ZSL
LET'S WORK FOR WILDLIFE

EDGE
EVOLUTIONARILLY DISTINCT & GLOBALLY ENDANGERED

Survival Blueprint

Pearl Bubble Coral, *Physogyra lichtensteini* Philippines

Compiler: Grace Quiton-Domingo
Contributors: Grace Quiton-Domingo, Gregorio E. dela Rosa, Jr.

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1. STATUS REVIEW

1.1 Taxonomy:

Phylum: Cnidaria

Class: Anthozoa

Order: Scleractinea

Family: Euphyllidae

Genus: *Physogyra*

Species: *Physogyra lichtensteini*
Common names English: Pearl bubble coral, Tipped bubblegum coral

1.2 Distribution and population status:

1.2.1 Global distribution:

This species can be found in the Indian and Pacific oceans, from Mozambique and the Red Sea to southern Japan, northern Australia and Fiji. It is native species of Saudi Arabia; Australia; Bahrain; Burma; Comoros; Egypt; United Arab Emirates; Eritrea; Philippines; Fiji; Guam; India; Indonesia; Iran; Iraq; Israel; Japan; Jordan; Kenya; Kiribati; Kuwait; Madagascar; Malaysia; Maldives; Northern Mariana Islands; Marshall Islands; Mauritius; Mayotte; Micronesia; Mozambique; Nauru; New Caledonia; Oman; Pakistan; Palau; Papua New Guinea; Qatar; meeting; Seychelles; Singapore; Solomon Islands; Somalia; Sri Lanka; Sudan; Taiwan (China); Tanzania; Tuvalu; Vanuatu; Vietnam; Wallis and Futuna; Yemen and Yibuti. (Turak and Wood 2014).

1.2.2 Local distribution:

Country	Region / province	Site	Level of Protection	Population size (colonies)	Reference(s)	Notes
Philippines	Southern Leyte	Brgy. San Juan, Hinunangan	Community-conserved area	3	Quiton-Domingo 2012	Research report of EDGE Marine Protected Area (MPA) survey in Hinunangan and Silago, Southern Leyte
		Brgy. Calag-itan Hinunangan	Community-conserved area	2	Quiton-Domingo 2012	Research report of EDGE MPA survey in Hinunangan and Silago, Southern Leyte
		Brgy. Sudmon, Silago	Community-conserved area	4	Quiton-Domingo 2012	Research report of EDGE MPA survey in Hinunangan and Silago, Southern Leyte
		Brgy. Mercedes, Silago	Community-conserved area	1	Quiton-Domingo 2012	Research report of EDGE MPA survey in Hinunangan and Silago, Southern Leyte
	Ilocos Sur	Sta. Maria		1	Philippine National Museum	Collections
	Quezon	Ikulong Island, Brgy. Aluyon, Burdeos		12	dela Rosa, Curnick & Koldewey (*in press*)	
		Brgy. Palasan, Burdeos		1	dela Rosa, Curnick & Koldewey (*in press*)	
		Anawan Island, Brgy. Carlagan, Burdeos		1	dela Rosa, Curnick & Koldewey (*in press*)	

Country	Region / province	Site	Level of Protection	Population size (colonies)	Reference(s)	Notes
Philippines	Quezon	Malaguinoan Maliit Island, Brgy. Calutcot, Burdeos		2	dela Rosa, Curnick & Koldewey (*in press*)	
		Maragakdak MPA, Brgy. Calutcot, Burdeos	Community-conserved area	3	dela Rosa, Curnick & Koldewey (*in press*)	
		Gumian, Brgy. Aluyon, Burdeos		3	dela Rosa, Curnick & Koldewey (*in press*)	
		Kabalwa Island, Brgy. Aluyon, Burdeos		1	dela Rosa, Curnick & Koldewey (*in press*)	
		Lawis, Brgy. Palasa, Burdeos		2	dela Rosa, GE. Jr.	(personal observations)
		Binunbunan Island, Brgy. San Rafael, Burdeos		2	dela Rosa, GE. Jr.	(personal observations)
		Katakian, Patnanungan		2	dela Rosa, GE. Jr.	(personal observations)
		Brgy. Villahesus, Alabat		1	Philippine National Museum	Collections
		Brgy. Balungay, Alabat		1	Philippine National Museum	Collections
	Batangas	Hugom Marine Sanctuary, San Juan	Community-conserved area	2	dela Rosa, GE. Jr.	(personal observations)
		Laiya Aplaya, San Juan		1	dela Rosa, GE. Jr.	(personal observations)
		Baluarte, San Juan		2	dela Rosa, GE. Jr.	(personal observations)
		Laiya Ibabao, San Juan		2	dela Rosa, GE. Jr.	(personal observations)
	Bohol	Matabao Marine Protected Area	Community-conserved area	1	dela Rosa, GE. Jr.	(personal observations)
		Bilangbilangan Marine Protected Area	Community-conserved area	1	dela Rosa, GE. Jr.	(personal observations)
		Takot Babag, Talibon		1	dela Rosa, GE. Jr.	(personal observations)
		Mono-mono, Talibon		1	dela Rosa, GE. Jr.	(personal observations)
		Canmongo, Talibon		2	dela Rosa, GE. Jr.	(personal observations)

