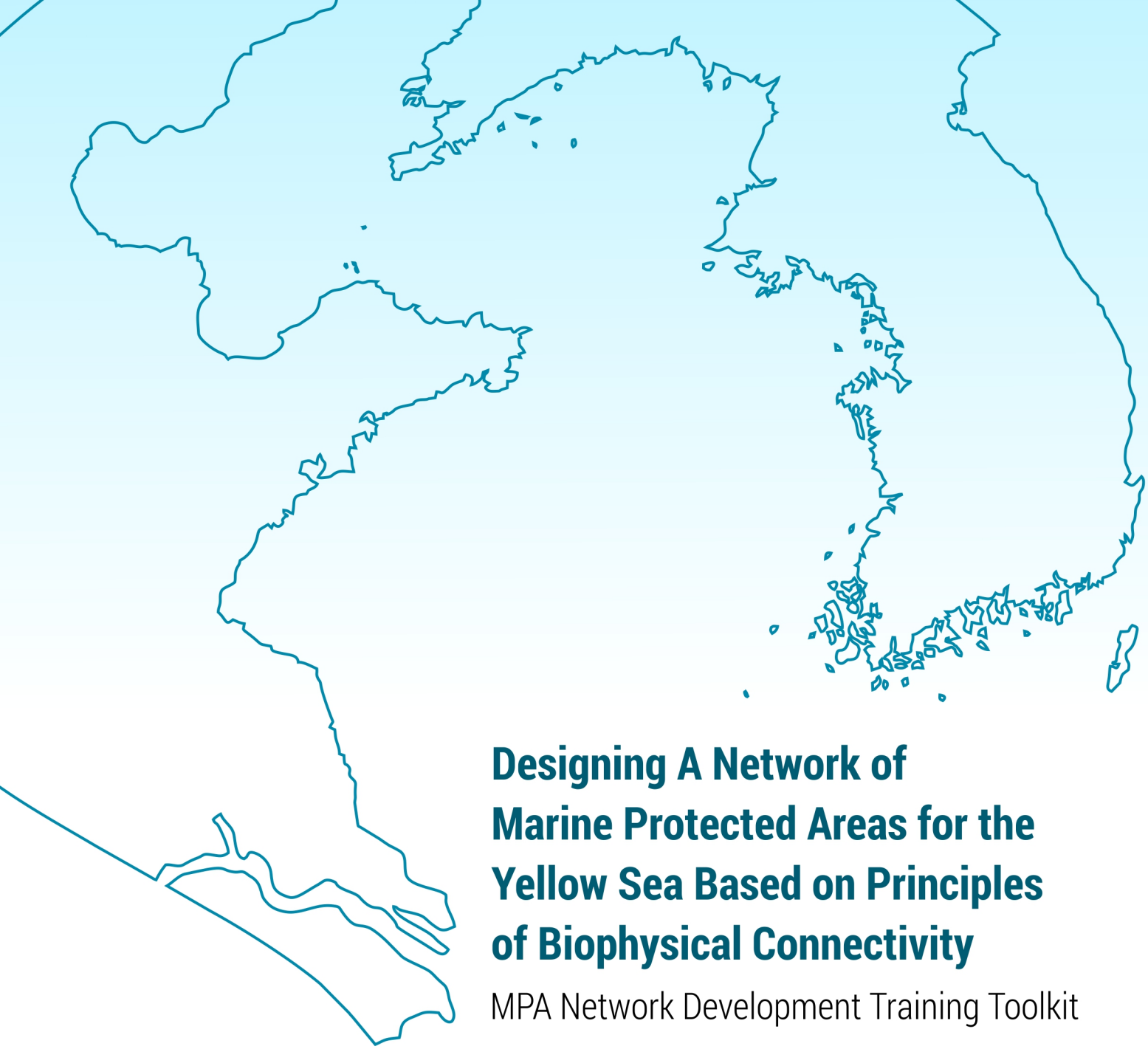

Designing A Network of Marine Protected Areas for the Yellow Sea Based on Principles of Biophysical Connectivity

MPA Network Development Training Toolkit

Prepared by
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Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem: Restoring Ecosystem Goods and Services and Consolidation of a Long-term Regional Environmental Governance Framework (UNDP/GEF YSLME Phase II Project)

Designing a Network of Marine Protected Areas for the Yellow Sea based on Principles of Biophysical Connectivity
MPA Network Development Training Toolkit

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Preface

UNDP/GEF has provided assistance to countries bordering the Yellow Sea in support of their efforts to address among others the increasing trends of depleting fishery stocks, loss of coastal wetland, land and sea-based pollution and implementation of the Yellow Sea Large Marine Ecosystem Strategic Action Programme (YSLME SAP) adopted by China and RO Korea. One of the assistance programs to implement the SAP is the UNDP/GEF/UNOPS project entitled Implementing the Strategic Action Programme for the Yellow Sea Large Marine Ecosystem: Restoring Ecosystem Goods and Services and Consolidation of a Long-term Regional Environmental Governance Framework, or the UNDP/GEF YSLME Phase II Project. The objective of this regional project is to achieve adaptive ecosystem-based management of the Yellow Sea Large Marine Ecosystem bordered by China and RO Korea by fostering long-term sustainable institutional, policy and financial arrangements for effective ecosystem-based management of the Yellow Sea in accordance with the YSLME SAP. The four components of the project are sustainable national and regional cooperation for ecosystem-based management and improved ecosystem carrying capacity (ECC) with respect to provisioning services, regulating and cultural services, and supporting services.

Under the Outcome of "MPA network strengthened in the Yellow Sea", the project would support a series of activities leading to the expansion of the MPA system that will take into account connectivity measured by use of the developed connectivity toolkit or other means, and increase in management effectiveness of existing MPAs.

In line with this Outcome, the YSLME Project Management Office organized the 1st regional workshop on designing a network of MPAs for the YSLME in Seocheon, RO Korea, on 23-27 July 2018 sponsored by the National Marine Biodiversity Institute of Korea. Attended by more than 30 representatives from 17 research institutes, universities, NGOs, regional organizations and local governments of PR China, RO Korea and the United States of America, the workshop was congratulated in person by Mr. Kwan-jin KIM, Deputy Director of Marine Ecology Division of Marine Policy Office, Ministry of Ocean and Fisheries of RO Korea; Dr. Jin Yong CHOI, Executive Director of the Marine Conservation of Korea Marine Management Corporation (KOEM); and Dr. Sun-Do HWANG, President of the Marine Biodiversity Institute of Korea (MABIK). The five-day workshop was facilitated by Ms. Rocio Lozano-Knowlton of MERITO Foundation of the United States of America.

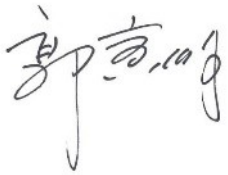
The training workshop was designed to help participants better design a network of MPAs in Yellow Sea by improving their capacity and skills in the following areas:

- Understanding the added value of scaling up to MPA Networks;
- Understanding the biophysical elements and tools required to design ecologically connected and functional MPA networks;
- Articulating the objectives for the YSLME MPA Network
- Understanding the status of knowledge of and data gaps for the three-representative species;
- Vulnerability Assessment of the 3 representative species and habitats;
- Risk Assessment for MPAs;
- Management options for addressing impacts;
- Managing capacity assessment;
- Establishment of a framework for the YSLME MPA Network;
- Site selection criteria for the network;
- Overview of GIS decision making tools;

- Consolidating a roadmap for designing the MPA Network; and
- Consolidating a roadmap for making the YSLME MPA Network operational.

This toolkit contains the theories, steps, and processes for designing a functional MPA Network for the YSLME presented and utilized during the technical workshop.

I wish to thank Ms. Rocío Lozano-Knowlton, Executive Director of MERITO Foundation, and Ms. Anne Walton, former Director of NOAA ONMS International MPA Capacity Building Program for jointly designing the training workshop and consolidating the training materials into this toolkit. I also wish to extend my sincere thanks for Dr. Sangjin Lee, Environmental Economist of YSLME Phase II Project, and Ms. Sunyoung Chae of KOEM of RO Korea for coordinating the participation and contribution of resource persons of various organizations leading to the succest of the Workshop. It is hoped that with their valuable help this toolkit can provide a consolidated framework for MPA practitioners and associated working groups within and beyond the YSLME Phase II Project to continue to collaboratively establish a functional network of MPAs based on biophysical connectivity contextualized to the YSLME. Furthermore, we also offer it as a useful reference to MPA practitioners, managers, researchers and students in countries bordering the Yellow Sea and of other large marine ecosystems who wish to increase management effectiveness of MPAs through developing them into ecological, management and social networks.



Yinfeng Guo
Chief Technical Adviser and Manager
UNDP/GEF YSLME Phase II Project

How to use this Toolkit:

- The toolkit is divided in five (5) sections, each section reflects the information, best practices or case studies presented through slides, handouts, worksheets and posters used during the 1st technical workshop of July 23-27, 2018 to gather information and bring consensus among participants regarding the various aspects of MPA Network design for the YS.
- **The text in dark red** are guiding notes for the facilitator of future technical workshops such as what the slide represents, or how to connect concepts or provide case studies.
- **Text in blue makes cross-reference** to the findings, information or conclusion gathered or agreed upon the participants of the 1st technical workshop in July 2018.
- Each day's section includes a summary of what will be accomplished that day, duration required for the day's workshop, objectives of the day, competences needed from the participants, and recommended reading or videos.
- Embedded into the pages of this toolkit are all the blank worksheets, handouts and posters referred in the slides.
- The number in the right indicates the slide number for each day's presentations.
- A dark grey line demarks the end of a slide.

Table of Contents

DESIGNING A NETWORK OF MPAS FOR THE YELLOW SEA BASED ON THE PRINCIPLES OF CONNECTIVITY – WORKSHOP OVERVIEW

July 23, 2018 ◆ Seocheon, Republic of Korea

Spotted Seal: Philagraphicon *Illustration of Spoon-billed Sandpiper: Planet of Birds* *Yellow Croaker Illustration: AliExpress.com*

Slide 1

KEY CHALLENGE: How to get from general principles to practical actions that go beyond the establishment of single or groups of MPAs to an operational MPA network in the Yellow Sea.

Slide 2

OPENING SESSION

1. *Welcome by host organizations*
2. *Introduction*
3. *Overview of YSLME project*
4. *Overview of the structure and content of the workshop*

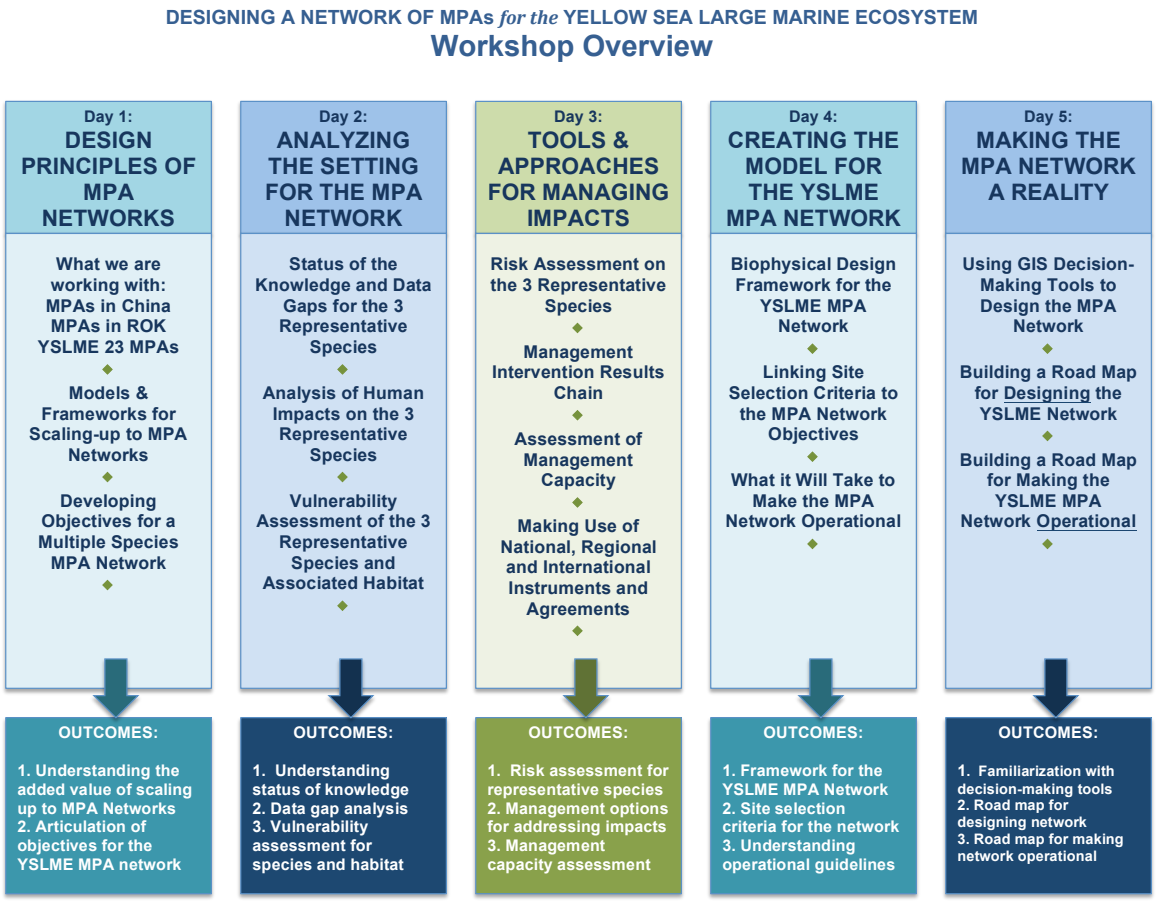
Photo of Songdo Tidal Flat: Korea.net

We will start the morning with a welcome by our host organizations.

After the first 3 items on the list above are completed, see the next slide for the 4th item: "structure and content of the workshop". Talk about this, or about the Workshop Overview poster shown on the next slide.

Slide 3

Poster 1.1 Workshop overview

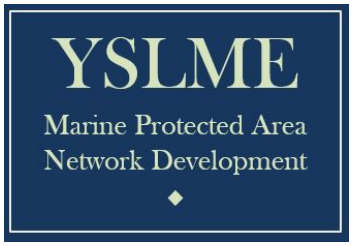


The facilitator walks participants through this poster so they can see the content they will be covering. Explain how this is an interactive, participatory process. The work they generate from the workshop will help inform the selection of sites for the network. It is hoped that the outcome from the workshop will be that they have done enough preliminary analysis and have a deep enough understanding of all the considerations for creating an effective MPA network based on connectivity. However, this is an interim step, and a network will not actually be designed as that will require broader engagement and input by the stakeholder community.

Note: Keep this poster on the wall and refer to it first thing each day, so they don't get too lost in all the process steps. Review where they have been, and then what they will be covering during the new day.

Slide 4

DAY 1: Design Principles of MPA Networks



Summary of Day 1 (July 23, 2018):

Day 1 establishes the workshop context and format. The main goals and outcomes of Day 1 are the creation of an inventory of MPAs in the Yellow Sea (YS) already established by the governments of China and RO Korea, and understanding of their status, types of MPAs, and what do they protect, articulation of the first draft of SMART objectives and a big picture of the YSLME MPA Network. The information about existing MPAs and the three indicator species must be presented by experts of each country and species. The draft SMART objectives will be refined on Day 4. Prior to that, participants will look at what information was made available during the rigorous study undertaken and published by WWF, KORDI and KEI in March 2006. Specifically, at the 23 proposed priority areas (PPAs) for Conservation of the YS Ecoregion, and what kind of information was gathered that can be useful now for the establishment of the YSLME MPA Network. After reviewing all the working pieces, participants will have more information about the three indicator species that will be worked with (Yellow croaker, Spotted seal and Spoonbill sandpiper) and representatives of each country and experts of each indicator species work together to articulate SMART objectives of the YSLME. To reach a common understanding and agreement of the foundation components of the YSLME MPA network from the perspective of protecting three species.

Objectives of Day 1:

1. To provide the context and format for the workshop in order to manage anticipated outcomes for the workshop
2. To develop an initial understanding and assessment of the process for how the 23 sites were selected, and what criteria or direction was used for selecting these sites
3. To develop a familiarization with the types and effectiveness of existing MPAs in China as an orientation to how they might contribute to the YSLME network
4. To develop a familiarization with the types and effectiveness of existing MPAs in RO Korea as an orientation to how they might contribute to the YSLME network.
5. To provide an early-on opportunity for the species-specific groups to conduct a quick analysis of what is missing from the mix in regard to the YSLME MPA Network.
6. To become familiar with the need to establish clear guidelines, goals, objectives and criteria all specific to the intended outcome of the MPA network and creating results that are greater than that of a single MPA.
7. To start to think about the defining elements of the YSLME network and what they might look like based on the successes (and challenges) of other models of practice.

8. To reach a common understanding and agreement of the foundational components of the YSLME MPA network (big picture framework) among the workshop participants, from the perspective of protecting three different representative species of concern and other relevant objectives needed to ensure success of the network
9. To explore and understand how to build the basic framework for designing an MPA network based on biological connectivity, with grappling with the complexity of using three different focal species, plus the generalist group.

The main outcomes of the first day of the YSLME MPA Network Design 1st technical workshop of July 23, 2018 in Seocheon, RO Korea, were the presentation and shared knowledge of Mr. Linlin Zhao, of the First Institute of Oceanography of China (SOA), and Mr. Tae-Cheol Jang from KOEM, RO Korea, with regard to the inventories (type, number and purpose) of existing MPAs in the Yellow Sea by each country. Another very important outcome was the background information provided by Ms. Young Rae Choi of Florida International University regarding the 23 Potential Priority Areas (PPAs) identified during a very comprehensive study in 2006 of areas worthy of conservation measures by WWF, KIOST, KEI and YSLME. Ms. Choi's presentation highlighted the areas that were identified as PPAs within the YS and that are close to existing MPAs. His presentation also remarked the conservation criteria and status of the three indicator species given during the study.

Duration of Day 1 Technical Workshop: 8.5 hours including 2 hours for coffee breaks and lunch

Competencies needed:

Presentations 1.1, 1.2, & 1.3 must be given by experts or authors of the Yellow Sea Ecoregion Study of 2006, and MPA Management Agencies of China and ROK respectively. They must be experienced and knowledgeable of the past and current situation and management of China's and RO Korea's MPAs and they were provided with a presentation template in advance of workshop.

Further reading:

WWF, Korea Ocean Research and Development Institute (KORDI), and Korea Environment Institute (KEI). 2006. 'Yellow Sea Ecoregion, A global treasure, a global responsibility'. Japan Fund for Global Environment and UNDP/GEF Yellow Sea Project. 12 pp.

Slide 5

PRESENTATION & ASSESSMENT 1.1: Review of the 23 Recommended YSLME PPAs

To provide some context on the work that has already been done, the first presentation will be on the 23 recommended YSLME PPAs. Before we get started, please pull out worksheet 1.1 (next slide).

Slide 6

Worksheet 1.1 YSLME PPA Network Assessment

Please use this worksheet to capture the important points about the PPAs that have already been identified by the YSLME project. This presentation will be 30 minutes long, with an opportunity for a 15-minute Q&A. You can fill out the worksheet during the presentation.

WORKSHEET 1.1: YSLME PPA Network Assessment

Please make notes on this worksheet during the YSLME PPA Network process presentation. It is important to capture as much information as possible as we will be conducting a preliminary gap analysis on MPAs missing from the network later in the morning. If you do not have expertise in regards to one or more of the representative species, and are not sure how to answer the questions specific to that species, please feel free to leave it blank.

TOPICS COVERED DURING PRESENTATION	NOTES FROM PRESENTATION	
	China	RO Korea
1. Number of MPAs by Country:		
2. How many of these MPAs are included in the 23 sites recommended by YSLME?		
3. What are the <u>overall objectives</u> for the YSLME MPA Network (big picture)?	a.	
	b.	
	c.	

4. Describe key steps in the <u>process</u> the participants went through to make a determination of the location, size and distribution of the 23 PPAs:	a.	
	b.	
	c.	
	d.	
	e.	
	f.	
5. What was the <u>criteria</u> or guidance provided to select each of the 23 PPA sites?	a.	
	b.	
	c.	
	d.	
6. How many PPAs were selected to protect each of the categories of representative species (by country)?	a. migratory birds	a. migratory birds
	b. marine mammals	b. marine mammals
	c. fish	c. fish
7. Given what you might know about the <u>Spoon-billed Sandpiper</u> which of the following are covered by some or all of the 23 PPAs:	a. □ Key places where life history stages take place are included (ecologically important areas)	b. □ Key habitats associated with life history stages are included
	c. □ Important migratory pathways or stopovers are included	d. □ Sites selected to address priority human impacts on this resource
8. Given what you might know about the <u>Spotted Seal</u>, which of the following are covered by some or all of the 23 PPAs:	a. □ Key places where life history stages take place are included (ecologically important areas)	b. □ Key habitats associated with life history stages are included
	c. □ Important migratory pathways or stopovers are included	d. □ Sites selected to address priority human impacts on this resource
9. Given what you might know about the <u>Yellow Croaker</u>, which of the following are covered by some or all of the 23 PPAs:	a. □ Key places where life history stages take place are included (ecologically important areas)	b. □ Key habitats associated with life history stages are included
	c. □ Important migratory pathways or stopovers are included	d. □ Sites selected to address priority human impacts on this resource

Slide 7

PRESENTATION & ASSESSMENT 1.2: Overview of China's Existing MPAs in the Yellow Sea

Now we would like to hear from China about their existing MPAs (gazetted) in the Yellow Sea. Again, pull out worksheet 1.2 to capture some of the key points about these MPAs that will be relevant to our analysis on how they might be incorporated into the YSLME network. (Next slide to show worksheet).

Slide 8

Worksheet 1.2 Assessing Existing MPAs in the Yellow Sea

WORKSHEET 1.2: Assessing Existing MPAs in the Yellow Sea

Please make notes on this worksheet during the country presentations.

Country: ☐China ☐South Korea

TOPICS COVERED DURING PRESENTATION	NOTES FROM PRESENTATION
1. Total number of MPAs in the Yellow Sea	
2. Overall, what kind of geographic distribution (in clusters, coastal, offshore, or any other geographic pattern)	a.
	b.
	c.
	d.
	e.
	f.
3. Purpose and need for different types of MPAs (why were these places designated as MPAs, what was the driver)	a.
	b.
	c.
	d.
	e.
	f.
4. Types of designations (RAMSAR sites, National Parks), or classifications based on national standards for protected areas.	a.
	b.
	c.
	d.
	e.
	f.
5. Target species, habitats or other natural resources that are the focus of protection by the MPAs	a.
	b.
	c.
	d.

You can see at the top that you will need to check the China box, then answer questions during the presentation. The presentation should be 30 minutes long, with an opportunity for a 15-minute Q&A.

PRESENTATION & ASSESSMENT 1.3: Overview of RO Korea's Existing MPAs in the Yellow Sea

Much as we have done with the China MPAs, we will now hear about the existing Republic of Korea MPAs using same worksheet 1.2, just check mark South Korea in (go to next slide).

WORKSHEET 1.2: Assessing Existing MPAs in the Yellow Sea
Please make notes on this worksheet during the country presentations.

Country: ☐China ☐South Korea

TOPICS COVERED DURING PRESENTATION	NOTES FROM PRESENTATION
1. Total number of MPAs in the Yellow Sea	
2. Overall, what kind of geographic distribution (in clusters, coastal, offshore, or any other geographic pattern)	a.
	b.
	c.
	d.
	e.
	f.
3. Purpose and need for different types of MPAs (why were these places designated as MPAs, what was the driver)	a.
	b.
	c.
	d.
	e.
	f.
4. Types of designations (RAMSAR sites, National Parks), or classifications based on national standards for protected areas.	a.
	b.
	c.
	d.
	e.
	f.
5. Target species, habitats or other natural resources that are the focus of protection by the MPAs	a.
	b.
	c.
	d.

This is the same worksheet you used while listening to the China presentation, but now check the South Korea box at the top. Again, the presentation will be 30 minutes long, with an opportunity for a 15 minutes Q&A.

IDENTFYING THE GAPS AMONG THE COLLECTIVE MPAs

In the Yellow Sea

- ✓ Connectivity optimization
- ✓ Key stages/places of life history of representative species captured
- ✓ Replication of ecological (biophysical) features that support the health of the species
- ✓ Adequate number of viable sites included

Top photo: Birds Korea, Jan van de Kam
Flyway Map: Mike Regan

Bottom photo: Korea Expose

Now that we have had an overview of the range of MPAs on both the China and RO Korea sides of the Yellow Sea, as well as the YSLME proposed protected areas, we are going to conduct a very preliminary gap analysis to see what is missing from the mix. This is preliminary because we still have much analysis to do, but if there are some obvious sites for inclusion or exclusion from the mix – or some types of sites missing altogether based on the above parameters, then this is a good time to capture that information while these last three presentations are fresh in our minds. Let's discuss the four points above.

Slide 12

EXERCISE 1.1: Preliminary Gap Analysis of Existing MPAs

Our next exercise is the gap analysis.

Slide 13

EXERCISE 1.1: Preliminary Gap Analysis of Existing MPAs

Objective: *To provide an early-on opportunity for the species-specific groups to conduct a quick analysis of what is missing from the mix in regard to the YSLME MPA Network.*

Activity:

1. Break into 3 species-specific teams.
2. Review worksheets 1.1 and 1.2.
3. Collectively, fill out worksheet 1.3 as a preliminary gap analysis on whether the selection of existing MPAs provides adequate coverage for the maintenance of healthy, viable populations of your representative species.

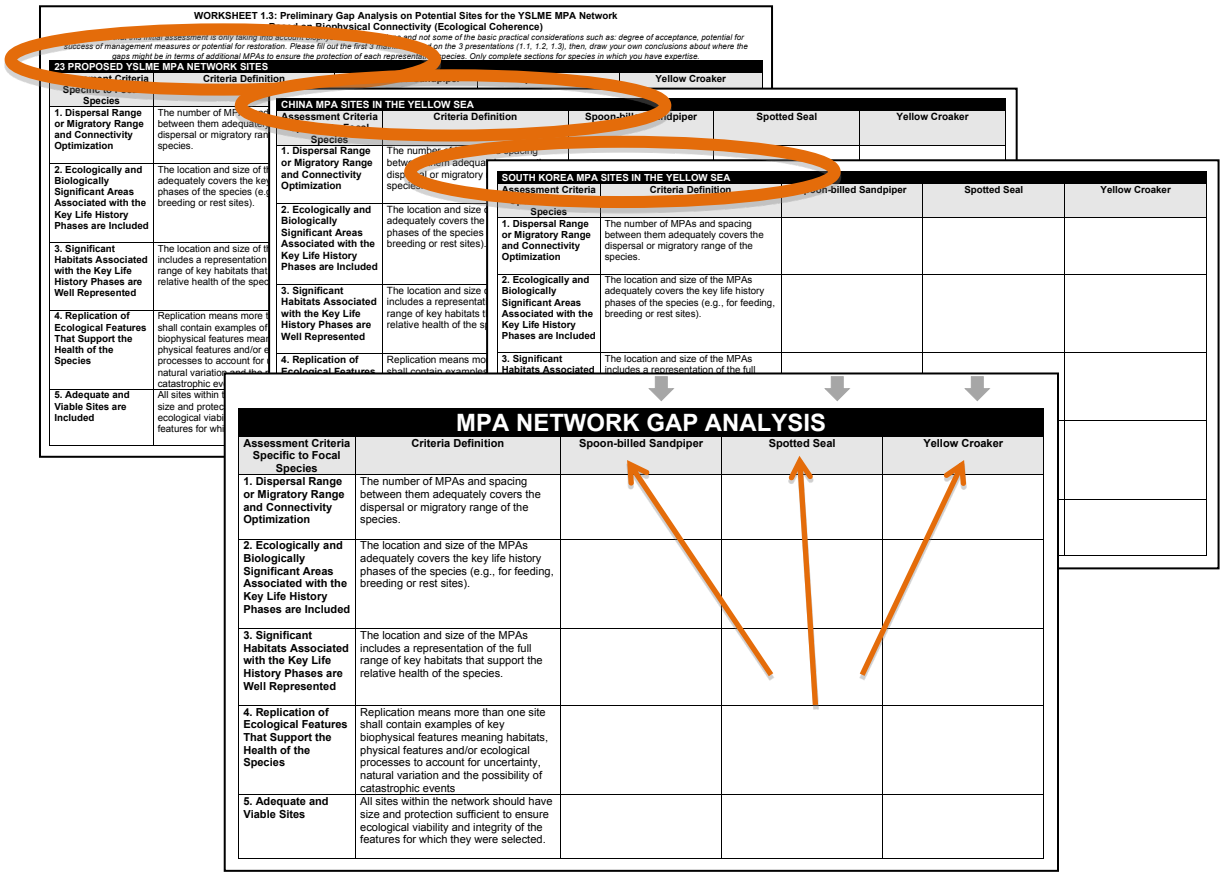
Time: *45 minutes*

Note: *This should be a quick and dirty assessment as this will be revisited on Day 4 and 5.*

Walk them through the instructions, then show them the worksheets in the next slide.

Slide 14

Worksheet 1.3 Preliminary Gap Analysis



Please pull out worksheets 1.3. (there are four parts to this worksheet). You will see that these worksheets are already set up as a progression. Since you will be in your "species" groups, just conduct your analysis based on your species of concern. Afterwards, we will debrief and see what you came up with, comparing between the three groups what the gaps look like at this time.

Slide 15

VIDEO:

Marine Protected Areas:

A Success Story – Perspectives on Ocean Science (available on YouTube)

University of California Television

Show this video after lunch, note it is 57 minutes long and determine how much you want to show.

Slide 16

PRESENTATION & INTERACTIVE SESSION 1.4: Scaling up From Individual MPAs to Networks of MPAs

This morning we have been primarily focusing on individual MPA sites and trying to assemble them into an MPA network. In many MPA networks around the world, this is how they have commonly moved towards creating a network – working with the individual MPAs that are already in place and trying to knit them into some kind of cohesive network. However, now with the experience of time, we have learned how to be more intentional with the network design process in order to achieve the kind of results that can be amplified by an MPA network versus a bunch of individual sites.

Slide 17

A Marine Protected Area (MPA) is:

Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment (IUCN (International Union for Conservation of Nature), 2008)).

This IUCN definition for MPAs is really mostly focused on "what" is being protected, a place-based approach to MPAs.

Slide 18

Handout 1.1 MPA Network Terms and Definitions


HANDOUT 1.1.docx

MPA Designation Prerequisites:

- ✓ *Recognized authority to designate MPAs*
- ✓ *Recognized authority to manage MPAs*
- ✓ *Recognized authority to implement zones and regulations*
- ✓ *Recognized authority to enforce MPA*
- ✓ *Recognized authority to implement management plan*

. . . But that is only half of the equation. The MPA has to have a legal basis, and management has to have the legal authority to actually manage the resources AND have the tools to be effective.

Slide 19

Ecosystem-based Management:

- *Ecosystem functions:* ecological process within or between ecosystems
- *Ecosystem or ecological integrity:* ecosystem ability to house or maintain a living community over the long term
- *Ecosystem health:* stability of an ecosystem, resilience to stress
- *Ecosystem services:* what an ecosystem can offer to humans

Building off the IUCN definition we saw a couple of minutes ago, over the decades of creating MPAs, we started to realize that single species management is not really as effective as taking an "ecosystem-based management" approach. ASK PARTICIPANTS: In your own words, what does ecosystem-based management mean to you? Let's break this down and see what "ecosystem approach" might mean – go through sub-definitions in slides. THEN ASK: What do you think some of the challenges of ecosystem-based management might be? Then go to the next slide.

Slide 20

EBM Recognizes that Ecosystems are Dynamic and Inherently Uncertain:

- *Management must move from reactive to proactive style which requires on-going scientific analysis and adaptive management.*
- *Research has to re-orient itself to view the ecosystem as a whole.*
- *Risk assessments of management choices must be reviewed regularly and adapted to new information.*
- *Multiple sector uses and impacts must be viewed cumulatively and not in isolation.*
- *The ultimate aim is to maintain the ecosystem as it naturally occurs – not to adapt it to human needs, but to enable it to accommodate an acceptable level of human use.*

(IUCN (International Union for Conservation of Nature), 2008)

As you can see, ecosystems are dynamic and changing – full of uncertainty. Discuss the points in this slide, and before going to the next slide ask:

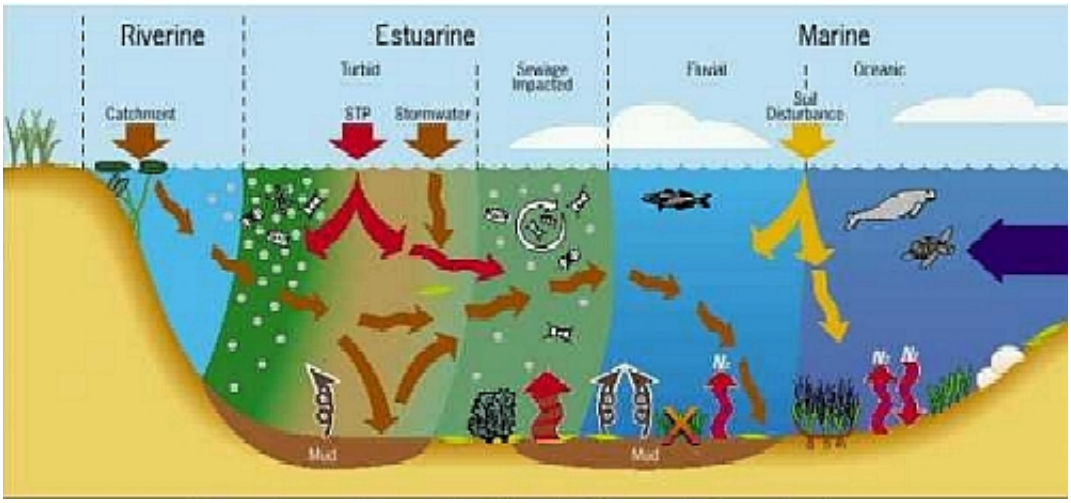
Why is this concept of "protecting ecosystems" a challenge for MPA managers"? Talk about this and go to next slide.

Slide 21

Handout 1.2 Designing principles for MPA Networks

Ecosystem-based Management Challenges:

- ✓ *boundaries are difficult to determine*
- ✓ *can never encompass all relevant processes*
- ✓ *boundaries may change seasonally or over time*



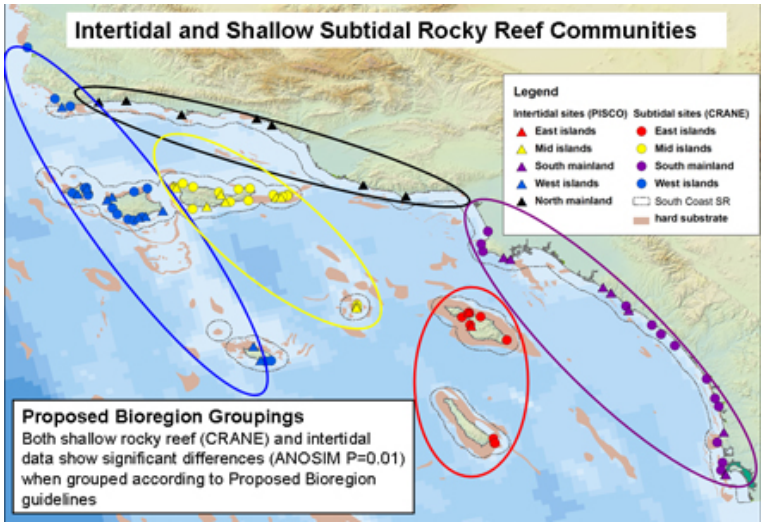
Ecosystem-based management is still less than a perfect approach, and certainly has its limitations creating challenges for MPA managers if they really want to be effective.

Slide 22

Defining MPA Network

An MPA network is a system of individual marine protected areas:

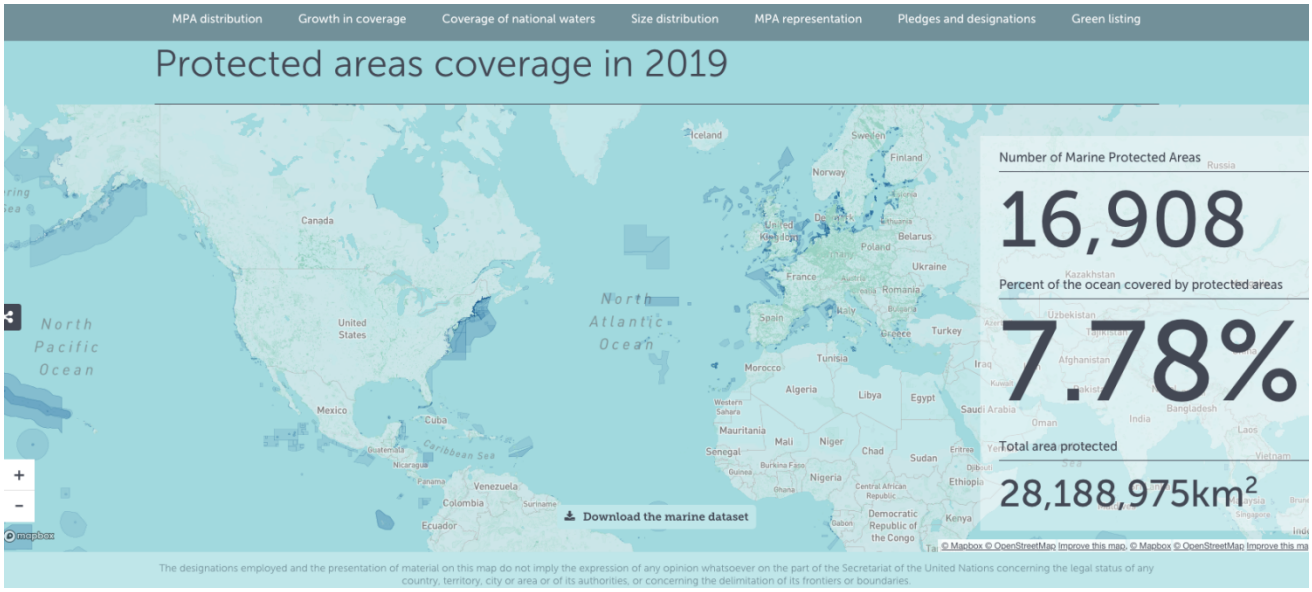
- *Defined by connectivity;*
- *Operating at various spatial scales;*
- *With a range of protection levels;*
- *That fulfill management goals and objectives more effectively than individual sites could alone.*



From the concept of ecosystem-based MPAs emerges the idea of building “networks” of MPAs – a grouping of discreet sites spread out over an area but linked or “connected” by providing protection to critically important places within a larger ecosystem.

Slide 23

What is the added value of scaling up from individual MPAs to a network of MPAs? **What is the difference?**



Source: https://www.protectedplanet.net/marine#distribution

ASK: what do you think the value of an MPA network is over individual sites? Why are we moving towards an MPA network in the Yellow Sea when there are already so many MPAs spread all over the area? Looks like we are all thinking in the same way about the benefits on MPA networks.

Slide 24

What can we hope to achieve by scaling up?

A well-designed network will help:

- *Stem the loss of marine resources and recovery of entire ecosystems*
- *Magnify benefits of individual sites*
- *Protect large-scale processes*
- *Slow the loss of endangered marine species, and other resources*
- *Restore depleted fisheries*
- *Engage multiple stakeholders*
- *Benefit from other site's experiences*

Slide 25

Types of MPA Networks:

- *Social Networks*
- *Biophysical or Ecological Networks*
- *Management-based Networks*

Since we have been talking about the concept of "ecosystem-based management" as the springboard for moving towards MPA networks, let's not get stuck on the idea that MPA network site selection is only about the biophysical side of the equation. We also have to consider the social and management benefits of moving towards the network model.

Slide 26

Social Networks Provide an Opportunity to:

- *Open channels of communication to share experiences and lessons learned*
- *Shared and joint capacity building*
- *Institutionalize administrative and financial mechanisms*
- *Takes into consideration the human community and cultural aspect side of MPAs*

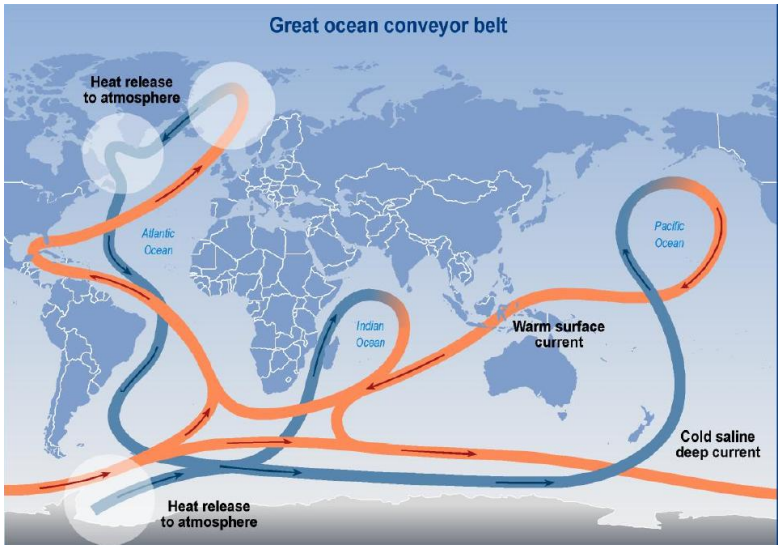
Source: barnraisers

Let's take a look at these three underlying principles behind MPA networks, starting with the social side. QUESTION: What do you think the social advantages of an MPA network might be?

Slide 27

Ecological Networks Based on:

- *Geomorphology & bathymetry (structure & features)*
- *Current circulation*
- *Transition zones of major biogeographic regions (critical nesting, nursery and feeding grounds)*
- *Linkages between ecosystems (corridors)*
- *Migratory corridors*
- *Life history ranges and associated habitats*



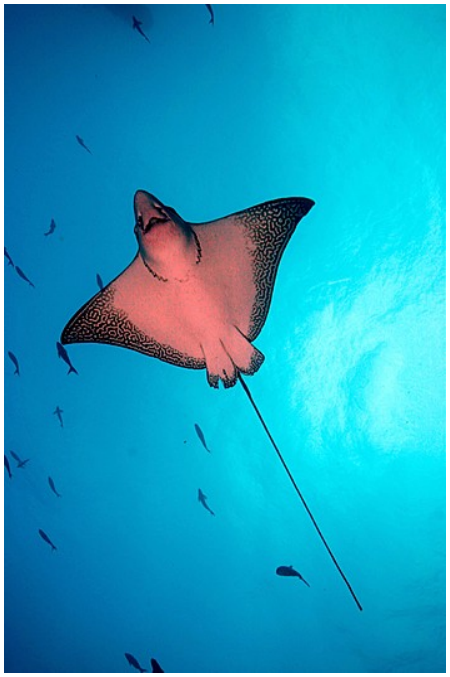
QUESTION: Can you think of other ways to define an ecological network of MPAs?

Slide 28

Management-based Networks:

- *Incorporates concepts of social and ecological networks*
- *Consistency in program development*
- *Consistency in regulatory development*
- *Common approaches to addressing priority resource management issues*
- *Integrated management*

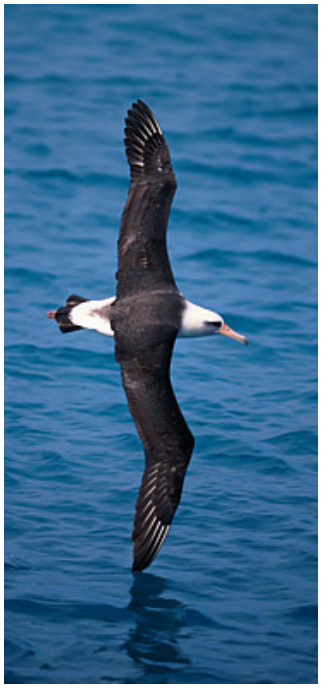
QUESTION: What do you think might be the value from a management standpoint in creating a network of MPAs? Go to next slide which is also on management.



Slide 29

Management-based Networks:

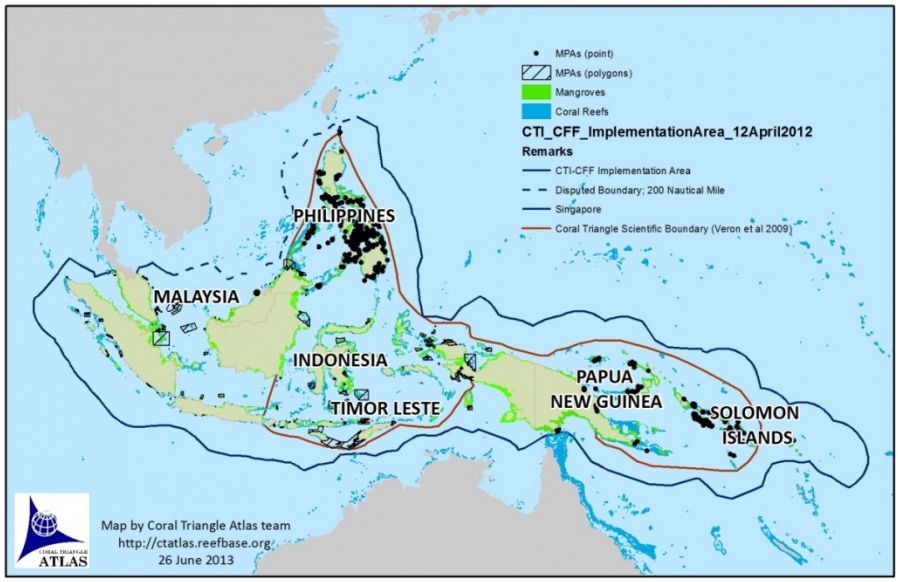
- *Increased efficiency, consistency and coordination to improve management effectiveness*
- *Prevent duplication of effort*
- *Build collective management capacity within network*



Slide 30

What does an effectively-managed MPA Network look like?

A collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection.



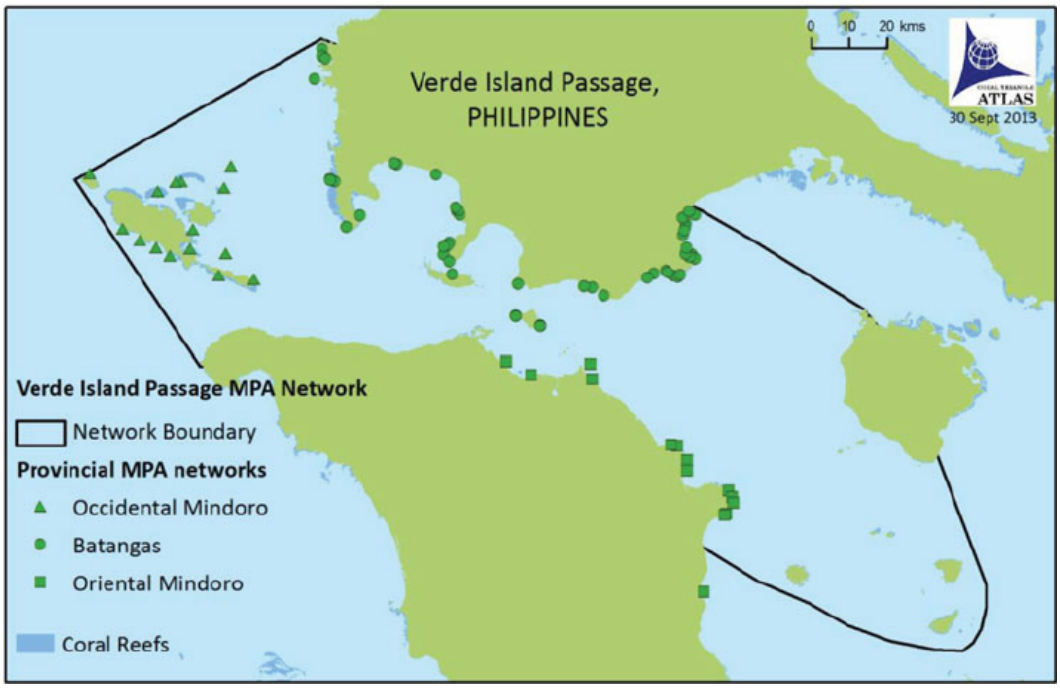
Thinking beyond the design process for creating the MPA network, they also have to be managed in a cooperative manner. We will talk more about the management side in a couple of days.

About 3,000 MPAs originally established in 6 countries were called a network so they worked to re-define it, and also creating a social learning network.

Slide 31

What is an MPA Network?

Not just any collection of MPAs can be called a network.



Let's take a look at some of the design concepts and principles. You can't just take a smattering of MPAs across a seascape and assume that they can be considered a "network". This map shows an example of the Verde Passage MPA network that was intentionally designed based on biophysical connectivity (connectivity through currents), as well as social connectivity – site selection based on communities that had acknowledged the need for additional protection of fisheries resources. Another element was that the communities were interested in engaging in co-management of the sites – thereby becoming a governance or management factor, not just co-management, but that the choice of sites allowed for them to be managed and governed using a similar model. There was a common governance framework. This network is now part of the Coral Triangle Initiative (CTI).

Slide 32

What is an MPA Network?

Not just any collection of MPAs can be called a network.

- ✓ *They must interact in some meaningful manner to meet management, social and/or conservation objectives of the network*
- ✓ *An MPA network is also a network of people*

As seen from the Verde Passage example, the connection between sites has several aspects to it.

Slide 33

PRINCIPLE: *ecologically* REPRESENTATIVE *network*

We are going to get more specific here and look at some of the considerations behind these principles. For instance, what does it mean when we say we are designing an "ecologically representative" network?

Slide 34

PRINCIPLE: *ecologically* ***REPRESENTATIVE*** *network*

DEFINING FOCUS OF NETWORK*: all ecosystems and habitats?*

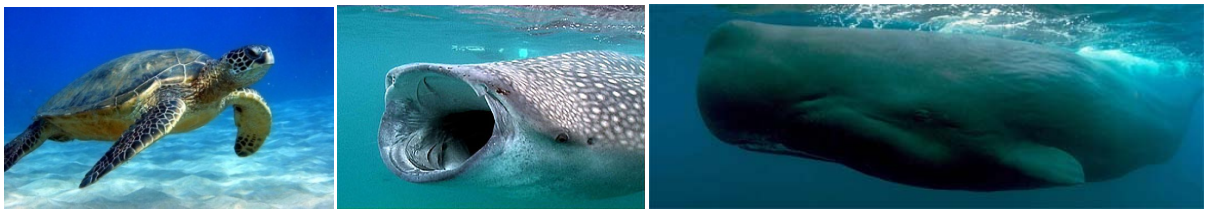
What exactly are we trying to protect?

Slide 35

PRINCIPLE: ecologically <u>REPRESENTATIVE</u> network

DEFINING FOCUS OF NETWORK:

- All ecosystems and habitats?
- Critical habitat for threatened or endangered species?



Slide 36

PRINCIPLE: ecologically <u>REPRESENTATIVE</u> network

DEFNING FOCUS OF NETWORK:

- *All ecosystems and habitats?*
- *Critical habitat for threatened or endangered species?*
- *Areas important for vulnerable life stages?*

Slide 37

PRINCIPLE: ecologically REPRESENTATIVE network

DEFINING FOCUS OF NETWORK:

To protect important life stages/history stages of fisheries resources

RESULTS OR BENEFITS:

- Increase in population of fisheries resources
- Increase in protein source
- Increase in income
- Sustainable management

We need to be specific about our focus for our MPA network BEFORE we design the network and start selecting the appropriate sites. In this example, we see that that our focus is to protect the most vulnerable life history stages of fisheries resources. The benefits we get from that are not only biological (population size), but also have social and management implications.

Slide 38

PRINCIPLE:

- Ecologically REPRESENTATIVE network

DEFINING FOCUS OF NETWORK:

- Areas important for vulnerable life stages
- For fisheries resources

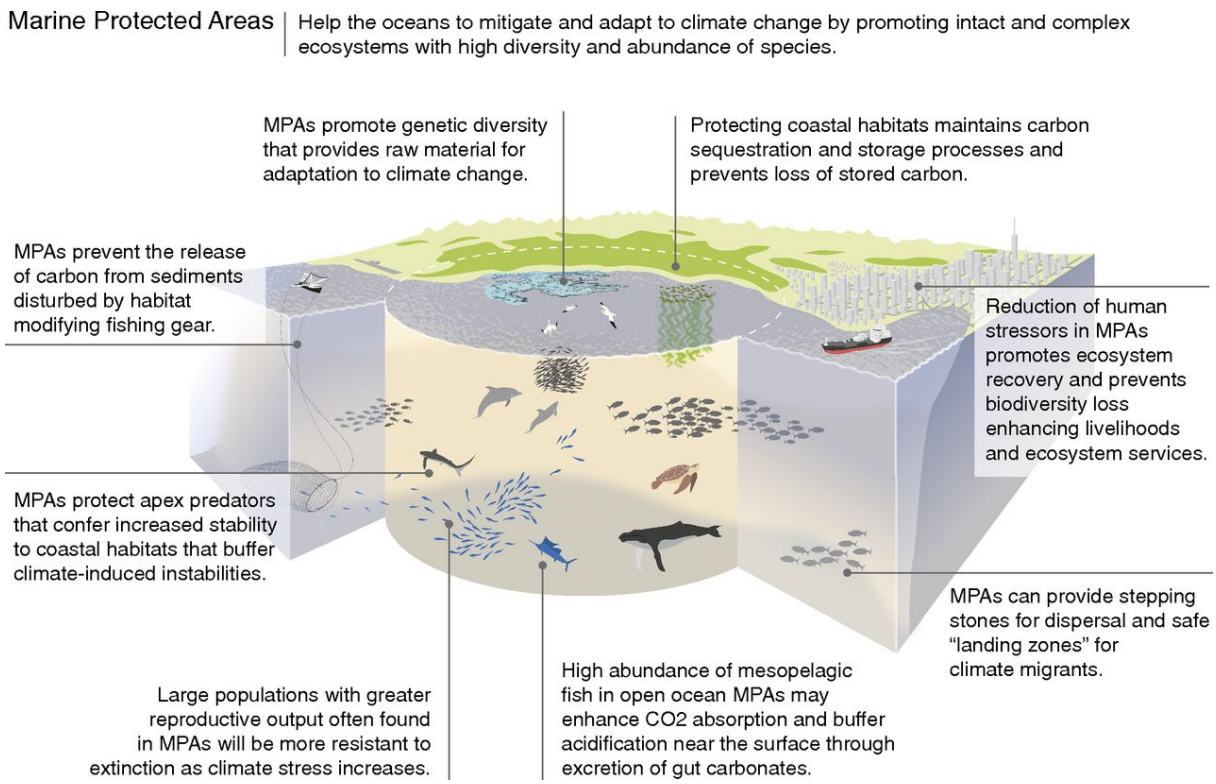
RESULTS OR BENEFITS:

Ecological, social, management

SITE CRITERIA

So what we are doing here is setting up the "design" framework for the YSLME MPA network. Once we get clear about the principle, focus of the network and results we are looking for, then we can develop the site criteria – but that piece is still a few days away from now.

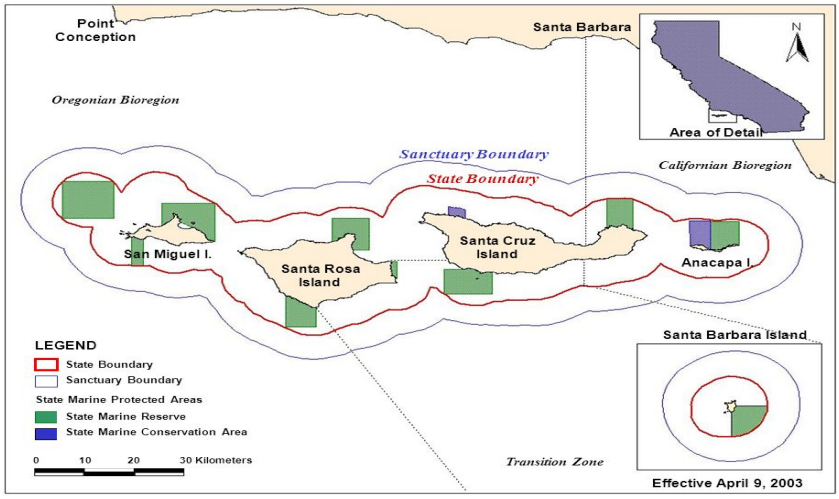
Slide 39



Source: marine-conservation.org, Roberts et al.

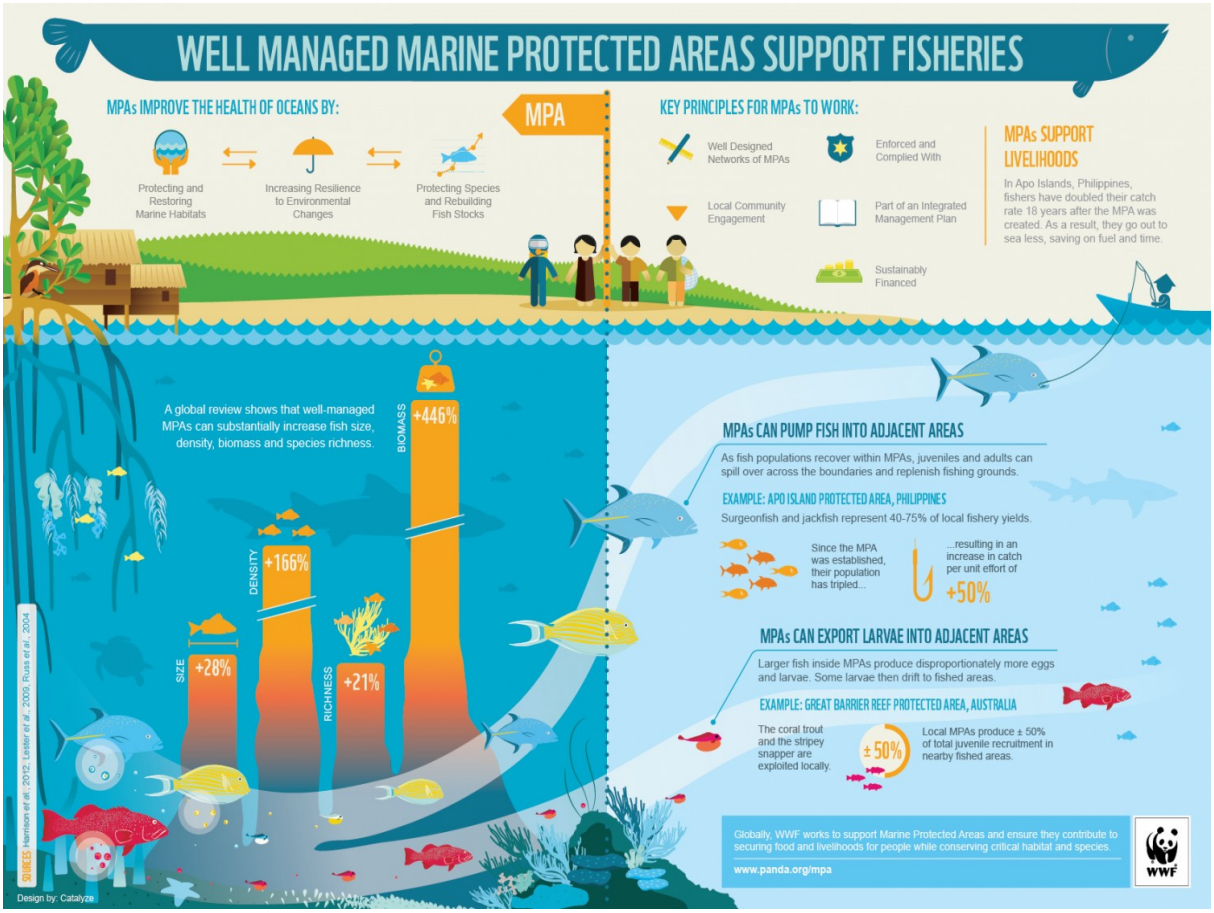
Let's look at this process through a series of visuals. MPAs can be created to achieve a whole lot of different kinds of results, as you can see from this illustration from Roberts, et al (Marine-Conservation.org).

Slide 40



This is an example of the Channel Islands National Marine Sanctuary – located in a transition zone between two bioregions. They created this network of protected areas specifically to address commercial fish species decline. The design process (which took 8 years) was based on input from stakeholders (users of the area) and government agencies and informed by the science generated by a scientific panel. The objectives were biophysical, social and management based. Because site selection was based on clearly articulated objectives (for which there was ultimately some trade-offs), on which the size, distribution and location of the sites were located.

Slide 41



After 15 years in place, along with both biological and socioeconomic monitoring and enforcement programs in place, these are the kinds of results that can be realized from a well-planned network (www.panda.org/mpa).

Slide 42

These are some of the incremental steps that are important to designing an effective and results-based MPA network. Are they big enough? Are they close enough? Are they representative enough? Are they numerous enough? Are they well protected/managed/enforced? (wildlifetrusts.org/mczfriends).

Slide 43

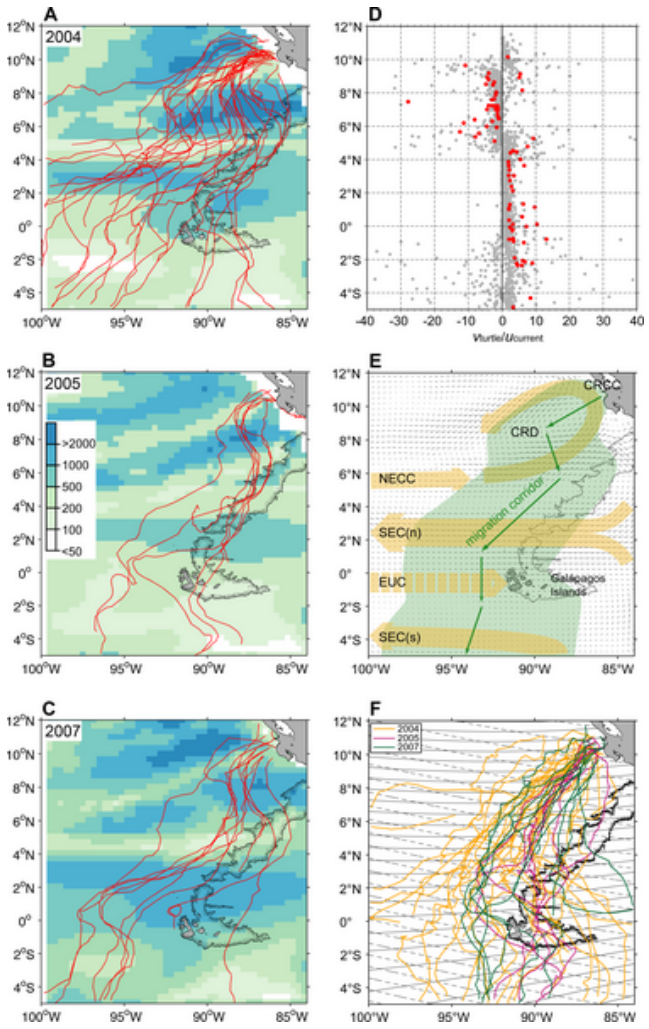
CONNECTIVITY

Now let's talk about the YSLME MPA network and connectivity – a principle that has already been identified with this network.

Slide 44

What about biophysical <u>connectivity</u>?

MPA network design should seek to maximize and enhance the linkages among individual MPAs, groups of MPAs within a given ecoregion, or networks in the same and/or different regions.

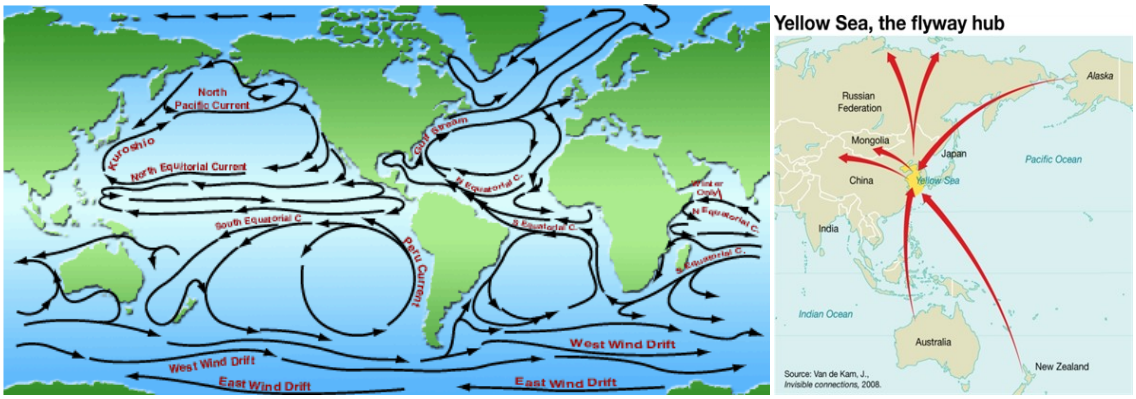


We have already talked a bit about the concept at different scales, particularly given the fact that we are working with three very different representative species. Because we are working with three groups of MPAs (China's, RO Korea's and 23 PPAs) what is the connectivity between these three groups?

Slide 45

What about biophysical connectivity?

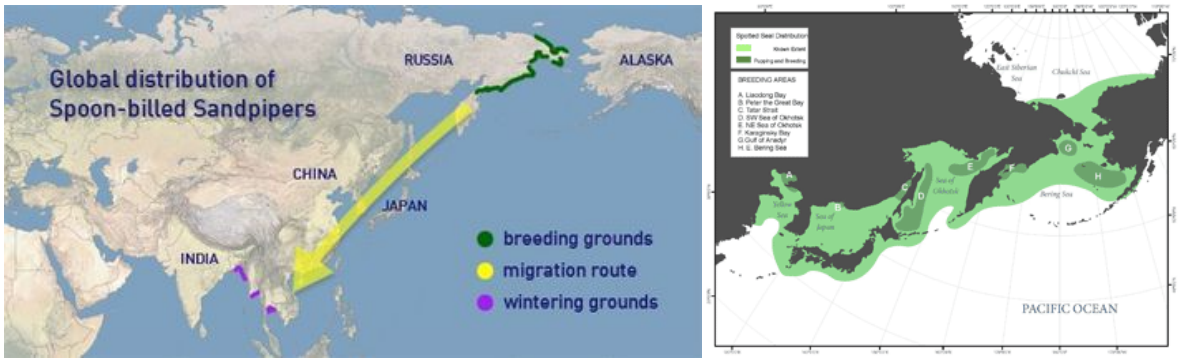
MPAs in a network that interact through ecological and oceanographic linkages enhance the ecological function of and benefits to each.



This is looking at connectivity at a very macro level – much as you would for migratory birds or marine mammals. The image on the right shows the flyway hub, looking at a very large-scale connectivity.

Slide 46

What about biophysical connectivity?



- *Large migratory species can have ranges of 1,000's km;*
- *Pelagic fish, e.g., blue fin tuna, hundreds to several thousand km;*
- *Smaller fish & bottom dwelling invertebrates – 1 to 100s km*
- *Sessile species – can be <1 km*

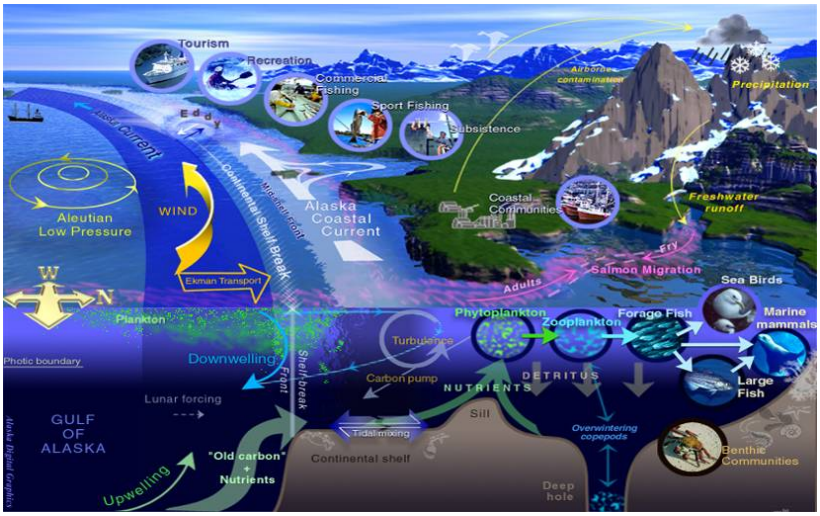
Can we really expect to manage a species at this scale? There is a very macro o very micro analysis approach depending on the species.

Source: birding247

Slide 47

What about biophysical <u>connectivity</u>?

Apply available information on biological, chemical & physical linkages within the network & beyond.



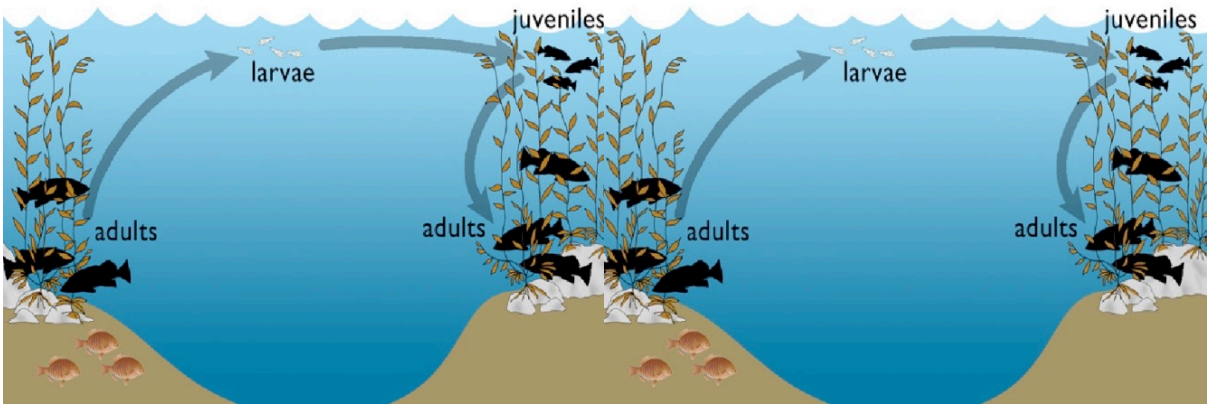
Factor in the impacts from outside the network, e.g., terrestrial linkages to coastal watershed catchments.

Looking at connectivity at this scale, we also need to think about influences, impacts and events outside of our MPA network and how they might impact the species we are trying to protect. What kind of information might you need to design the network?

We have to understand what is happening in the larger scale that affects the area and species.

Slide 48

What about biophysical connectivity?



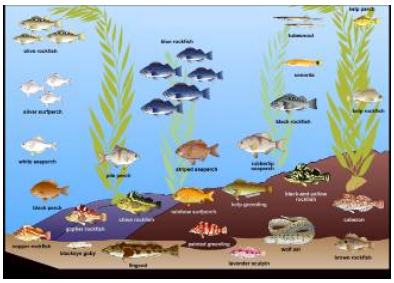
Connectivity may also allow for movement of marine life from one habitat to another during different life stages

Let's go to a more micro scale and look at the life history of fisheries resources and associated habitats. What does connectivity look like at this scale? And what kind of information do you need to design the network?

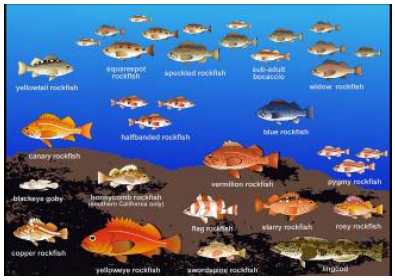
Also, what are the human use impacts? Just like during the macro scale but likely less types of human use impacts at smaller scales.

Slide 49

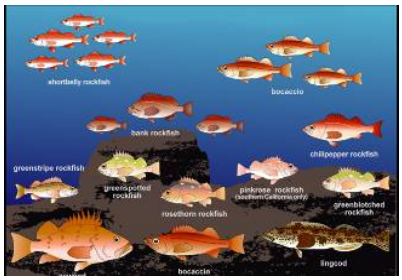
What about biophysical connectivity?



0 – 30 m



30 – 100 m



100 – 200 m

Connectivity may also allow for movement of marine life from one habitat to another during different life stages

What the scale and scope of that means, varies significantly by species.

Slide 50

CONNECTIVITY

Scale & Scope

As we talk about connectivity, we are really asking some important questions about scale and scope.

Slide 51

PRESENTATION 1.5: Models and Frameworks for Different Kinds of MPA Networks from Around the World

Let's take a look at different MPA network models from around the world and see what they look like.

Slide 52

WORKSHEET 1.4: Identifying and Evaluating Key Elements of Different Types of MPA Networks

Fill in each case study name as it is being presented in the boxes across the top. Then, answer all of the seven questions in the left hand vertical column for each of the case studies. For the last two questions on "successes" and "challenges", please draw your own conclusions. Please be prepared to discuss comparisons between each of the case studies in a plenary session at the end.

Key Elements to Consider	Case Study:	Case Study:	Case Study:	Case Study:	Case Study:
Geographic Scope (national, transboundary, multi-national)					
Driver Behind Network Creation (trigger or incentive)					
Network Organizational Structure or Body (coordinating body)					
Type or Category of Network (you may select multiple categories if relevant)	☐ Ecological ☐ Social ☐ Governance ☐ Learning	☐ Ecological ☐ Social ☐ Governance ☐ Learning	☐ Ecological ☐ Social ☐ Governance ☐ Learning	☐ Ecological ☐ Social ☐ Governance ☐ Learning	☐ Ecological ☐ Social ☐ Governance ☐ Learning
Network Objectives (what it is trying to achieve)					
+ Successes (based on your analysis)					
- Challenges (based on your analysis)					

Of course, just to be able to track some of the key points in the case studies we will be covering, each person will have two of these sheets. Across the top, indicate which case study you are capturing information on, and then work the matrix vertically to fill out the information.

Worksheet 1.4 Identifying and evaluating key elements of different types of MPA networks

Slide 53

Global Progress: a sampling of REGIONAL MPA networks

Slide 54

Global Progress: a sampling of REGIONAL MPA networks

20 total regions to date with strong coordinating framework and treaty or agreement have progressed the furthest; most of these use systematic conservation planning

Numbers are changing all the time. These regional networks usually have a Secretariat or some sort of governance structure.

Slide 55

Global Progress: a sampling of REGIONAL MPA networks

Mesoamerican Barrier Reef, Gulf of Mexico, Northeast Pacific, Southeast Pacific, Eastern Tropical Pacific, Baja to Bering, Scotian Shelf, East Africa Marine Ecoregion, Indian Ocean Commission, Western Africa Regional Network, PERSGA MPA Network, Caspian Regional MPA Network, Southeast Asian MPA Network, Sulu-Sulawesi Marine Ecoregion, Natura 2000, MedPAN, OSPAR, Helcom, Antarctic, Arctic

We are going to start at the regional scale – large-scale MPA networks, all of them are transboundary – across multiple countries

Slide 56

Eastern Tropical Pacific Seascape

Costa Rica, Panama, Colombia & Ecuador

- *Type:* Ecological, Governance
- *Total Area:* 2,110,000 km^2, includes EEZ and high seas

- *Agreement:* in 2004, signed San Jose Declaration to establish network from existing MPAs
- *Management:* rotating secretariat, developed Action Plan plus annual work plans, national and regional support to develop integrated management strategies
- *Purpose:* to improve existing management, manage at network scale

This network focused on making linkages between existing MPAs in four countries. The sites have shared migratory species due to three major currents, and multiple smaller currents. It is also a tremendous laboratory for climate change as El Niño and La Niña events move right up the coast from south to north of South America. Their first task as a network was to become the first "cluster" marine world heritage site, so all of them had to have management plans in place. Once this was achieved, they moved towards joint management of pelagic megafauna, then pelagic fisheries. They have functioned well, in large part due to the shared governance structure at the secretariat level,

strong support from NGOs. The biggest challenge is varying levels of political will at the national government level, especially as administrations have changed. This MPA network includes the high seas. Three main currents and six sub-currents connect these MPAs. The World Heritage wanted to create the first 'Cluster' of MPAs, one of its first tasks was to create management plans to all four sites (work conducted by Anne Walton).

Slide 57

MedPAN South

11 Non-EU Countries of the Southern & Eastern Mediterranean

- *Type:* Social/Learning
- *Purpose & Need:* aims to create new MPAs and improve management effectiveness; and create a functional social/learning network for underserved Mediterranean MPAs
- *Challenges:* huge range of cultures, countries and languages, capacity and political will very low
- *Results:* strong social and learning network developed between countries

Regional Network of MPAs in West Africa

23 MPAs in 6 countries

- *Type: Ecological, Social, Governance*
- *Purpose & Need: high levels of biophysical connectivity through Canary Island and Guinea upwellings, and the movement of migratory species*
- *Goal: to ensure, at the scale of the eco-region that: "the preservation of a coherent set of critical habitats . . . for the regeneration of natural resources and the conservation of biodiversity to the benefit of the societies".*
- *Administration: a secretariat facilitates and coordinates the network activities with technical assistance from PRCM and financial support from international partners*

Strong international NGO support, and political will from governments. Pressures are still great from the oil and gas industry and industrial fishing, as well as the scale of poverty. The focus is protection of migratory species, good social networking with support from NGOs and some governments such as Germany. Has a secret in place, very similar model to Easter Tropical Pacific but a lot more poverty such as destroying mangroves for wood.

Slide 59

Global Progress:
A sampling of NATIONAL MPA networks

Let's scale this down and take a look at the national level MPA networks (within a single country).

Slide 60

Global Progress:

A sampling of NATIONAL MPA networks
30 total to date

Slide 61

Global Progress

A sampling of NATIONAL MPA networks

Bahamas, Belize, Cuba, Jamaica, Grenada, Chile, Ecuador, Peru, Venezuela, Brazil, Mexico, USA, Canada, Tanzania, Seychelles, South Africa, Madagascar, Yemen, Philippines, Indonesia, Vietnam, Palau, Fiji, New Zealand, Australia, UK, Germany, Netherlands, Croatia

Slide 62

Vietnam

16 MPAs

- *Type: Ecological, Social*
- *Management: all managed under the Ministry of Agriculture and Rural Development*

(currently)

- *Site Selection: based on representative biological and physical characteristics*
- *Social network structure: established to increase coordination and cooperation between sites: elected governing board and by laws established*

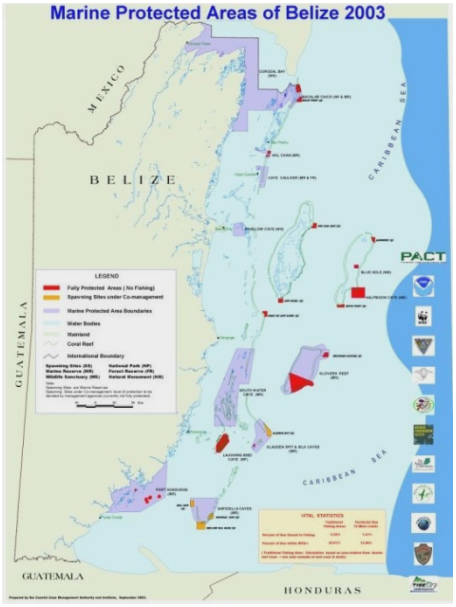
The original site selection took place around 2,000 after extensive site surveys along the coast of Vietnam. The actual gazetting of sites has been slow due to changing government structures and the placement of the authority to actually designate and manage MPAs (back and forth between the Ministry of Fisheries and the Ministry of Agriculture and Rural Development) – but always with community engagement in the process and management. They have a highly dependent on outside funding support and program support. Outside support has been like a roller coaster over the past

decade as has been the political will. The huge thrust towards economic development has been a priority and only recently has the government understood the importance of the natural resources to the health of their economy.

Slide 63

Belize National MPA System

- *Type: Ecological, Social*
- *Guiding Principle: "that the potential contribution of the protected areas system to national development and poverty alleviation should be maximized"*
- *Site Selection: 25 MPAs in total, started by ranking existing MPAs, then building off of those*
- *Management: MPAs an integral part of the national ICZM Plan, the MPAs representing different zones within in the broader national plan*



Belize MPA network is an integrated design, coordinated with their ICZM zoning plan. It is considered a model of success with high political will, NGO support and stakeholder engagement in the creation and management of the network. Strong recognition of the importance of the MPA network to international tourism, as well as local fisheries management.

Slide 64

Palau National

MPA Network

- *Type: Ecological, Social, Governance (under Micronesia Challenge); network goal legislated by Protected Areas Network of 2003*
- *Implementation: community level*
- *Target: committed to protecting 30% of nearshore waters by 2020 through national network of MPAs*
- *Design: using both biophysical and socioeconomic principles including representation and replication criteria, critical area criteria and connectivity criteria*

Another model MPA network, driven by the Micronesia Challenge of protecting 30% of nearshore waters by 2020 – and the goal has already been reached. This effort has been wholly driven by the government (with NGO support) and considered a model for the world, with strong stakeholder engagement. They have integrated their network with the concept of watershed management, realizing that the land-based sources of impacts are having a huge influence on their ability to manage MPAs. One of their biggest challenges is impacts from climate change.

Slide 65

Global Progress:

A sampling of SUB-NATIONAL MPA networks

Let's look at smaller scale MPA networks, but none the less effective as it all comes down to both the design and management of the sites.

Slide 66

Global Progress:

A sampling of SUB-NATIONAL MPA networks

35 total to date
(some countries have multiple networks)

Slide 67

Global Progress:

A sampling of SUB-NATIONAL MPA networks

BVI, Colombia, Ecuador, Mexico, USA, Canada, Mauritius, South Africa, Madagascar, Yemen, Philippines, Indonesia, Papua New Guinea, Solomon Islands, Kiribati, New Zealand, Australia

Slide 68

Gulf of California

11 MPAs in Sea of Cortez

- *Type: Ecological & Governance*
- *Purpose & Need: high endemism (approximately 770 species) and high species diversity*
- *Approach: gap analysis conducted by partnership of government institutions, 180+ national and international experts contributed to site selection*
- *Protection: currently: 14,925 km^2; if "especially important areas" are included – then 15% coverage of Golf of California (GoC); if "ecological processes" are included, then 24% coverage of GoC.*

Strong international NGO support as well as national/local level NGO support. Varying government will and support over the years. Considered a strong model of success.

Slide 69

Socotra Archipelago

Four Islands & Rocky Outcrops of Yemen

- *Type: Social, Ecological*
- *Purpose & Need: a system of protected areas within larger managed area (elaborate zoning*

plan) at juncture of three LMEs

- *Sites Selected: for convenience, and to minimize loss to local communities; good representation of biotopes and of coral, fish, algal and seagrass communities; connectivity not addressed*

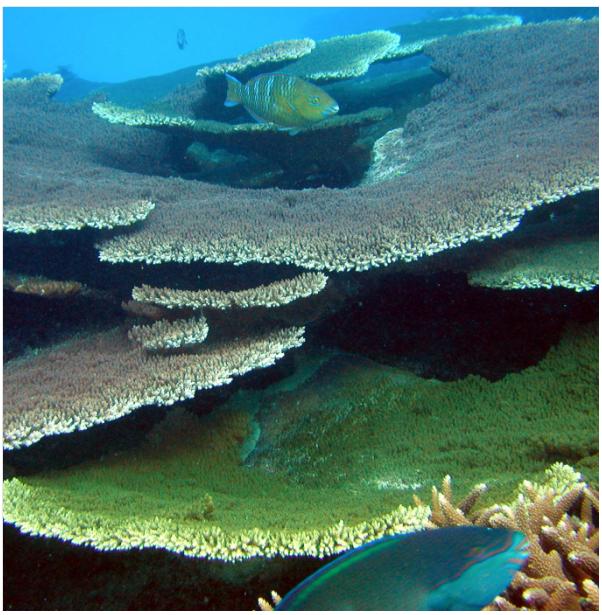
MPA network structured around large-scale zoning plan in territorial waters. Strong stakeholder engagement in the creation of the network and management, although management capacity has been low with support coming from outside consultants.

Slide 70

South Pacific

Phoenix Islands Protected Area (Kiribati)

- *Type: Ecological, Social*
- *Purpose & Need: one of the most remote island chains on earth and could be one of the last atolls and reef island archipelagos in pristine condition*
- *Site Selection: 8 uninhabited islands except for largest atoll of Kanton, total area = 408,250 km^2*
- *Approach: "to learn how nature and people can function harmoniously where distance and isolation are both a challenge and the saving grace"*



This is an extremely large and remote MPA network. They have taken a strong "cultural" approach to the network – considering both the people and the place, however management capacity is extremely low. The network was created with support from international NGOs, without which it would not have happened. Government has been slow to participate in actual management but taken a high profile on the issue of climate change and the clamping down on industrial fishing in their territorial waters (tuna fisheries).

Slide 71

Global Progress:

A sampling of TARGETS & CHALLENGES for MPA networks

Let's take a look at some of the drivers behind the MPA networks – which often are external drivers.

Slide 72

TARGETS & CHALLENGES

A Global Perspective

- ✓ *Micronesia Challenge: 30% nearshore ecosystems protected by 2020*

- FSM, Guam, Palau, Marshalls

- ✓ *Caribbean Challenge: 20% nearshore marine resources protected by 2020*

- Dominican Republic, Grenada, Jamaica, Bahamas . . .

- ✓ *Philippines: 10% marine waters fully protected by 2020*
- ✓ *New Zealand: 10% marine environment protected by 2020*
- ✓ *UK: network of Marine Conservation Zones established by 2020*

Of course, we are all familiar with what started as the Durban Accord under the CBD, then became the Aichi Accord – setting targets for the creation of individual MPAs. That became a huge incentive for regions or individual countries to establish their own targets. The Micronesia Challenge started a domino effect - and you can see what happened from there. These are just some examples as the list is always growing.

Slide 73

Global Progress:

Some stats on TOTAL COVERAGE for MPA networks

Let's try and understand what we are getting from all of these activities on MPAs and MPA networks.

Slide 74

- ✓ *Total number of MPAs: approx. 6,000*
- ✓ *Coverage area: over 4.2 million km^2 of ocean*
- ✓ *Percent of coverage: 1.17% of marine area of world*
- ✓ *Continental shelf coverage: 4.32%*
- ✓ *Off-shelf coverage: 0.91%*
- ✓ *Total ocean protection risen by 150% since 2003*
- ✓ *Latest trend: very large MPAs, 11 MPAs larger than 100,000 km^2 together making up 60% of the global coverage*

IUCN Summary of MPA Status (Toropova Caitlyn, 2010)

Please note that these numbers are changing all the time and vary according to how this is being reported. But at least this gives an idea of the trends.

Slide 75

What are we doing in terms of placement of MPAs?

- ✓ *56% MPAs are 10-20 km from another MPA*
- ✓ *78% MPAs are 20-150 km from another MPA*
- ✓ *Many MPAs 'connected' to up to 10 others*

What are we protecting from a global perspective?

- ✓ *Reefs: 15-22%*

- ✓ *Mangroves: 17%*
- ✓ *Seagrasses: 10%*
- ✓ *Estuaries: 8%*
- ✓ *Seamounts: 2%*

The placement of MPAs is largely driven by: convenience, manageability, and where we have data.

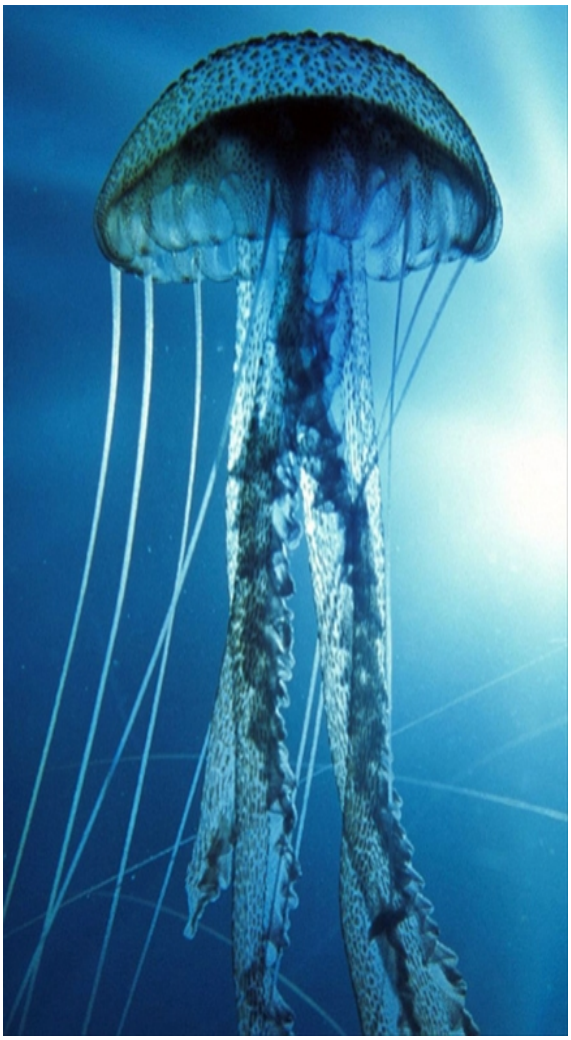
Slide 76

Recommendations

A Global Perspective (from UNEP WCMC)

- ✓ *Continue and expand existing efforts*
- ✓ *Collaborate and co-ordinate*
- ✓ *Harmonize terminology and approaches so that progress can be measured*
- ✓ *Improve reporting and monitoring at national, regional, global level*
- ✓ *WCPA- Marine checklist for evaluation*
- ✓ *Management and governance of MPA networks*

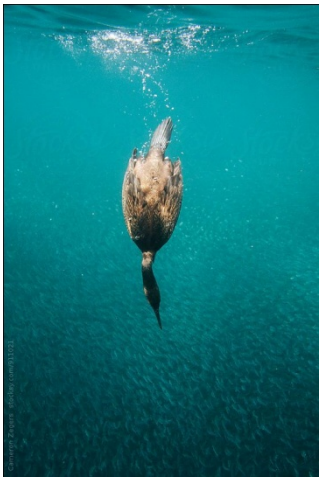
(UN Environment World Conservation Monitoring Center, 2018)



. . . And these are the recommendations that have come out of UNEP.

Slide 77

Best Practices for Planning MPA Networks:



- *CLEARLY DEFINE NETWORK OBJECTIVES: ecological, economic and social-cultural objectives*
- *LONG-TERM POLITICAL COMMITMENT: establish early, maintain throughout*
- *STAKEHOLDER PARTICPATION: establish early, maintain throughout*
- *SUPPORT MECHANISM IN PLACE: maintains functionality of network*

And this first point will lead us to our next steps . . .

Slide 78

EXERCISE 1.2: Building the Objectives for the YSLME Network for Multiple Species with Different Dispersal Ranges and Habitat Requirements

. . . Which is to build the first of the foundational pieces for our MPA network, which is to create objectives for the network.

Slide 79

SMART objectives

More specifically, you are going to build "SMART" objectives.

