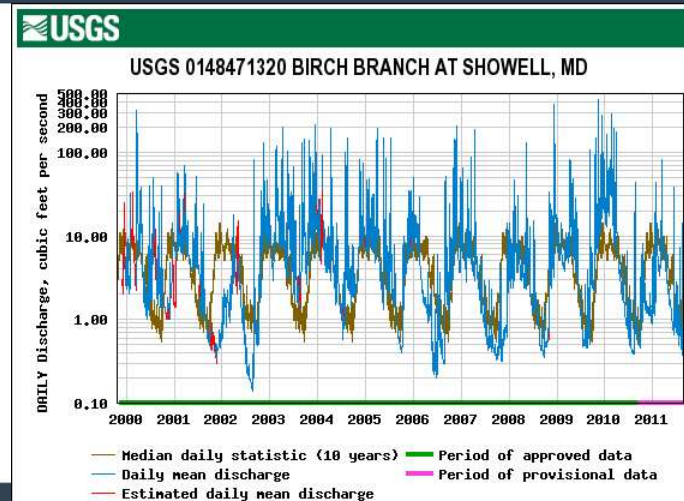
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Early sign of improvement

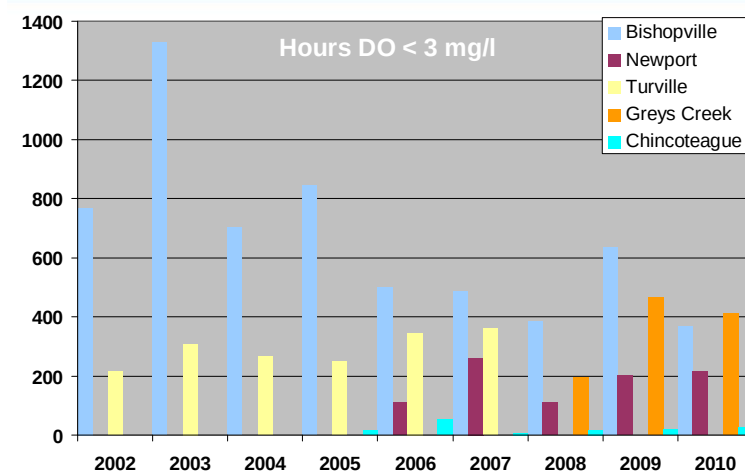


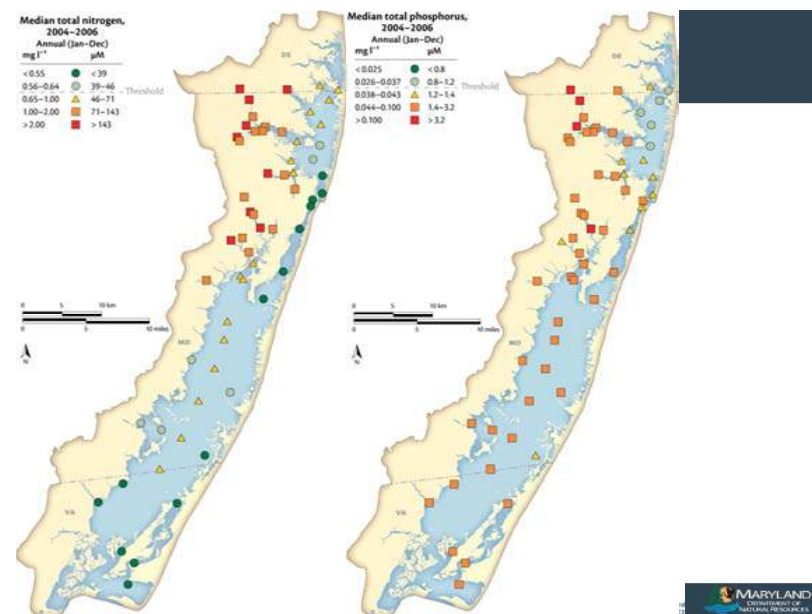
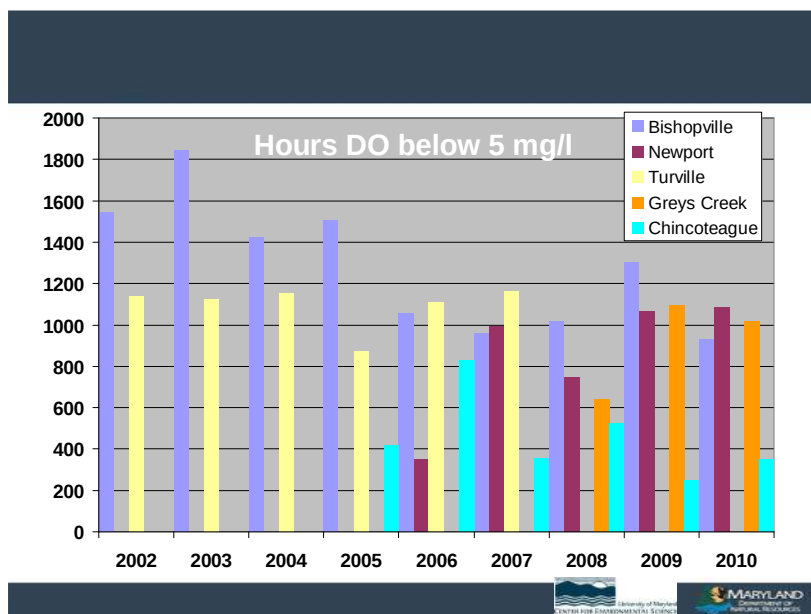
Changes not related to flow