Handout 1.4 SMART Objectives

Worksheet 1.5 Selecting the Objectives for the YSLME MPA Network

Worksheet 1.6 Developing SMART Objectives


WORKSHEET 1.6-1.doc


WORKSHEET 1.5.doc


HANDOUT 1.4.doc

Slide 80

SMART objectives

What do you want to achieve as a result of your MPA network (should be greater than the sum of the parts)?

To get back to basics, this is what we mean when we say objective. However, how language is used in constructing an objective is very important because we have to have a way to know EXACTLY what the intention is, or we won't know whether the network is actually achieving the objectives or not.

Slide 81

SMART objectives

S = specific

M = measurable

A = achievement or outcome

R = realistic

T = time bound

So this is why we like to build "SMART" objectives, since 5, 10 or 20 years from now, after monitoring our MPA network on a regular basis, we will know whether we have really achieved what we set out to achieve or not. Also, without constructing a "SMART" objective, how can we select the sites in our network? They should be selected to achieve the results or objectives we are looking for.

Slide 82

HANDOUT 1.4: SMART Objectives
(what you want to achieve as a result of the YSLME MPA Network)

A good objective is also SMART:

- **S – specific**
- **M – measurable**
- **A – Achievement or Outcome Oriented**
- **R – Realistic**
- **T – time-limited**

Categories of Objectives:

1. **Conservation-based**
2. **Socially-based**
3. **Economic-based**
4. **Culturally-based**
5. **Governance-based**
6. **Management-based**
7. **Addresses specific resource management issues or impacts on the target resource (species or habitats)**

EXAMPLES OF *SMART* OBJECTIVES:

INEFFECTIVE GOAL	EFFECTIVE GOAL
To restore the population of Spotted Seals	To restore the population of Spotted Seals throughout the range of its migration area in the Yellow Sea region.
INEFFECTIVE OBJECTIVES	**EFFECTIVE OBJECTIVE**
Protect critical habitat of Spotted Seals within the Yellow Sea region.	Within the next five years, ensure legal protection for 30% of representative habitat for breeding, feeding and calving grounds of the Spotted Seal within the Yellow Sea region.

Everyone pull out Handout 1.4 and let's walk our way through it.

Slide 83

EXERCISE 1.2: Building Objectives for the YSLME Network

Objective: *To reach a common understanding and agreement about the foundational components of the YSLME Network (big picture framework) among the workshop participants. This is from the perspective of protecting three different representative species of concern AND other relevant objectives needed to ensure success of the network.*

Activity:

1. In small teams, review Worksheet 1.5 and determine the types of objectives you would like to develop for the YSLME network,
2. Then, referring to Handout 1.4 and using Worksheet 1.6, develop the language for your objectives,
3. Put final objectives on flip chart to share.

Time: *60 minutes*

Now, let's do it ourselves. Walk them through the instructions, then show them the worksheets in the next slide.

Slide 84

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1. Review what a "SMART" objective looks like

HANDOUT 1.4: SMART Objectives
(what you want to achieve as a result of the YSLME MPA Network)

A good objective is also SMART:

- **S – specific**
- **M – measurable**
- **A – Achievement or Outcome Oriented**
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Categories of Objectives:

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This is now just a reference for you as you do the exercise, since as we have already gone through the details of how to create a SMART objective.

Slide 85

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2. Objective: What do you want to achieve as a result of the MPA Network for Protection of Your Representative Species?

Pick from this selection of objectives and then turn this into a "SMART" objective.

WORKSHEET 1.5: Building Objectives for the YSLME MPA Network

1) Within each of your 4 planning teams, please review the list of management objectives below. 2) Then, select management objectives for the YSLME MPA Network from your group's perspective and area of interest. Remember, the YSLME area is designated for multiple-use, so your objectives should reflect that reality. 3) Later in the planning process you might find that you will have to consider some trade-offs in how to manage conflicting uses of the marine environment, as such, this is a good time to also consider other [practical] objectives from the list below to ensure the YSLME MPA Network can successfully achieve its objectives. Note: feel free to modify, make more specific or create whole new objectives. This worksheet is only intended to make the job easier, not influence your decisions on objectives.

I. SELECTING MPA NETWORK OBJECTIVES

(what you want to achieve as a result of the YSLME MPA Network)

BIOPHYSICAL (CONSERVATION) OBJECTIVES

☐ Living marine resources are sustained in their current state for future generations.
☐ Losses to biodiversity and ecosystem functioning and structure prevented.
☐ Resident ecosystems, communities, habitats, species, and gene pools adequately represented and protected.
☐ Ecosystem functions maintained and restored.
☐ Areas protected that are essential for key life history phases of species.
☐ Habitat and ecosystem functions required for focal species' survival to be restored or maintained.
☐ Habitat quality and/or quantity restored or maintained.
☐ Ecological processes essential to habitat existence protected.
☐ Replication of significant areas of habitats protected across the MPA network as an insurance policy.
☐ Significant areas of representative habitats protected across the MPA network.
☐ Slow population decline.

SOCIOECONOMIC OBJECTIVES

☐ Economic status and relative wealth of coastal residents and/or resource users improved.
☐ Increased opportunities for livelihood diversification.
☐ Household occupational and income structure stabilized.
☐ Aesthetic value enhanced or maintained.
☐ Existence value enhanced or maintained.
☐ Wilderness value enhanced or maintained.
☐ Recreation opportunities enhanced or maintained.
☐ Ecological services values enhanced or maintained.
☐ Monetary benefits distributed equitably to and through coastal communities.

We really created this as a "cheat sheet" for you – to give you a head start on picking the categories of objectives for the MPA network – and we hope you will come up with a least three different objectives.

WORKSHEET 1.6: Developing "SMART" Objectives
(What you want to achieve as a result of YSLME MPA Network?)

First, answer each of the following 7 questions. Then, string your answers from questions 1-6 together to create a "SMART" objective. You may use this worksheet to develop multiple SMART objectives.

Species or Other Asset to be Protected by the YSLME MPA Network: _____

Objective Category: _____

Asset to Be Protected *(what does the objective apply to - species, habitat, human community, etc.)*	**Threat(s)** *(what needs to be addressed in order for a change to take place – population size, condition, etc.)*	**Spatial Extant** *(where – is this in a specific location, or across the entire Yellow Sea)*	**Outcome** *(future condition – what you want this to look like in the future)*	**Measure** *(describe the kind of measureable change - more, less, maintain (quantify if possible))*	**When** *(over what time period to achieve this - short, medium or long term)*	**Why is this important?** *(why should this be a priority in the Yellow Sea)*
1.	2.	3.	4.	5.	6.	7.

Objective *(combine answers 1-6 into a "SMART" objective)*:

Is it **SPECIFIC**? Is it **MEASUREABLE**? Is it **ACHIEVEMENT** or outcome oriented? Is it **REALISTIC**? Is it **TIME** limited?
IT'S A SMART OBJECTIVE!

3. Only use this template as long as it is useful, but you must develop at least 1-3 SMART objectives.

Once you have selected the types of objectives you want to use from Worksheet 1.5, now you have to turn them into SMART objectives. By following this formula, you should get there. If the formula gets in your way, then don't use it. Once you are satisfied with your objectives, put the principle category, then the objective on a flip chart to share.

SMART

Objectives

Now let's share our objectives by doing a gallery walk. Each team will get more than 10 minutes to present, then bring them altogether and try and reconcile them, knowing that you are talking about Three different representative species.

Thank you.

Day 2. Analyzing the Setting for the YSLME MPA Network

July 24, 2018 ◆ Seocheon, Republic of Korea

Spotted Seal: Philagraphicon; Illustration of Spoon-billed Sandpiper: Planet of Birds Yellow Croaker Illustration: : Planet of Birds

Summary of Day 2:

One of the goals of Day 2 is to look at the details of what we know about each of the three indicator species. We also want to identify the state of the knowledge and realize what it is like to work with limited information. We hope to understand that we may never have all the information we think we need for the MPA network design since it is never possible to have complete information, but we can identify what we do know, what are the gaps in knowledge, and where we may be able to find the information that is essential and what we lack so that we can move forward in the design. The pieces of information that are crucial for MPA network design are the life history of the indicator species, the habitat types associated with their life cycles, the conditions of those habitats, the conditions of the target species, and the human use impacts because the purpose of the MPA network is to manage those conditions. That is the package we need to know in order to design an effective and functional MPA network.

However, the main goal of Day 2 is to understand that data is essential for the design of an effective and functional MPA network. If we really want to understand or secure the future of target species, we need to view historical data, identify trends and changes of their distribution, abundance and/or their habitats, to then understand where we are at, predict the future and decide what interventions are necessary to implement. This is the concept of an adaptive management cycle which is continuous.

Objectives of Day 2:

1. To understand that "best available information" is often our starting point for creating MPAs and MPA networks, although it is important to understand what minimal type of information is essential to being able to move forward, and how to find it.
2. To lay out some of the basic life history and spatial requirements of each of the three species, while understanding the relationship of these life stages to key habitats and ecological conditions.
3. To understand that often MPA networks are based on data-poor situations, however, now is the time to identify essential data needs.
4. To examine some of the major issues the natural resources in the Yellow Sea are facing and understanding the types of impacts they are creating.

5. To understand the types of human use interactions and the specific impacts they have on each of the three representative species in order to begin to understand the role that a network of MPAs could play in their protection.
6. To develop an assessment and understanding of how each of the three representative species, respond to multiple stressors. This will help to calibrate the areas of greatest vulnerability, and resilience.

Duration of Day 2 workshop: 9 hours (including maximum of 2 hours for coffee breaks and lunch)

Competencies needed: At least one participant represented from each country's government or research institution works with one or more of the indicator species and has access to spatial-temporal data of the indicator species and their habitats (for each of the three species). At last one or more participants of the training is highly skilled in GIS decision-making tools such as Marxan.

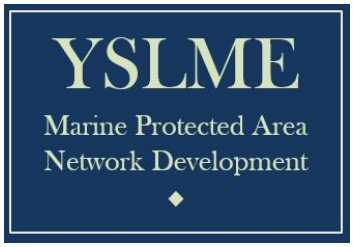
Recommended videos:

- Allison Green: Rules of Thumb for MPA network design really work! (ARC Centre of Excellence) (6:50)
- Supporting a regional MPA network of marine turtles in West Africa (UN Environment) (8:34)
- Creating an MPA network in Southwest Bay, Malekula (Island Reach) (6:48)

A summary of the outcomes of the second day of the 1st technical workshop are presented in pages 3 and 4 of Appendix A. Some of the most important outcomes of Day 1 of July 23, 2018 technical workshop are the information presented and shared by workshop participants from the governments of China and RO Korea in regard to the State of the Knowledge of each of three indicator species such as life cycle and critical habitat, spatial temporal distribution, data sources and data gaps using the tailored worksheets of day 2. Human use threats were also identified for each species, and in some cases the exercises helped identified the lack of information regarding the effectiveness of management efforts to address human use threats in RO Korea and China.

Slide 1

Marine Protected Area Network Development



Today we are going to spend the entire day deepening our understanding of the setting of the Yellow Sea, the three representative species we are working with under the YSLME project, the associated habitats and impacts from human uses and climate change – it is a day focused on data and analysis of the resources.

Slide 2

PRESENTATION 2.1: State of the Knowledge and Working with Limited Information

In order to analyze the setting – that is the Yellow Sea – before we start designing the MPA network, we have to understand what kind of data we are working with.

Slide 3

State of the Knowledge

The role of information in predicting and managing potential impacts

Photo: Bird Life International, Zang Ming

Information about the life history of our representative species is not only important, but also the conditions around them, as you can see in this photo.

Slide 4

State of the Knowledge

5. Data and information serve as the foundation for all planning efforts.
6. Planning requires integrating quantitative and qualitative information about global processes with information occurring at the local and community level.

Need good historical and current data to understand what will happen in the future.

Slide 5

Why do we need information and data for planning efforts?

7. Information allows us to establish baseline conditions
8. Information and data are needed to run models and are also generated by models
9. Information and data help educate the public about local issues and how global issues (e.g., CC) can impact them locally
10. Information and data tell us about local processes and conditions

Data is essential if we are going to be well-informed planners, but a lack of data shouldn't keep us from moving forward.

Slide 6

Why do we need information and data for planning efforts?

- Network planning efforts must be able to successfully integrate information about regional, national and global processes, such as sea level rise and temperature change, with local information about coastal land uses, marine ecosystems and socioeconomics.
- Models often provide global or large-scale information about scenarios that have to be translated to the local scale.

The scale of data is important in regard to the story it can tell us, but scale can also limit our understanding of specific place-based planning areas such as the Yellow Sea. Because it is difficult to scale data down with any accuracy, we use models or extrapolations to get to an understanding of the scale we are working at.

Slide 7

The value of modeling and understanding large, complex systems like the Yellow Sea

Global climate models (GCMs) serve an important role in climate change planning efforts. GCMs are mathematical models that researchers use to understand the earth's response to changing conditions in the atmosphere, on land and in the oceans.

Very complex interactions in the ocean, atmosphere, and land are very difficult to capture and understand. We have actually learned a lot from climate models in trying to understand what the planet, and coastal and marine environments responses will be to large-scale events in the ocean and atmosphere.

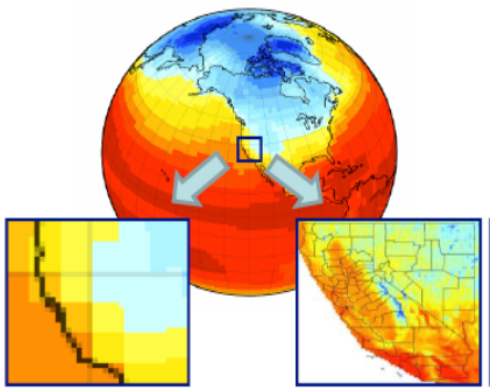
Slide 8

The value of modeling and understanding large, complex systems like the Yellow Sea

- Coarse spatial resolution for large scale or global models can often present limitations for

local planning efforts.

- However, they are critical sources of information for planning efforts.
- Future efforts could be undertaken to downscale models to better understand local impacts.

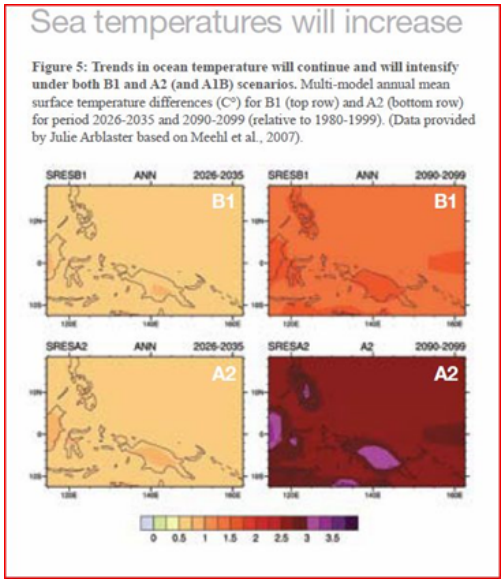


Shows different size grid cells. Looking for downscale models in the future

Slide 9

The value of modeling and understanding large, complex systems like the Yellow Sea

Global climate models can tell us how sea temperature may change, which will in turn effect countless ecological communities.

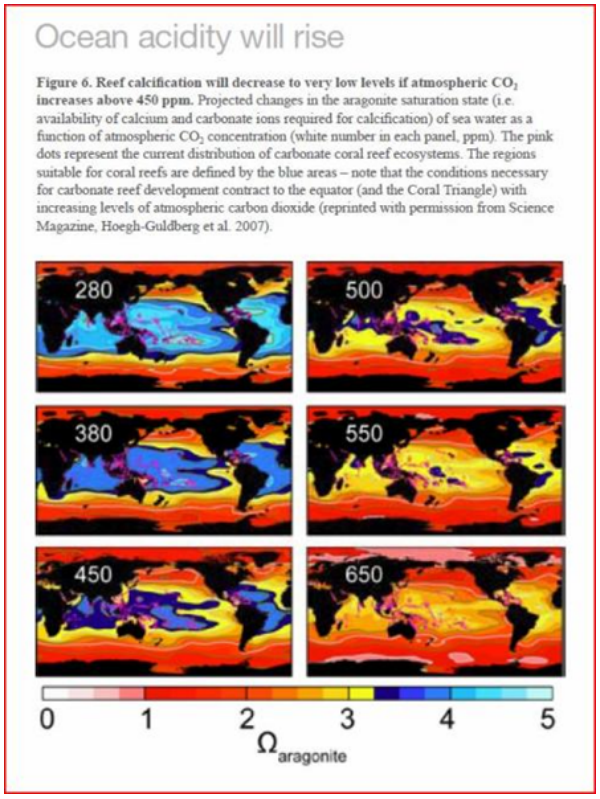


By examining trends, such as this one shown in the slide of changing sea temperatures, we can start to predict what the impacts will be on ecological communities.

Slide 10

The value of modeling and understanding large, complex systems like the Yellow Sea

Global climate models tell us how ocean acidity may change which will impact marine biodiversity as well as marine dependent communities.

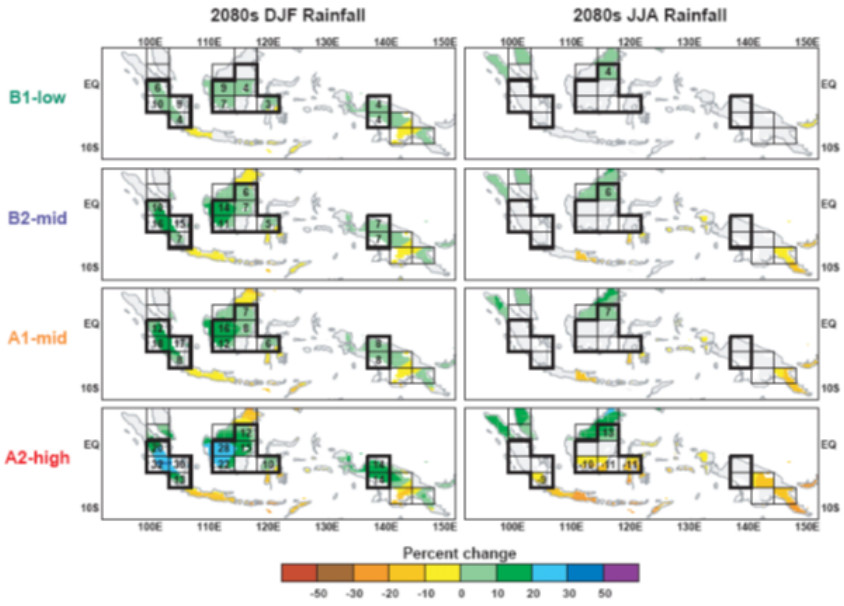


These figures show projected scenarios of ocean acidification. They are actually a representation of the availability of calcium and carbonate ions in the seawater as a function of the atmospheric CO_2 concentration. The pink dots represent the current distribution of carbonate coral reef ecosystems. The areas suitable for reef development are shown in blue. With increasing levels of CO_2, we can see how this area is drastically reduced.

Blue areas will be where the reefs can still survive based on ocean acidification. As the # increases, the blue area shrinks significantly.

Slide 11

The value of modeling and understanding large, complex systems like the Yellow Sea



Global climate models can help give us an indication of how patterns may change based on different times of the year. What you see here are rainfall patterns.

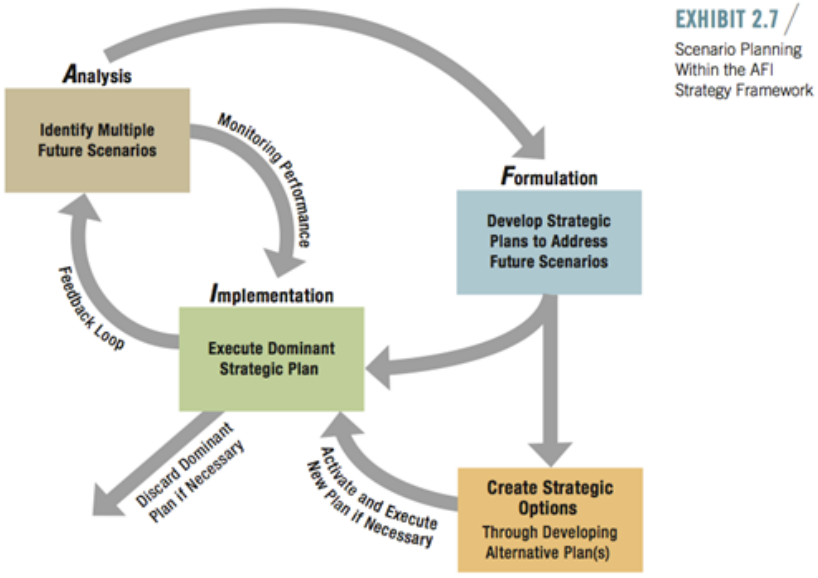
You will see these patterns change based on climate variability during periods such as the El Niño and La Niña events. Models really help combine scenarios (by combining data sets and planning sets) for different kinds of conditions and interventions, what the different combinations of scenarios and interventions will forecast.

Slide 12

Scenario planning in the face of uncertainty in the Yellow Sea

Scenario planning is strategic planning:

- Combines known facts and projections with plausible alternative outcomes
- Recognizes that many factors may combine in complex ways
- Focuses on uncertainties

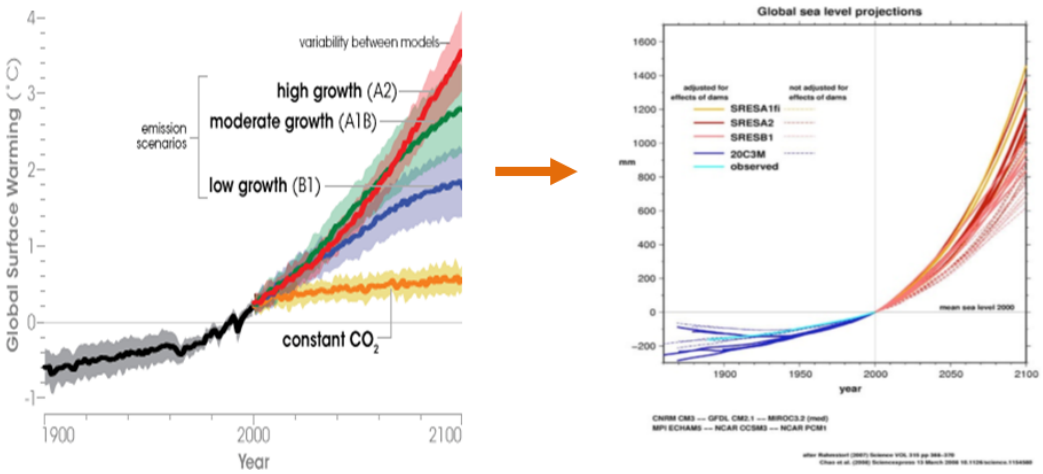


These kinds of models allow us to set up a range of scenarios – or different kinds of responses to different conditions.

Slide 13

Scenario planning in the face of uncertainty in the Yellow Sea

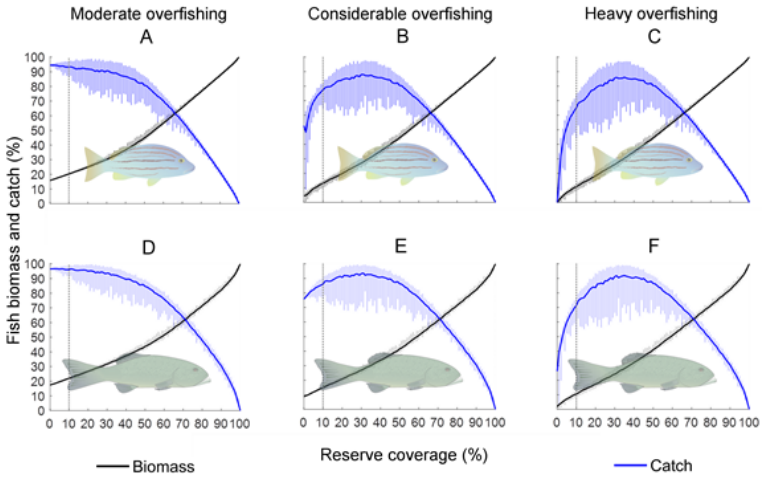
Integrating scenarios into planning efforts allows for adaptive management and acknowledges uncertainty up front.



However, there is always the uncertainty factor: Just as all decisions we make in our lives and professions are done with a level of uncertainty, whether it is planning for retirement or planning infrastructure for future populations and urban growth centers. For climate change, the uncertainty is in the severity of the impacts for an area. By using historical data and modeling we are able to create models for potential impact which allow us to start planning based on the uncertainty. This is what the International Panel on Climate Change has done, they use new data all the time to run the models to project.

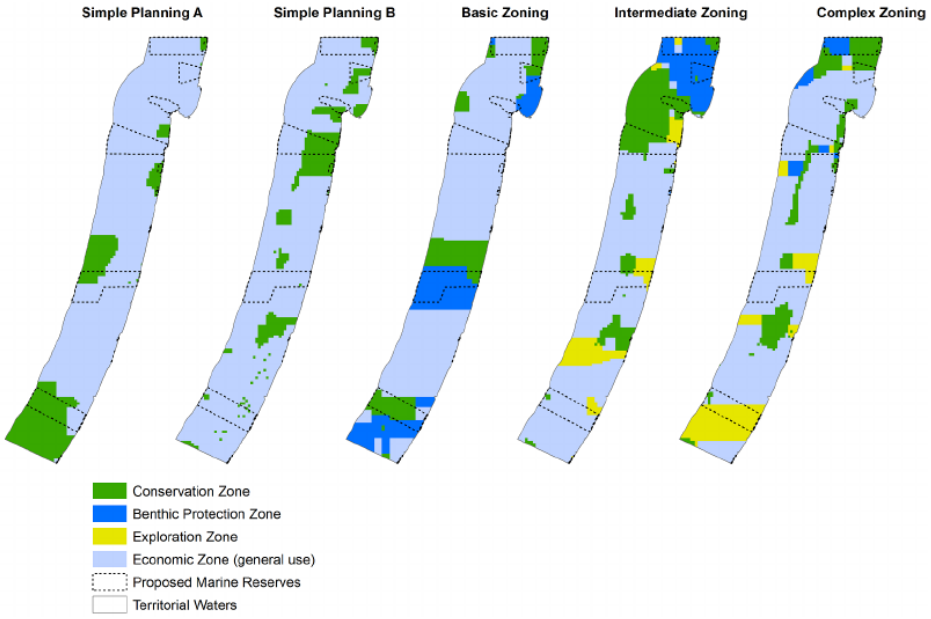
Scenario planning in the face of uncertainty in the Yellow Sea

Scenario planning allows us to consider and plan for action or adaptation before we have to do it. Planning efforts should consider the worst-case scenario.



Just as we develop different scenarios to plan for climate change, these models can also be, and are, used for fisheries management, plotting biomass against different catch or levels of fishing pressure. The crossing of the two curves is the max sust yield (maximum sustainable yield). Now we have to manage before that intersection or there will not be a reserve and will meet the decline of the population. We use scenario planning on fisheries management as well.

Scenario planning in the face of uncertainty in the Yellow Sea



Scenario planning is not only used to understand biophysical systems and response, but also the potential effects of different management scenarios such as shown by this range of zoning options. This type of scenario developed includes and understanding of the condition of the natural resources, their response to stressors, and their response to management approaches such as this range of zone options.

This is a strip of marine environment using different zoning. We will be using this and conditions and layering these.

Slide 16

Due to the vulnerabilities of coastal and marine resources, planning efforts must move forward despite uncertainty

Photo: Bangkokpost

In any case, lack of data at the appropriate scale should not hinder us from moving forward with planning the YSLME MPA network.

Slide 17

Identifying data gaps is an important part of the planning process

- If you realize that you have data gaps, be sure to identify them and begin to establish a transparent process for gathering data based on planning priorities
- Begin to identify partners within the research community and within local communities that may have data and information
- An inventory can begin to make it clear that the MPA network may need to make tough decisions in the future
- Factor in shifting baselines -– interviews, oral histories, photographs
- Be sure to understand perceptions (what people think, attitudes and belief) *versus* data – both have value

We are going to start with identifying our data needs, then our data gaps.

Slide 18

Existing data and current level of knowledge on:

- Species coverage
- Critical life history stages and associated habitat
- Ecological conditions
- Socioeconomic activities

For now, these are the priority data sets we will be working with for each of the three species: Yellow Croaker, Spoon-billed Sandpiper and the Spotted Seal.

Slide 19

EXERCISE 2.1: State of the knowledge for each of the three representative species

See we are going to start with an exercise to see exactly what we do know.

Slide 20

EXERCISE 2.1: State of Knowledge for Each of the three Representative Species

Objective: to lay out some of the basic life history and spatial requirements for each of the three species, while understanding the relationship of these key life stages to key habitats and ecological conditions.

Activity: In small groups, and in reference to the Yellow Sea map and Worksheet 2.1a, b, or c (worksheets are species specific): (1) identify information on: (a) distribution and abundance; (b) spatial depiction of critical life history stages; (c) associated habitat; and (d) major threats. (2) Use your map to draw on spatial references to the above information

Time: 65 minutes

Refer to next two slides

Worksheet 2.1a State of the Knowledge on the Spotted Seal (sub-population)

Worksheet 2.1b State of the Knowledge on the Spoon-billed Sandpiper

Worksheet 2.1c State of the Knowledge on the Yellow Croaker

WORKSHEET 2.1a:
State of the Knowledge on the Spotted Seal (sub-population)
in the Yellow Sea Large Marine Ecosystem

Country: _____ **Sub-national Level:** _____

Overview on data:

1. SPECIES SPATIAL DISTRIBUTION AND ABUNDANCE	**National level research:** ☐ Spotted seal distribution & abundance within the Yellow Sea is well studied and understood ☐ Spotted seal distribution & abundance within the Yellow is not well studied or understood ☐ Spatial range of the Spotted seal appears to be extensive throughout the Yellow Sea ☐ Spatial range appears only within discreet areas throughout Yellow Sea ☐ The entire geographic range of this sub-population of the Spotted seal is well understood	**Sub-national level research:** ☐ Spotted seal distribution & abundance within the Yellow Sea is well studied and understood ☐ Spotted seal distribution & abundance within the Yellow Sea not well studied or understood ☐ Spatial range of the Spotted seal appears to be extensive throughout the Yellow Sea ☐ Spatial range appears only within discreet areas throughout Yellow Sea ☐ The entire geographic range of this sub-population of the Spotted seal is well understood
2. CRITICAL LIFE HISTORY STAGES	**Critical Life History Stages:** *Which of these behaviors are well documented throughout the range of the YSLME?*	☐ feeding ☐ breeding ☐ calving ☐ resting ☐ migration corridors
	Associated Habitat: *Check which behavior, then list associated habitat in the space next to the corresponding behavior. If not known, please indicate. Please indicate on map.*	☐ feeding:
		☐ breeding:
		☐ calving:
		☐ resting:
		☐ migration corridors:
	Associated Ecological Conditions: *Check which behavior, then list associated ecological conditions are needed to maintain the health of the population in the space next to the corresponding behavior. If not known, please indicate. Please indicate on map.*	☐ feeding:
		☐ breeding:
		☐ calving:
		☐ resting:
		☐ migration corridors:
3. OVERALL HEALTH OF THIS SUB-POPULATION OF SPOTTED SEALS	**Status of Sub-Population:** *Is the population stable, or is there a known trend in the change and or health of the population.*	☐ population appears to be stable and healthy
		☐ population appears to be stable, but under threat
		☐ population appears to be declining or unstable
		☐ population status not well understood
4. HUMAN USE ACTIVITIES & CORRESPONDING MANAGEMENT MEASURES		

Note: each worksheet is species-specific
Each team should work with the worksheet that is relevant to their group
They need to indicate the scale they are working on the sheet (sub-national or national level)

Slide 22

Slide 23

EXERCISE 2.2a: Identification of Data Gaps

Slide 24

EXERCISE 2.2a: Identification of Data Gaps

Objective: to understand that often MPA networks are based on data-poor situations, however, now is the time to identify essential data needs.

Activity:

1. In small groups, and in reference to the Yellow Sea, map and Worksheet 2.2, identify data gaps in regard to information on: (a) distribution and abundance; (b) spatial depiction of critical life history stages; (c) associated habitat; and (d) major threats.
2. Identify data gaps both spatially (on map) and on Worksheet 2.2.

3. Compare outcomes among small groups in plenary session.

Time: 60 minutes

Worksheet 2.2 Identification of Data Gaps

Slide 25

WORKSHEET 2.2: Identification of Data Gaps

Use the worksheet only for the purposes of identifying data gaps on a country-by-country basis. Each individual will use this as their own worksheet, then collectively your small team will prioritize data gaps for each country and put those results on a flip chart for sharing in plenary.

Check one species only: ☐ SPOTTED SEAL ☐ SPOON-BILLED SANDPIPER ☐ YELLOW CROAKER

Country	POPULATIONS	DAY-TO-DAY SURVIVAL & MAINTAINING HEALTHY POPULATIONS			HUMAN USE ACTIVITIES	
	Distribution & Abundance	Critical Life History Stages	Associated Habitat Types	Associated Ecological Processes	Priority Threats	Effectiveness of Management Measures to Address Threats
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						

Slide 26

EXERCISE 2.2b: Identification of Potential Data Sources

Slide 27

EXERCISE 2.2b: Identification of Potential Data Sources

Objective: this is intended to be a quick and “low hanging fruit” exercise to identify where some of the easily accessible data may reside.

Activity: In small groups, review the priority data gaps from Exercise 2.2, then using Worksheet 2.3, brainstorm to identify existing data, data sources, and potential expertise that could be brought into this project to assist in the planning of a network of MPAs for the Yellow Sea.

Time: 30 minutes

Where are potential sources of data? Are there places where we could get data?

Slide 28

WORKSHEET 2.3: Template for Data Sources

As you write down specific data sources in the matrix, also indicate the specific country this might be applicable to, if appropriate.

Check one species only: ☐ SPOTTED SEAL ☐ SPOON-BILLED SANDPIPER ☐ YELLOW CROAKER

DATA SOURCES ↓	DATA NEEDS						
	Distribution & Abundance	Behavior – Critical Life History Stages	Associated Habitat Types	Associated Ecological Process	Human Use Impacts & Threats	Management Measures to Address Threats	Other
MODELS/ EXTRAPOLATIONS							
IN-SITU DATA							
SATELLITE DATA							
INDIVIDUAL AS SOURCE							
LITERATURE SOURCE							

Worksheet 2.3: Template for Data Sources

WORKSHEET 2.3.docx

Slide 29

PRESENTATION 2.2: Consideration of Human Uses of the Yellow Sea and Their Impacts on the three Representative Species

Since we are talking about creating an MPA network in the Yellow Sea, our concern is designing the MPA network in such a way that it protects the three species from human use (and climate) impacts

on the species. Your next level of understanding will be focused on the human uses. And ultimately, we have to remember that MPA managers do NOT manage resources, they manage human uses and associated impacts.

Slide 30

THREAT: Impacts from Fisheries

(Entanglement, bycatch, overfishing)

Photo source: Patch

We are going to look at some of the priority ISSUES that have been identified by the YSLME project and elaborate on those a bit. NOTE: MAKE THIS AN INTERACTIVE DISCUSSION WITH THE PARTICIPANTS ELABORATING ON IMPACTS SPECIFIC TO THEIR SPECIES.

Use questions! i.e., what do you think some of the impacts may be to these three key species?

Slide 31

THREAT: Impacts from Fisheries

(Entanglement, bycatch, overfishing)

- Drift nets
- Certain purse-seiner
- Gill nets
- Mid-water trawls

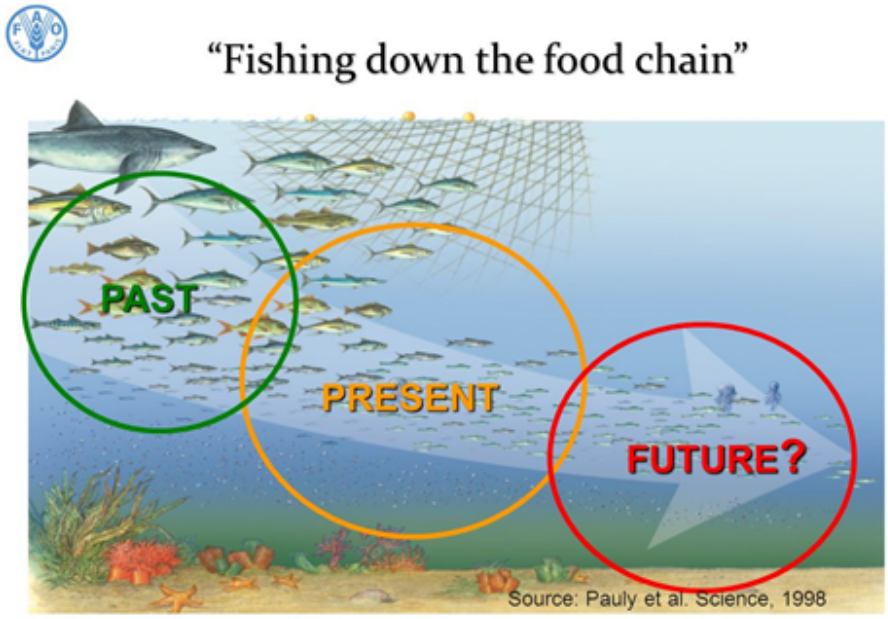
Left to right: Birdlife International, Smithsonian Portal, Oregon State University

32

THREAT: Impacts from Fisheries

(decreasing fish stocks)

- Excessive effort Increasingly landing smaller fishes, from lower end of food chain
- Fishing down marine food webs
- 2/3 fish stocks fished at their limit or overfished (FAO)

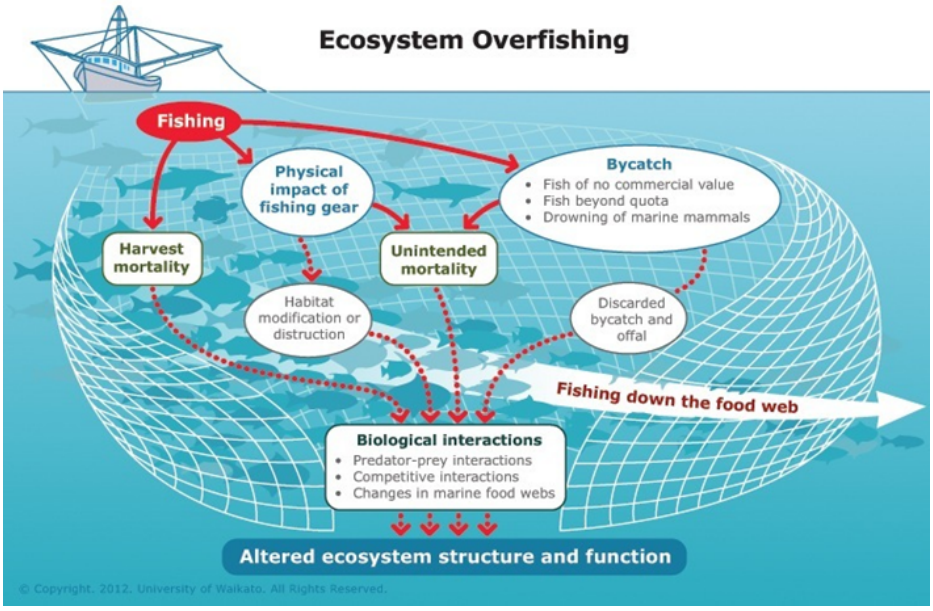


Source: http://images.slideplayer.com/14/4463481/slide_8.jpg

Let's talk a little bit about fishing down the food chain. What are the trends you are seeing in the Yellow Sea? How has the specific kind of catch and the effort been changing?

THREAT: Impacts from Fisheries

(altered ecosystem structure and function)



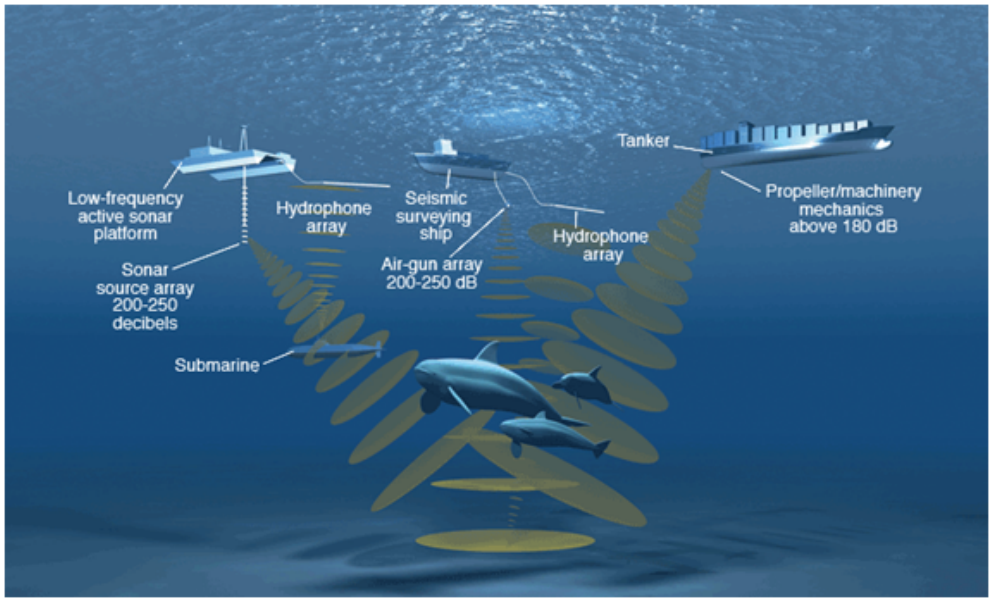
Source: wikipedia

And how can we expand those impacts from overfishing beyond just fisheries resources, what are the secondary impacts we are seeing rippling throughout the ecosystem?

Slide 34

THREAT: Impacts from Shipping

(underwater noise pollution)



Source: www.marineinsight.com

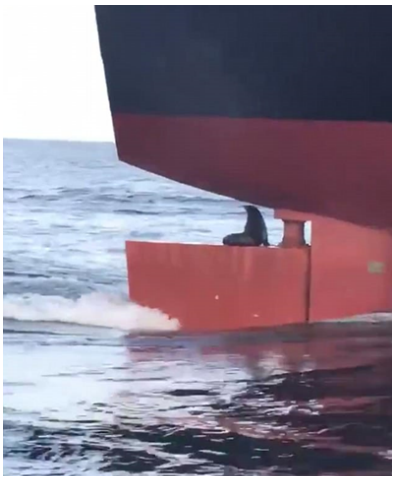
By looking at the shipping lanes and vessel traffic tracking systems in the Yellow Sea, you can see that the volume of vessel traffic is of great concern to marine species and habitats.

Slide 35

THREAT: Impacts from Shipping

(underwater noise pollution)

- Cargo vessels, supertankers, cruise ships produce noise from engines, props, generators and bearings
- Dominates the frequency ranges of 20-300Hz, same range used by many species of cetaceans
- Impedes communication, difficult to distinguish ship noise from natural sounds



Even though this picture shows a "free rider" on the stern of this vessel, in fact, noise pollution is of great concern to many marine species.

Slide 36

THREAT: Impacts from Shipping (collision)

And then, there is always the threat of collisions, which is probably of greatest concern to marine mammals.

Slide 37

THREAT: Impacts from Shipping

(Discharge of pollutants and invasive species, oil spills)

There is also the pollution factor associated with marine shipping – solid waste, liquid waste, ballast water – and the big one – the potential for major oil spills, which we just saw in the Yellow Sea earlier this year.

Slide 38

THREAT: Oil and Gas Development

- Physical impacts of seismic surveys & construction of installations
- Exclusion of marine mammals from valuable habitat and disturbance to resting, feeding & breeding
- Health risks from pollutants and toxins related to oil industry

In addition, the whole renewable energy industry is growing globally at a rapid pace. As of 2016 there were 1,207 projects under way at varying stages of development. Thus, it's not about whether to build them, but rather where.

Slide 39

THREAT: Military Activities

- Exercises & testing may displace or distress animals
- Low & mid-range frequency sonar linked to mass strandings
- Submarine activity, torpedo testing and military maneuvers may disturb animals in their feeding, breeding & resting grounds

These are just some of the known activities of the Navy and their impacts on marine resources.

Slide 40

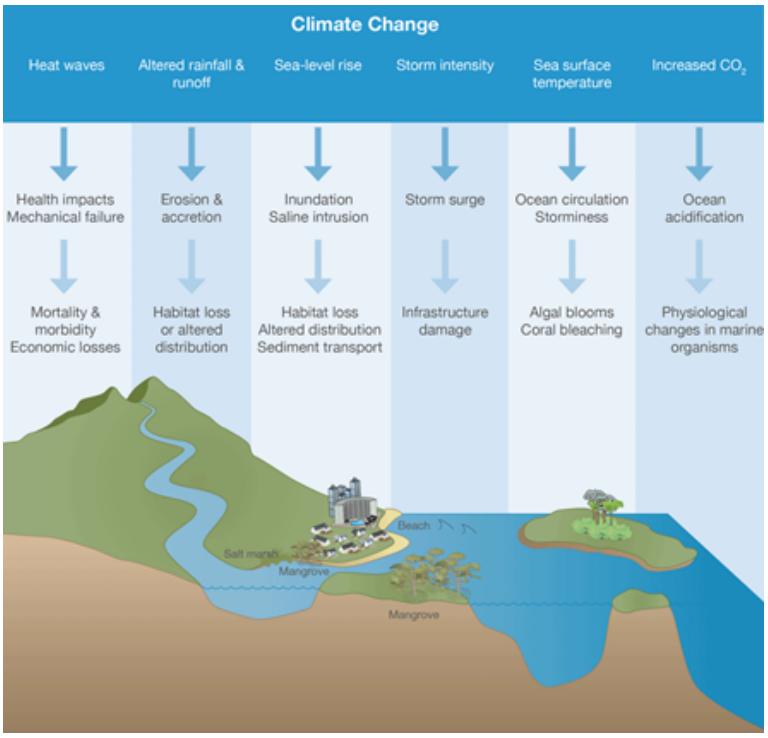
THREAT: Military Activities

Military operations are always as concern and create many of the impacts we already spoke about. There is always the question though, do MPAs have the authority to reduce or control military activities and impacts – usually not. Having said that, in the U.S., we do require the military to develop environmental impact statements about their activities and the impact in biologically sensitive areas.

Slide 41

THREAT: Climate Change

- Loss of food sources animals depend on
- Changes to food web of entire ocean (combined with other non-climate stressors)
- Impacts to migratory paths and breeding grounds
- Probable increase in susceptibility to disease

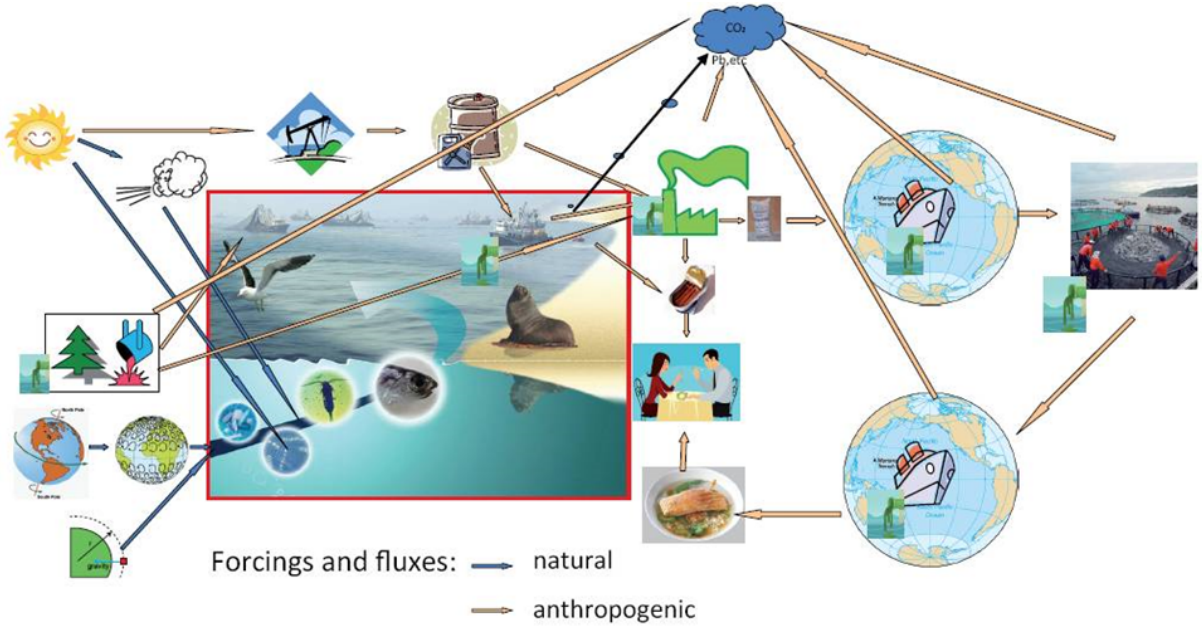


Source: coastadapt

Then there is the impact of climate change – whether you call this a natural or human-induced impact, it has added significantly to the mix of concerns we have as natural resource managers.

Slide 42

THREAT: Climate Change



With the addition of climate impacts creating very real concerns for MPA managers, we are starting to look at and trying to understand the cumulative impacts of both climate and non-climate stressors on the marine resources.

Slide 43

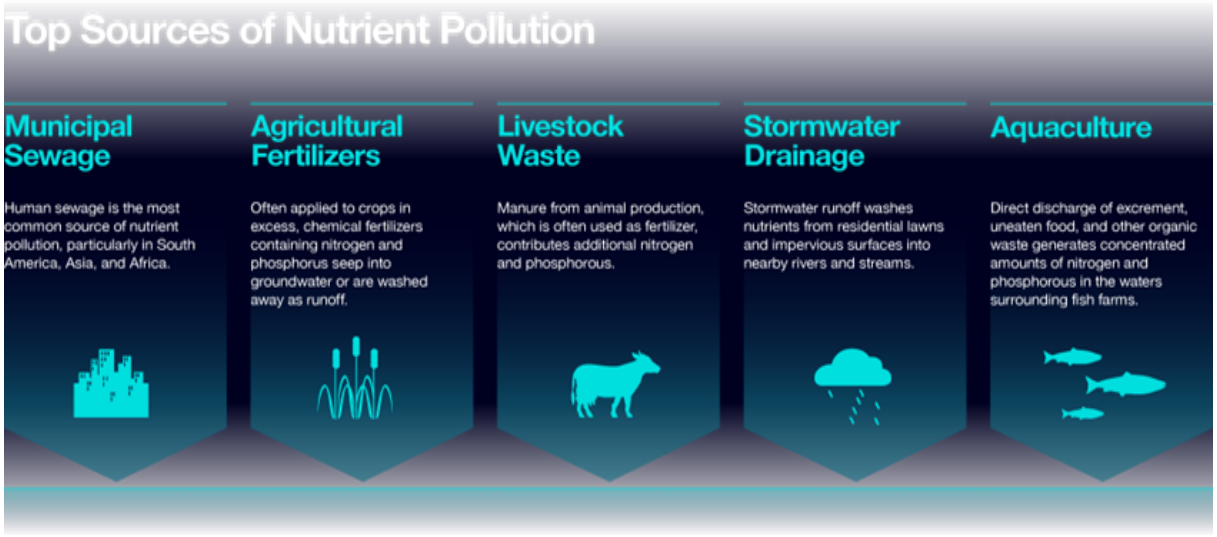
THREAT: Pollutants, Sediment and Toxics

This is a major issue in the Yellow Sea with so many land-based sources of pollutants entering into the Yellow Sea through catchment systems and from the coastal margin, as well as from the marine side.

Slide 44

THREAT: Pollutants, Sediment and Toxics

- Land-based sources of pollutants and toxics
- Ocean dumping of pollutants and toxins
- Sediment loads from streams, rivers and coastal alterations
- PCBs as sources of endocrine disruption, causing impairment of reproduction, development and immunotoxicity
- Stored in fat of animals, passed through milk of females



Source: http://www.oceanhealthindex.org/methodology/components/nutrient-pollution

Along the bottom of this slide, you see some of the major urban and rural types of pollutants entering the system

THREAT: Pollutants, Sediment and Toxics = HAB

Source: Daily Mail

And of course, all these pollutants have a secondary impact in the Yellow Sea as you see here in the harmful algal blooms.

Slide 46

THREAT: Pollutants, Sediment and Toxics

= Jellyfish Blooms

Source: State of the Planet, Columbia University

. . . and jellyfish blooms. The algal blooms and jellyfish blooms are results, not causes!

Slide 47

THREAT: Habitat Loss & Degradation

Then there is loss and degradation of habitat and nowhere has this been more evident than in the loss of mudflats, and important habitat for migratory birds in the Yellow Sea.

Slide 48

THREAT: Habitat Loss & Degradation

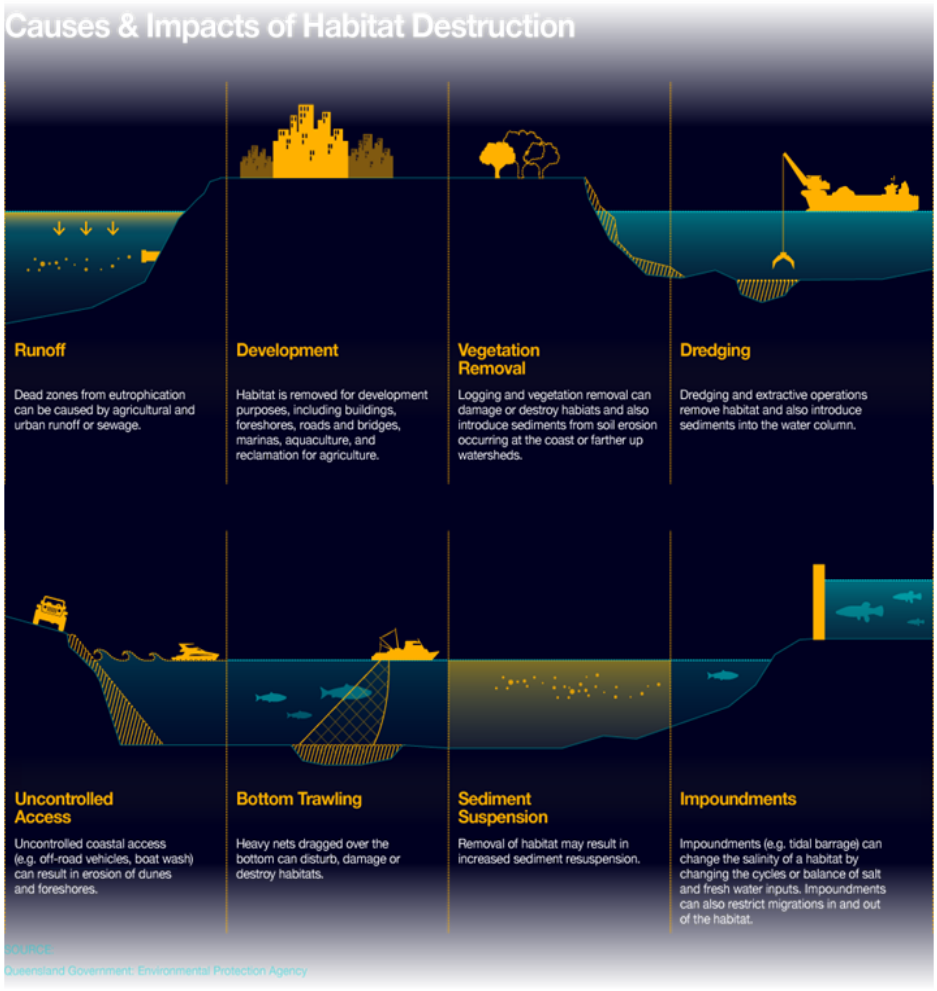
- Coastal development (e.g., landfills and harbors)
- Bottom trawling and dredging (e.g., scallops)
- Renewable energy development
- Fish farms (including acoustic harassment devices)
- Shipping lanes and dredging of channels
- Military activities

Of course, the cause of loss and degradation of habitat are coming from both human uses on the coastline and in the marine environment.

Right side picture is dredging.

Slide 49

THREAT: Habitat Loss & Degradation



http://www.oceanhealthindex.org/methodology/components/habitat-destruction-intertidal

Here is another illustration of causes and impacts of habitat destruction.

Slide 50

THREAT: Unsustainable Mariculture

- Habitat loss
- Habitat destruction
- Non-native species
- Impacts of nutrients on water quality
- Transfer of diseases
- Genetic impacts
- Impacts on bottom culture
- Impacts on feed source

Photo: Jack Parkinson

Finally, but probably not the last of the impacts, are those from the extensive development of mariculture operations in the Yellow Sea.

Slide 51

THREAT: Unsustainable Mariculture

Slide 52

THREAT: EMERGING ISSUES?

Did we miss anything?

Slide 53

EXERCISE 2.3: Analysis of Human Uses and Their Impacts on the three Representative Species

Now we'll engage in a series of exercises to help us better understand what the response is of each of our target species to different kinds of impacts.

Slide 54

EXERCISE 2.3: Analysis of Human Uses and Their Impacts on the three Representative Species

Objective: To understand the types of human interactions and the specific impacts they have on each of the 3 species in order to begin to understand the role that a network of MPAs could play in their protection.

Activity:

1. In small groups, work your way through Worksheet 2.4 to determine what kinds of human

uses are having what sorts of impacts on your representative species.

2. Use your Yellow Sea map to identify the geographic extent of these activities in regard to impacts on your target species.
3. Identify any additional sources of impacts beyond the 9.

Time: 1 hour, 15 minutes

Refer to next slide.

Slide 55

Handout 2.1 Comparing Vulnerability Assessment Models

Handout 2.2 Impact Assessment Terminology

Worksheet 2.4 Analysis of human uses and their impacts on representative species in the YSLME

WORKSHEET 2.4: Analysis of Human Uses and Their Impacts Representative Species in the YSLME

Please review the nine previously identified priority sources of impacts on the natural resources of the Yellow Sea. Please fill out the worksheet to indicate how they might be impacting your representative species of concern. You may add additional impacts specific to your species, from either within or outside the YSLME. Again, indicate where these impacts are taking place on the map, queing them to the numbers on the left side column of this worksheet. On day 3 we will more fully develop the intervention response to human impacts.

Check one species only: ☐ **SPOTTED SEAL** ☐ **SPOON-BILLED SANDPIPER** ☐ **YELLOW CROAKER**

Human Use Activity	a. What is being impacted (animal behavior, habitat, ecological process)?	b. How is the resource being impacted?	c. Is there a specific human behavior that is creating the impact?	d. What is the root cause of the behavior?
Fisheries (Example is for Spotted Seal)	*Animal population size reduced due to entanglement*	*Death from drowning*	*Drift nets*	*Poor enforcement on high seas*
1. Pollution and Contaminants				
2. Eutrophication				
3. Harmful Algal Blooms (HABs)				
4. Fishing Effort Exceeding Carrying Capacity				
5. Habitat Loss and Degradation				
6. Change in Ecosystem Structure				

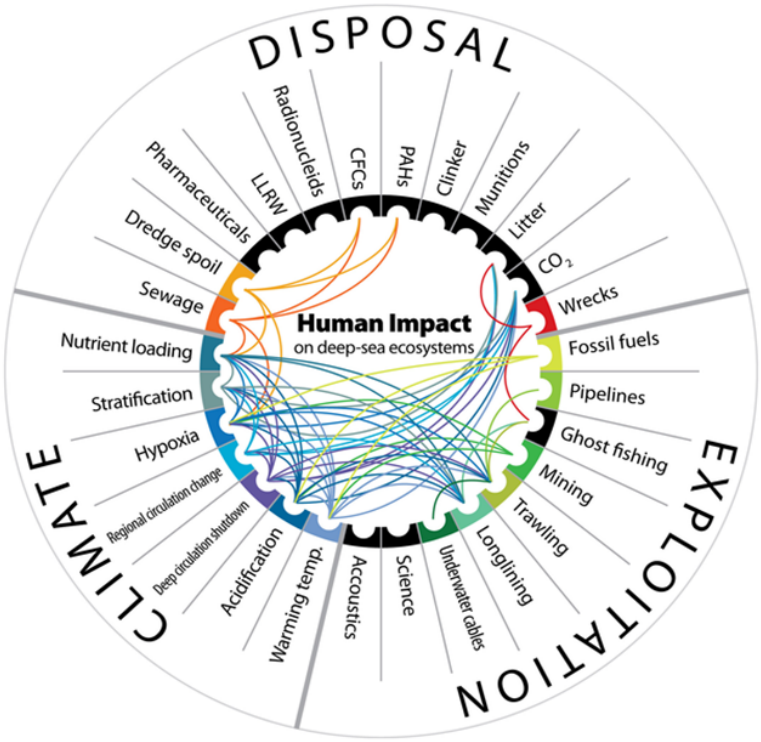
The focus of this exercise is to really understand what the impacts actually look like.

Slide 56

EXERCISE 2.4: Vulnerability Assessment of the three Representative Species

Slide 57

Synergies among anthropogenic and climate impacts on marine species and habitats



PLOS ONE

Now we are going to start to look at what happens when you start to analyze impacts across multiple stressors, not just individual stressors.

Slide 58

EXERCISE 2.4: Vulnerability Assessment of the three Representative Species (two-step exercise)

Objective: To develop an assessment and understanding of how each of the three representative species, respond to multiple stressors. This will help to calibrate the areas of greatest vulnerability, and resilience.

Activity:

1. In small groups, work your way through Poster 2.1a to determine the adaptive capacity of your representative species in regard to specific impacts.
2. Then, work your way through Poster 2.1b.
3. In a gallery walk session, share your results with the entire group.

Time: 90 minutes on worksheets, 40 minutes to share and discuss

Refer to next 2 slides

Slide 59

STEP 1: Impact Analysis

(to what degree is the representative species at risk)

- Based on type of human use impact
- Intensity + frequency of the activity
- Level of impact as a result of the intensity frequency

This a multi-step exercise where we're going to try and first understand how the intensity and frequency of the human use activity (or climate impact). How serious of a repeated assault is the human use activity.

Slide 60

REPRESENTATIVE SPECIES: ☐ Spotted Seal ☐ Spoon-billed Sandpiper ☐ Yellow Croaker
RELATIVE CURRENT CONDITION OF THE POPULATION: ☐ healthy population ☐ moderately impacted ☐ heavily impacted

PART 1: RISK AND ADAPTIVE CAPACITY ANALYSIS

A. Impact Analysis (Risk) (type and level of impact on representative species)					B. Resilience Analysis (describe representative specie	
1. human use activity	2. type of impact from human use activity (describe)	3. intensity of activity	4. frequency of activity	5. impact level	1. resists impact from human use activity (no change)	2. recovers from im from human us activity (some level of ret
a.						
b.						
c.						
d.						
e.						
f.						
			TOTAL IMPACT LEVEL ➔ Add all of vertical column 5 and divide by the number of human uses in column 1 (higher overall number indicates less impacts or more positive response)		TOTA Add all of vertical column 4 and div (higher overall number indicates greater ca

INSTRUCTIONS (by column number) FOR IMPACT ANALYSIS:

1. List no more than the top 6 major human use activities that take place in the YSLME and have the likelihood of greatest impact on your species.
2. Describe the specific impact on your representative species.
3. Intensity of activity = volume, size or number of incidents

INSTRUCTIONS (by column number

1. Resist – Is the representative spec change as a result of this stressor (nc
2. Recover – Is the representative sp to such a level that it is viable (in term

We are going to start by first looking at the left-hand side of poster 2.1a and calibrating the intensity and frequency of each of the human use activities and then give it an impact level rating (column 5). The impact rating system is explained in the instructions at the bottom and to the left.

Once the left-hand side is complete, then the next step is to try and understand the response of your target resource to the impacts. How well does your target resource adapt to change? So now you

can fill out the right-hand side of poster 2.1a, and rate the adaptive capacity based on the instructions in the box at the bottom and to the right.

Poster 2.1a Impact Analysis of Human Use Activities on Representative Species

Poster 2.1b Impact Analysis of Human Use Activities on Representative Species

Slide 61

STEP 2: Resilience Analysis

(to what is the ability of the representative species to adapt to impacts)

- Resists impact from human use activity
- Recovers from impact
- Irreversible impacts
- Resilience level (level of adaptability)

The second step to this assessment is to try and understand the cumulative impacts, across all the stressors. Go to next slide.

Slide 62

POSTER 2.1b: Impact Analysis of Human Use Activities on Representative Species

In the first pass of this exercise (poster 2.1a) we looked at the response of the representative species to individual human uses or stressors. Now we're going to take a brief look at the cumulative impacts from multiple stressors on each representative species.

REPRESENTATIVE SPECIES: ☐ Spotted Seal ☐ Spoon-billed Sandpiper ☐ Yellow Croaker

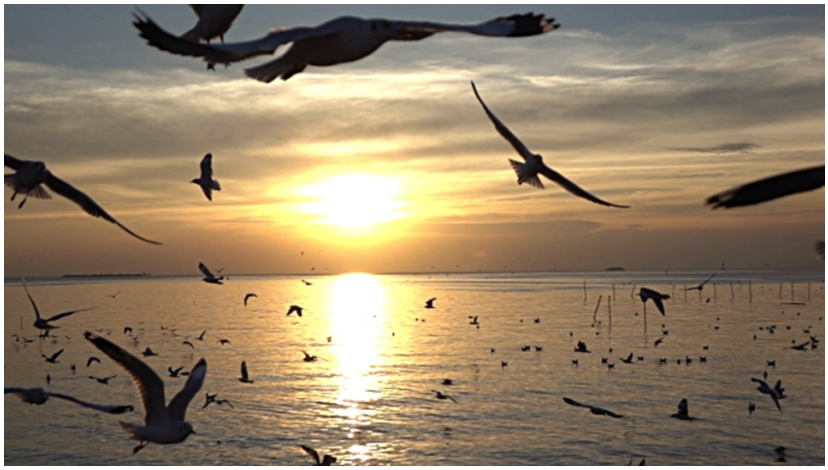
PART 2: CUMULATIVE IMPACT ANALYSIS

A. How the representative species or ecosystem responds to multiple stressors:		B. Impact on representative species over time:
1. Are there secondary (or amplified) impacts on the representative species as a result of the combination of two or more stressors/ from human use activities? Describe the combination of stressors and their impacts.	a. b. c.	1. If the cumulative impacts are constant from year to year (accounting for predictable variables like seasonality), what is the anticipated loss of that representative species (population size, spatial extent, etc.) over the next 5 years if no action is taken: 1% 5% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% ➔ percent of loss over 5 years
2. At what level do you expect to see change as a result of multiple human use stressors on your representative species?	☐ Individual (health, distribution) ☐ Population (productivity) ☐ Community (species diversity) ☐ Ecosystem (functional and intact system)	
3. What types of impacts do you expect on the human community as a result of the cumulative impacts on your representative species? (please describe)	1. social: 2. economic: 3. cultural: 4. other: 5. other:	2. If the cumulative impacts are constant from year to year (accounting for predictable variables like seasonality), what is the anticipated loss of that representative species (population size, spatial extent, etc.) over the next 10 years if no action is taken: 1% 5% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% ➔ percent of loss over 10 years

First walk your way through "Part A" and as you answer the questions, think about the effect of ALL the stressors on your target resource. Then, go to "Part B" and make an assessment of what would happen if there is no YSLME network in place to protect your species. Once you are done with both posters, put them up on the wall together and we will walk around and hear from all three groups what your findings are.

Slide 63

Thank you



Day 3. Understanding Tools and Approaches for Managing Impacts on Species and Habitats

July 25, 2018 ◆ Seocheon, Republic of Korea

Spotted Seal *Spoon-billed Sandpiper* *Yellow Croaker*

Spotted Seal: Philagraphicon; Illustration of Spoon-billed Sandpiper: Planet of Birds Yellow Croaker Illustration: : Planet of Birds

Summary of Day 3:

During Day 3, we work to determine the level of adaptive capacity of the three representative species' key habitats. Assess management options and anticipated results such as type of intervention and target audience for intervention, what is actually being addressed by intervention and anticipated change results from intervention. With the understanding that we can't look at singular human impacts, we need to look at impacts of collective uses and cumulative impacts. We analyze what are the impacts collectively doing; We also evaluate the adaptive capacity of habitats. We look at resiliency and the five parameters to measure the resiliency of a system; We review the status, condition of and potential for MPAs in China and RO Korea to implement recommended management interventions from the organizational capacity, institutional authority, management potential perspectives, and identify the management gaps; and towards the end of the day we identify areas of vulnerability of the representative species, habitats, management capacity, organizational capacity and ability to address human use impacts.

Duration: 9 hours including 2 hours for coffee breaks and lunch

Competencies needed: At least 50% of the participants are MPA management practitioners in the Yellow Sea in China and RO Korea (ideally 25% from China and 25% from RO Korea). At least 50% of the participants work in scientific research or resource conservation of the three indicator species and their habitats at research institutions or not-for-profit conservation organizations.

The objectives of Day 3 are:

1. To understand the adaptive capacity of each of the three species' key habitats to the 9+ stressors as a calibration of how they might respond to protection within an MPA network.
2. To get an early calibration on what management interventions might be appropriate to addressing the impacts on each of the three representative species, and what the anticipated results might be in terms of improving the protection of these species.

3. To make a determination of the potential capacity of existing MPAs in China and RO Korea for extending adequate protection to the representative species and habitats by addressing human use threats, and if not, where are the gaps.
4. To consolidate the assessments conducted on Day 2 and Day 3 in order to identify patterns or areas of strengths or weaknesses to better understand the assets and limitations we are working with in designing an MPA network.
5. To look at other possibilities beyond MPA site interventions as tools to protect representative species and habitats, particularly within a transboundary or international context.

RECOMMENDED VIDEOS:

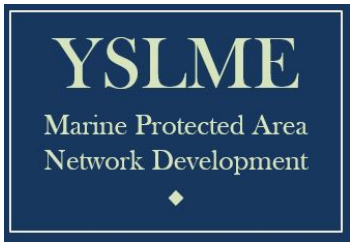
- MPA Film: Protecting Marine Life (with English captions) Coastal America (2:31)
- Baltic Sea MPAs (Ocean + TV) (1:43)
- See What's Underwater in Chile's Newest MPA (WWF Canada) (3:21)

The main outcomes of the 3rd day of the YSLME MPA Network Design 1st technical workshop on July 25, 2018 in Seocheon, RO Korea, used the assessment conducted on Day 2 regarding human induced and cumulative impacts on the three representative species (Page 3 of Appendix A) to then (a) Evaluate the adaptive capacity of the key habitats of each of the representative specie; (b) the assessment of the MPA Network management capacity in each country; and (c) calibrate the vulnerability of the three representative species, habitats, management and organizational capacity to obtain an overall assessment of where the strengths and weaknesses are in the Yellow Sea for each species.

Slide 1

Marine Protected Area Network Development

Today we are going to focus on the management side of a network of MPAs. Designing and designating the network is only half of what is required for creating an effective MPA network. The real work starts when you start to assemble what the management possibilities might look like.



Slide 2

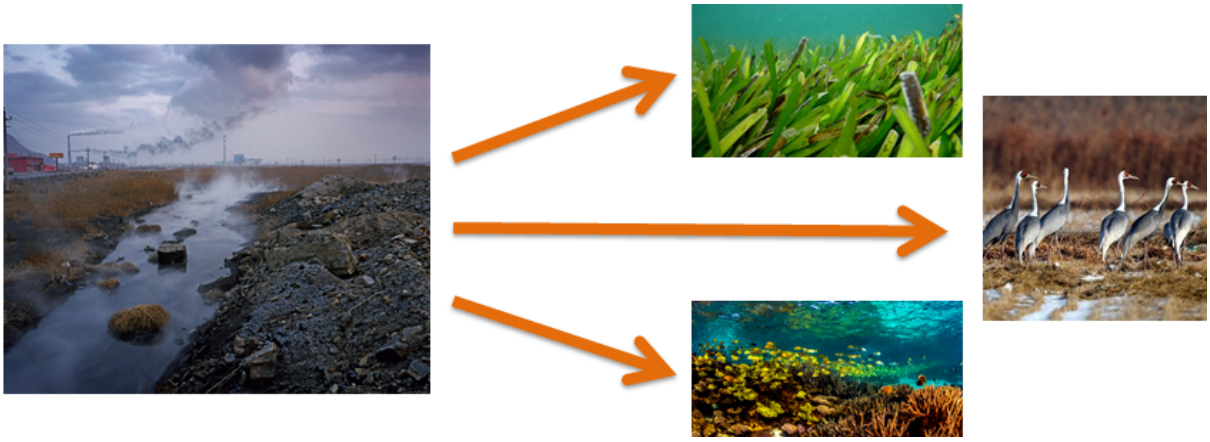
PRESENTATION 3.1: Adaptive Capacity of the three Representative Species' Key Habitats

However, to start with, we will complete our analysis on the vulnerabilities and adaptive capacity of key habitats associated with our species of concern.

Slide 3

Adaptive Capacity of Different Habitat Types

- *Each habitats' response to the frequency and intensity of the impacts from human use activities*
- *What happens if we look at single sources of impacts versus cumulative impacts*



We are going to look at 2 factors:

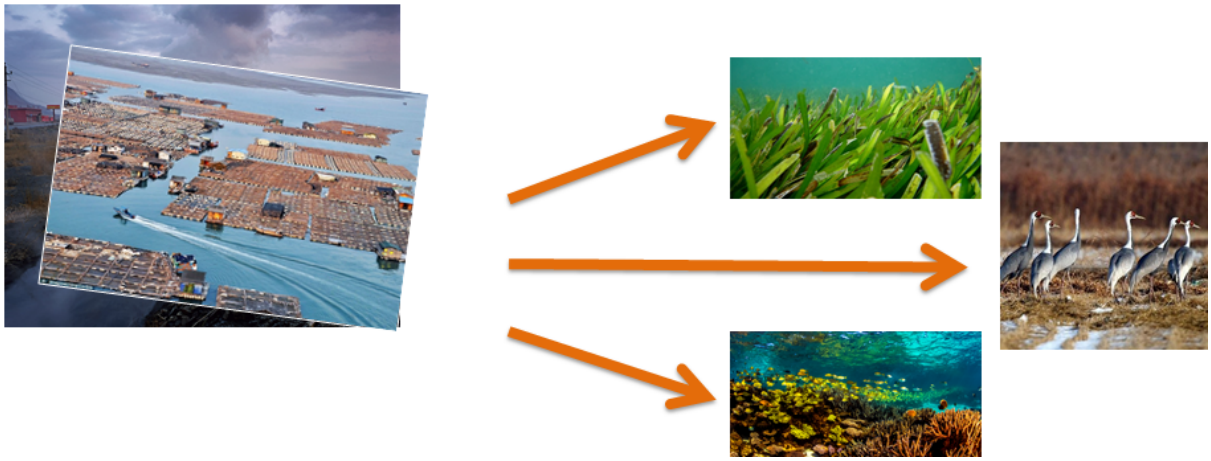
1. *The sensitivity of each habitat type, for instance we know that the fragility and recovery rate of a coral reef system when heavily impacted by human induced stressors is far greater than another habitat type such as a seagrass bed*
2. *However, we also know there is a difference between looking at a single impact on a habitat as opposed to understanding how a habitat responds to the cumulative effects of multiple stressors. We see an example here in the slide of non-point source pollution and how, when it interacts with different habitat types, the response is going to be different between mudflats versus seagrass versus coral reefs.*

Slide 4

Adaptive Capacity of Different Habitat Types

- *Each habitats' response to the frequency and intensity of the impacts from human use activities*
- *What happens if we look at single sources of impacts versus cumulative impacts*

Then, what happens from the layering effect of multiple stressors on each of these habitats – is the distinction between different levels of response the same, more equalized or more pronounced.

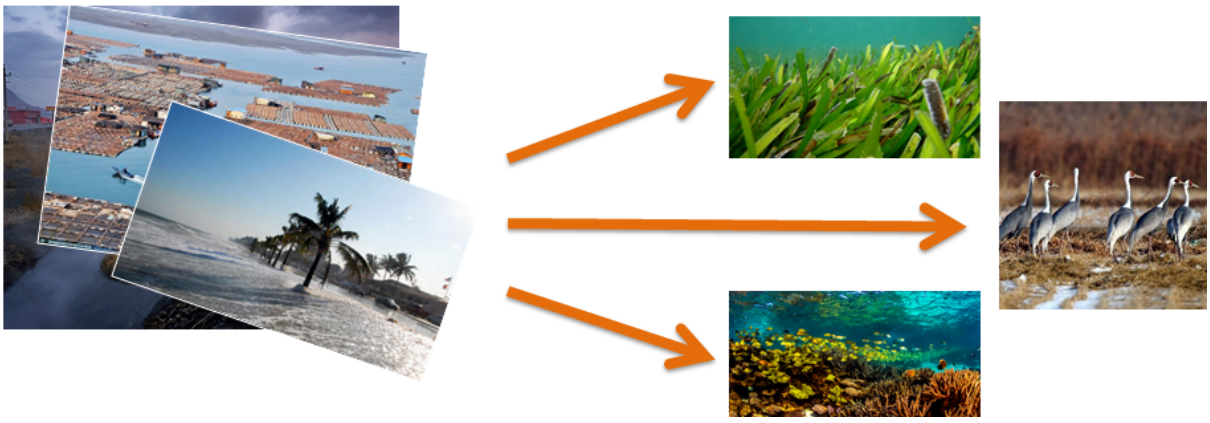


RUN QUICKLY THOUGH THE NEXT 2 SLIDES AS WELL.

Slide 5

Adaptive Capacity of Different Habitat Types

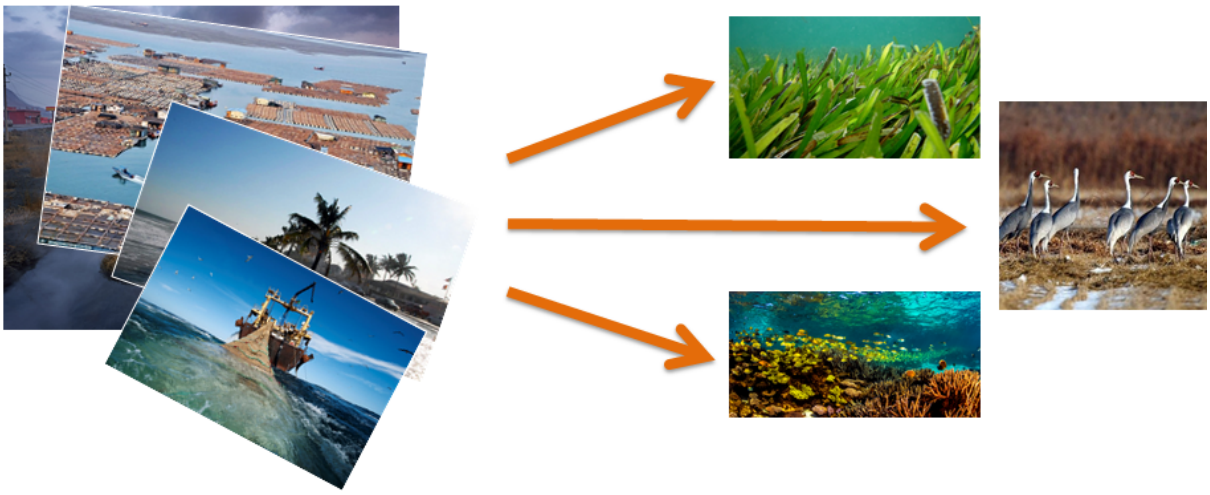
- *Each habitats' response to the frequency and intensity of the impacts from human use activities*
- *What happens if we look at single sources of impacts versus cumulative impacts*



Slide 6

Adaptive Capacity of Different Habitat Types

- *Each habitats' response to the frequency and intensity of the impacts from human use activities*
- *What happens if we look at single sources of impacts versus cumulative impacts*



Slide 7

Adaptive Capacity of Different Habitat Types:

Considerations for Evaluation

- *Extent, distribution and connectivity: geographic extent, integrity, continuity*
- *Past evidence of recovery: rate of regeneration*
- *Value/importance: value ecologically or societally*
- *Physical diversity: diverse physical and topographical characteristics*
- *Biodiversity: level of diversity of component species and functional groups in a habitat*

In order to evaluate the adaptive capacity of different habitat types, we are going to bring these five different parameters into play.

Slide 8

What does resilience look like?

- *Broad Geographic Extent*
- *Strong Recruitment*
- *Broad Size/Age Range*
- *High Biodiversity*
- *Low Human Impacts*
- *Healthy Populations*
- *History of Surviving Stress*

This is what a resilient system looks like – in other words, it has a high adaptive capacity to stress.

EXERCISE 3.1: Adaptive Capacity of the three Representative Species' Key Habitats

Objective: *to understand the adaptive capacity of each of the three species' key habitats to the 9+*

POSTER 3.1: Adaptive Capacity Assessment of Key Habitats (based on condition and response)

This is a rapid assessment of the status and condition of the "ecological potential" for each major habitat associated with key life cycle periods of your representative species. Review definitions for "ecological potential" terms in handout 1.3. Then, rate on a scale from 1-5 (see scoring interpretation at bottom of poster) for each habitat type. If you think your answers might vary considerably by stressor, consider evaluating the habitat for each stressor separately.

REPRESENTATIVE SPECIES: ☐ Spotted Seal ☐ Spoon-billed Sandpiper ☐ Yellow Croaker

HABITAT TYPE	ECOLOGICAL POTENTIAL	SCORE	RATIONALE
1.	a. Extent, distribution & connectivity		
	b. Past evidence of recovery		
	c. Value/ importance		
	d. Physical diversity		
	e. Biodiversity		
	(divide total score by 5) TOTAL SCORE ➔		
2.	a. Extent, distribution & connectivity		
	b. Past evidence of recovery		
	c. Value/ importance		
	d. Physical diversity		
	e. Biodiversity		
	(divide total score by 5) TOTAL SCORE ➔		
3.	a. Extent, distribution & connectivity		
	b. Past evidence of recovery		
	c. Value/ importance		
	d. Physical diversity		
	e. Biodiversity		
	(divide total score by 5) TOTAL SCORE ➔		
4.	a. Extent, distribution & connectivity		
	b. Past evidence of recovery		
	c. Value/ importance		
	d. Physical diversity		
	e. Biodiversity		
	(divide total score by 5) TOTAL SCORE ➔		
5.	a. Extent, distribution & connectivity		
	b. Past evidence of recovery		
	c. Value/ importance		
	d. Physical diversity		
	e. Biodiversity		
	(divide total score by 5) TOTAL SCORE ➔		

stressors as a calibration of how they might respond to protection within an MPA network.

Activity:

1. *In small groups, and in reference to Handout 3.1, use Poster 3.1 to evaluate the adaptive capacity of each of the key habitats for your representative species in response to cumulative impacts*
2. *Share your findings in a gallery walk session*

Time: *1 hour for exercise, 15 minutes to share*

NEXT 2 SLIDES SHOW HANDOUT 3.1 AND POSTER 3.1


HANDOUT 3.1.docx


POSTER 3.1.docx

Slide 10

HANDOUT 3.1: Ecological Factors of Adaptive Capacity

Extracted and modified from: CEC 2017. *North American Rapid Vulnerability Assessment Tool*. Montreal, Canada, Commission for Environmental Cooperation. 30pp

To help in the evaluation of the **ecological potential** factors of adaptive capacity, consider the following explanation of each factor. Keep in mind that you do not need to evaluate a factor that does not apply to habitat.

Extent, distribution & connectivity: Habitats that are currently widespread in their geographic extent in the YSLME, with high integrity and continuity likely have greater adaptive capacity, and may be more likely to withstand stresses and persist into the future. Habitats that are degraded, isolated, limited in extent, or currently declining due to non-climate and climate stresses likely have less adaptive capacity, and may be less likely to persist into the future.

Past evidence of recovery: Some habitats may have more rapid regeneration times and/or are dominated by species with short generation times. Habitats with a shorter recovery period from the impacts of stressors (<20 years) may have greater inherent ecological adaptive capacities than slower developing/ recovering habitats (>20 years), as slower recovering habitats may be more inherently vulnerable to the potential intervening effects of stressors.

Value/importance: Is the habitat highly valued ecologically or societally? Habitats with a high societal value likely have higher adaptive capacity, as people may have a greater interest in protecting and/or maintaining them and the ecosystem services they provide. Habitats may be ranked as having high ecological value due to greater compositional heterogeneity/variability, or as a result of their high value they may benefit from greater conservation prioritization, either of which could confer greater adaptive capacity.

Physical diversity: Habitats that include diverse physical and topographical characteristics (e.g.,, variety of aspects, sediment types) may have higher adaptive capacity. Also known as heterogeneity, this could be a site with a more varied depth profile, complex currents, north and south facing habitat, or many other variable physical features that could confer adaptive advantage.

Biodiversity: The level of diversity of component species and functional groups in a habitat may affect the adaptive capacity of that habitat to impacts. For example, habitats with multiple species per functional group likely have greater adaptive capacity because response to changes from stressors varies among the species. Greater biodiversity in terms of variety and number of component species and functional groups may increase potential adaptive capacity for a given habitat at a given location.

Slide 11

PRESENTATION 3.2: Management Intervention Results Chain

Now that we have complete our vulnerability/adaptive capacity analysis on the natural system of the Yellow Sea, we are going to start to look at management approaches appropriate to the network of MPAs, and relevant to the stressors we are trying to address.

Slide 12

What does managing an MPA actually mean?

Are we actually managing the natural resources?

What is it we are actually managing?

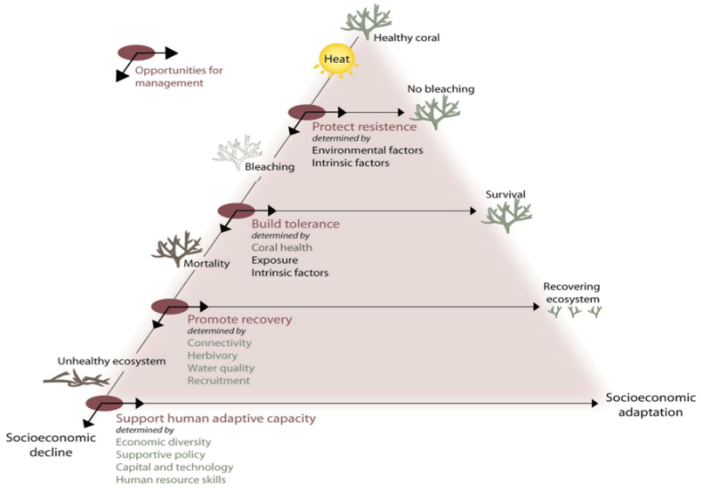
Slide 13

NO.

Were actually managing human behavior.

We don't need to manage the natural resources, they do fine on their own, especially if left alone. We just have to manage human interactions with the natural resources.

Slide 14



This slide is an example of a coral reef ecosystem going through dynamic changes as a result of ocean warming and the opportunities for intervention BEFORE the system is beyond it's "tipping point".

Slide 15

How do we manage human behavior?

1. INFLUENCE BEHAVIOR

- ✓ *Education*
- ✓ *Voluntary compliance*
- ✓ *Best management practices*

So what can we actually do as MPA management? For sure the biggest part of our job is managing human behavior and taking the pressure from humans off of the natural resources. We can start with the soft touch of "influencing behavior" – educating people about the value of the natural resources in the hopes that understanding will result in them changing their behavior. You can see some examples of how we do that in this slide.

Slide 16

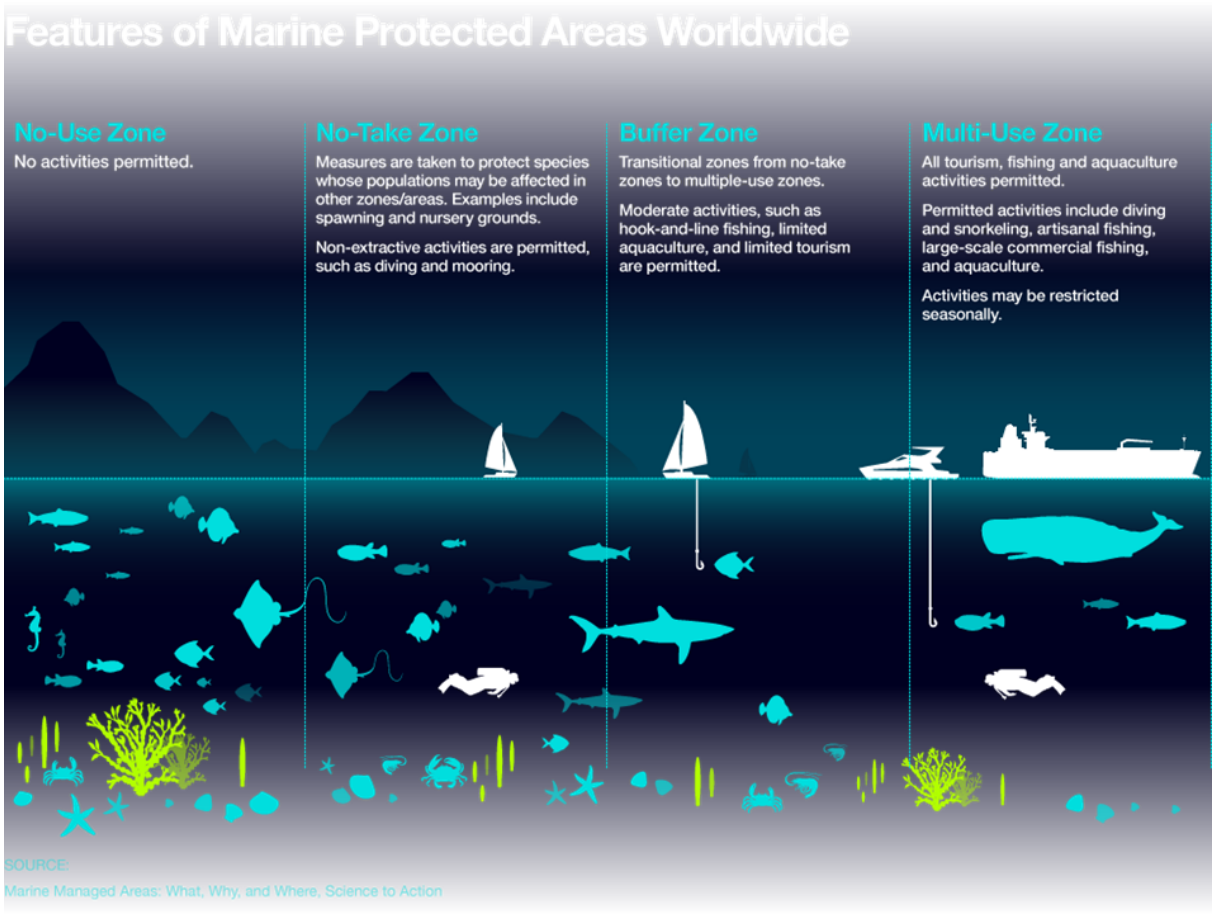
How do we manage human behavior?

2. MODIFY BEHAVIOR

- ✓ *Regulations*
- ✓ *Permits*
- ✓ *Spatial restrictions: zones for specific uses*
- ✓ *Spatial restrictions: zoning by objectives*
- ✓ *Spatial restrictions: zoning to prohibit activities*
- ✓ *Temporal zones: seasonality*

The next level of changing human behavior is to "modify behavior" by putting some requirements on how people conduct themselves when in an MPA.