Summary

New techniques show potential improvement.





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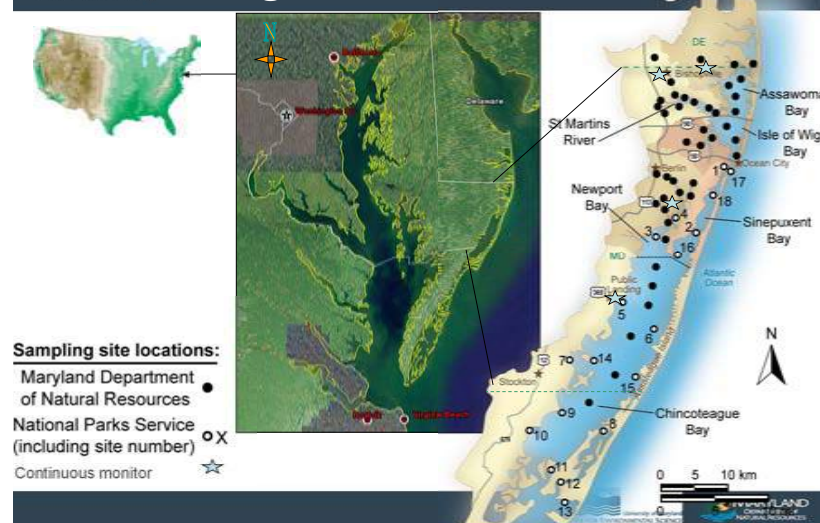
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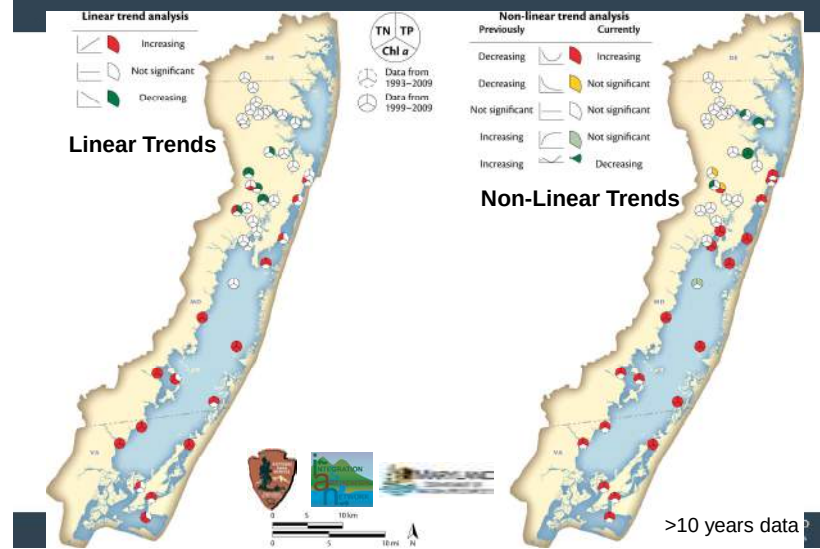
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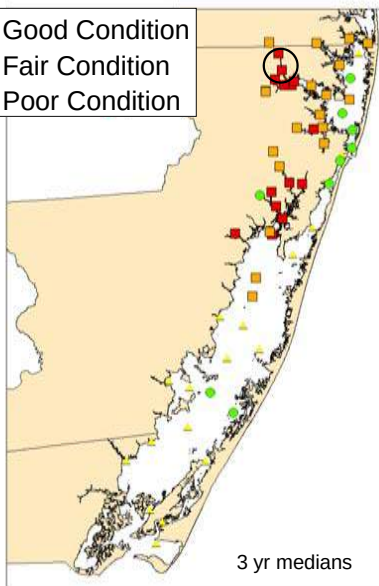
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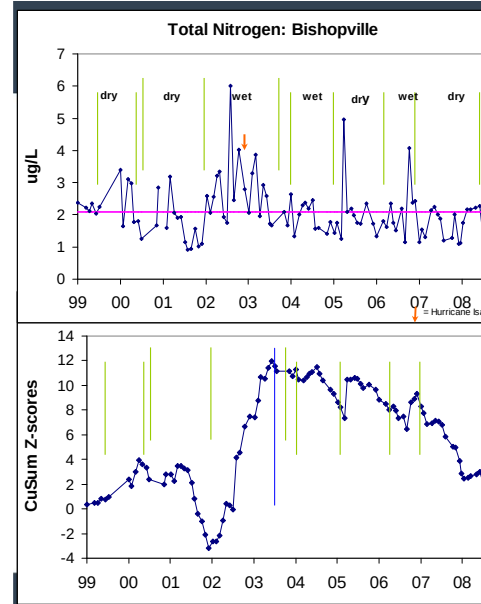
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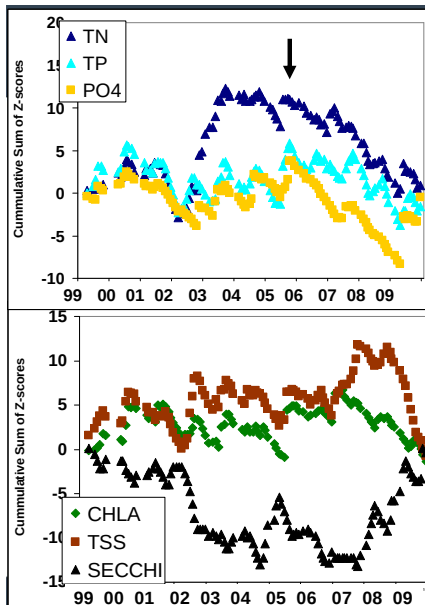