Slide 17



Source: Ocean healthindex.org

This just gives you a further example how MPAs use zoning to "modify behavior", allowing for a range of activities to take place in an MPA depending on the type of zone.

Slide 18

How do we manage human behavior?

3. CONTROL BEHAVIOR

- ✓ *Prohibitions*
- ✓ *Enforcement*
- ✓ *Recommendations to other authorities*

The 3rd level of changing human activity is to actually "control behavior". This means to prohibit some activities from taking place altogether, meaning enforcing and prosecuting violators. It also means that when an MPA does not have the authority to prohibit an activity, they coordinate with an entity that does have the authority (e.g., Ministry of Fisheries, Military, CZM management authority, etc.).

We should also note here that there is some overlap here between these different behavior change

approaches.

Slide 19

How do we manage human behavior?

4. OTHER MANAGEMENT MEASURES

- ✓ *Economic incentives: user fees, access fees or license fees*
- ✓ *Economic incentives: right of way fees*
- ✓ *Economic incentives: development fees*
- ✓ *Economic incentives: permit fees*

Our final behavior change approach has to do with creating incentives or disincentives – depending on how you look at it. In any case, fee systems are a way to put a value on the natural resources, and, as a user group, you are required to pay for that value when you use the waters of an MPA. This is not without controversy as it lands right in the middle of the conversation about "open access" to the marine environment. However, as that conversation about "open access" is changing, so is the valuation of the natural resources and the access to them changing. Look at how marine spatial planning has caught on around the world.

Slide 20

EXERCISE 3.2: Management Intervention Results Chain

Objective: *To get an early calibration on what management interventions might be appropriate to addressing the impacts on each of the three representative species and habitats, and what the anticipated results might be in terms of improving the protection of these species.*

Activity:

1. *In small groups, and in reference to Handouts 3.2 and 3.3, use Poster 3.2 to determine how you are going to change human behavior in order to improve the adaptive capacity of your species and meet your MPA network objectives*
2. *Share your results with the entire group.*

Time: *1 hour, 20 minutes for exercise, 25 minutes to share*

Now it's time for you to look at these "behavior change" management tools and see how you can apply them to the human use activities occurring in the Yellow Sea that may be impacting the habitats and species you are trying to protect.

NEXT 2 SLIDES CONTAIN IMPORTANT HANDOUTS FOR THE WORKSHOP PARTICIPANTS TO REFER TO. THEN TALK THEM THROUGH THE ACTUAL POSTER.

Poster 3.2 Management Intervention Results Chain

POSTER 3.2.docx

Handout 3.2 Behavior-based Management Strategies Flow Chart

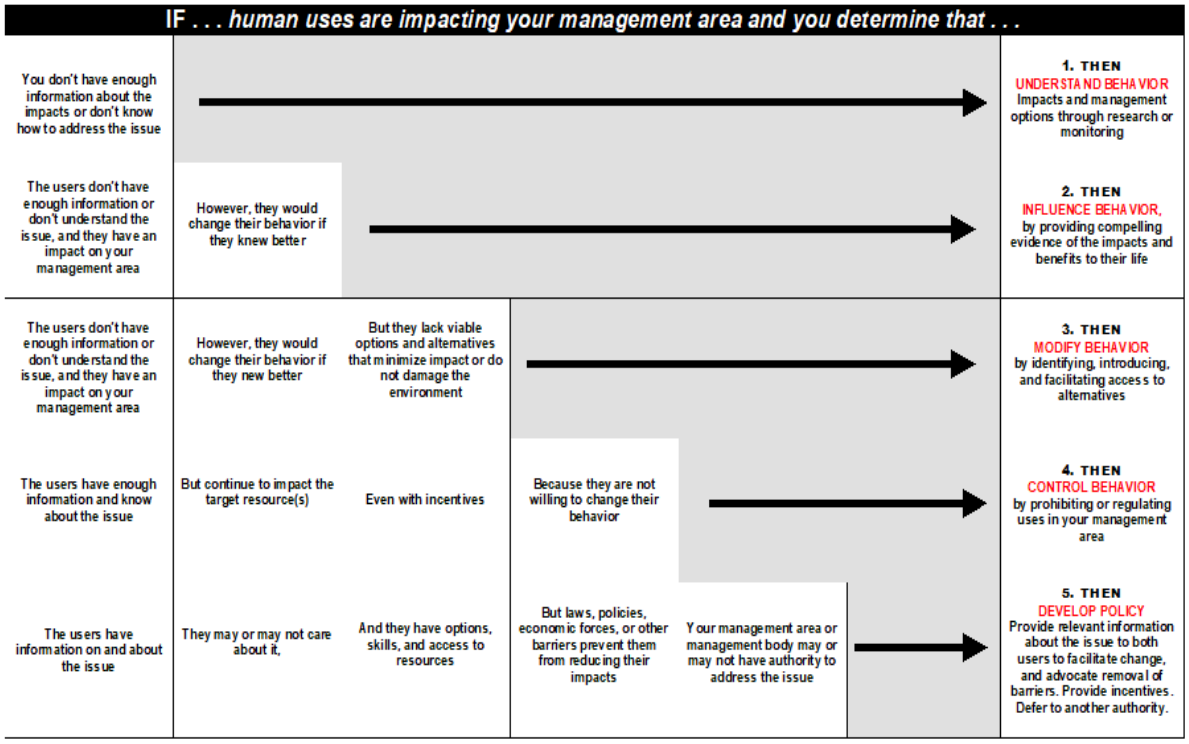
HANDOUT 3.2.doc

Handout 3.3 MPA Network Management Strategies

HANDOUT 3.2.doc

Slide 21

HANDOUT 3.2: Behavior-based Management Strategies Decision Making Flow Chart



HANDOUT 3.3 Understanding MPA Network Management Strategies

Management Tool	Description of MPA Management Strategy
1. INFLUENCE BEHAVIOR	
Education and Outreach	Education and public outreach may be the best approach for low to medium impact uses whereby a modification of behavior is all that is required to make that activity compatible with your conservation objectives. ➡ *An example is to provide a visitors' center and signage near bird nesting sites so that tourists don't disturb these areas during nesting season; or a boater education campaign, including signage at marinas, to educate boaters on no discharge zones in a management area.*
Voluntary Compliance	Voluntary compliance can apply to zones or BMPs and seeks to educate the user group about the impacts from their specific activity with the intent that they will choose to comply with the recommendations of voluntary zones or BMPs. ➡ *An example of a voluntary zone would be to ask fisherman not to fish during spawning season in a specific area.*
Best Management Practices (BMPs)	Best Management Practices set a standard for how an activity is to be conducted in order to reduce impacts on natural resources. A BMP can either be put in place as a mandatory or voluntary action. ➡ *An example of a BMP for a dive boat operation is that before each dive a site orientation is required to be given by the dive master for the divers to explain the dive site, fragile environments and diving etiquette.*
2. MODIFY BEHAVIOR	
Regulations	Regulations are used to control how, when or where specific activities can or cannot take place in a management area or a specific zone. Each zone will most likely have it's own set of regulations. ➡ *For example, regulations for a "fishing zone" might specifically state that hook and line fishing is allowed, while any bottom contact gear is prohibited.*
Permits	Allows certain activities to take place within the management area or in specific zones based on the conditions of the permit. ➡ *Example of a research permit is one that allows for research activities to take place in the conservation zones IF no bottom contact takes place as a result of the research activity. In addition to this requirement, the research PI may be required to file a research methods plan prior to receiving the permit, or required to share data with the management area manager(s).*
Spatial Restriction: Zoning for Specific Uses	Used primarily to 1) cluster activities that are similar in terms of impacts and spatial/temporal requirements; and/or 2) to specifically separate activities that are not compatible with one another. ➡ *Zoning for specific uses might include: wind farms, military operations, sand and gravel mining, marine transportation, offshore mariculture; or for broader categories of uses such as industrial uses vs low impact recreational uses*
Spatial Restriction: Zoning by Objective	Primarily used to meet management objectives of management area. ➡ *Zoning by objective might include: economic development areas, conservation areas, multiple use areas, cultural protection areas*
Spatial Restriction: Zones for Prohibiting Specific Uses	Used to prohibit a specific use that is not compatible with the primary objectives of the management area. Prohibition zones may be spatially discrete areas, or might apply to the entire management area. ➡ *Prohibition zones might include something like the exclusion of oil and gas development anywhere in the management area.*
Temporal Zones	Temporal zones are most often applied to coincide with specific periods in the life history of a living marine resource; or to allow a human use activity that happens only during a specific small window of time, but on a regular basis. ➡ *Examples of temporal zones might include the closing of a beach to tourism during turtle nesting season or fishing closure during spawning season. Temporal zones can also be used to allow an activity that occurs on a periodic, but regular basis such as regatta.*
3. CONTROL BEHAVIOR	
Prohibitions	Determines specifically when are activity cannot take place in the management area (or in a specific zone). ➡ *Example of a prohibition is making an activity such as sand mining illegal anywhere in the management area; or making the use of jet skis illegal in or near sensitive seabird nesting sites.*
Enforcement	Increase enforcement presence on the water and shoreline, and improve interpretive enforcement (education and outreach) to increase compliance with regulations. ➡ *An example includes Investing in training and paying local community members to conduct on-going shoreline observations and maintain presence on the water; or creating an MOU with the military to enforce zones and/or regulations in your management area.*
Recommendation to Other Agencies	"Recommend to Other Agencies" is a management strategy that directs the management area manager(s) to request other agencies with jurisdictional authority within or adjacent to your management area to either create their own zones or take management action to address impacts on your management area. ➡ *Example is to coordinate with coastal zone managers to create development set back zones to control sediment input or discharge into your management area.*
4. OTHER MANAGEMENT MEASURES	

Slide 23

PRESENTATION 3.3: Assessment of Management Capacity

Slide 24

What is management capacity?

The ability to effectively manage human use activities in order to bring about measurable changes that show a trend towards meeting your MPA network objectives.

After all, our real purpose in creating an MPA network is to create more resilient species and habitats in order to protect and provide them with a viable and healthy future. This requires some management capacity.

Slide 25

What is management capacity?

1. MANAGEMENT POTENTIAL

- ✓ *Staff is well trained and technically competent*
- ✓ *Management is responsive and able to adapt to change*
- ✓ *Stakeholder support and engagement is strong*
- ✓ *Management is proactive rather than reactive*
- ✓ *Management engages in strong partnerships*

There are two pieces to management capacity: (1) management potential; and (2) operational capacity. Let's start with "management potential" and these five key points: READ SLIDE.

Slide 26

What is management capacity?

2. ORGANIZATIONAL CAPACITY

- ✓ *MPAs are backed by strong political will*
- ✓ *MPAs have the necessary authority, policy and regulations to effectively manage*
- ✓ *MPAs are supported by strong enforcement program*
- ✓ *MPAs are committed to monitoring and evaluation programs*
- ✓ *MPA have sustainable financing mechanisms secured and in place*

The other side of management capacity is "organizational capacity". READ SLIDE. Without a strong "management potential" and "organizational capacity" in place, it is unlikely that your interventions will be effective, and in effect, you will have a paper MPA network.

Slide 2

EXERCISE 3.3: Assessment of Management Capacity

Objective: *Now that we have taken a closer look at different management approaches, we need to determine the potential capacity of existing MPAs in China and South Korea and their ability to extend adequate protection to the representative species and habitats by addressing human threats, and if not, identify the gaps.*

Activity:

1. *In small groups, and in reference to Handout 3.4, use Poster 3.3 to determine the existing MPAs organizational and institutional capacity, management potential and gaps,*
2. *Share your results with the entire group.*

Time: *1 hour for exercise, 30 minutes to share*

Handout 3.4 List of Existing MPAs in China and South Korea

Poster 3.3 MPA Management Adaptive Capacity

Let's check in on the management capacity of MPAs in the Yellow Sea. SEE NEXT 3 SLIDES.

POSTER 3.3: MPA Management Adaptive Capacity

We will conduct this evaluation by MPA designation category (under what authority was this MPA designated as indicated horizontally across the top). Try to keep in mind your representative species to best understand how these different kids of MPAs might address the types of impacts you are concerned with. To score each MPA type based on the evaluation criteria, review the scoring system at the bottom of the poster. You may work on this in plenary, as a whole group, or break into country groups. See scoring system at bottom of matrix.

Management Capacity Evaluation Criteria ↓	China MPA Designations					South Korea MPA Designations						
	SEPA	SOA	SFA	Prov. Gov	MOA	Marine Life Protected Area	Marine Ecologic Protected Area	Wetland Protected Area	Marine Environ Conserv	Fisheries Resource Protect	National, Province, Co. Park	Natural Heritage
Management Potential												
1. MPA staff are well trained and technically competent, providing sufficient time, understanding and dedication to effectively manage. 2. MPA management is knowledgeable and responsive to change in the environment and able to adapt management approaches and actions during incidents or high periods of stress.												
3. Stakeholder relationships are strong and adaptable to changing situations in both the environment and MPA management. 4. Management is proactive in its ability to identify, respond and adapt to changes before they become evident and an unmanageable problem.												
5. MPA management has strong partnership relationships with other transboundary or interagency entities, in which they work together to solve problems.												
TOTAL SCORES → (Management potential by MPA designation type)												

First half of the worksheet is on "management potential".

Slide 29

Organizational Capacity										
6. There is strong political will and local/regional champions that support the MPAs.										
7. The MPA's authority, policy and regulations are strong and clear enough to address the natural resource management threats and challenges.										
8. There is a strong and effective enforcement program to ensure high levels of compliance with the MPA's regulations.										
9. MPA management actively employs a monitoring and evaluation program to ensure the sites are effectively managed.										
10. The administrative and financial management of the sites are in place and secure to ensure longevity of the MPAs.										
TOTAL SCORES → (Organizational potential by MPA designation type)										

SCORING SCALE				
5	**4**	**3**	**2**	**1**
SUPERIOR *(Exemplifies the ideal condition)*	**GOOD** *(Better than adequate, but could use improvement)*	**FAIR** *(Adequate but could easily be improved)*	**POOR** *(Not adequate, but provides modest function)*	**CRITICAL** *(This factor not functional or does not exist)*

Adaptability Levels		
3.7 to 5	**2.4 to 3.6**	**1 to 2.3**
HIGH	**MODERATE**	**LOW**

Second half of the worksheet is on "organizational capacity" – and the scoring system for evaluating both is at the bottom, as you can see in the slide. As a reference, you will see in the next slide the list of MPAs in the Yellow Sea.

Slide 30

HANDOUT 3.4: List of Existing MPAs in China and South Korea

China's Marine National and Local Reserves in the Yellow Sea Ecoregion
(WWF, KORDI and KEI, 2006)

Marine national nature reserves (NNRs)	Location	Areas(hm2)	Important conservation targets	Management authority
Snake Island-Laotieshan Mountain NNR	Lushun, Liaoning Province (Prov.)	17 000	Vipers and birds and their habitats	SEPA
Yalu River Costal Wetland NNR	Donggang, Liaoning Prov.	112 180	Tidelands, wetlands, water birds and migrating birds	SEPA
Changli Golden Seaboard NNR	Changli, Hebei Prov.	30 000	landscape and marine ecosystem	SOA
Chongming Dongtan NNR	Chongming County, Shanghai	4 900	Estuary wetland	SFA
Yancheng Birds NNR	Yancheng, Jiangsu Prov.	453 000	Hooded Cranes and tidelands, wetlands	SEPA
Nanji Islands NNR	Pingyang County, Zhejiang Prov.	20 106	Islands, molluscs and marine ecosystem	SOA
Tianjin ancient seaboards and wetlands NNR	Tianjin	21 180	Ancient seaboards relics of conch dykes and oyster beaches, wetlands ecosystem	SOA
Huanghe River Delta	Dongying, Shandong Prov.	153 000	Original wetland ecosystem and water birds	SFA
Shuangtai Estuary water birds NNR	Panjin, Liaoning Prov.	80 000	Hooded cranes, Siberian cranes, Swan goose, etc.	SFA
Marine local nature reserves (LNRs)	**Location**	**Areas(hm2)**	**Conservation Targets**	**ManagementAuthority**
Dalian Haiwang nine-islands marine NR	Dalian, Liaoning Prov.	2 143	Seashore physiognomy, seaboard scenes and seabirds	Liaoning Provincial Gov.
Dalian Laopian Island NR	Dalian, Liaoning Prov.	1 580	Marine creatures and ecosystem, Karst and marine abrasion physiognomy landscape	Liaoning Provincial Gov.
Sanshan Island NR	Dalian, Liaoning Prov.	200	Chlamys (Azumapecten) farrer, Haliotis discus hannai, and other rare seafood	MOA
Jinshitan Geology NR	Dalian, Liaoning Prov.	2 200	Particular geological structures, paleontologic fossils and particular seaboard physiognomy	SEPA
Zhujiatun marine abrasion NR	Dalian, Liaoning Prov.	1 350	Marine abrasion physiognomy	SEPA
Liaodong Bay wetland-marine NR	Panjin, Liaoning Prov.	80 000	Water birds, Largha seals and other rare marine creatures	Liaoning Provincial Gov.
Rare marine creatures NNR	Changhai County, Liaoning Prov.	220	Breeding area for Chlamys (Azumapecten) farrer, Haliotis discus hannai and 辣刺参(Stichopus japonicus ??) and habitat for prawns migration.	SEPA
Suizhong arenaceous seaboard and biodiversity NR	Suizhong County, Liaoning Prov.	20 7700	arenaceous seaboard and marine ecosystem	SOA
Huanghua Chenier NR	Huanghua, Hebei Prov.	117	Chenier and plants within the area	SOA
Leting Shijiutuo Island NR	Leting County, Hebei Prov.	3 775	Animals exp. Birds and plants	Hebei Provincial Gov.
Miaodao Islands marine NR	Changdao County, Shangdong Prov.	875 600	Birds and warm temperate zone island ecosystem	SOA
Qingdao Dagongdao Island ecosystem NR	Qingdao, Shandong Prov.	1 600	Birds, marine creatures and their habitats	Shandong Provincial Gov.
Qianliyan Island ecosystem NR	Yantai, Shangdong Prov.	1 823	ever-green broad-leaved forests and birds	Shandong Provincial Gov.
Wuli shell's dykes and wetland NR	Wuli County, Shangdong Prov.	80 480	Chenier seaboard***wetland	Shandong Provincial Gov.
Rongcheng Chengshantou Marine NR	Rongcheng, Shangdong Prov.	3 000	Seaboard physiognomy and lagoon ecosystem	SOA
Rongcheng Sanggouwan NR	Rongcheng, Shandong Prov.	13 333	Rare marine creatures	SEPA
Jimo Marine creatures NR	Jimo, Shandong Prov.	915	Economic marine products	SEPA
Jinshan three-islands marine NR	Jinshan County, Shanghai	4 000	Marine ecosystem, sub-tropic zone plants	SOA
Wuzhishan birds islands NR	Zhoushan Islands, Zhejiang Prov.	470	Seabirds	Zhejiang Provincial Gov.
Ningpo marine relics NR	Ningpo, Zhejiang Prov.	456	Ancient sea embankment relics	SOA

MPAs in the Republic of Korea Along the Yellow Sea
(personal communication with KOEM staff, December 2017)

#	MPA name	MPA category	IUCN category	area (ha)	no take zone	No take zone area(km2)	designation yr	Autorities	Management plan
1	Bigeum, Docho-do (island)	Wetland Protected Area - Tidal Flat	IV	12.32	Part	12.3	2015	Ministry of Oceans and Fisheries	Bigeum, Docho-do (island) Wetland Conservation Plan
2	Siheung	Wetland Protected Area - Tidal Flat	IV	0.71	Part	0.7	2012	Ministry of Oceans and Fisheries	Siheung Wetland Conservation Plan
3	Jeung-do (island) Tidal flat	Wetland Protected Area - Tidal Flat	IV	31.3	Part	31.3	2010	Ministry of Oceans and Fisheries	Jeung-do (island) Tidal flat Wetland Conservation Plan
4	Song-do (island)	Wetland Protected Area - Tidal Flat	IV	6.11	Part	6.1	2009	Incheon Metropolitan City	Song-do (island) Wetland Conservation Plan
5	Ongjin Jangbong-do	Wetland Protected Area - Tidal Flat	IV	68.4	Part	68.4	2003	Ministry of Oceans and Fisheries	Ongjin Jangbong-do Wetland Conservation Plan
6	Jindo	Wetland Protected Area - Tidal Flat	IV	1.44	Part	1.4	2002	Ministry of Oceans and Fisheries	Jindo Wetland Conservation Plan
7	Muan	Wetland Protected Area - Tidal Flat	IV	42	Part	42.0	2001	Ministry of Oceans and Fisheries	Muan Wetland Conservation Plan
8	Buan Jooljpo Bay	Wetland Protected Area - Tidal Flat	IV	4.9	Part	4.9	2006	Ministry of Oceans and Fisheries	Buan Jooljpo Bay Wetland Conservation Plan
9	Gochang	Wetland Protected Area - Tidal Flat	IV	10.4	Part	10.4	2007	Ministry of Oceans and Fisheries	Gochang Wetland Conservation Plan
10	Seocheon	Wetland Protected Area - Tidal Flat	IV	15.3	Part	15.3	2008	Ministry of Oceans and Fisheries	Seocheon Wetland Conservation Plan
11	Daebu-do (island)	Wetland Protected Area - Tidal Flat	IV	4.53	NA	NA	2017	Ministry of Oceans and Fisheries	NA

Slide 31

PRESENTATION 3.4: Identifying Areas of Vulnerability

Slide 32

What happens when we put our vulnerability assessments altogether?

REPRESENTATIVE SPECIES
+
ASSOCIATED HABITATS
+
MPA MANAGEMENT CAPACITY
+
MPA ORGANIZATIONAL CAPACITY
=
Ability to Address Impacts

Yes, let's put it all together to identify the potential areas of strengths and weaknesses in regard to creating an MPA network in the Yellow Sea. This is simply a recap of all the considerations necessary to have in mind before we start designing the MPA network.

Slide 33

EXERCISE 3.4: Identifying Areas of Vulnerability

Objective: *To consolidate the assessments conducted yesterday and today in order to identify patterns or areas of strengths and weaknesses in order to better understand the assets and limitations we are working with in designing an MPA network in the Yellow Sea.*

Activity*:*

1. *Referring back to exercises 2.4, 3.1 and 3.3, use Worksheet 3.1 to calibrate the vulnerability of the three representative species, habitats, management and organizational capacity, and ability to address impacts,*
2. *Provide the whole group with an overall assessment of where you think the strengths and weaknesses are in the Yellow Sea for your species by putting your vulnerability results on a flip chart.*

Time: *45 minutes for exercise, 15 minutes for sharing assessment*

Worksheet 3.1 Calibrating Areas of Vulnerability

You have already generated all of the information necessary to populate worksheet 3.1. GO TO NEXT SLIDE.

Slide 34

WORKSHEET 3.1: Calibrating Areas of Vulnerability

Review posters 2.1a & b, and posters 3.1 thru 3.3 to generalize information for this table. Please see information at the bottom of this page on how to calibrate vulnerability.

Evaluation Components	Risks (Pressure + Sensitivity)			Adaptive Capacity (Response)		
	LOW	MODERATE	HIGH	LOW	MODERATE	HIGH
REPRESENTATIVE SPECIES:						
HABITATS ASSOCIATED WITH SPECIES:						
MPA MANAGEMENT CAPACITY:						
MPA ORGANIZATIONAL CAPACITY:						
Evaluation Components	LOW	MODERATE	HIGH	LOW	MODERATE	HIGH
ABILITY TO ADDRESS MAJOR SOURCES OF IMPACTS:						

IN THIS WORKSHEET, we are assembling all the pieces into one model so we can easily spot where the strengths and weaknesses will be in a Yellow Sea MPA network.

Slide 35

PRESENTATION 3.5: Assessment of National, Regional and International Legal Instruments and Agreements

Just one more thing, there are tools and instruments out there, at the national, regional and international levels, that can be leveraged to garner the political support and muscle needed to enhance protection of the natural resources. Many MPAs and MPA networks around the world are taking advantage of these tools and applying them to strengthen interventions in their MPAs.

Slide 36

Six Categories of Marine Protected Areas:

I. Strict protection (e.g., Nature Reserve/ Wilderness Area)

Ia – managed mainly for biodiversity protection

Ib – managed mainly for preserving area in its natural condition

II. Protection of ecosystem biodiversity and ecological structure (e.g., National Park)

- to promote education and recreation

Let's first look at the six IUCN MPA categories. You are all probably familiar with these, but this is just a reminder of different levels of protection that can be applied to MPAs.

Slide 37

Six Categories of Marine Protected Areas:

III. Conservation of natural features (e.g., Natural or National Monument)

- areas with high visitor value

IV. Conservation through active management (e.g., Habitat/Species Management Area)

- areas with active intervention

Slide 38

Six Categories of Marine Protected Areas:

V. Landscape/seascape conservation and recreation (e.g., Protected Seascape)

- nature and conservation values created by interactions with humans through traditional management practices

VI. Sustainable use of natural ecosystems (e.g., Managed Resource Protected Area)

- areas for compatible use

Slide 39

Beyond the IUCN standards for MPAs, let's look outside the box and see what other global instruments there are to support MPAs.

Slide 40

Global Instruments:

- *United Nations Convention on the Law of the Sea (1994)*
- *Convention on Biological Diversity (1993)*
- *United Nations Conference on the Human Environment (1972)*
- *United Nations Conference on Environment & Development (1992)*
- *World Summit on Sustainable Development (2002)*
- *UNEP Regional Seas Programme*

There are global instruments, that if you are a signatory country, can be leveraged to improve the management of MPAs. This is just a small example.

Slide 41

THREAT:

- *Impacts from Fisheries*

INSTRUMENTS:

- *UN ban on large scale (greater than 2.5km) driftnets*
- *fisheries management entities increasingly requiring use of pingers*

Let's just look at some examples for how different instruments, tools and agreements have been applied to addressing human use issues in MPAs.

Slide 42

THREAT:

- *Impacts from Fisheries*

INSTRUMENTS:

- *IMO: ASBS and ATBA*
- *Passive Acoustic Monitoring Systems*

Slide 43

THREAT:

- *Oil and Gas Development*

INSTRUMENTS:

- *Marine spatial planning*
- *Innovative technology such as bubble curtains used to reduce the noise of pile driving*

Slide 44

THREAT:

- *Military Activities*

INSTRUMENTS:

- *Require the use of environmental impacts statements, especially in regards to military activities in protected areas or known critical habitat for the three representative species*
- *Negotiate time and area sensitive closures based on sensitive life history periods of the three representative species.*

Slide 45

THREAT:

- *Climate Change*

INSTRUMENTS:

- *Increase efforts and resources for reduction of non-climate stressors to marine resources*
- *Take an adaptive management approach that is both responsive and flexible to the uncertainty of climate change impacts on marine species & habitats*
- *Governments agree to reduce global greenhouse emissions via the Paris Accord*

Slide 46

THREAT:

- *Pollutants, Sediment and Toxics*

INSTRUMENTS:

- *Use consumer power to demand PBDE-free products (e.g., water bottles)*
- *Control use of hazardous products in watershed and in coastal margins*
- *MARPOL*
- *IMO Convention on the Prevention of Pollution*

Slide 47

THREAT:

- *Habitat Loss & Degradation*

INSTRUMENTS:

- *Land use development regulation*
- *Watershed management*
- *Marine spatial planning*
- *Integrated Coastal Zone Management (ICZM)*

Slide 48

EXERCISE 3.5: Application of National, Regional and International Legal Instruments and Agreements

Objective: *To look at other possibilities beyond MPA site interventions as tools to protect representative species and habitats, particularly within a transboundary or international context.*

Activity:

1. *With your species team, reference Handouts 3.6 and 3.7 to get a better understanding of the types of protection instruments that are already in place, versus those that could be leveraged for added protection,*
2. *Then fill out Worksheet 3.2 with ideas of how to increase protection for species and habitats; and/or address human use impacts.*

Time: *30 minutes for exercise*

Worksheet 3.2 Scaling-up Interventions for the Protection of Marine Species and Habitats, and Addressing Impacts

WORKSHEET 3.2.docx

Slide 49

WORKSHEET 3.2: Scaling-up Interventions for the Protection of Marine Species and Habitats; and Addressing Human Use Impacts

This approach can be used to either apply additional layers of protection to species and/or habitats or be used to address specific human uses that are impacting those species and habitats.

What needs to be addressed?	Explain the issue:	Suggested Instrument to Address Issue:	How will this make a difference?	What is the anticipated result or outcome from using this instrument?
INCREASE AND/OR IMPROVE SPECIES PROTECTION				
INCREASE AND/OR IMPORVE HABITAT PROTECTION				
ADDRESSING IMPACTS FROM HUMAN USE ACTIVITIES ON SPECIES OR HABITATS				

Slide 50

Thank you!

Day 4. Creating the Model for the YSLME Network

July 26, 2018 ◆ Seocheon, Republic of Korea

Spotted Seal *Spoon-billed Sandpiper* *Yellow Croaker*

Yellow Croaker Illustration: AliExpress.com; *Spotted Seal: Philagraphicon;* *Illustration of Spoon-billed Sandpiper: Planet of Birds*

Summary of Day 4.

Our focus for Day 4 is going to be designing the site selection criteria and framework for the YSLME MPA Network. We will look at different types of criteria, and we will connect the criteria to the objectives that were outlines in Day 1 and see if everything works together. However, because we cannot create an MPA network for both highly migratory species (Spotted Seal and Spoon-billed Sandpiper), and not highly migratory species (Yellow Croaker), under the same criteria and considerations, we are going to break it down between fisheries resources and highly migratory species as the considerations are just slightly different from one another. Note, we will leave highly migratory fish such as tuna out of the analysis. Considerations of site selection include:

- Biophysical Criteria (protecting key life history stages of the three representative species, protecting critical habitats of the three representative species, creating corridors for protection of the range of species, addressing areas of greatest impacts, protecting species and habitats that are most vulnerable and protecting viable populations of species and habitats)
- Social criteria
- Governance Criteria

On Day 4, we will Build the Logic Model for the YSLME Network by Linking Objectives and Site Criteria. We will also learn how to enable an environment to support an operational MPA network by assessing and building the institutional framework at different scales, building the political will and maintaining support and building the capacity and identifying the resources to become operational. We will learn from case studies, and then during exercise 4.3, we will assess where they are in terms of developing a local, regional or national operational network of

MPAs.

Duration of workshop Day 4: 9 hours including a coffee break and lunch.

Competencies needed: At least 50% of the participants are MPAs management practitioners in the Yellow Sea in China and RO Korea (ideally 25% from China and 25% from RO Korea). At least 50% of the participants work in scientific research or resource conservation of the three indicator species and their habitats at research institutions or not-for-profit conservation organizations

Objectives of Day 4:

1. To develop the foundational pieces of the YSLME network as guidance to selecting the actual sites for inclusion.
2. To make recommendations on the criteria to be used for designing the YSLME MPA network based on the perspective of each of the three species groups.
3. To make a clear determination and commitment to the biophysical approach used for designing the YSLME MPA network.
4. To confirm that the site selection criteria actually complements and will move us towards meeting the overall objectives for the YSLME MPA Network.
5. To consider some of the most important components early in the process in order to ensure the MPA network moves from the design stage to becoming operational. Some of these elements require early buy-in, at the design stage, then need to be maintained over the long term.
6. To use this guideline as a calibration of how operational MPAs are in the Yellow Sea, at different scales. Also, as a means to establish some of the "operational" gaps that need to be addressed for MPAs in both China and RO Korea.

The main outcomes of Day 4 during the YSLME MPA Network Design workshop on July 26, 2018 were the revised set of objectives and site selection criteria for the YSLME MPA Network to protect the Spotted Seal;, Spoon-billed Sandpiper, and the Yellow Croaker. The objectives and site selection criteria for each representative species are presented in Appendix A, pages 6 to 9.

Suggested reading:

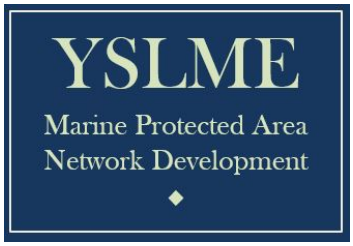
- Green, A., White, A., Kilarski, S. (Eds.) 2013. Designing marine protected area networks to achieve fisheries, biodiversity and climate change objectives in tropical ecosystems: A practitioner guide. The Nature Conservancy, and the USAID Coral Triangle Support Partnership. Cebu City, Philippines. viii + 35 pp.

- Sala, E., Aburto-Oropeza, O., Paredes, G., Parra, I., Barrera, JC., Dayton, PK. 2002. A general model for designing networks of marine reserves. *Science*. 298: 1991-1993.

- Establishing marine protected area networks: Making it happen. 2008. IUCN (International Union for Conservation of Nature). IUCN- World Commission on Protected Areas. National Oceanic and Atmospheric Administration and The Nature Conservancy. Washington, DC, USA. 118 p

Slide 1

Marine Protected Area Network Development



Welcome back to day 4. Our focus for the day is going to be designing the criteria and framework for the YSLME MPA Network. THIS WOULD BE A GOOD TIME TO GO BACK TO POSTER 1.1 ON THE WALL THAT SHOWS THE OVERVIEW OF THE WORKSHOP. BRIEFLY RECAP HOW YOU GOT TO WHERE YOU ARE TODAY, AND THEN GO OVER THE DAY 4 TOPICS. Help them knit this altogether.

Slide 2

PRESENTATION 4.1: Designing the YSLME MPA Network

We are now going to start to think about site selection criteria, however, we are going to break it down between fisheries resources and highly migratory species as the considerations are just slightly different from one another.

Handout 4.1 Checklist of steps to consider in MPA Network design

Slide 3

DESIGNING MPA NETWORKS FOR FISHERIES RESOURCES

Let's start with the Yellow Croaker, or at least fish in general. We will keep highly migratory fish out of this picture for now.

Slide 4

MPA Site Selection: Ecological Considerations

- Replenishment or recovery of fish stocks
- Export of eggs, larvae and adults
- Protection and/or recovery of essential fish habitat
- Protection of threatened or endangered species
- Protect fisheries resources during critical stages such as spawning
- Build resilience for fisheries resources in the face of climate change

When thinking about MPA site selection for fisheries resources, these are some of the considerations.

Slide 5

MPA Site Selection: Socioeconomic Considerations

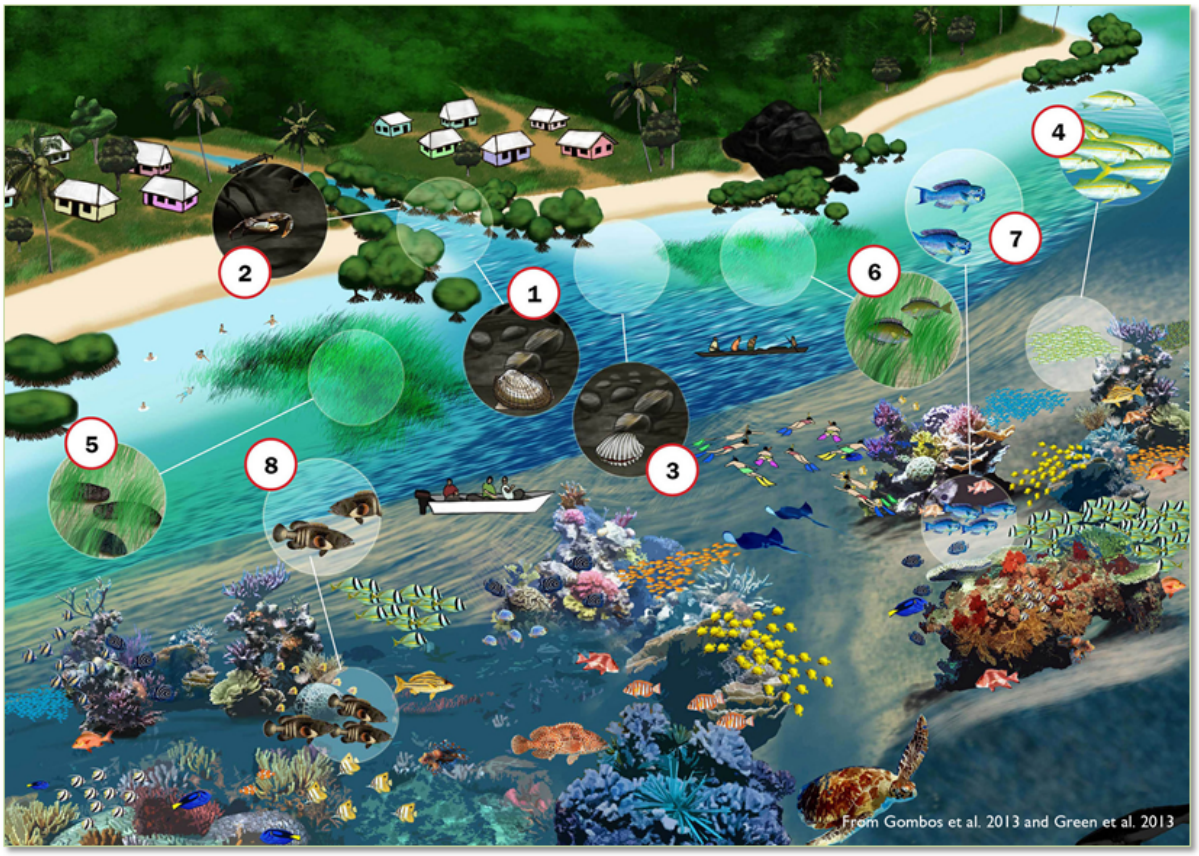
- Sustain livelihood opportunities
- Provide food security
- Provide opportunities for engagement in MPA management

However, just like when we developed our network objectives, we also have to consider humans and their needs as part of the ecosystem we are protecting, particularly coastal communities.

Photo: Don O'Brien/Flckr
Photo: World Fish
Photo: Time
Photo: Climate Home News

ECOLOGICAL CONSIDERATIONS: REPRESENTATIVE HABITATS

Each Species of Fish Need Different Healthy Habitats Where It Can Eat, Live, Grow and Reproduce



Let's look at some of the basic principles for designing MPA networks for the purpose of protecting and enhancing populations of fish species.

The first principle is the recommendation by Green et al 2013 (from their Coral Triangle work) to represent 20-40% of each habitat in the management area – in this case the Yellow Sea.

This is because:

- *Different species use different habitats, so it's important to protect representative examples of each habitat in MPAs to protect all biodiversity and key fisheries species.*
- *How much depends on fishing pressure and other fisheries management outside.*

Rationale from *(Green A, White A, Kilarski S (Eds), 2013)*

Figure caption. Different species use different habitats. For example, some bivalves, crabs and sea cucumbers use river mouths, estuaries, mangroves and seagrass beds (1, 2, 3 and 5), while some fish use sandy bottoms (4), seagrasses (6) and coral reefs (7 and 8).

Represent 20-40% of each habitat within marine reserves. *Since different species use different habitats, protection of all plants and animals and the maintenance of ecosystem health, integrity*

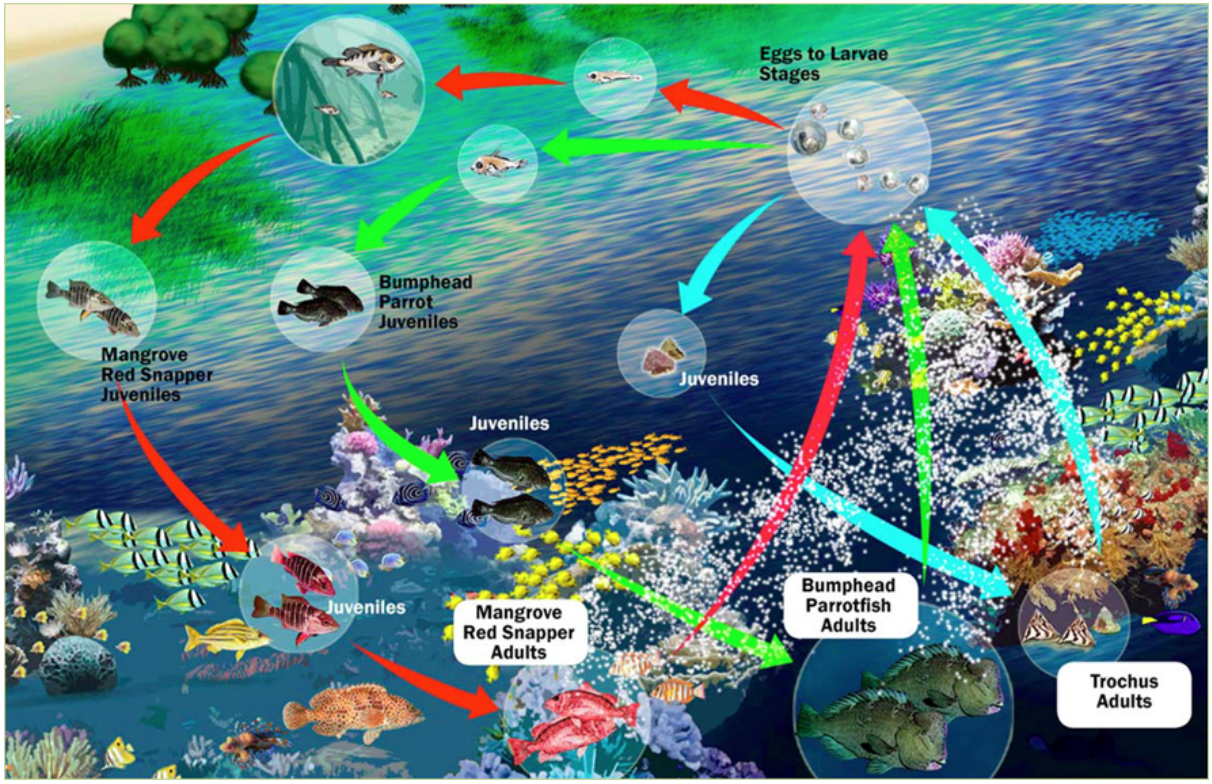
and resilience can only be achieved if adequate examples of each habitat are protected within marine reserves. Habitats (e.g., mangroves, coral reefs and seagrass) that are connected through regular movements of species should also be protected.

A key consideration is the amount of habitat to include. To ensure achievement of fisheries objectives, biodiversity conservation and ecosystem resilience in the face of climate change, marine reserves should encompass at least 20-40% of each habitat type, with the recommended percentage varying with several factors including fishing pressure and if there is additional effective protection (e.g., fisheries management) in place outside of reserves.

Since a population can only be maintained if it produces enough eggs and larvae to sustain itself, fisheries ecologists recommend that it is necessary to protect ~35% of unfished stock levels to ensure adequate replacement over a range of species. Therefore, if fishing pressure is high and the only protection offered is marine reserves, then the proportion of each habitat in reserves should be ~35% (where habitat protection is used as a proxy for protecting fisheries stocks). A higher level of protection (40%) may also be required to provide insurance against impacts of severe disturbances to the environment. Lesser levels (20%) can be applied in areas with low fishing pressure or in areas where effective protection is offered outside of marine reserves (e.g., effective fisheries management). If aiming to protect species with lower reproductive output or delayed maturation (e.g., sharks or large groupers), more area will be required.

ECOLOGICAL CONSIDERATIONS: CONNECTIVITY

Consider Connectivity Between Habitats by Protecting Adjacent Examples of Each Habitat Type



(Green A, White A, Kilarski S (Eds), 2013):

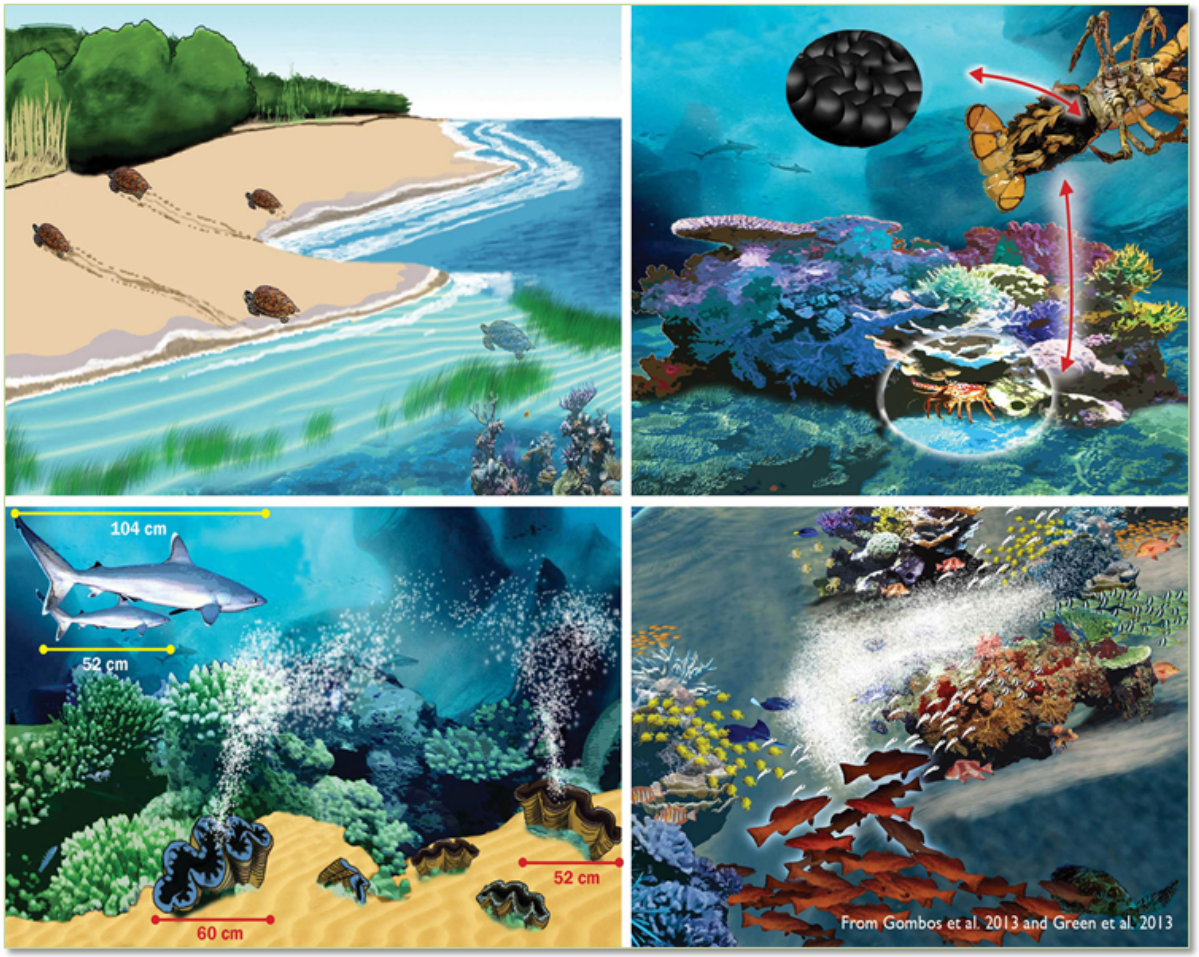
Figure caption. Some species use different habitats at different times in their lives.

Another thing to consider is the location of MPAs (i.e., the need to locate MPAs where the primary habitat of key species is located) and connectivity among habitat types, i.e., Where key species use different habitats throughout their lives.

This image shows how some species (e.g., the mangrove red snapper, also called mangrove jack) use different habitat types throughout its life. Therefore, to protect this species, it is necessary to protect all of the habitat types it uses throughout its life (and to make sure these areas are close enough together to allow for movement among them).

ECOLOGICAL CONSIDERATIONS: REPRODUCTIVE STAGES

Successful Reproduction Depends on Location, Numbers, Body Size and Timing



LOCATION: Each species needs specific amounts of areas to reproduce, including the need for adults to locate in groups particularly when they release sperm and eggs.

NUMBERS: As many individuals as possible need to grow to adults and reproduce.

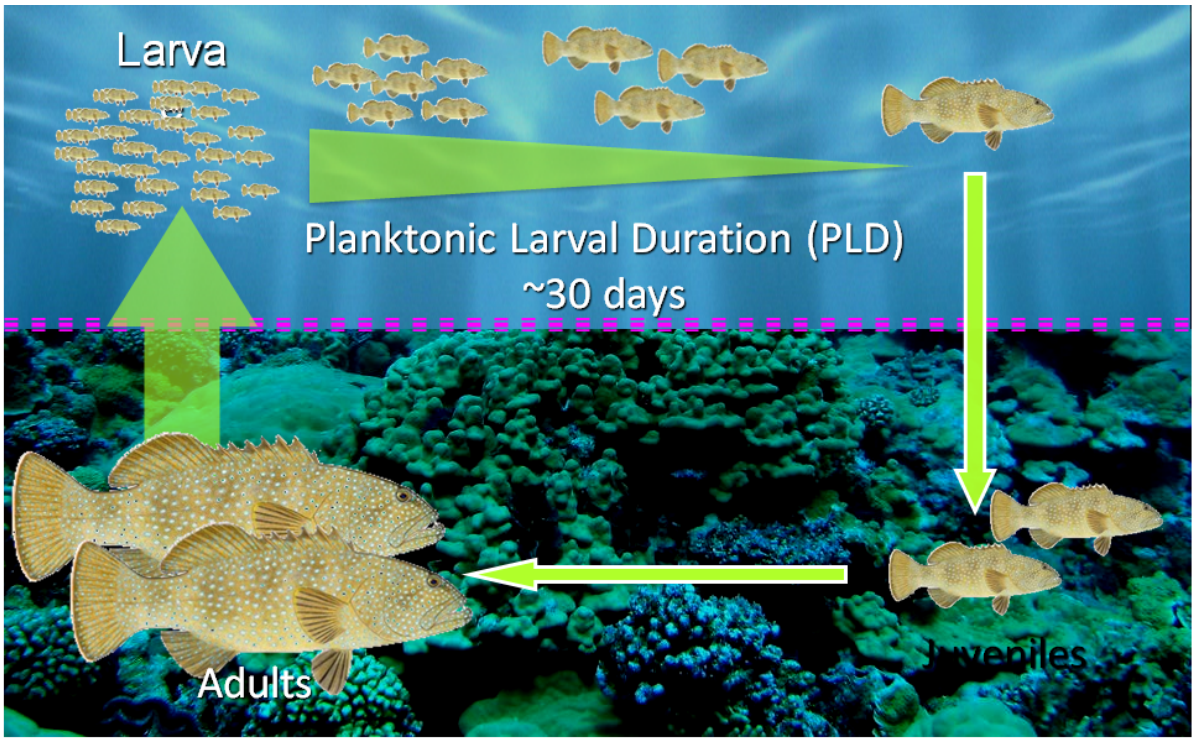
BODY SIZE: Different species enter reproductive phases at different sizes, so it is important to allow each species to grow to its reproductive size **before** harvesting.

TIMING: Some species come together to reproduce at specific times of the year (spawning aggregations)

When designing the MPA network with the reproductive needs of fisheries resources in mind, there are four considerations: location, numbers, body size, timing. GO THROUGH TEXT SLIDE. In this part of the design process we are not only looking at spatial considerations, but also temporal (such as spawning events) and management (taking the pressure of certain size fish and allowing them to mature).

ECOLOGICAL CONSIDERATIONS: LIFE HISTORY

Designate MPA Areas According to Adult and Juvenile Movement



To understand this, let's consider the life cycle of a reef fish. Most reef fishes have two life history phases.

For example, here we have two adult coral trout, a male and female, living on the reef. When they reproduce, hundreds of thousands to millions of tiny larvae are released into the waters above the reef.

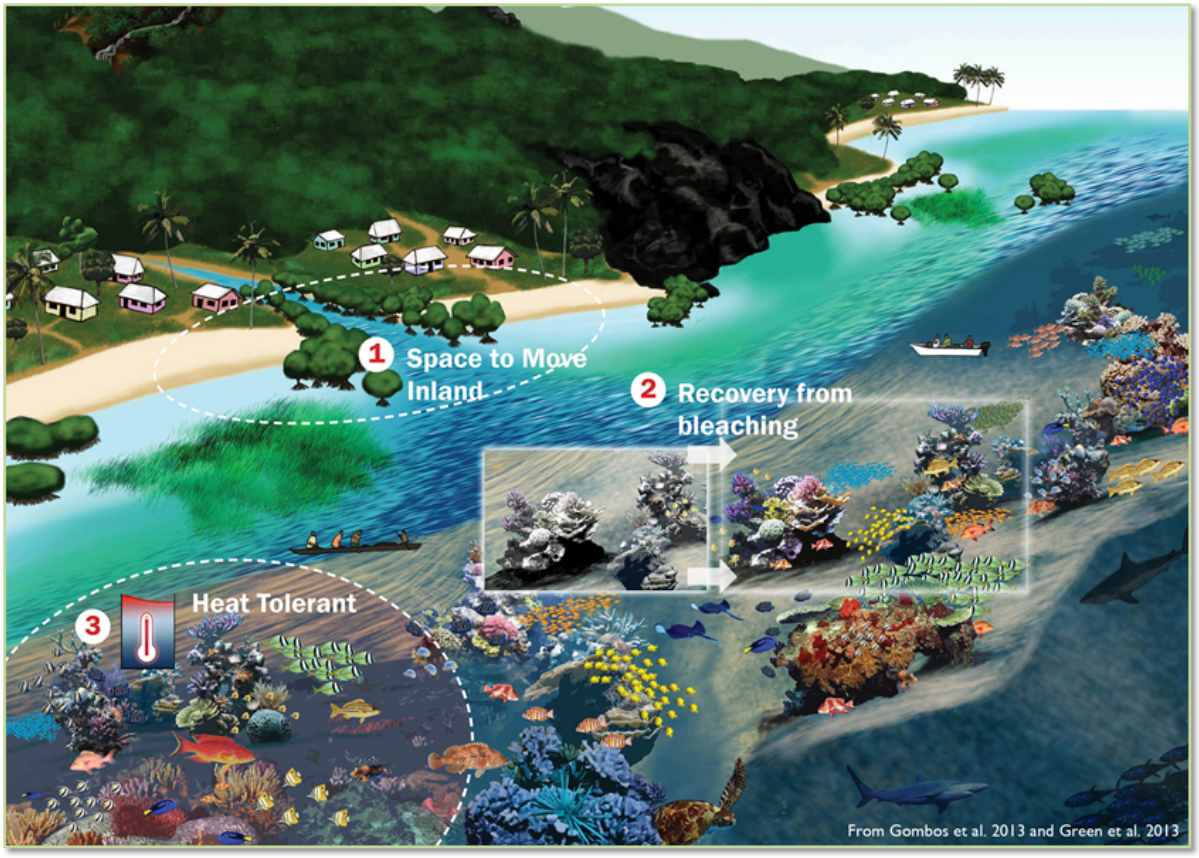
The larvae spend about 30 days out in the blue growing, and for the vast majority, dying – we estimate that as many as 99% of them die during this period, most of them eaten by other animals. How far they travel away from their parents is a real mystery and could be hundreds of kilometers. For the lucky few who survive the voyage they find a reef and settle down, and will generally stay on that reef for the rest of their lives.

Reef fish move different distances in these two life history phases. Most species don't move very far (a few meters, 100s of meters, or a few kilometers) as adults and juveniles, while larvae have the potential to move much further (10s, 100s or 1,000s of kilometers).

Scientists (e.g., Palumbi et al., 2004 (Palumbi, 2004)) recommend that since adults and juveniles are most vulnerable to fishing outside of MPAs, we should set the size of MPAs size according to movement patterns of adult/juvenile fishes.

ECOLOGICAL CONSIDERATIONS: RESILIENCY

Some Areas Survive and Recover Better Than Others



Some areas have characteristics that provide them with a better chance of surviving and recovering from threats as they are more resilient than other areas. These may be well suited as fisheries replenishment zones and resilient areas for climate change adaptation.

It is also important to identify and protect areas that may be more resistant or resilient to climate change in MPAs.

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*(Green A, White A, Kilarski S (Eds), 2013)**. Figure caption:** Some sites are more resilient and should be included in marine reserves including mangroves that have space to move inland with rising sea levels (1); and ecosystems that have resisted or recovered from damage (e.g., coral bleaching) in the past (2) or have characteristics that indicate they are more likely to survive impacts in the future (e.g., heat-tolerant corals that may be more resistant to coral bleaching) (3).*

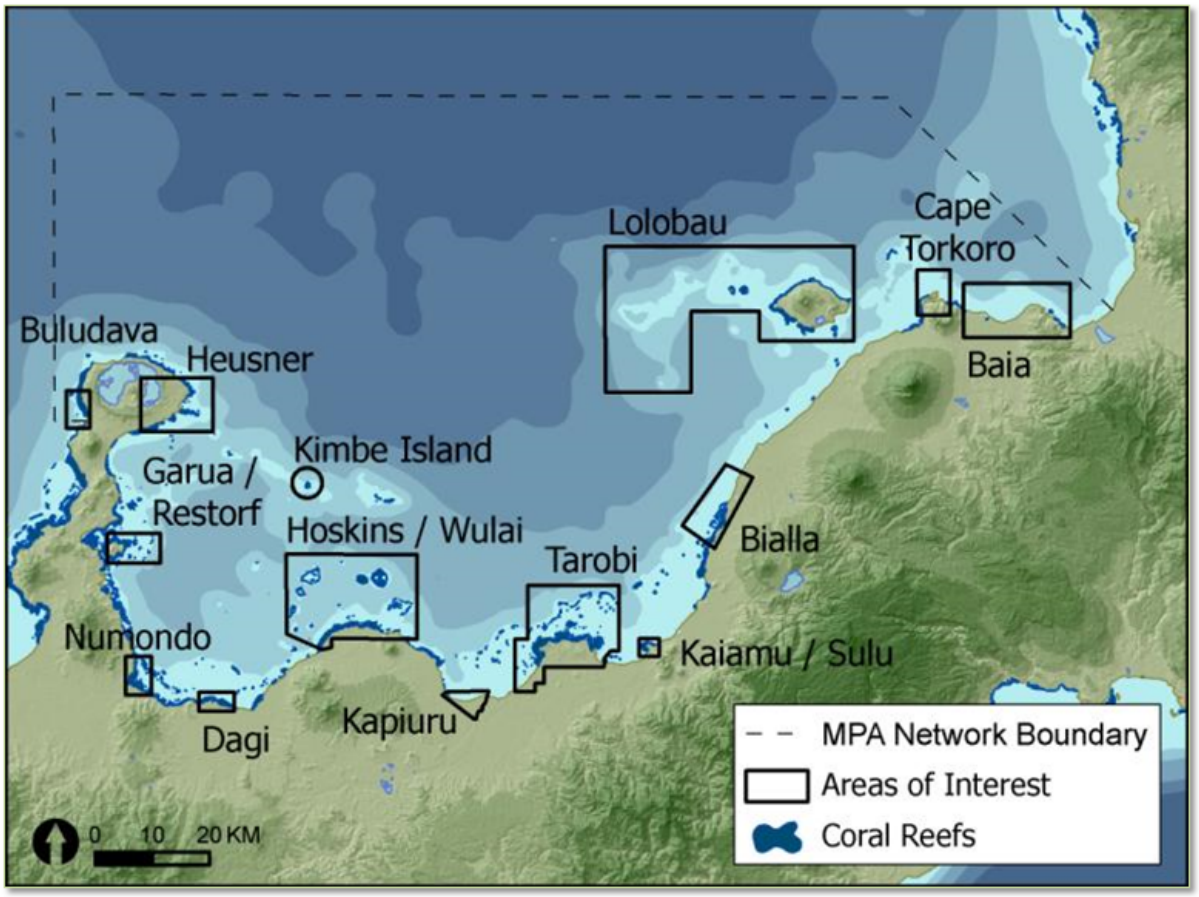
***Include resilient sites in marine reserves**. Resilient sites (refugia) for key habitats and species should be included in MPAs, preferably marine reserves, because they are likely to be important for maintaining biodiversity in the face of climate change. They include areas most likely to withstand climate change impacts such as: those known to have withstood environmental changes (or extremes) in the past; areas with historically variable sea surface temperature and ocean carbonate*

chemistry, which may be more likely to withstand changes in those parameters in future; and coastal habitats (e.g., mangroves, turtle nesting areas) which have adjacent, low-lying inland areas without infrastructure that they can expand into as sea levels rise. Refugia may also provide fisheries benefits, since habitat loss is a major threat to tropical coastal fisheries in the face of climate change.

Slide 11

ECOLOGICAL CONSIDERATIONS: SPREAD THE RISK

Include at Least 3 Widely Separated Replicates of Each Habitat Type in MPAs



The next principles is the need spread the risk by protecting at least three widely separated replicates of each habitat type in MPAs. This example is from Kimbe Bay in Papua New Guinea. (Green SJ, Meneses ABT, White AT, Kilarski S, Christie P., 2008).

Replicate protection of habitats within marine reserves. *Protection of habitats in at least three widely separated MPAs, ideally in marine reserves, minimizes the risk that all examples of a habitat will be adversely impacted by the same disturbance. Thus, if some protected habitats survive the disturbance, they can act as a source of larvae to facilitate recovery in other areas.*

Replication also helps manage the uncertainty associated with biological heterogeneity within habitats. Since variations in communities and species within habitats are often poorly understood,

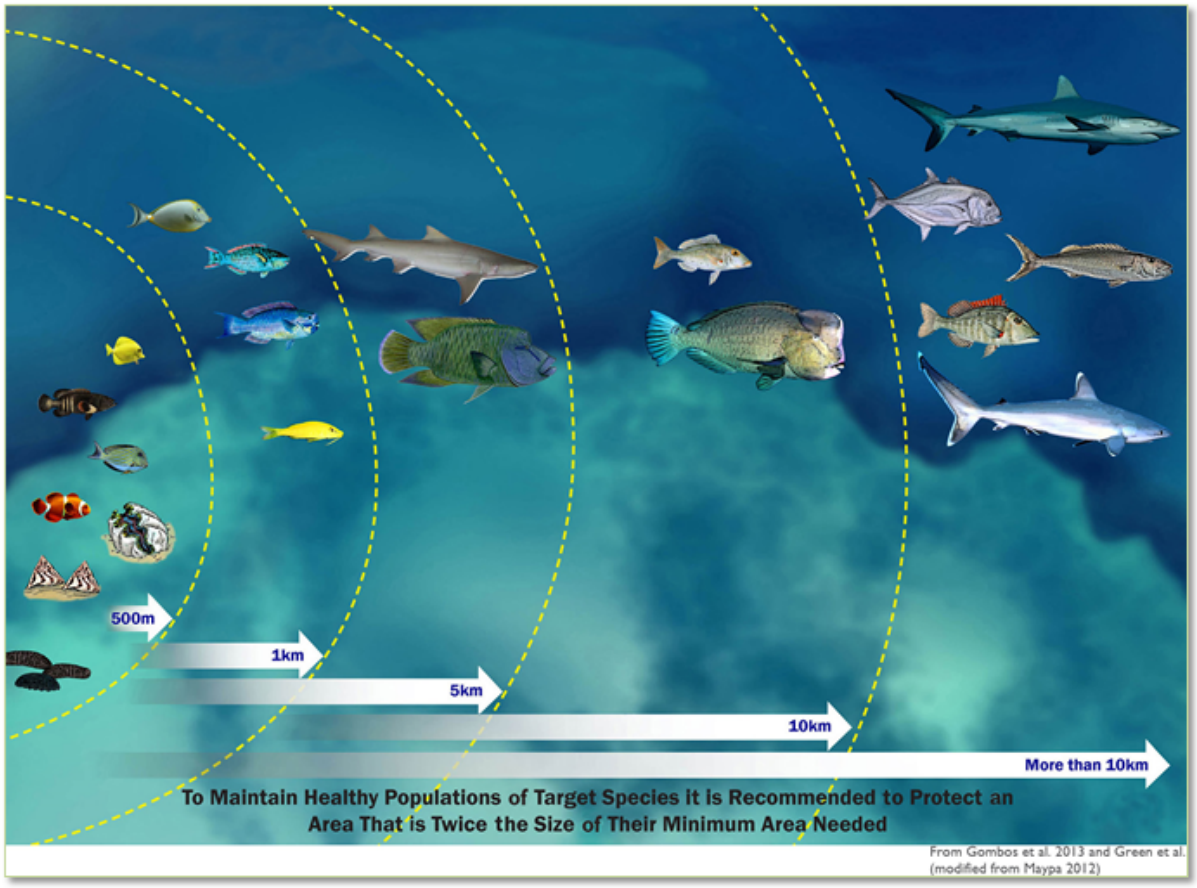
habitat replication increases the likelihood that examples of each are represented within the network of protected areas.

Figure caption. *Spreading the risk: the design of a resilient MPA network in Kimbe Bay, Papua New Guinea, shows where Areas of Interest were identified as potential MPAs. The design includes at least three widely separated examples of each habitat type in different Areas of Interest (Green, 2009).*

Slide 12

ECOLOGICAL CONSIDERATIONS: SPECIES RANGE

Some Species Need Bigger Areas Than Others as Adults in Order to Eat, Live and Reproduce.



Very Small Distances (< 500 m)

- small groupers
- some surgeonfishes
- invertebrates

Small Distances (< 1 km)

- some unicorn fishes
- some goatfishes
- many parrotfishes

Medium Distances (< 3 km)

- humphead wrasse
- lemon shark

Large Distances (< 10 km)

- bumphead parrotfish
- some emperors

Very Large Distances (< 20 km)

- some trevallies
- large emperors
- large reef snappers
- other sharks

So how do we apply this – how big should MPAs be? Latest science suggests that the size should depend on key species (and how far they move) and if other effective protection is in place.

While we've known this for a while, how do we apply it to MPA network design? The key is to consider the key species the communities want to manage, and how far they move. Unfortunately, we haven't been able to apply this information in any detail before because we didn't have the information on movement patterns of key species available.

Over the last year, we've reviewed the best available science regarding movement patterns of adult/juvenile coral reef and coastal pelagic fish species. We can now use this info to have informed discussions with communities regarding how large MPAs should be based on:

- *Key species they are interested in, and how far they move*
- *If there is other effective protection in place.*

Some options:

- *Most species don't move very far as adults/juveniles (most < 1-3 km^2), although some move longer distances (5 km to > 20 km). If possible, it is better to have large MPAs (10-20 km) because they protect larger populations of more species.*
- *But if this is not feasible (e.g., for most community managed areas in inshore areas), then we need to think clearly about what species communities want to protect, how far they move, and how to protect them (i.e., MPAs of the appropriate size, or by some other means, e.g., regulations to protect wide ranging species).*

Figure caption. *Different fish species have home ranges of different sizes (above), so they need different-sized marine reserves.*

Apply minimum and variable sizes to MPAs. *For marine reserves to protect biodiversity and contribute to fisheries enhancement outside their boundaries, they must be able to sustain target species within their boundaries. This will allow for the maintenance of spawning stock, by allowing individuals to grow to maturity, increase in biomass and contribute more to stock recruitment and regeneration.*

Where movement patterns of target species are known, this information can be used to inform

decisions about marine reserve size. Some species (e.g., some parrotfishes, sharks, trevally, mackerel, snappers and emperors) need larger marine reserves because their home ranges (the area in which individuals spend the majority of their time) are larger. While others (e.g., small grouper, most parrotfishes and surgeonfishes) need smaller marine reserves, because their home ranges are smaller.

From a conservation perspective, larger reserves (e.g., 10 to 20 km in diameter) are preferred, because they enhance population persistence by increasing the protection of larger populations of more species. While smaller reserves may be preferred for fisheries management (e.g., 40 ha or 0.4 km^2), since they allow for the export of more adults and larvae to fished areas, leading to increased levels of stock replenishment.

Optimal size will also depend on the level of resource use and the efficacy of other management tools. Where fishing pressure is high and there is no additional effective fisheries management for wide ranging species, then networks of both small (a minimum of 0.4 km^2) and large (e.g., 4 to 20 km across) marine reserves will be required to achieve biodiversity, climate change and fisheries objectives. If additional effective management is in place for wide ranging species, then networks of small marine reserves can achieve most objectives, particularly regarding fisheries management (provided they achieve 20-40% habitat protection).

Other types of zones (e.g., with fishing gear or access restrictions), should be as large as possible up to the entire multiple use MPA.

References for Figures: *(Gombos. M., 2013), (Maypa, 2012).*

Slide 13

DESIGNING MPA NETWORKS FOR HIGHLY MIGRATORY SPECIES

Now let's move to highly migratory species and take a look at how MPA network design might take on some variations.

Slide 14

Challenges of Using MPAs for Migratory Species Protection:

- Size or scale required to protect highly migratory species is not typical of MPA models
- Habitat needs are fluid and difficult to define in terms of providing place-based habitat protection for highly mobile species
- May be difficult to use the MPA management model as a means to address threats to highly migratory species.

You can understand the challenges of protecting the life history range of highly migratory species. These could easily turn into intercontinental marine and land-based protected areas.


Photo: East Asian Australasian Flyway Partnership

Photo: Japan Times

Slide 15

Using Critical Habitat as Site Selection Criteria:

Critical Habitat

Refers to those parts of a migratory species' range that are essential for day-to-day well being and survival, as well as for maintaining a healthy population growth rate.

One way to start narrowing it down is to identify "critical habitat" for the health and survival of the species.

Slide 16

Defining Critical Habitat:

1. **Important periods/places in the life history of cetaceans**
   - FEEDING
   - BREEDING
   - NESTING
   - CALVING
   - FLEDGLING

Somewhat similar to the criteria for fisheries resources, we also look at the important life history stages of the species and connect that to the places, or habitat requirements of that stage in their life.

PHOTO: Korea.net

Slide 17

Defining Critical Habitat:

2. **Important places for day-to-day survival**
   - *MIGRATION CORRIDORS*
   - *RESTING AREAS*

Other considerations include migration corridors (this can easily get into large-scale MPA planning), as well as the resting sites along those corridors.

Photo: Kimchee Guest Houses

Slide 18

Defining Critical Habitat:

3. **Physical features**
   - STATIC BATHYMETRIC FEATURES. Slopes, canyons, seamounts
   - DYNAMIC HYDROGRAPHIC FEATURES. Currents, frontal systems
   - OCEANOGRAPHIC PROCESSES. Upwelling, eddies

We can also think about key physical features that are associated with supporting foraging, resting or other needs.

Photo: Valerie Lord

Slide 19

Defining Critical Habitat:

Best to identify places (fixed, geographically-based) or conditions non-geographically-based)?

There are other parts of the biophysical environment that may be critical to the life stages, but are temporal, variable and dynamic in nature. Since we think of MPAs as being "place-based" including these kinds of features would require adaptive management at a scale and timeframe we are just not accustomed to.

Slide 20

Defining Critical Habitat:

Best to identify places (fixed, geographically-based) or conditions (non-geographically-based)? **Is this decision driven by the data?**

- Spatial habitat preference data
- Behavioral data
- Environmental/oceanographic data

The question is, in addition to "fixed place" MPAs, are we willing to also protect conditions (non-geographically fixed places) as part of the network? That is really a data question, a management question, and a governance question.

Slide 21

Defining Critical Habitat:

Limitations of using surveys to determine critical habitat areas:

- Areas surveyed tend to be close to land
- Points to areas near land being most important, rather than pointing to representative habitat or true extent of critical habitat in ocean

Let's get back to habitat, as in fixed places. Most of what we know comes from scientific data. Most marine data come from areas closer to shore – because of accessibility, practicality in terms of costs, and it is just plain more visible. Does that mean we are missing areas of critical habitat in the open ocean? If so, do we need to consider them?

Slide 22

Defining Critical Habitat:

Limitations of using surveys to determine critical habitat areas:

- Areas surveyed tend to be close to land
- Points to areas near land being most important, rather than pointing to representative habitat or true extent of critical habitat in ocean
- **Leads to question about need to protect critical habitat where there are greatest interactions with humans?**

This then leads to the next question – should we really be protecting animals based on the proximity to human uses– where the impacts are actually taking place, especially since we already said that we're not managing wildlife, but rather human behavior?

Slide 23

MPA Management:

Scientific Considerations

- Value for monitoring and research of migratory species

And sticking to the practical side, should we also consider MPA locations that provide easy access to key life history stages for monitoring and research purposes?


Photo: oregonstate.edu

Photo: phys.org

Slide 24

MPA Management:

Economic Considerations

- Potential to make a contribution to or enhance the economic value of an area through habitat protection
- Enhance effective management of marine wildlife tourism and overall protection of the area for tourism

Let's get back to the socioeconomic side of the equation, can protection of the resources not only benefit conservation interests, but also economic interests of local communities through such activities as tourism and wildlife viewing.

Photo (left): China Daily

Photo (right): Kimchee Guest Houses

Slide 25

MPA Management:

Social or Cultural Considerations

- Existing or potential value to local communities, as well as national and international community because of its aesthetic, educational, recreational, historic/heritage and/or cultural value

Last, but certainly not least, what about the intrinsic value of conservation and specific sites associated with those values. Should they be considered part of the MPA mix?

Slide 26

MPA Management:

National & International Considerations

- Potential to gain recognition from national or international forums or conventions such as UNESCO, MSB, World Heritage List, regional agreements for cetaceans or other international designation

And just one more thing, how can we leverage this MPA network as an opportunity for further national and international recognition and possible designations? We have the LME designation, RAMSAR designations, but is there something, not just for the purpose of recognition, but to actually enhance awareness and management of the MPA network.

Slide 27

MPA Management:

Feasibility and Practicality Considerations

- Legal framework in place to create MPAs
- Strong political will
- Support from public
- Compatible with existing use of area
- External influences can be controlled
- Compatible with existing management regimes

Let's go back and revisit some of the basic operational necessities to reconsider before we start developing site selection criteria.

Slide 28

EXERCISE 4.1: Designing the YSLME MPA Network

Let's get started developing site selection criteria. All the work you have done over the past three days should help to inform you in this process. Go back and refer to your posters and worksheets, they are intended to be a resource at this juncture.

Slide 29

EXERCISE 4.1: Designing the YSLME MPA Network

Objective: to make recommendations on the criteria to be used for designing the YSLME MPA network based on the perspective of the three species groups.

Activity:

1. In small groups, and in reference to Handout 4.2, use Posters 4.2 a, b & c to develop MPA

network site selection criteria based on your particular species group,

2. Be sure to consider the balance between biophysical (ecological), social and governance criteria and that during the site selection stages there will be some trade-offs in trying to meet the different criteria.

Time: 1 hour, 30 minutes

NEXT SLIDESHOW HANDOUT, WORKSHEETS are too big to include in the slide show, so pull them out and go over them by holding them up. Each of the three worksheets represents a different category of site criteria.

Handout 4.2 Site Selection Criteria Development


HANDOUT 4.2.docx

Posters 4.2a, 4.2b and 4,2c Developing Site Selection Criteria


POSTER 4.2a.docx


POSTER 4.2b.docx


POSTER 4.2c.docx

Slide 30

HANDOUT 4.2: Site Selection Criteria Development

■ **CRITICAL HABITAT**

1. Important periods/places in the life history of representative species:

- Feeding
- Breeding
- Calving

- Nurseries
- Spawning areas
- Larval dispersal
- Recruitment areas

- Migration stopovers
- Feeding and resting grounds
- Breeding grounds

2. Important places for day-to-day survival

- Migration corridors
- Resting areas
- Feeding areas

3. Physical Features

- Static bathymetric features – *slopes, canyons, seamounts*
- Dynamic hydrographic features – *currents, frontal systems*
- Oceanographic processes – *upwelling, eddies, currents*

■ **OTHER DRIVERS FOR ESTABLISHING SITE SELECTION CRITERIA**

1. Data availability

- Spatial habitat preference data
- Behavioral data
- Environmental/oceanographic data

2. Ecological Considerations

- Variety of representative habitats
- Contributes to essential ecological processes or life support systems (e.g., upwelling)
- Preserves genetic diversity
- Protects threatened or endangered species

3. Scientific Considerations

- Value for monitoring and research

Here is your cheat sheet to help you get started.

Slide 31

GROUP PRESENTATIONS AND FACILITATED AGREEMENT:

Reconciling the Basis Design of the MPA Network

Slide 32

Slide 33

EXERCISE 4.2: Revisiting the YSLME MPA Network Objectives and Linking Them to the Site Selection Criteria

Now that we have developed site criteria, we need to go back and make sure they complement our objectives – what we want to achieve from the MPA network.

Slide 34

EXERCISE 4.2: Linking the Objectives for the YSLME Network with the Site Selection Criteria

Objective: To confirm that the site selection criteria actually complements and will move us towards meeting the overall objectives for the YSLME MPA Network.

Activity:

1. In small groups, and in reference to Posters 4.2 a,b & c and your MPA network objectives that are on a flip chart, assemble your logic model using Worksheet 4.1.

2. Test the validity of your logic model by reading it counter-clockwise then clockwise and if it all the pieces don't support each other, then you need to either change your objective or your site criteria.

Time: 1 hour, 30 minutes

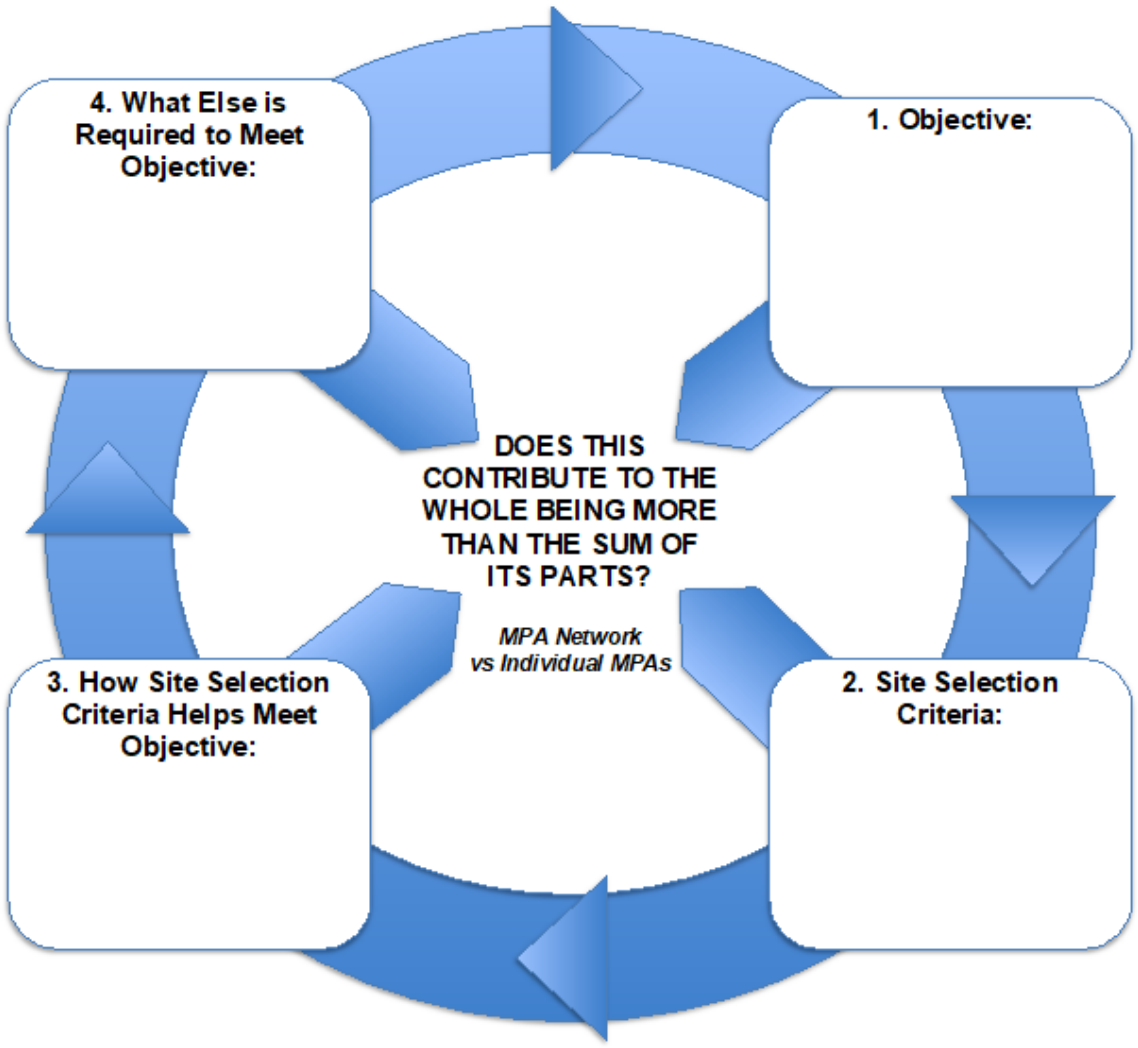
Worksheet 4.1 Building the Logic Model for the YSLME Network: Linking objectives and Site Criteria

Slide 35

Use one worksheet per objective

WORKSHEET 4.1: Building the YSLME MPA Network Logic Model

Please draw a similar logic model configuration on a flip chart for each one of your objectives/site selection criteria. If a single site selection criteria helps to meet multiple objectives, then you may group them. If this doesn't all flow together, and contribute to making the "whole greater than the sum of the parts", then you should go back and check whether either your objective or your criteria needs to be changed.



Slide 36

PRESENTATION 4.2: What it Means to Become Operational

Now that we have the two book ends of our MPA network design framework, let's go back to thinking about what this network is going to look like when it is up and running.

Slide 37

What is an MPA Network?

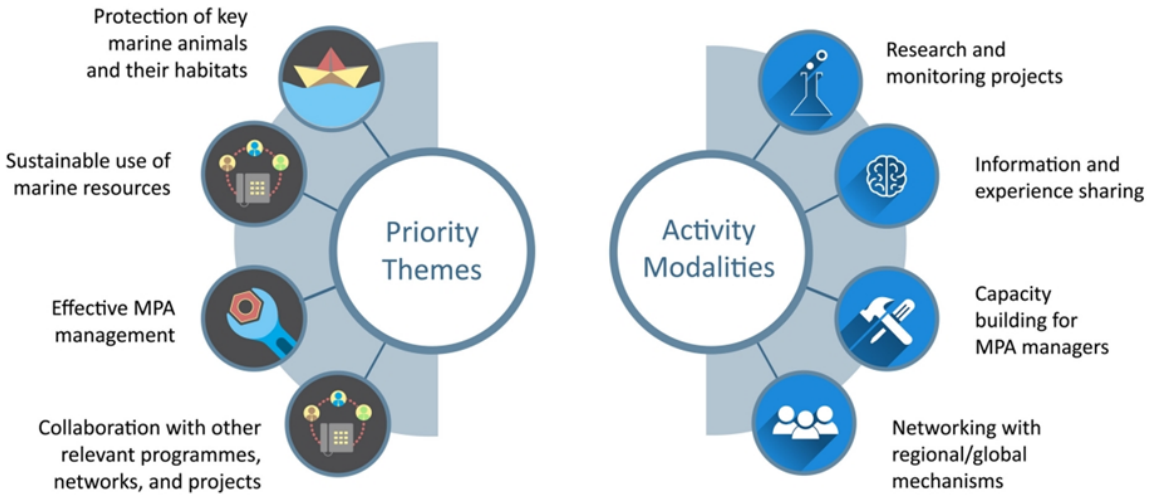
Not just any collection of MPAs can be called an MPA network

- They must interact in some meaningful manner to meet management and/or conservation objectives of the network
- An MPA network is also a network of people

Let's go back to what an MPA network is – and not just a bunch of "place", but also how it functions.

Slide 38

BECOMING OPERATIONAL AT THE MPA SITE LEVEL



This is what a functional, singular MPA looks like, but as you move towards the bottom of this illustration, on both sides, it moves more towards what the value of a network looks like.

Slide 39

BECOMING OPERATIONAL AT THE MPA SITE LEVEL

What about becoming operational at the network scale?

Slide 40

MPA Network Operational Process

This is what an operational network looks like. But to further illustrate operational networks, let's look at a series of cases studies where MPA networks have become operational in different ways.

Slide 41

OPERATIONAL MPA NETWORKS: Models of Practice

VIETNAM'S SYSTEM-WIDE MONITORING AND EVALUATION PROGRAM

Let's start with Vietnam's network-wide monitoring and evaluation program. It was designed by 10 MPA managers for all 16 MPA sites in the network.

Slide 42

This is a three-part monitoring and evaluation program, with the evaluation occurring at different time sequences based on how long it takes to measure change or detect trends. For all three areas, there are standardized indicators of change.

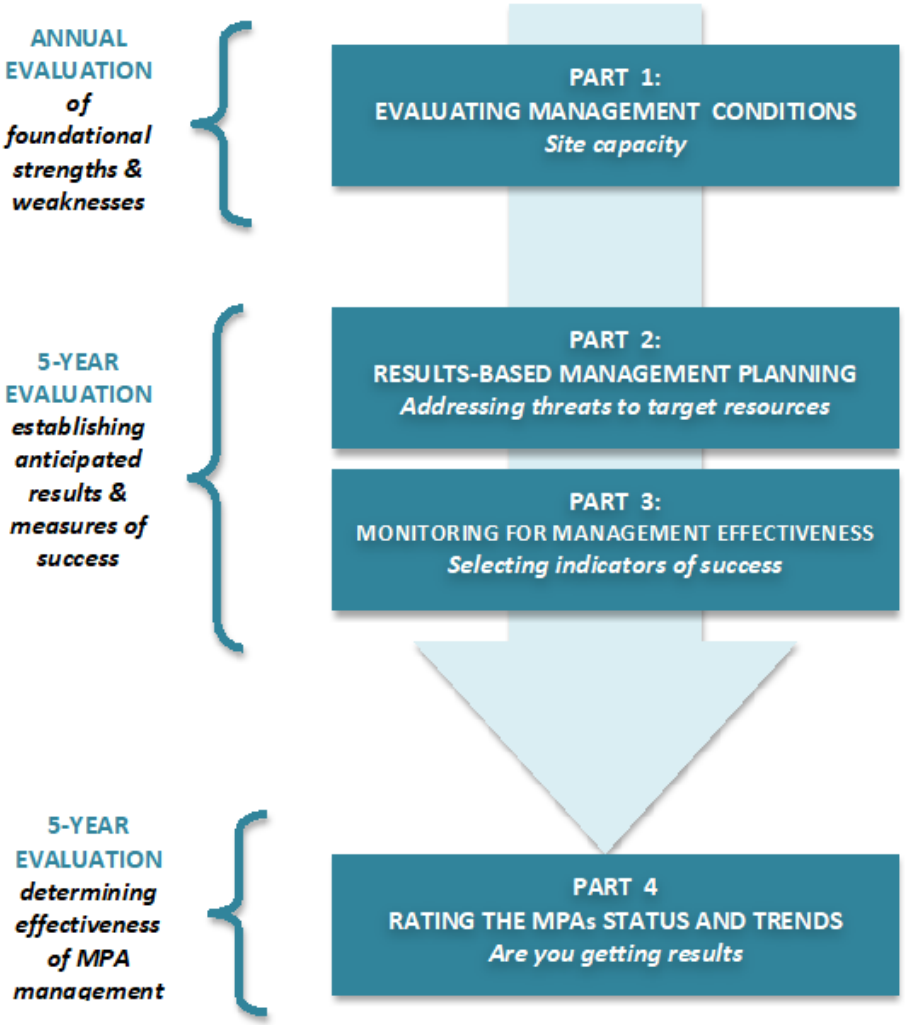
The first part is just evaluating site capacity – the ability of the staff to do their job, their technical capacity, site infrastructure and physical plant, etc.

The second part is how effectively are they really addressing the threats to their MPAs, by looking at factors such as successful education and outreach programs, enforcement programs, etc.

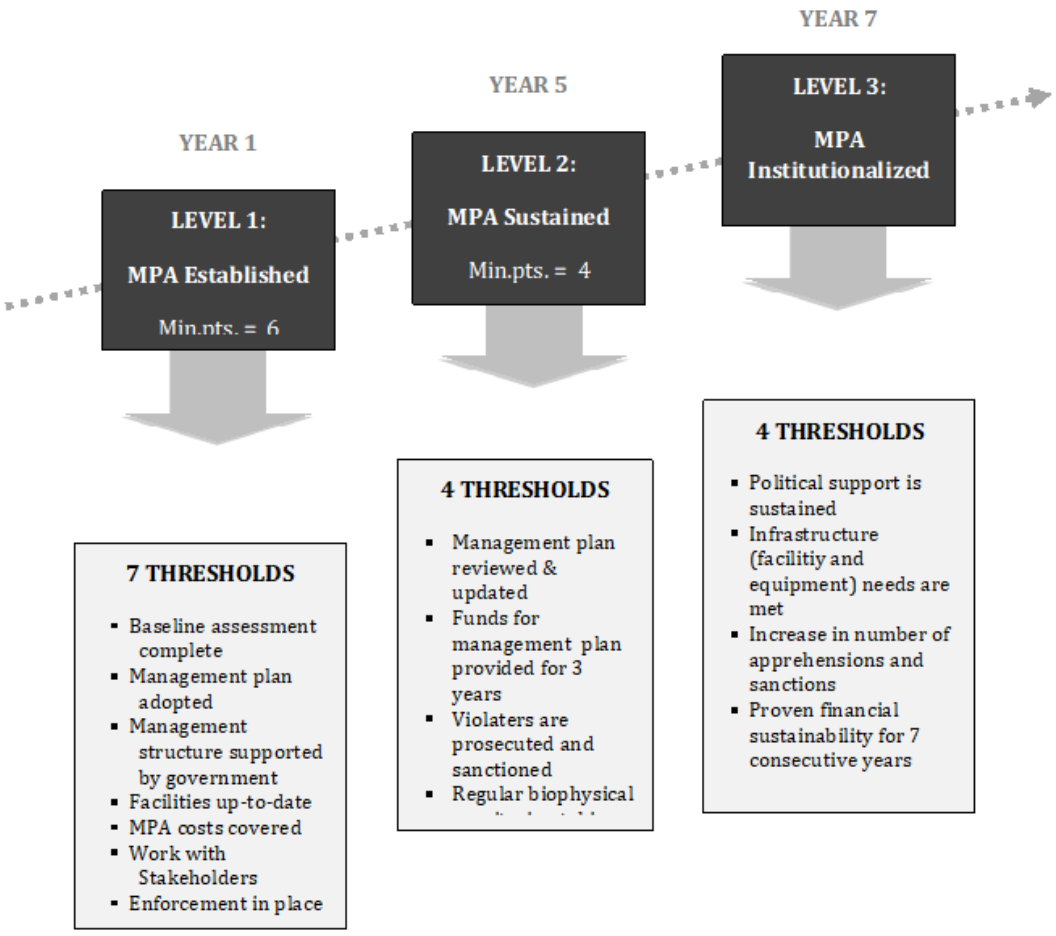
The 3rd part is the results section – how well are they meeting their biophysical, socioeconomic and other objectives – what is the level of change they are seeing?

VIETNAM MPA NETWORK

Management Effectiveness 4-Part Evaluation Program Model



Slide 43



The idea is that each MPA will be ranked based on its contribution to the MPA network, and they will fall within one of these three categories. Each category has certain thresholds or standards that need to be met.