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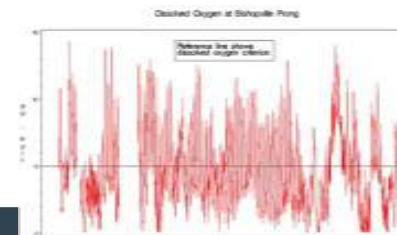


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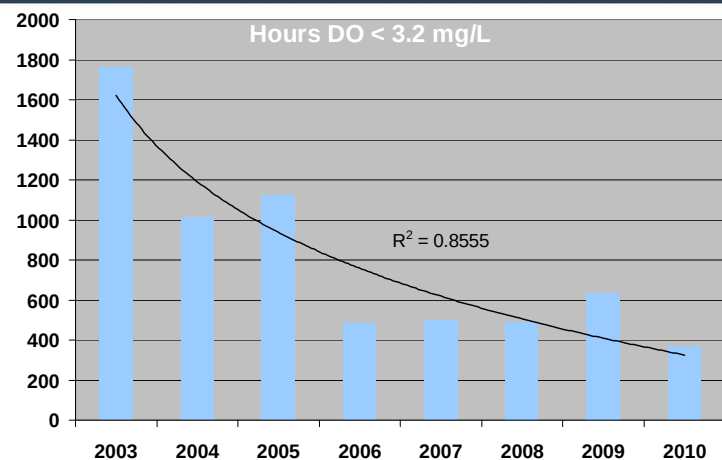