Slide 44

In terms of what the network is collectively protecting, the managers decided on these six targets, all of which they are collectively working to improve the condition of.

STANDARDIZED TARGET RESOURCES:

Using an assessment of 10 MPAs in Vietnam conducted in the Spring on 2015, the following 6 target resources (bundled into 3 categories) have been selected as the measures of success for both individual MPAs in Vietnam, as well as the network as a whole:

- **WATER: water quality**
- **HABITATS: seagrass beds, coral reefs, mangroves**
- **LIVING MARINE RESOURCES: sea turtles, reef fish**

This selection of the 6 standardized target resources was based on two factors: 1) an inventory of target resources identified by 10 MPAs in the Vietnam MPA network; 2) an inventory of existing monitoring programs for 10 of the MPAs in Vietnam (both inventories assembled from site interviews in Spring of 2015). The selection was ground-truthed at a workshop for MPA managers in the Spring of 2016. Additionally, the evaluation conducted in the Spring of 2015 will be used to establish the baseline condition for MPAs in Vietnam, for which any change in these target resources will be measured against.

SAMPLING OF MAJOR SOURCES OF HUMAN-INDUCED IMPACTS TO THE 6 TARGET RESOURCES:

WATER	HABITATS			LIVING MARINE RESOURCES	
1. Water Quality	**2. Seagrass Beds**	**3. Coral Reefs**	**4. Mangroves**	**5. Sea Turtles**	**6. Reef Fish**
IMPACTS: ▪ Tourism development ▪ Marine pollution ▪ Mine exploration ▪ Agricultural runoff ▪ Boat-based pollution ▪ Construction ▪ Aquaculture pollution ▪ Fresh water diversion	IMPACTS: ▪ Coastal development ▪ Trawling ▪ Water quality ▪ Snail exploitation	IMPACTS: ▪ Coral exploitation for lime ▪ Tourism (direct use impacts, i.e., diving) ▪ Harbor dredging ▪ Anchoring of tourism boats ▪ Water quality	IMPACTS: ▪ Harvesting ▪ Water quality ▪ Tourism impacts	IMPACTS: ▪ Harvesting of turtles ▪ Harvesting of eggs for tourists	IMPACTS: ▪ Over-fishing ▪ Destructive fishing practices ▪ Illegal night diving by outsiders ▪ Illegal trawling ▪ By-catch ▪ Poor enforcement

This list of human use impacts indicated in the table above was extracted from the survey and interviews of staff from 10 MPAs that was conducted in the Spring of 2015.

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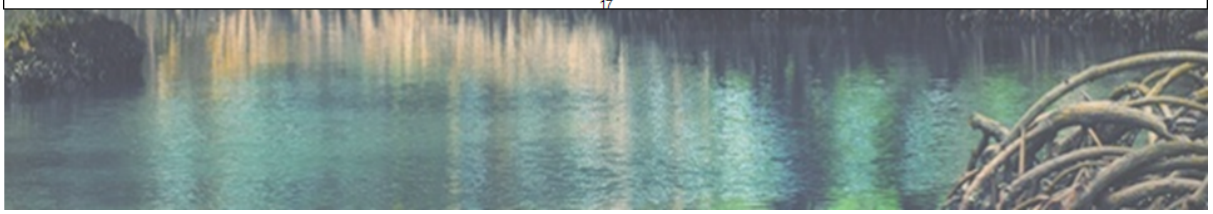

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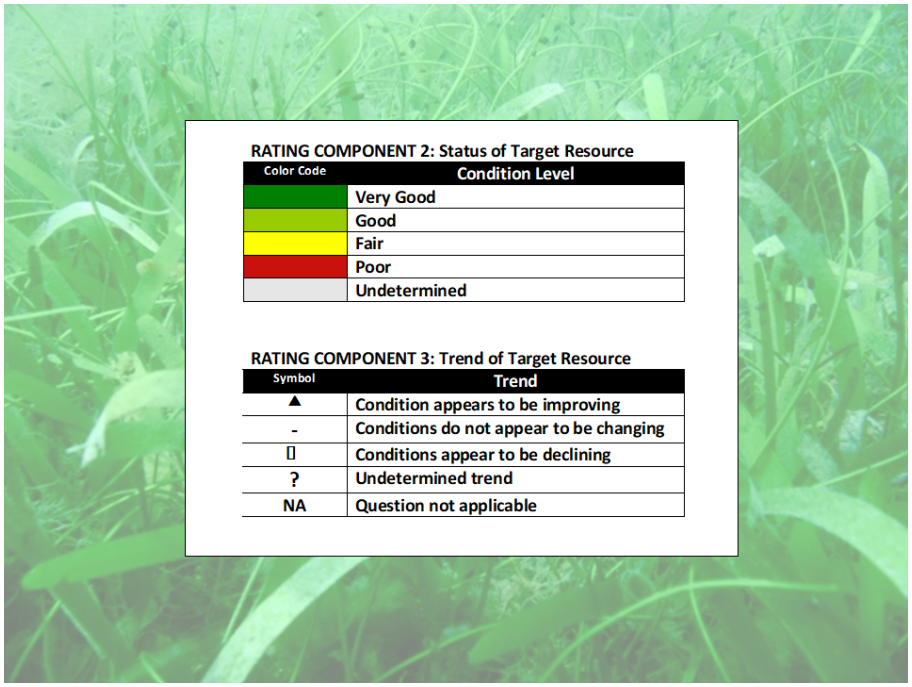
Every five years, based on set criteria, they will rate how well they are at achieving the anticipated results. It will also indicate what sites are pulling all the weight and which ones are not contributing.



RATING COMPONENT 2: Status of Target Resource

Color Code	Condition Level
	Very Good
	Good
	Fair
	Poor
	Undetermined

RATING COMPONENT 3: Trend of Target Resource

Symbol	Trend
▲	Condition appears to be improving
-	Conditions do not appear to be changing
▯	Conditions appear to be declining
?	Undetermined trend
NA	Question not applicable

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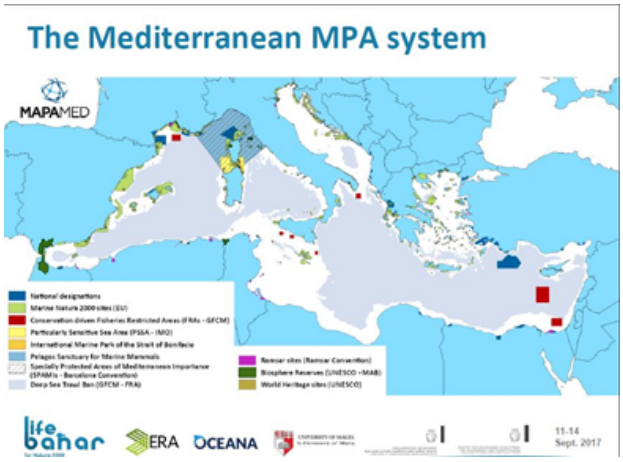
OPERATIONAL MPA NETWORKS: Models of Practice

MedPAN LEARNING NETWORK

- Included 11 non-EU countries of the Mediterranean in 4-year learning program
- Three program areas:
    - Regional and national training workshops
    - Mentor program
    - Implementation program
- Objective: to enhance effective conservation of MPAs through strengthening the network of MPA managers.



Let's look at different network-wide operational models – this one is around learning and improving the capacity of MPA practitioners and stakeholders associated with the MPAs. There are 21 countries bordering the Mediterranean, and in 2009 when this program began, 11 of those countries were non-EU, primarily in the eastern and southern Mediterranean.

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OPERATIONAL MPA NETWORKS: Models of Practice

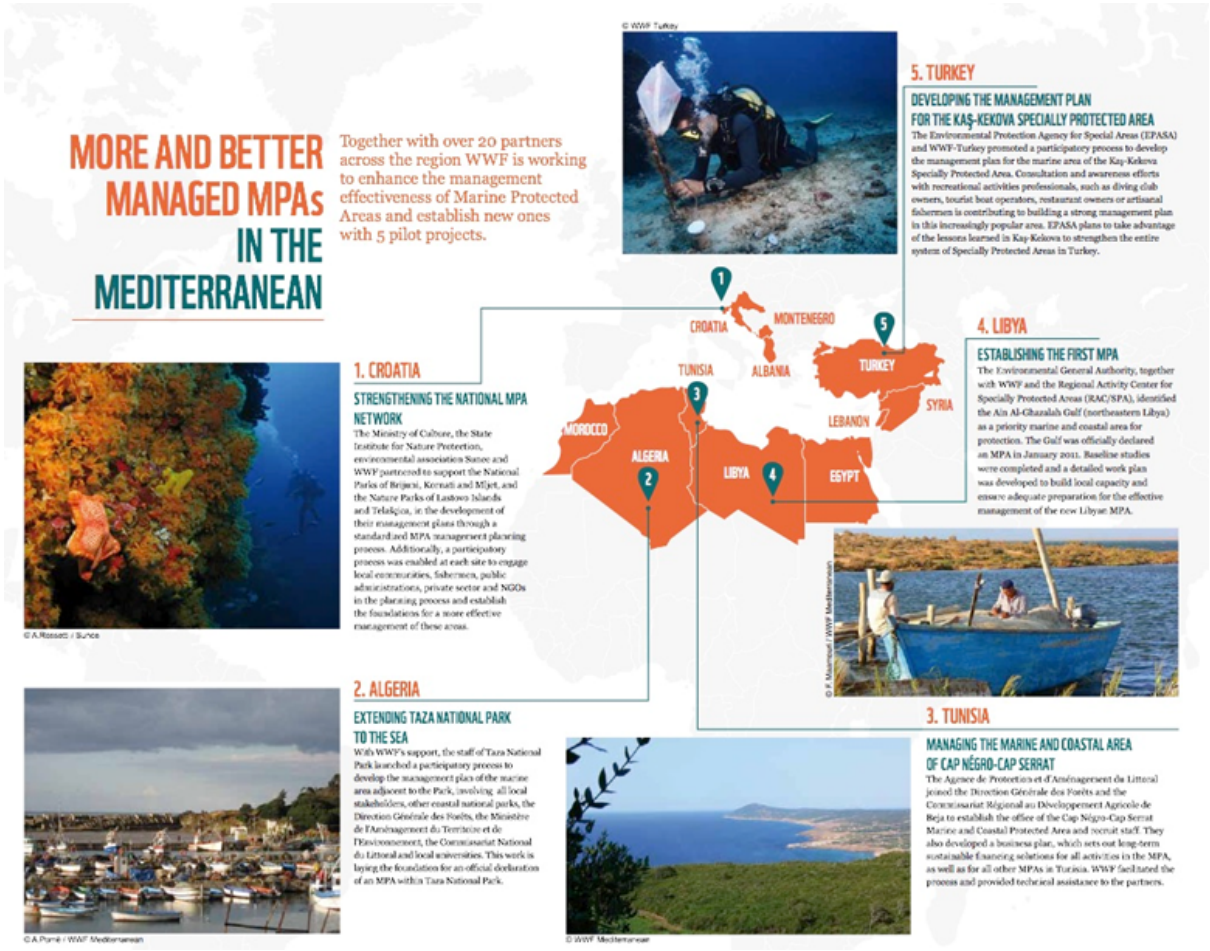
MedPAN LEARNING NETWORK

Capacity built for over 300 MPA practitioners in the region:

- Fundamentals of MPAs
- Management planning for MPAs
- Marine Spatial Planning
- Planning for Sustainable Fisheries in MPAs
- Planning for Sustainable Tourism in MPAs

Over 300 practitioners went through an intensive multi-year capacity-building program. Many of them went on to become part of an MPA leadership program in 2015. And those that went into the program are now mentoring a second cohort of leaders. This slide is just an example of some of the capacity-building programs they went through.

MedPAN LEARNING NETWORK – Five Pilot Projects



There were also five pilot projects created as part of the network's implementation plan:

1. *CROATIA – A network of MPAs was created under the Ministry of Culture and the State Institute for Nature Protection*
2. *ALGERIA – they extended land-based Taza National Park seaward and created a new MPA, along with a stakeholder-based process created a new management plan – firsts for Algeria*
3. *TUNISIA – supported the creation of the office and hiring of staff for Cap-Negro-Cap-Serat MPA, and developed a sustainable business plan to support the site*
4. *LIBYA – supported the establishment of the first MPA in Libya*
5. *TURKEY – worked with stakeholders to create a management plan for Kas-Kekova MPA*

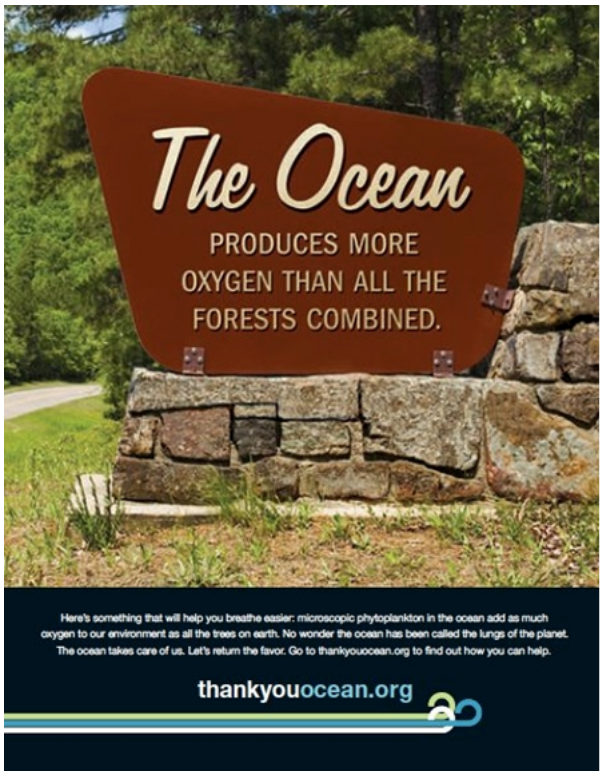
OPERATIONAL MPA NETWORKS: Models of Practice

U.S. NATIONAL MARINE SANCTUARIES "Thank You Ocean" CAMPAIGN

- MPA network-wide awareness building campaign (Calif.)
- Partnership between State of California and NOAA
- Billboards, posters, public service announcements on television and radio Docent training workshops and handbooks
- Created Ocean Communicators' Alliance
- Objective: focused on educating the public about the importance of sustaining ocean life and inspiring Californians to practice stewardship to alleviate four threats to MPAs: climate change, marine debris, water pollution, risks to marine life

Now let's talk about a network-wide awareness-building program. This was created among a network of four very large-scale national marine sanctuaries in California, USA, in partnership between NOAA and the State of California. The awareness-building campaign was between 2006-2008, before social media was what it is today – so they used video, TV spots, radio spots and billboards. But they also trained docents in the thematic areas, and among the MPA educators, they created an "Ocean Communicators' Alliance" whereby they all echoed the same messages about the ocean, using the same campaign tools.

U.S. NATIONAL MARINE SANCTUARIES "THANK YOU OCEAN" CAMPAIGN



Here is an example of some of the billboards.

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U.S. NATIONAL MARINE SANCTUARIES "THANK YOU OCEAN" CAMPAIGN

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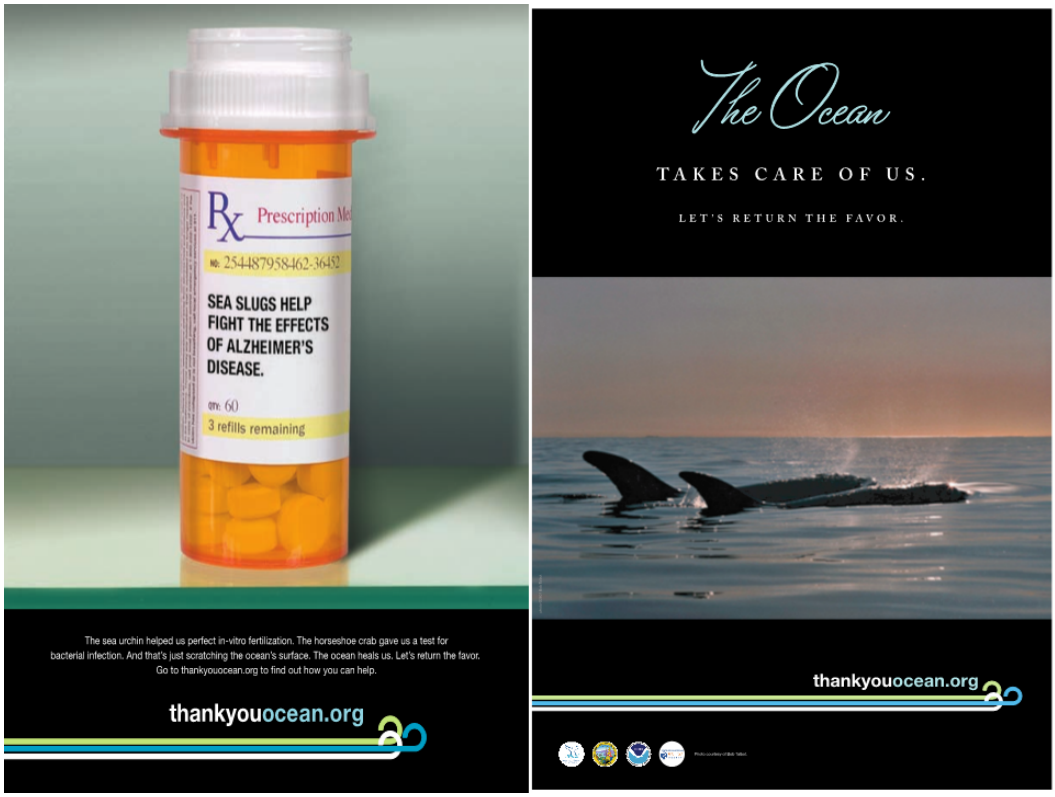

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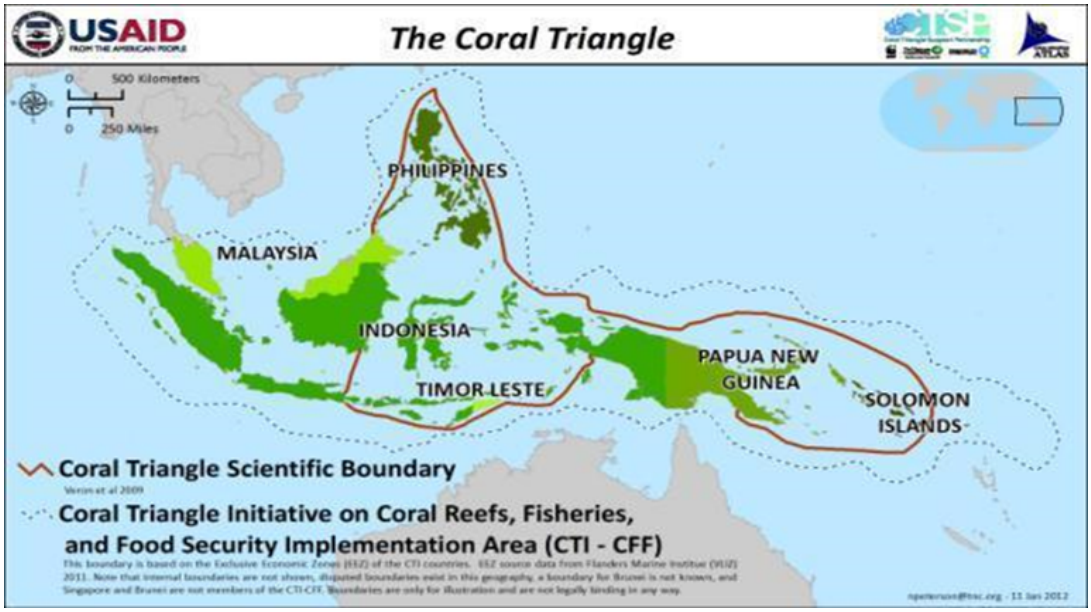
OPERATIONAL MPA NETWORKS: Models of Practice

CORAL TRIANGLE GOVERNANCE STRUCTURE



Switching gears again to another operational network approach, let's look at the network governance structure for the MPA network in the Coral Triangle – which involves six countries: Malaysia, Philippine, Indonesia, Timor-Leste, Papua New Guinea and Solomon Islands.

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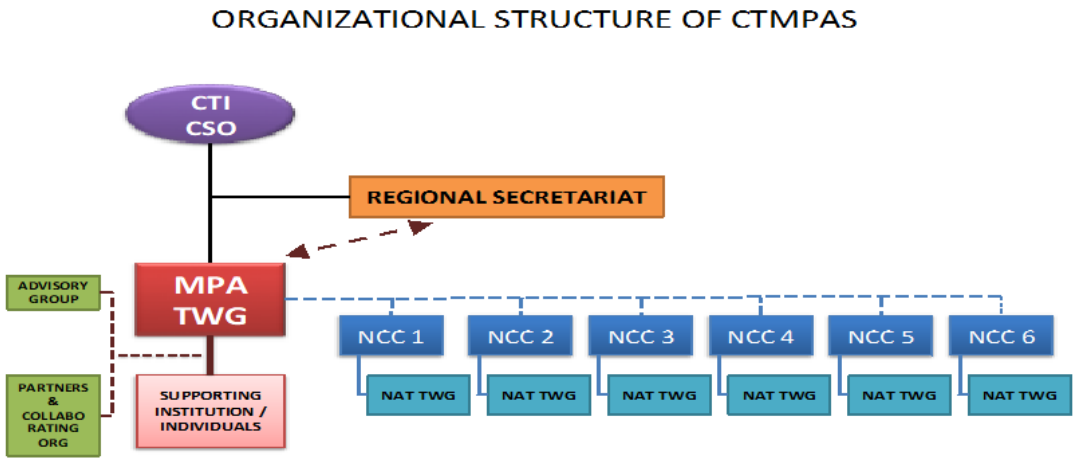
OPERATIONAL MPA NETWORKS: Models of Practice

CORAL TRIANGLE GOVERNANCE STRUCTURE



The CORAL TRIANGLE MPA SYSTEM and its governance system is considered a permanent structure.

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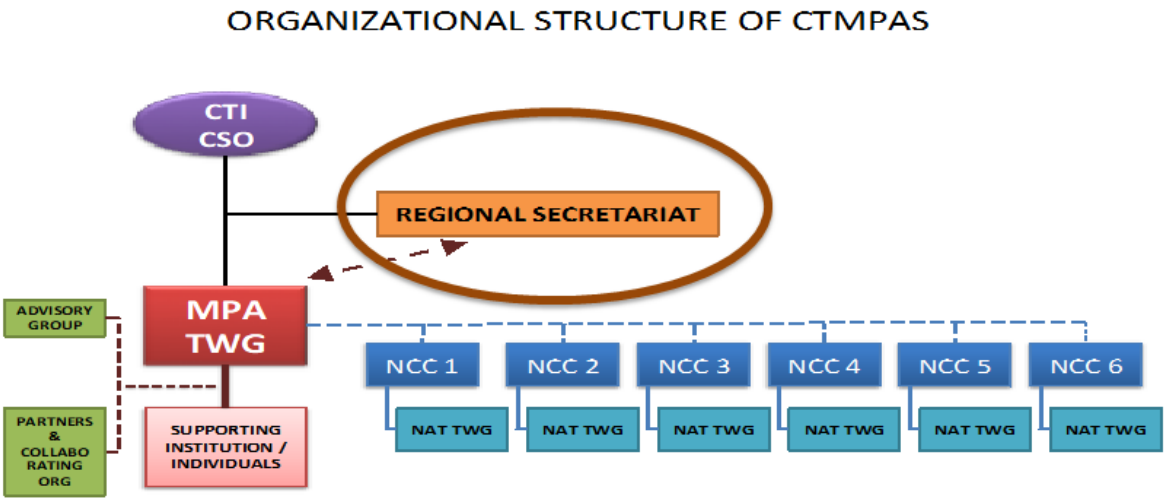
OPERATIONAL MPA NETWORKS: Models of Practice

CORAL TRIANGLE GOVERNANCE STRUCTURE



The REGIONAL SECRETARIAT is the official institutional coordinating body for the Coral Triangle MPA System. With its stable funding, it is considered the central system for all official communication and coordination with all components of the Coral Triangle Initiative (fisheries, climate change, seascapes).

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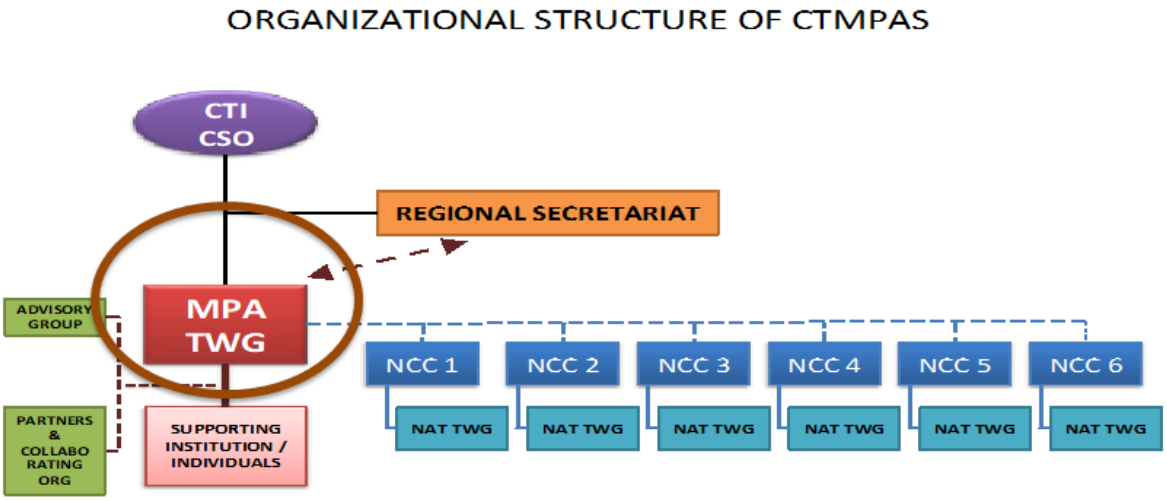
OPERATIONAL MPA NETWORKS: Models of Practice

CORAL TRIANGLE GOVERNANCE STRUCTURE



The MPA TWG or TECHNICAL WORKING GROUP – serves as a steering and oversight committee for the design, development and operation of the Coral Triangle MPA System and reports to the Regional Secretariat. The MPA TWG or Technical Working Group also liaises with the NCCs (National Coordinating Committees).

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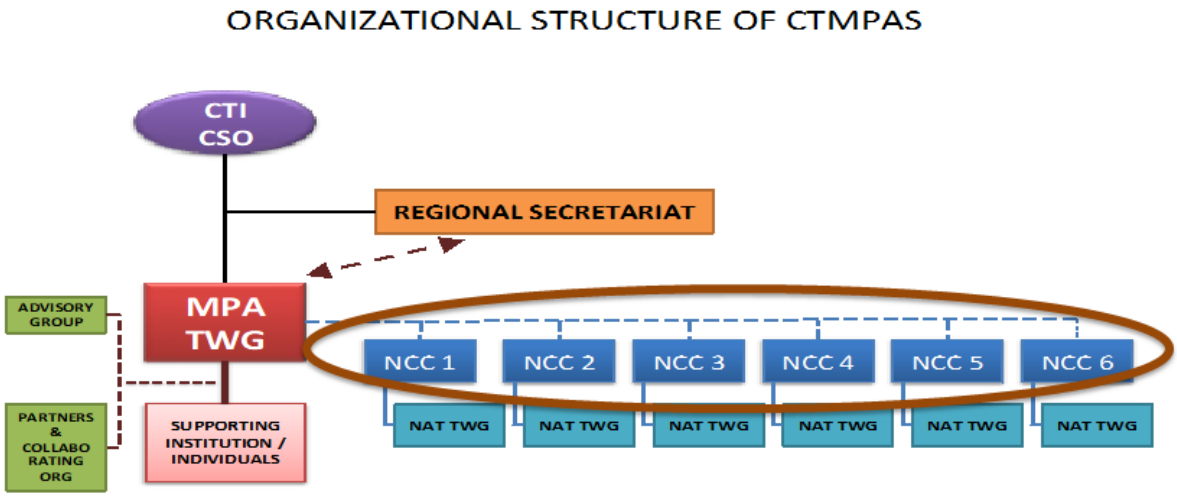
OPERATIONAL MPA NETWORKS: Models of Practice

CORAL TRIANGLE GOVERNANCE STRUCTURE



You can see that there is a National Coordinating Committee for each of the six Coral Triangle countries. They are responsible for operating and strengthening their own national MPA systems, and their own domestic programs.

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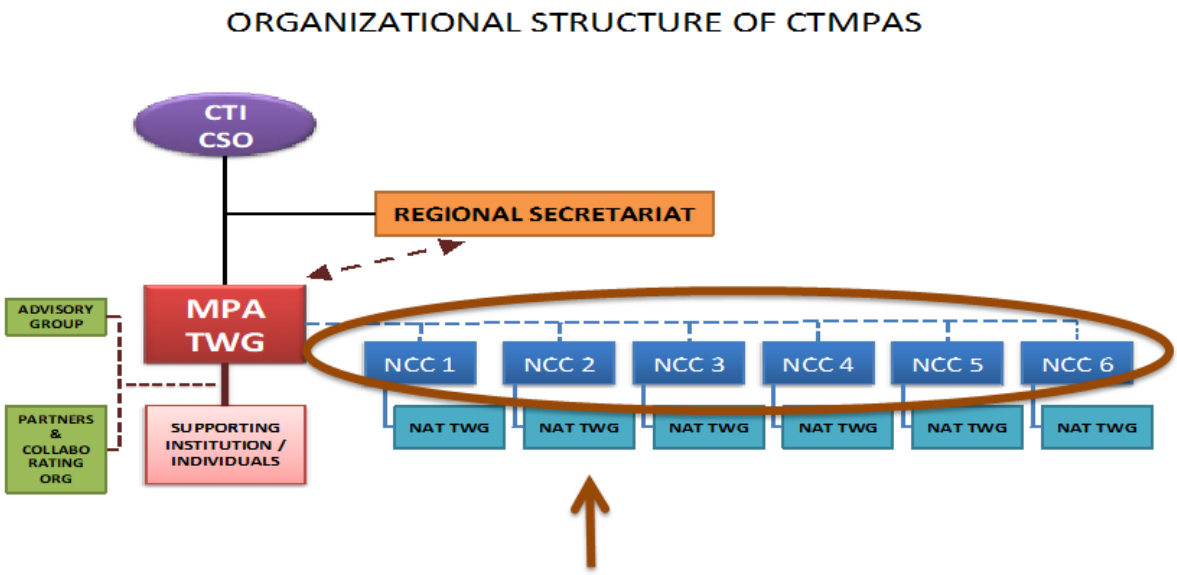
OPERATIONAL MPA NETWORKS: Models of Practice

CORAL TRIANGLE GOVERNANCE STRUCTURE



Then there is the NATIONAL level TECHNICAL WORKING GROUPS, where the work actually happens in strengthening the MPAs and making them more operational.

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OPERATIONAL MPA NETWORKS: Models of Practice

COSTA RICA'S SUSTAINABLE FINANCE PROGRAM: Forever Costa Rica

Public – Private Partnership Funding:

- Asociación Costa Rica Por Siempre
- SINAC Costa Rica
- The Nature Conservancy
- Linden Trust for Conservation
- Moore Foundation
- The Walton Family Foundation

The last operational network model we are going to look at is on sustainable financing for the network of MPAs in Costa Rica. This is a unique public-private partnership built around a trust fund model.

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OPERATIONAL MPA NETWORKS: Models of Practice

COSTA RICA'S SUSTAINABLE FINANCE PROGRAM: Forever Costa Rica

CHALLENGES

The primary challenges in the management of MPAs in Costa Rica are:

- Conservation of primary marine and coastal ecosystems
- Lack of planning instruments for good governing
- Missing of systematic monitoring of indicators for ecological integrity
- Weak system of surveillance and enforcement
- The solution concentrates on financing improving activities in a sustainable way.

BENEFICIARIES

- marine protected areas of Costa Rica
- national system of areas of conservation (SINAC)
- ministry for the environment and energy (MINAE)
- coastal communities
- civil society

The financing is also linked to addressing the five primary challenges identified in the slide, which includes a commitment to developing and implementing management plans for MPAs, as well as a monitoring program to evaluate how well the collective MPAs are in overcoming these challenges. Another thing to note here is that "coastal communities and civil society" are beneficiaries of the trust fund – both indirectly (receiving the benefits of a healthy coastal and marine environment) and directly.

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OPERATIONAL MPA NETWORKS: Models of Practice

COSTA RICA'S SUSTAINABLE FINANCE PROGRAM: Forever Costa Rica

ENABLING FACTORS

- Public and private partners make compromises in revenues to ensure that all the actions planned are matching for five years with 100% of the funds required, including recurring revenues
- Independent, simple and flexible trusteeship with clearly defined reporting and transparency mechanism – Costs of the activities of the Execution and Monitoring Plan 2010 – 2015 represent the basis for the financial scenarios to determine the trusteeship's amount and the basic outlines of its investment policy

- Government committed through budget compensation

A trust fund provides a long-term funding source to finance activities defined in the Implementation and Monitoring Plan. The trust is founded on perpetuity, independence, simplicity, flexibility and transparency. The founding partners serve as trustors, while the beneficiary is the country's national protected areas. As part of the trust fund agreement, the government is also committed as a financial contributor.

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OPERATIONAL MPA NETWORKS:

Where do you start?

Now that we have looked at five models of practice and what it looks like to be operational at the network scale, where do we begin? It's starts by looking at what programs, projects and support mechanisms you already have in place at the individual MPA level. Which one of those seeds could be sprouted into a network-wide program?

Slide 63

EXERCISE 4.3: Where We Are in Terms of Creating an Operational MPA Network for the YSLME

So we are going to examine where the seeds have been sprouted already, and then decide where we need to plant new seeds in order for us to create an operational network.

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EXERCISE 4.3: Where we are in terms of Creating on Operational MPA Network for the YSLME

Objective: to use this guideline as a calibration of how operational MPAs are in the Yellow Sea, in different operational areas. This will help to establish some of the operational gaps.

Activity:

1. In small country groups, referring to Handout 4.5 and using Worksheet 4.2, first assess the operational capacity of your MPAs,
2. Then identify what gaps need to be filled.

Time: 1 hour, 15 minutes for exercise, 35 minutes to share

NEXT TWO SLIDES SHOW HANDOUT AND WORKSHEET

Slide 65

HANDOUT 4.5: Checklist of Steps to Consider in Becoming Operational

I. EDUCATION, OUTREACH & COMMUNICATION

☐ Implement system-wide communications, education and awareness building
☐ Increase visibility, understanding and awareness of MPA network or system
☐ Provide wider public opportunities to engage in the MPA system or network
☐ Facilitate the sharing of experiences, challenges and successes amongst MPAs in the network or system
☐ Maintain effective communication between MPA managers/staff across all MPAs in network or system
☐ Provide opportunities for electronic networking, twinning arrangements and learning partnerships for MPA managers and staff from throughout the MPA network or system
☐ Support a network or system-wide communications team

II. RESEARCH & MONITORING

☐ Plan for system-wide monitoring
☐ Develop easily accessible data sharing system

III. MANAGEMENT

☐ Continually strengthen capacity of MPA managers, MPA staff, policy makers and key staff stakeholders to effectively manage MPA network or system
☐ Determine range and scope of activities to be undertaken by MPA network or system
☐ Work with MPA managers, government and NGOs to address current and future management challenges
☐ Continually engage key stakeholders in planning and implementation
☐ Implement integrated management approaches across MPAs in network or system
☐ Develop long-term sustainable financing plan for network or system
☐ Build in compliance and enforcement standards across the MPA network or system

IV. GOVERANCE OF NETWORK OR SYSTEM

☐ Develop consistent support system (political will) for the network regardless of changing government regimes
☐ Maintain effective coordination and linkages across sectors and jurisdictions
☐ Share costs and management responsibilities by building local support and leveraging opportunities from governments

V. EVALUATION

☐ Support an evaluation team
☐ Evaluate milestones and/or indicators of success
☐ Develop adaptive management framework
☐ Plan for celebrating successes and recognizing achievements

However, to start, we will complete our analysis on the vulnerabilities and adaptive capacity of key habitats associated with our species of concern.

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Day 5. Moving Towards Making the YSLME MPA Network a Reality

July 27, 2018 ◆ Seocheon, Republic of Korea

Spotted Seal *Spoon-billed Sandpiper* *Yellow Croaker*

Summary of Day 5.

On Day 5, we focus the first part of the day on demonstrating the benefits and how to of using of GIS decision-making tools to design MPA networks by applying site selection criteria. We will also create scenario development to meet multiple objectives and exercise weighing trade-offs needed to meet multiple objectives. We will go over an exercise for protecting Yellow Croaker in Haizhou Bay.

Today we will be building a 'Road Map of Process Steps for Designing the YSLME MPA Network' – Part I of the day. We will do these using Handouts 5.2a-d and Worksheet 5.1. Teams will work to develop a road map, laying out the process steps for designing the MPA network. Teams will also determine who should take responsibility for each process step against a timeline.

The part II of the day will be spent building a 'Road Map of Process Steps for Making the YSLME MPA Network Operational'. To do this, we will be using Poster 5.1 and the empty cards (you need to fill these out) in Handout 5.4, work in your teams to develop a road map, laying out the process steps for making the MPA network operational (effectively managed). Here also, teams will need to determine who should take responsibility for each process step against a timeline.

Time required: 8 hours including coffee break and lunch

Objectives of Day 5:

- To be exposed to a range of decision-making tools and understand how they work to support the MPA network site selection process.
- To learn how to use an intuitive decision-making tool to create different options that achieve different results

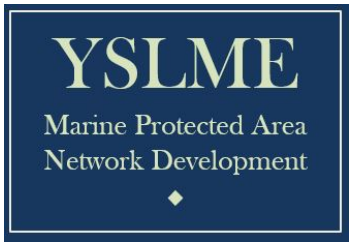
- As a complementary effort to the "design" road map, the "operational" road map will lay out the process for ensuring that the YSLME network is more effective and functional as a network, beyond what can be achieved with just a collection of individual MPAs.
- To design an MPA network development process specific to the multiple species needs of the YSLME MPA network.
- *Reconciling the three species-based road maps and creating a template for moving forward and making the MPA network a reality.*

Competencies needed: At least one participant represented from each country's government or research institution has access to spatial-temporal data of the indicator species and their habitats (for each of the three species). At least one participant of each country is highly skilled in GIS decision-making tools such as Marxan.

The main outcomes of Day 5 of the 1st technical meeting to design the MPA Network for the YSLME based on biophysical connectivity are presented in pages 8 to 11 of Appendix A and include the Planning Process Framework for YSLME MPA Network, and the Roadmaps with Timelines to establish the MPA Network based on the objectives and selection criteria for each of the representative species (Spotted Seal, Spoon-billed Sandpiper, and Yellow Croaker).

Slide 1

Marine Protected Area Network Development



Slide 2

DEMONSTRATION & INTERACTIVE EXERCISE 5.1: The Use of GIS Decision-making Tools to Design MPA Networks

Designing an MPA Network to Protect Yellow Croaker in Haizhou Bay

Slide 3

EXERCISE 5.2a: Building a Road Map of Process Steps for Designing the YSLME Network - Part I

EXERCISE 5.2a: Building a Road Map of Process Steps for Designing the YSLME MPA Network – Part I

Objective: to design an MPA network development process specific to the multiple species needs of the YSLME MPA network.

Activity: In your species teams, use the mapping cards (Handouts 5.2a-d) and Worksheet 5.1 (example only) and assemble a road map on a flip chart for moving forward – feel free to customize this in any way that makes sense to your team.

Time: 1 hour, 15 minutes

Handouts 5.2a-d Network design process steps road mapping card


HANDOUT 5.2a.doc


HANDOUT 5.2b.doc

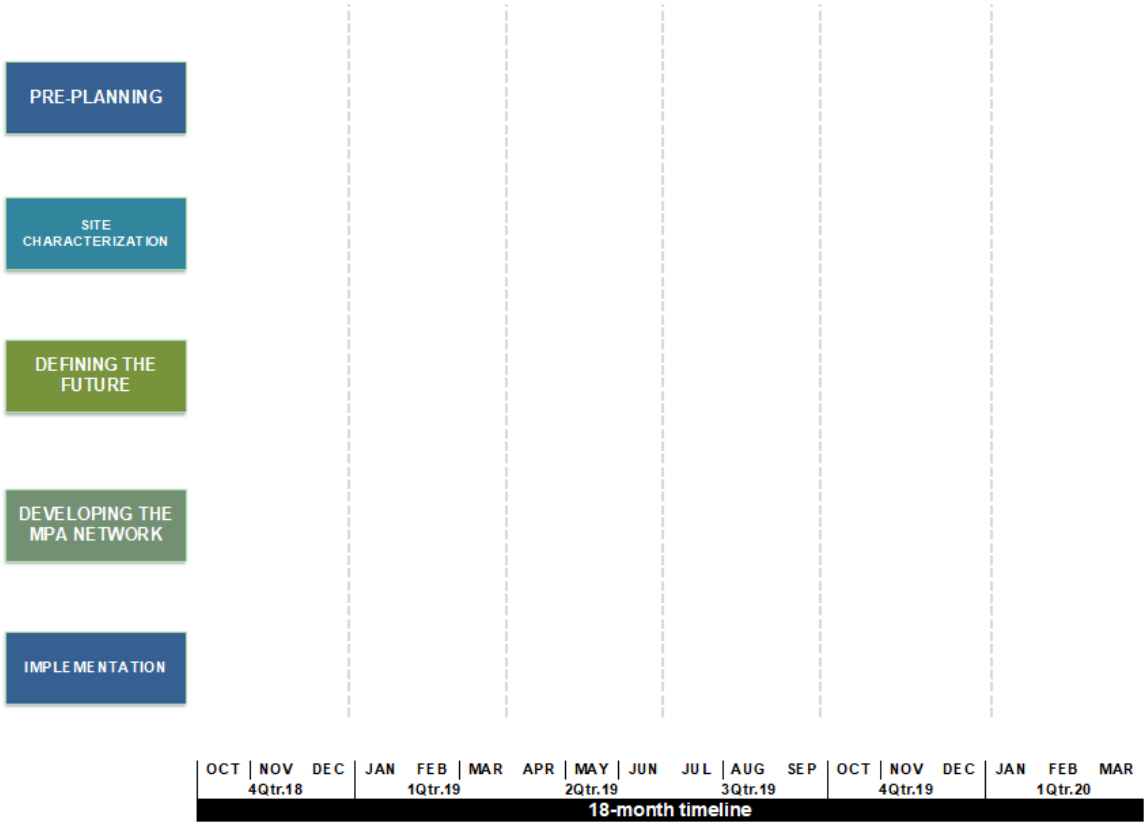

HANDOUT 5.2c.docx

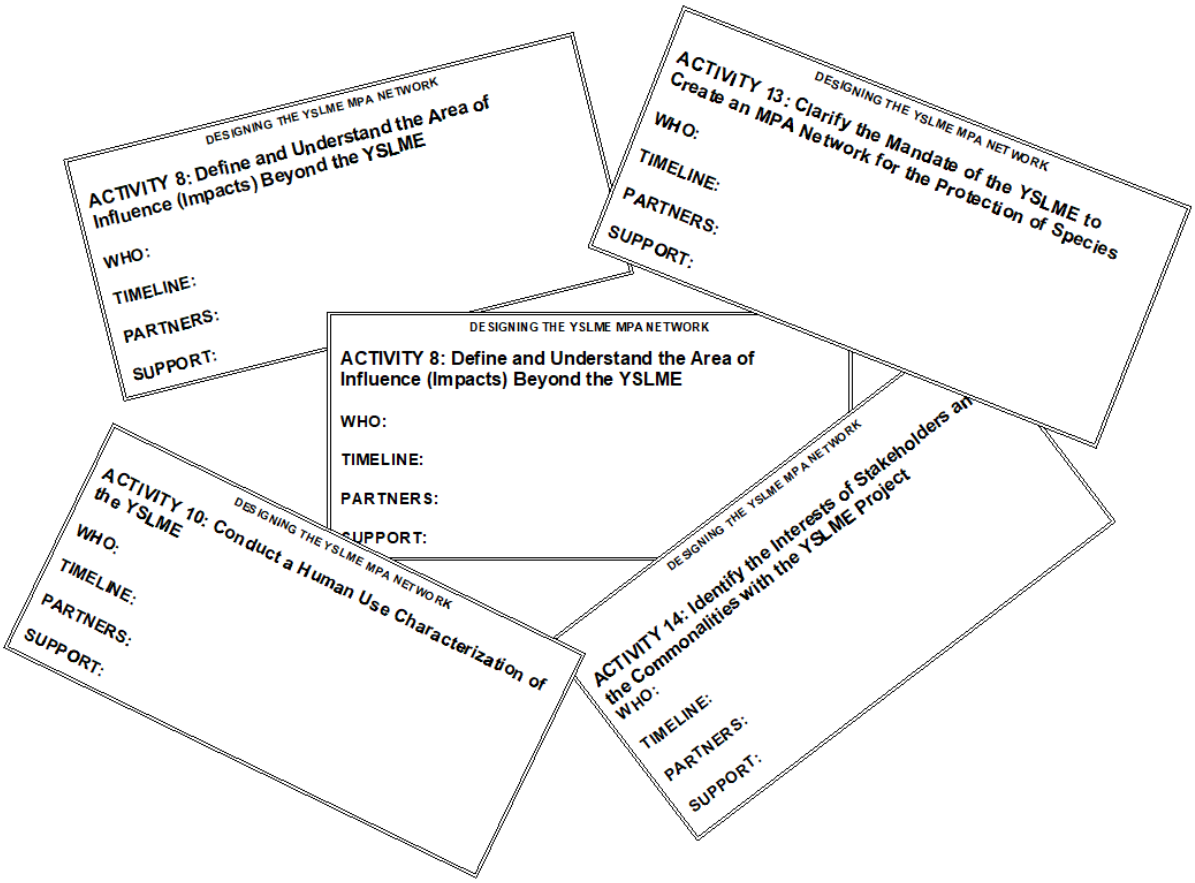

HANDOUT 5.2d.doc

Worksheet 5.1 MPA Network Design Process Model

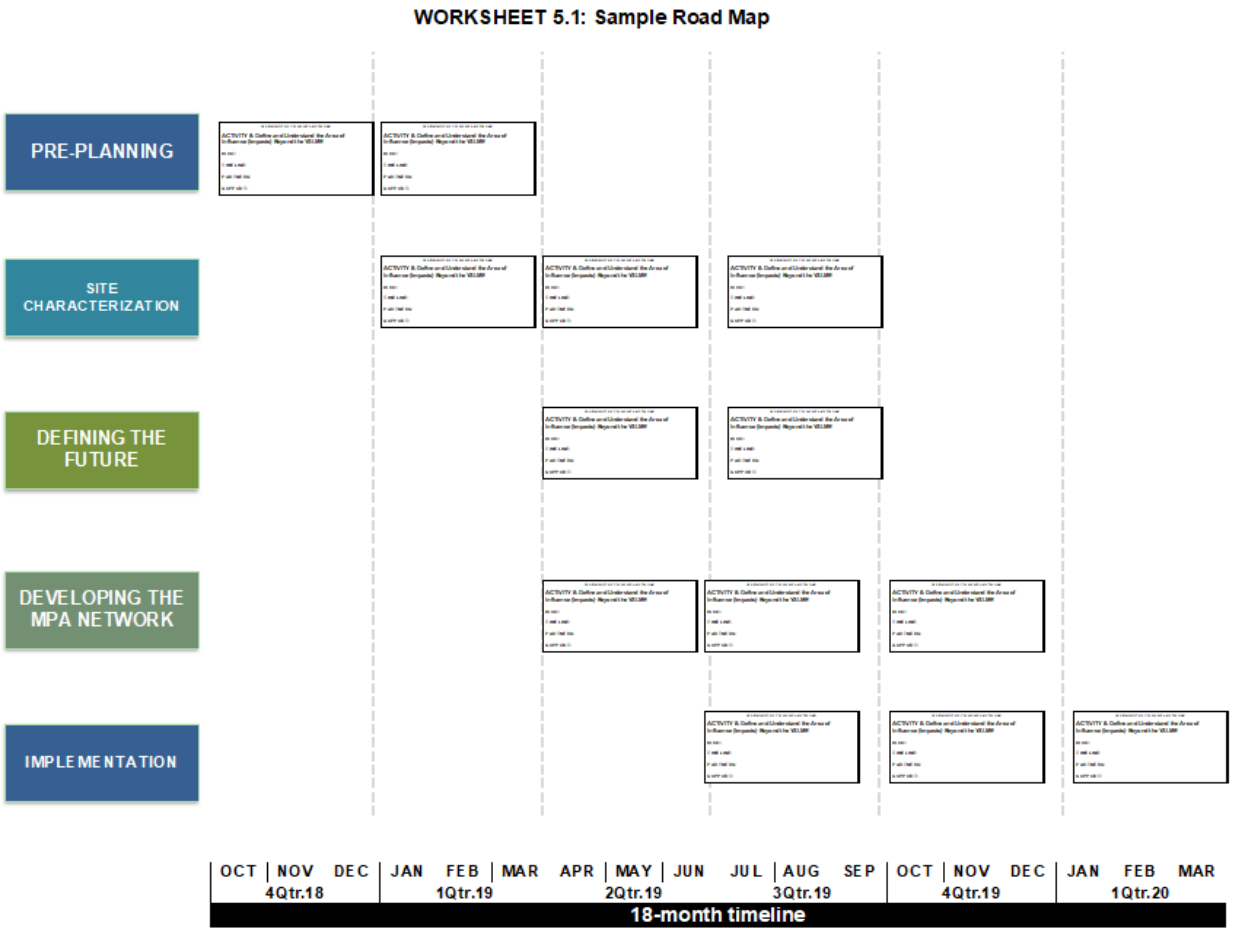

WORKSHEET 5.1.docx

WORKSHEET 5.1: Sample Road Map




DESIGNING THE YSLME MPA NETWORK
ACTIVITY 8: Define and Understand the Area of Influence (Impacts) Beyond the YSLME
WHO:
TIMELINE:
PARTNERS:
SUPPORT:
DESIGNING THE YSLME MPA NETWORK
ACTIVITY 13: Clarify the Mandate of the YSLME to Create an MPA Network for the Protection of Species
WHO:
TIMELINE:
PARTNERS:
SUPPORT:
DESIGNING THE YSLME MPA NETWORK
ACTIVITY 8: Define and Understand the Area of Influence (Impacts) Beyond the YSLME
WHO:
TIMELINE:
PARTNERS:
SUPPORT:
DESIGNING THE YSLME MPA NETWORK
ACTIVITY 10: Conduct a Human Use Characterization of the YSLME
WHO:
TIMELINE:
PARTNERS:
SUPPORT:
DESIGNING THE YSLME MPA NETWORK
ACTIVITY 14: Identify the Interests of Stakeholders an
the Commonalities with the YSLME Project
WHO:
TIMELINE:
PARTNERS:
SUPPORT:

Slide 7



Slide 8

EXERCISE 5.2a: Building a Road Map of Process Steps for Making the YSLME MPA Network Operational – Part II

Objective: As a complementary effort to the "design" road map, the "operational" road map will lay out a process for ensuring the YSLME network is more effective and functional as a network, beyond what can be achieved with just a collection of individual sites.

Activity:

1. In your species teams, use Poster 5.1 as your base along with the empty cards in handout 5.4,
2. Then refer to Handout 5.3 to fill out the empty cards,
3. Stick them on the poster according to the category and place in the timeline that is most appropriate.

Time: 1 hour.

Poster 5.1 Building a plan for making the YSLME Network operational

Handout 5.3 Integration Considerations

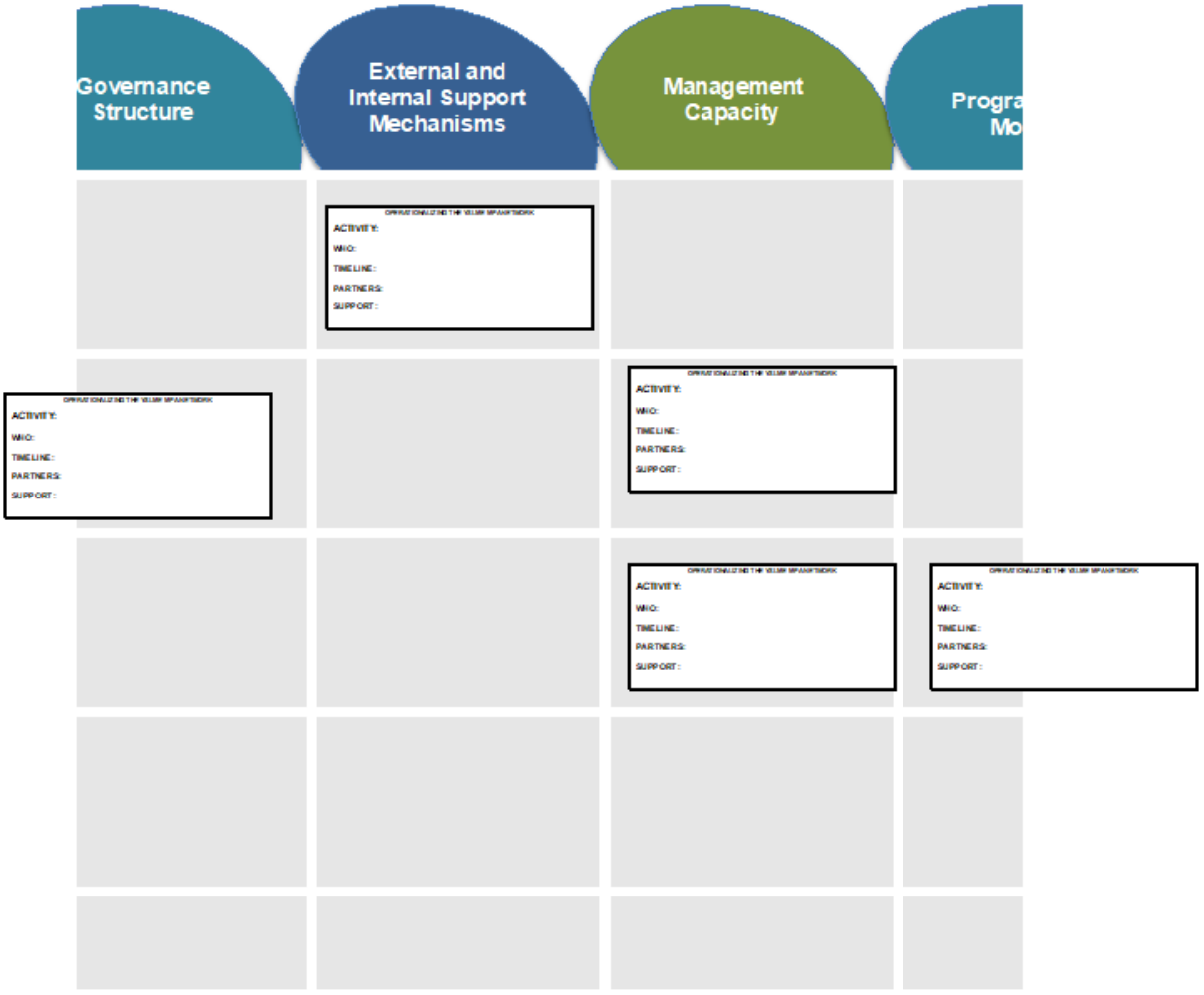
Handout 5.4 Operationalizing the Network Road Mapping Cards

NEXT TWO SLIDES SHOW HANDOUT AND WORKSHEET

Slide 10

POSTER 5.1: Building a Plan for Making the YSLME Network Operational

oster 4.3 and from that create a plan to make the entire YSLME MPA Network operational by ensuring each MPA in the network h perational components in place. This is your plan for making that happen. Fill out the "operational action" cards that are part of han e 4 operational categories – "governance structure", "external and internal support mechanisms", "management capacity" and "proc f practice" and place them on the timeline according to when they need to be accomplished in order to move the network towards b operational.



Slide 11

TEAM PRESENTATIONS:

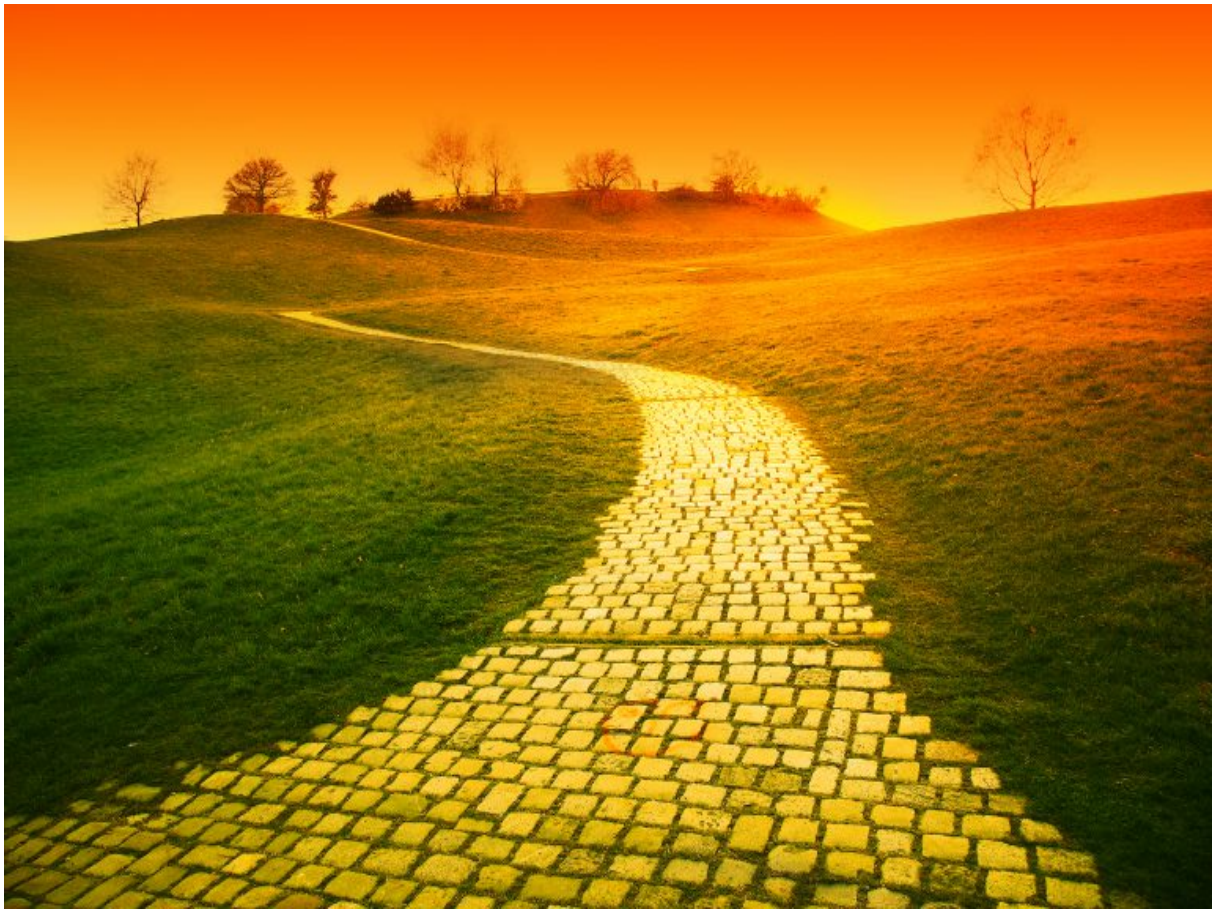
Road Maps for Developing the YSLME Network for Multiple Species

Slide 12

CLOSING SESSION:

Pointing Towards Next Steps and Completion of the Design of the MPA Network

Slide 13



Appendix A. Process Framework & Roadmap for Designing the Yellow Sea Large Marine Ecosystem (YSLME) MPA Network

By Rocío Lozano-Knowlton, MERITO Foundation Inc.
August 18, 2018

As part of the outcomes of the UNDP/GEF YSLME Phase II Project for a strengthened MPA network in the Yellow Sea, the YSLME Project Management Office organized the 1st regional workshop on designing a network of MPAs for the YSLME in Seocheon, RO Korea on 23-27 July 2018. The workshop was sponsored by the National Marine Biodiversity Institute of Korea. The workshop was attended by close to 30 representatives from 17 research institutes, universities, NGOs, regional organizations and local governments of PR China, RO Korea, and United States of America. Many of the attendees are experts in one of the three representative species, or national marine resource management policies, or work with stakeholders. Ms. Rocío Lozano-Knowlton of MERITO Foundation (USA) facilitated the five-day workshop. Colleague Ms. Anne Walton designed the workshop materials and agendas.

This document presents the proposed 'Process Framework and Roadmap for the design of a functional YSLME MPA Network'. The 'Process Framework' lays out eight (8) stages of the process, and the activities necessary to be performed in each stage. The 'Roadmap' is the timeline for each of the actions that need to be accomplished in order to create each necessary outcomes for the design and establishment of the network. During the 1st regional workshop of July 23-27, 2018, the workshop participants were introduced to all the stages and most activities and worked in teams to reach some of the necessary outcomes. Participants were able to share knowledge, information, collectively identify data gaps, articulate MPA network objectives, analyze vulnerabilities and assess risks, select site selection criteria, understand the utility of modeling making tools identified, the need to share standardized and spatialized biophysical data, and pieced together a timeline for the process all while using the spotted seal, spoon-billed sandpiper and small yellow croaker as flagship species where trans-boundary cooperation in conservation is needed. The conference also helped create a social network among participants.



This document summarizes the Process Framework and Roadmap for Designing the YSLME MPA

Network, and includes the some of the outcomes of the activities conducted[1] during the 1st regional workshop.

Specifically:

1. State of the Knowledge of each of the representative species
2. Data gaps and data sources
3. Identification of threats on representative species, species resilience, and cumulative impact
4. Objectives for each representative species for each representative species
5. Site Selection Criteria (Ecological, Social and Governance) for each representative species
6. Planning Process Framework for the Design of the YSLME MPA Network
7. Roadmaps for YSLME MPA Network (one for each representative species)

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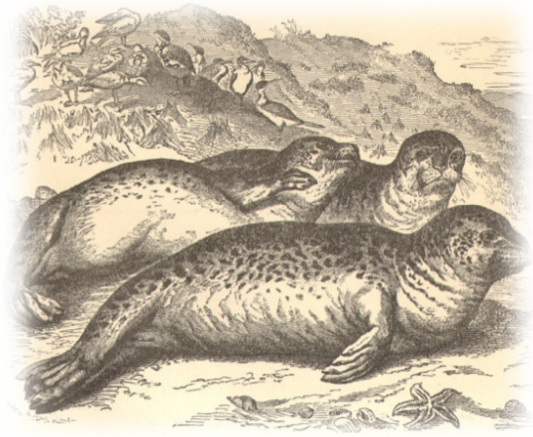
[1] *Based on information, opinions and consensus of the participants from China and Republic of Korea during the 'Designing a Network of MPAs for YSLME' workshop held on July 23-27, 2018 in Seocheon, RO Korea.*

1. State of the knowledge of each of the representative species



1.a **Spotted Seal (SS):** In China, SS is well studied and understood at a national research level. Korean participants' opinion in this regard varied. For some this species' spatial distribution is well understood, for others it is not. Spatial distribution occurs only in discrete areas along the coast, on islands, islets, and tidal flats in both countries. Discreet areas throughout the Yellow Sea coast in China were identified as critical habitat for feeding, breeding, calving and resting (Photo of map 1.a). SS seems to use RO Korea MPAs only for resting. Baekryung Island and DPRK coast we identified as habitat for feeding and resting as well. Population over all appears stable but under threats mainly due to coastal development in China, and RO Korea.

Other human activities threatening the SS population in China include: industrial fisheries, point and non-point source pollution, and marine transportation. In ROK: commercial fisheries, military activities, pollution from ballast water and invasive species. Management measures in place in China to protect the species include: The established no-take zones; habitat restoration efforts; reduced agriculture activities; efforts to reduce pollution. Setting an MPA at main migratory route was indicated, however, it was not specified if this is a plan, or has been done. However, there was no indication during China's MPA presentation regarding such MPA corridor, therefore it assumed it is only a plan. In RO Korea, the management measures to address impact are included: decreased fishing effort and reduction in permits for coastal development. Plans of unification efforts with China are foreseen. Natural events impacting SS in China is primarily sea level rise (loss of habitat) that affect

breeding and feeding grounds of SS in both countries.

1.b Spoon-billed Sandpiper (SBS):

Distribution and abundance of the SBS is not well studied nor understood in either country. China has documented life history stages in YS as feeding grounds and migration corridors for SBS. RO Korea has documented sites only as migration corridors. Both countries indicated the need of small fish availability, feeding grounds and sand/mud intertidal flats for SBS. Both also indicated SBS population appears to be declining and unsafe. Only ~ 11 individuals in RO Korea and ~ 500 in China exist.

Coastal reclamation, coastal development, mariculture, overfishing of hard clams and seaweed are main impacts from human use activities. In ROK, coastal reclamation, sea-sand collection, marine litter, and direct human disturbance. Protective laws enforced by Central Government, sustainable harvesting policies, monitoring and removal of invasive species were indicated by workshop participants from China as management measures in place by China, however, no specifics on critical habitats or which specific laws or policies which rise questions on effectiveness; ROK participants indicated habitat restoration, strong regulations, expansion of associated management centers, and restricted access to critical habitats as management measures. No specifics on where, when, or what specific management measures which also rises questions on effectiveness. Habitat loss and hunting are the most devastating impacts occurring outside of Yellow Sea to SBS not permitted in China or ROK. Strengthening and enforcement of laws to protect the species was indicated as necessary measure.

1.c Yellow Croaker (YC)

Species spatial distribution and abundance in YS is not well studied or understood in either country. Spatial range is extensive throughout YS. The only critical life history stage that is well documented for Yellow Croaker is spawning areas, but not spatialized hydrographic data available. The associated habitats were identified and shown in photo of map 1.c. Cold water mass was mentioned as ecological condition during presentation. The population appears to be declining or unstable. The two main activities impacting the YC in YS are overfishing, and marine pollution (point source and non-point source).

Required management measures include application of sustainable fisheries management approaches including catch limit, size limit, minimum net mesh size, spatial closure and seasonal closure. The most persistent natural event impacting the YC is climate change/warming oceans. The ideal mitigating measure was proposed drastic reduction of CO_2 emissions. These views were agreed by participants of both countries.

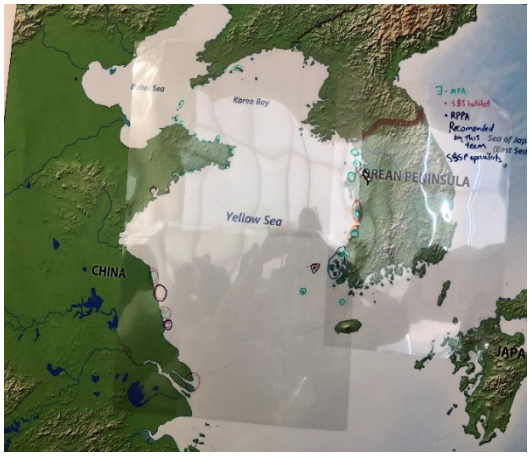
2. Data gaps and data

2.a Spotted Seal (SS):

Data on distribution and abundance of SBS is available in RO Korea and China. Both countries have in-situ, satellite data and literature source. Only China has modeling and extrapolation data. Behavior and critical stages data of SBS is available in China and RO Korea. Both countries have in situ, satellite data, and literature source data. Associated habitat type of data is also available regarding breeding, resting, calving, and migrating as in-situ data, satellite data, and literature source from both countries. RO Korea indicated Baekryeon Island and Garorim (>10 individuals) as critical habitat sites. There is a lack of data related to Human use and threats to the spotted seal in ROK. There is no data on the effectiveness of management efforts to address human use threats in ROK and China.

Map 1.a Critical habitats of SS in YS (areas in red)

2.b Spoon-billed Sandpiper (SBS):



Map 1.b Critical habitat of SBS in YS (in red SBS habitat, in black areas recommended to protect, in green, existing MPAs)

Data on distribution and abundance of SBS is available in ROK and China. Both countries have in-situ, satellite data and literature source. Only China has modeling and extrapolation data. Behavior and critical stages data of SBS is available in China and RO Korea. Both countries have in-situ data, satellite data and literature source data from a population of ~ 500 individuals and 12 respectively of this species. RO Korea, in addition, has individual as source data. Associated habitat type of data is also available regarding breeding, fledging and feeding as in-situ data, satellite data, and literature source from both countries. Associated ecological process data and human use impacts data is available at both countries in in-situ, satellite and literature source formats. Data is available on habitat loss (main human use threat) due to reclamation from both countries but not available regarding hunting from either country. No data available on the effectiveness of the management measures to address the above threats in either country except literature sources in ROK.

2.c Yellow Croaker (YC):

Map 1.c Critical habitat of Yellow Croaker in YS (dashed areas are spawning areas, with a X blue are reclaimed areas, Red are existing MPAs)

There is a lack of data available related to distribution and abundance from both countries. Data source in ROK is Marine Ocean Fisheries (MOF) who publishes a master fisheries plan every five years (Fisheries Resources Management Act, Chapter II). There is little data of Literature Source in China (i.e., Xo & Chen, 2009 Fisheries Science of China). There is no data regarding behavior and critical life history stages, only in-situ data from RO Korea. There is a little data regarding wintering and spawning areas in the YS. Spawning season appears to occur April through June but data is insufficient. In-situ data format us available from ROK. No data available from China. Lack of data regarding associated habitat types and ecological processes in both countries. Areas shown in map 2.c located in the Southern and Eastern areas of YS at lower ocean depths of sandy and muddy substrate. Wintering season appears to occur Nov. through March but data is insufficient. No data is available from China related to associated habitat or ecological processes. Data on management measures to address threats is available as literature source for RO Korea only through Enforcement Decree of Fishery Resources (Management act, MOF, Chapter III). None available from China.

3. Human impacts on representative species, species resilience, and cumulative impact

3.a On Spotted Seal:

The human activity that harms spotted seals the most in the YS is coastal development. Spotted seals lose their habitat to land reclamation for coastal development and/or mariculture. Although it may not be as highly impactful as an oil spill, the damage is permanent. The second most impactful human activity on spotted seals is by-catch and it is highly intense, although no data is available on its frequency. The 3rd most impactful human activity is pollution by marine litter and chemical contamination and accumulation that affects the health of the spotted seal, and their food availability. This species has little resilience to the cumulative effects of the three main identified human induced impacts. The cumulative (amplified) effects of these impacts lead to complete habitat loss, and physical damage affecting the health, distribution of individuals, the population as a whole, the community, and eventually the entire ecosystem. The social repercussions of impacting the population of spotted seals

will cause the loss of a flagship species for China and RO Korea, and loss of ecotourism revenue. More studies are needed to determine what the anticipated loss of this representative species would be over next 5-10 years if no action is taken.

3.b On Spoon-billed Sandpiper (SBS):

The most impactful human use activity is land reclamation causing habitat loss. The frequency and intensity of this activity in YS is very high and extensive, all year. The 2nd highest impact is 'Spartina grass', an invasive species of moderate intensity, but very frequent (daily) that also causes loss of habitat for an already endangered bird. The 3rd most impactful human use activity is climate change causing starvation of birds, habitat loss (sea level rise), and changes in migration patterns. This is a long-term very extensive (global) moderate impact. The 4th impact on SBS is non-point and point source pollution which causes health issues for SBS, pollutants' bio-accumulation, and makes their food less available. The 5th human use activity that impacts SBS is the wind-farm industry, which is altering their behavior such as migration routes. SBS is not resilient to the amplification and accumulation of these impacts. The species response to the multiple stressors leads to birds change of habitat/relocation or if not possible death, and changes in the ecosystem functionality. People will miss the birds (flagship species), loss of ecotourism revenue, and culturally iconic species.

3.c On Yellow Croaker (YC):

The main human use activity that impacts the yellow croaker the most is 'over-fishing' (scores 2). The type of impacts of include reduction on species biomass (abundance), and occurs year round. Second most impactful human uses were equally rated pollution and unsustainable fishing practices (both scored 3), specifically bottom trawling and other types of fishing methods and gear that destroy the habitats. Impacts of pollution identified include health impairment, and modifications in DNA and reduction of biodiversity of the target species and other species (from fishing gear). Both also occur year-round. Last but not least 'Gas development'. Oil spills affect health of yellow croaker. Impacts are acute but not as common, thus scored 4. The yellow croaker is relatively resilient unsustainable fishing practices but not to overfishing as indicated by the reduction on landings (score 2.4). The root causes of the impacts identified include: Lack of regulations and enforcement to prevent pollution in marine ecosystems; lack of management system of marine litter; lack of effective sustainable fisheries management; lack of public and fishers awareness. The cumulative (amplified) impacts of unsustainable fishing practices result in reduction of biomass (abundance), loss of habitat, spatial extent (by 70% in 5 years, and 90% in ten years); alteration of ecosystem functioning resulting in the social implications such as reduction of income for fishers and related fish processing industries, tourism, and culture shifts (i.e., traditional ceremonies or foods).

4. Objectives of the YSLME MPA Network based on three representative species & Site Selection Criteria

4.1.a Objectives of YSLME MPA Network to protect the Spotted Seal (SS):

i. To create the YSLME Collaborative Research Network for SS composed of researchers and resource managers from the three neighboring countries (ROK, China and DPRK) by 2019
ii. The YSLME Collaborative Research Network for SS will assess, research, build capacity, exchange scientific information and create an integrated database that contains spatialized data, identifies distribution, population, migratory routes, and critical habitats of SS and includes Bohai Sea by 2023.
iii. Designate 30% of the identified critical habitats in YS as MPAs based on the research, population assessment, and site selection criteria for SS by 2024.
iv. Establish an integrated management plan for YSLME Network that includes the priorities for SS by 2028

4.2.a Site selection criteria for Spotted Seal

- *Biophysical-based:* Representation, Replication, Connectivity, Critical Habitats, Source Population, Viability, Reproductive cycles, Foraging/Breeding grounds. Linked to objectives ii and iii
- *Socially-based:* Economic considerations, social considerations, shared learning and opportunities, threat reduction. Linked to objectives 5.1.a i, and iv
- *Governance-based: Integrated management, Ecosystem-based management, Political will and*
  leadership, Decision-making structure, Monitoring, Enforcement, Conflict resolution. Linked to objectives 5.1.a.i, and iv

4.1.b Objectives of the YSLME MPA Network to protect Spoon-billed Sandpiper (SBS):

i. To create the YSLME Collaborative Research Network of SBS composed of researchers and resource managers from 2 countries (ROK & China) by 2019

ii. The YSLME Collaborative Research Network for SBS will assess, research, build capacity, exchange scientific information and create an integrated database that contains spatialized data and identifies migratory routes, population status, feeding grounds, and critical habitat for SBS in YS by 2021.
iii. Increase by a minimum of 30% the MPA coverage for protection of SBS based on information gathered by the YSLME Collaborative Research Network for SBS, and the site selection criteria for this species by 2023.
iv. Increase by 30% the general public awareness and visibility of existing and newly established MPAs that

protect SBS and create economic incentives for communities living near these MPAs by 2028

4.1.c Objectives of YSLME MPA Network to protect Yellow Croaker (YC):

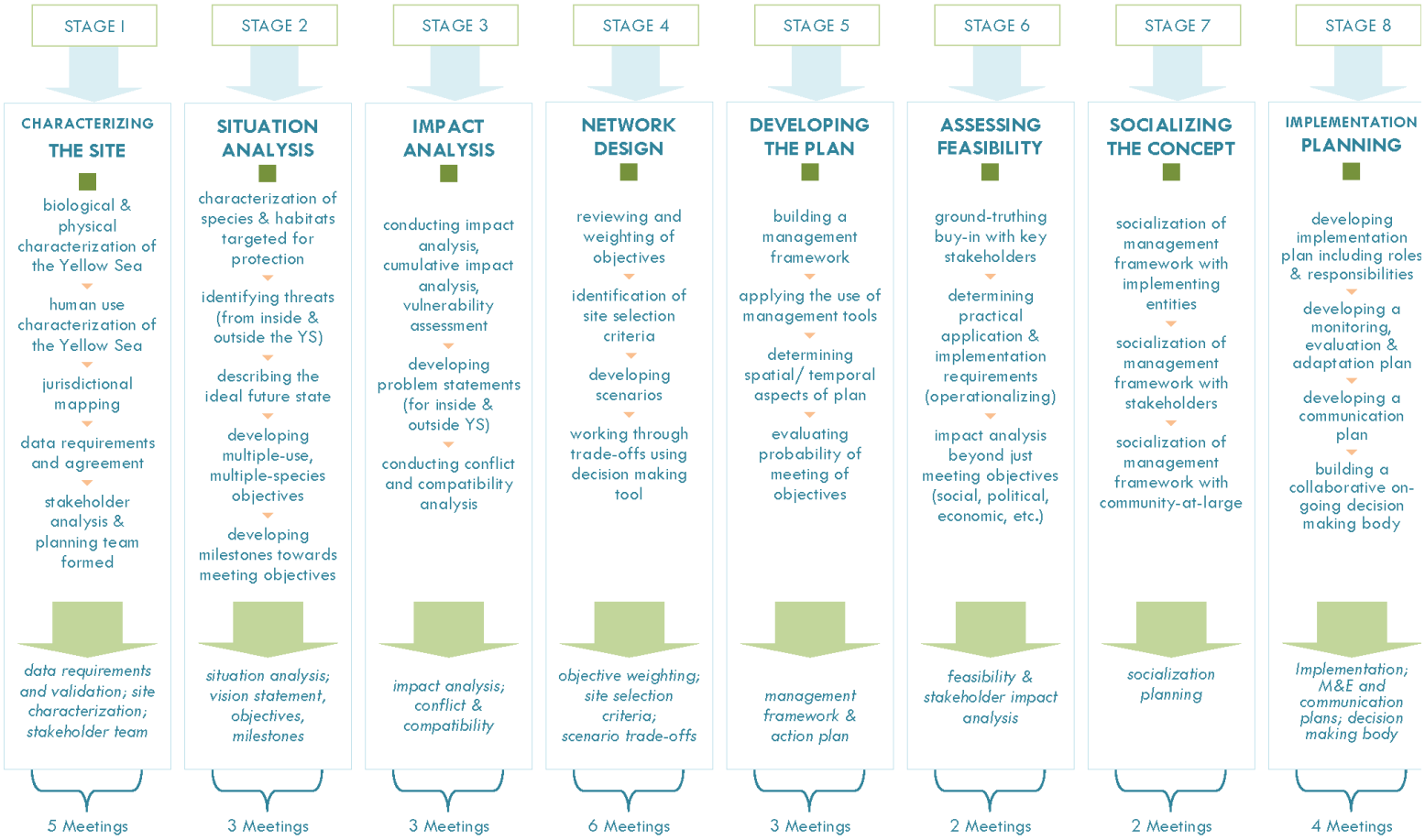
i. To protect 30% of the spawning grounds of the YC by establishing no-take MPAs in the YS based on representation, replication, connectivity, critical habitats, source population and areas heavily impacted by humans, by 2024.
ii. To develop, implement and enforce a sustainable fisheries management plan across the Yellow Sea for YC by the 3 countries (China, DPRK and RK) to reduce by 30% the fishing effort on Yellow Croakerby 2024.
iii. To increase the value of YC through eco-labeling campaigns (fish branding) to increase the income of YC fishing communities as incentive to implement sustainable fishing practices by 2026
iv. Increase by 30% the management capacity of resource management agencies, and the funding for research institutions to better manage and study YC by 2028.

4.2.c Site selection criteria for Yellow Croaker (YC)

- *Biophysical-based:* Representation, Replication, Connectivity, Critical Habitats, Source Populations, Reproductive cycles, Areas heavily impacted by human use. Linked to objective i, and ii
- *Socially-based:* Economic considerations, social considerations, cultural considerations, balance of uses (spatial planning), shared learning and opportunities, threat reduction. Linked to objectives ii & iii
- *Governance-based:* Integrated management, Ecosystem-based management, Political will and leadership, Institutional and gov. considerations, Decision-making structure, Type of management measure, Monitoring (population and habitat), Enforcement, Conflict resolution. Linked to objectives ii, iii, and iv

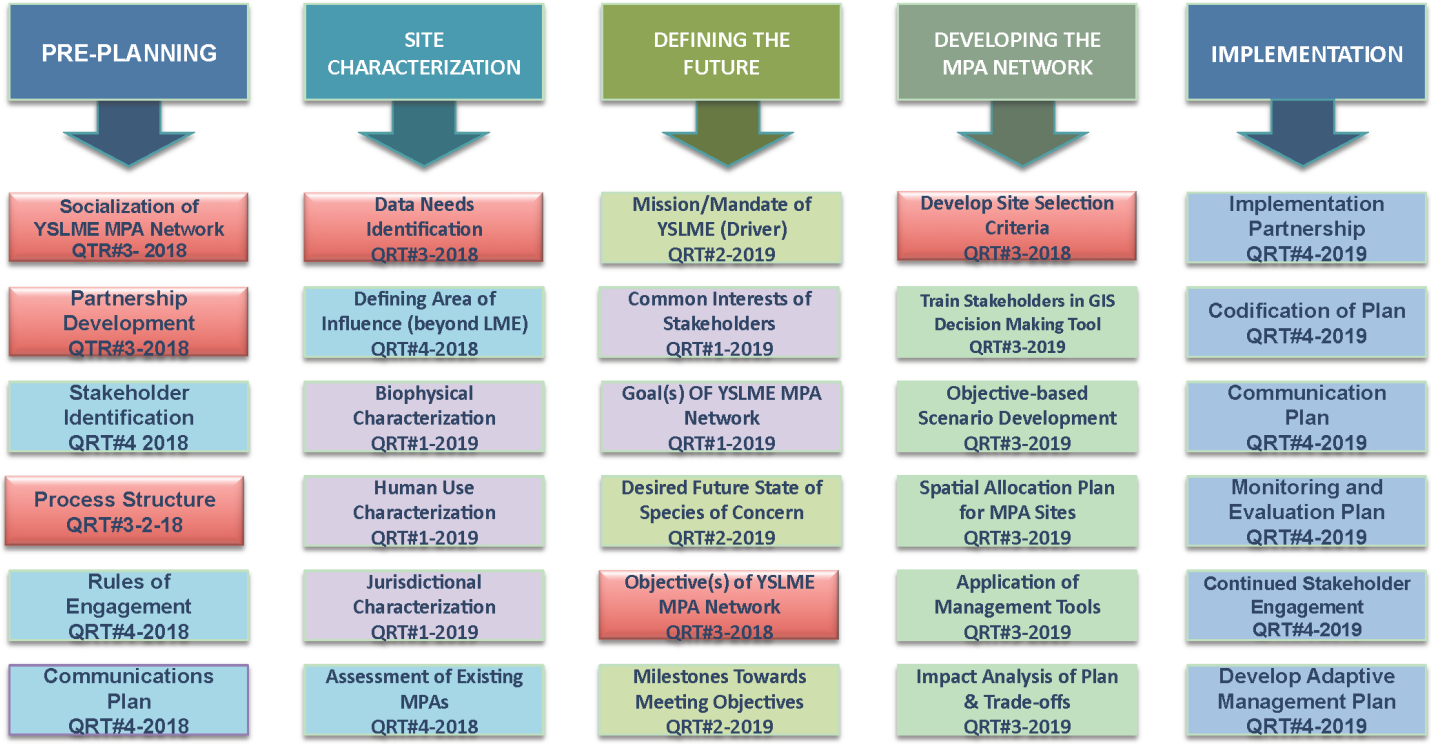
5. PLANNING PROCESS FRAMEWORK *for the* YSLME MPA Network

The following framework outlines the proposed planning process. This is intended to be a framewo provides general guidance on how the ecosystem-based management process might unfold. Some may be modified or the order changed based on needs, interests and capacity of the YSLME MPA network planning team to engage in a comprehensive ecosystem-based planning process.



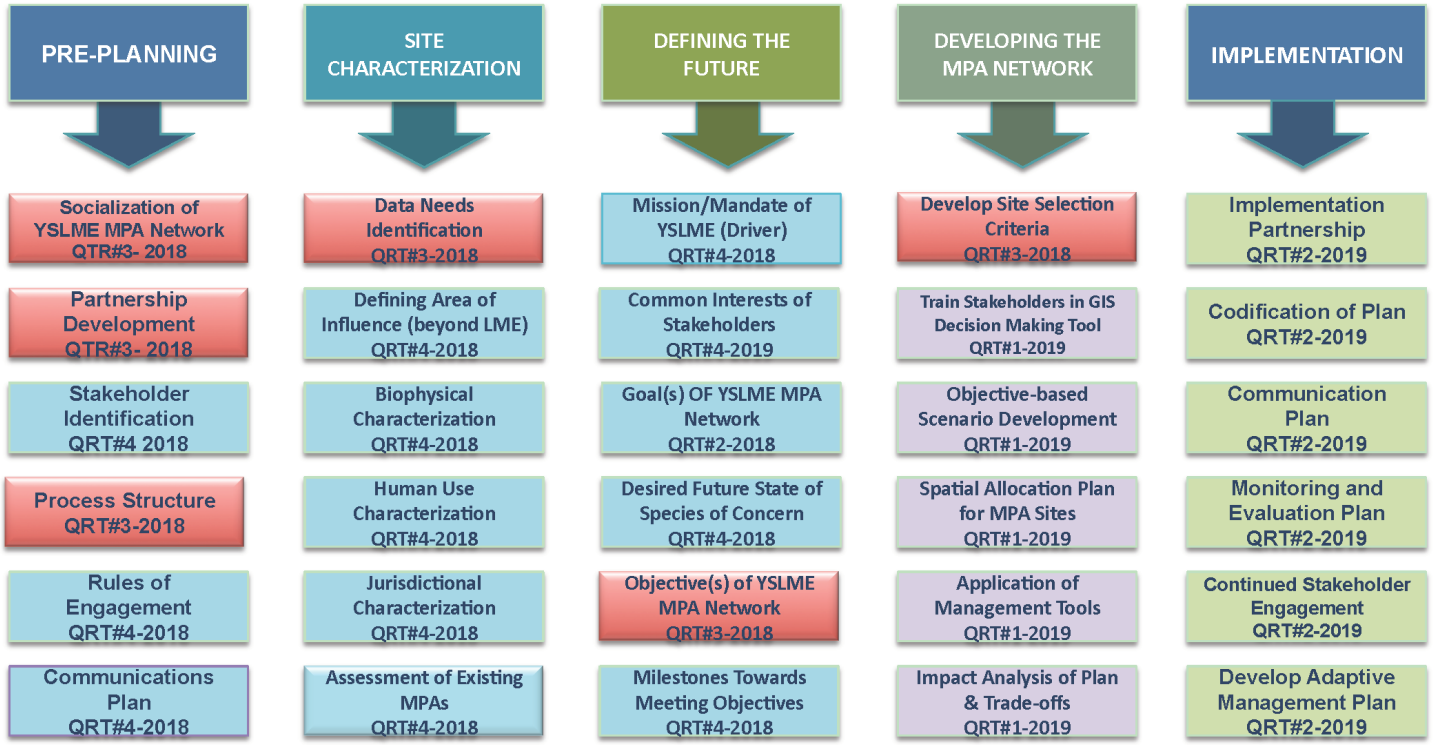
ROADMAP TO ESTABLISH THE YSLME MPA NETWORK (12-18 months)

6.A SPOTTED SEAL



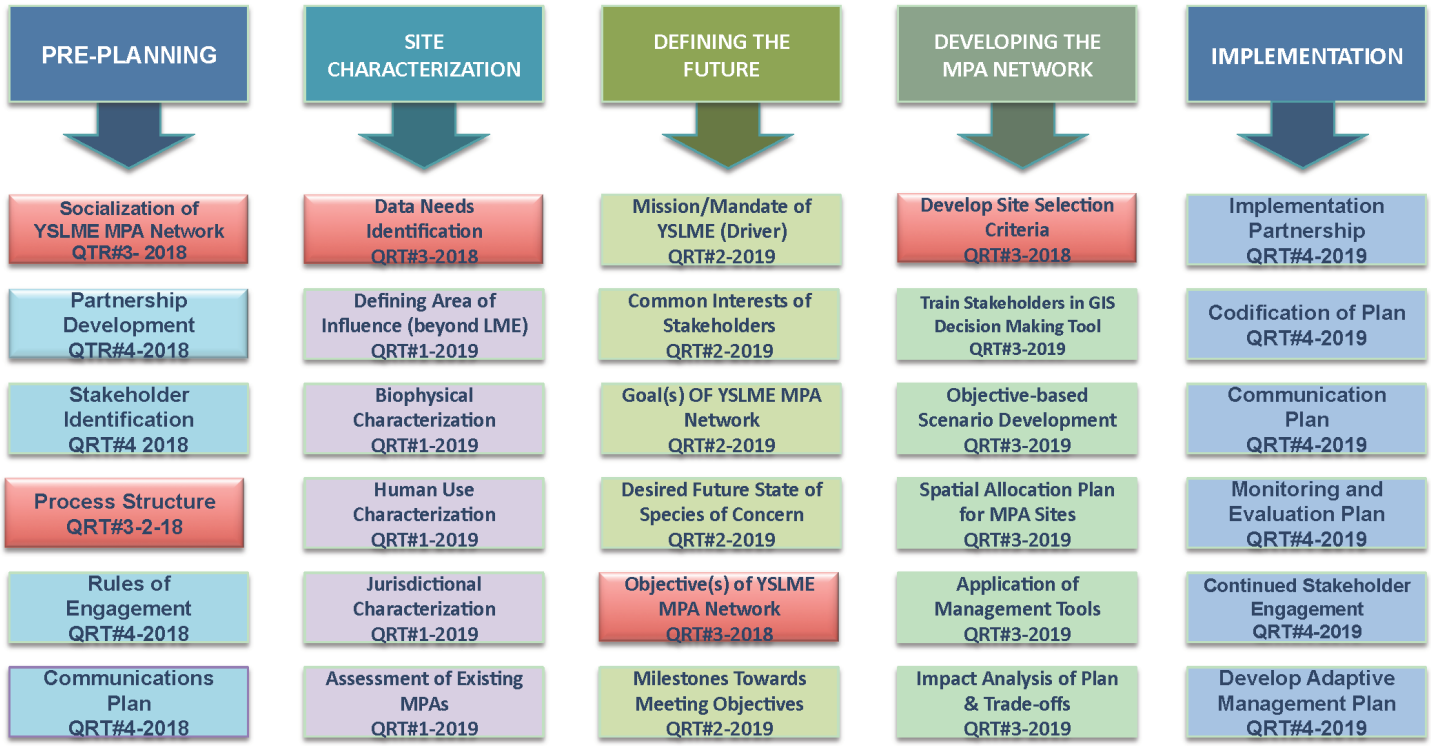
ROADMAP TO ESTABLISH THE YSLME MPA NETWORK (12-18 months)

6.B SPOON-BILLED SANDPIPER



ROADMAP TO ESTABLISH THE YSLME MPA NETWORK (12-18 months)

6.C YELLOW CROAKER



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