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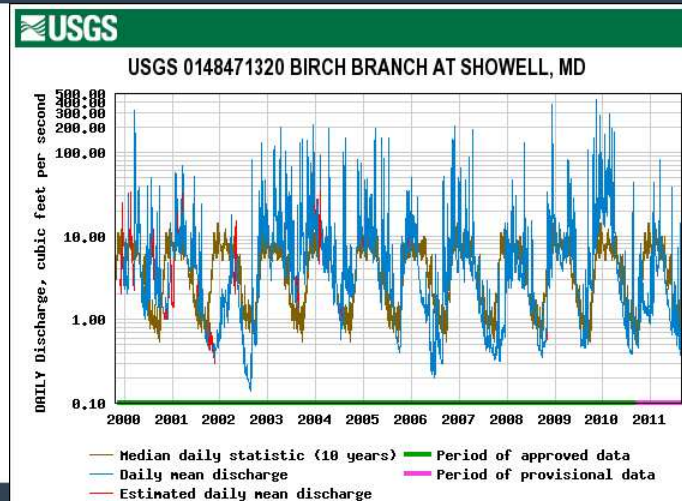
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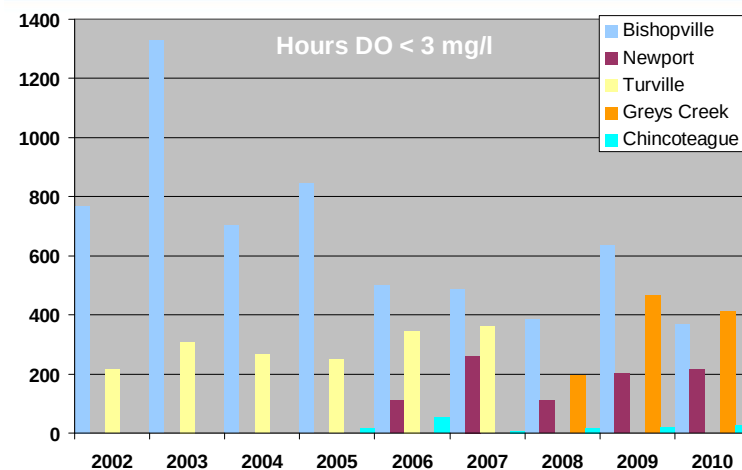


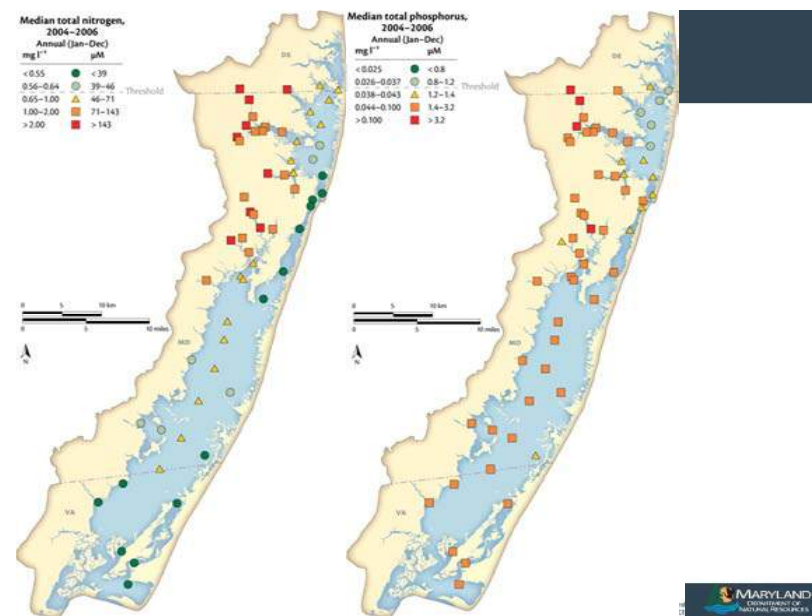
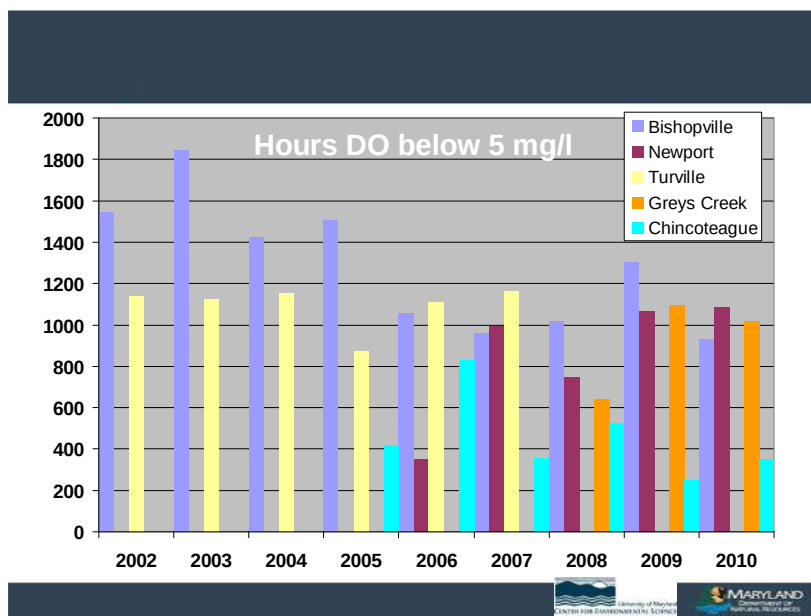
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