Country	Region / province	Site	Level of Protection	Population size (colonies)	Reference(s)	Notes
Philippines	Bohol	Brgy. Mahanay, Talibon		1	dela Rosa, GE. Jr.	(personal observations)
		Putik, Jetafe		1	dela Rosa, GE. Jr.	(personal observations)
		Brgy. Campao Occidental, Jetafe		1	dela Rosa, GE. Jr.	(personal observations)
	Surigao del Sur	Brgy. Capadan, Cortes		2	dela Rosa, GE. Jr.	(personal observations)
		Brgy. Nurcia, Lanuza		1	dela Rosa, GE. Jr.	(personal observations)
		Brgy. Madrileno, Cortes		1	dela Rosa, GE. Jr.	(personal observations)
	Palawan	Snake Island, Puerto Princesa		1	dela Rosa, GE. Jr.	(personal observations)
		Pandan Island, Puerto Princesa		1	dela Rosa, GE. Jr.	(personal observations)
		Meara Island, Puerto Princesa		2	dela Rosa, GE. Jr.	(personal observations)

1.3 Protection status:
Pearl bubble corals are listed as *Vulnerable* on the IUCN Red List of threatened species and is listed on Appendix II of CITES. In the Philippines, pearl bubble corals and other scleractinians are protected under Republic Act 8550 and the Fisheries Code of 1998. In addition, all wildlife, including scleractinian corals and its by-products and derivatives, are allowed for collection only for scientific, breeding or propagation purposes under Republic Act 9147 or the Wildlife Act of 2001 and the National Integrated Protected Areas System of 1992 or Republic Act 7586. Corals also protected under local legislation in the 1,827 marine protected areas all over the Philippines.

1.4 Habitat and resource assessment:

Physogyra lichtensteini favors turbid, shallow waters within 1-20m depth. They are commonly found in protected areas such as crevices and overhangs.

1.5 Biology and ecology:

Pearl bubble coral is a colonial, stony species that form massive colonies bubble-like appearance—thus its common name. Colonies can reach 3 meters in length. During the day, the surface of the colony has a pale grey, almost white colour and adorned with many small, spherical, fleshy vesicles that look like small grapes. The vesicles can either be smooth and rounded like a bubble (or fork-shaped with tiny bumps) which will retract when disturbed. At night, the species extends thick fleshy tentacles in order to catch food suspended in surrounding waters (Turak and Wood 2014; Veron 1986).

The structure of *P.lichtensteini* colonies are ideal for small crustaceans such as shrimp to live. The spaces between the individual vesicles are used by shrimps as hiding places from larger predators. Species associated with the Pearl bubble coral include Commensal shrimp such as *Vir philippinesis* (bubble coral shrimp), crabs such as *Achaeus japonicus* (orang-utan crab) and Hawksbill turtles, *Eretmochelys imbricata.*

Physogyra lichtensteini are gonochoristic - they release either sperm or eggs into the water where fertilization occurs (Veron 1986). Spawning occurs after sunset a few days after a full moon in late spring.

1.6 Threat analysis:

Pearl bubble corals are heavily harvested for the aquarium and live coral trade. According to IUCN, 11,000 specimens were allowed to be extracted annually from the wild as of 2012. Indonesia is the largest exporter of this species with an annual quota of 10,500 pieces as of 2005.

The population decline of this species is linked to general stressors of the coral reefs in the world. *P.lichtensteini*, like most corals, is severely threatened by destructive fishing, deforestation, pollution and other anthropogenic stressors. Climate change, coral diseases, bleaching (Carpenter *et al.* 2008, Burke *et al.* 2011), ocean acidification and extreme weather conditions caused by ENSO events and storms further threaten this species.

THREATS	Priority
Anthropogenic	
Overfishing	
Unsustainable collection for aquarium and live fish trade	
Illegal fishing methods (cyanide and dynamite)	
Poaching in marine protected areas	
Improper waste disposal and no recycling of wastes	
Sedimentation	
Weak management capacity of local government and community	
Natural	
Coral bleaching	
Crown-of-Thorns	

1.7 Stakeholder analysis:

Country	Stakeholder	Interest	Current activities	Impact	Intensity	Proposed activities
International	US AID	Development	Funder	+	Low	Submit proposals
	GIZ	Development	Funder	+	Low	Submit proposals
	UNDP-GEF	Development	Funder	+	Medium	Submit proposals
	Conservation International	Conservation	Practitioners	+	High	Collaborate
	Zoological Society of London	Conservation	Practitioners	+	High	Collaborate
	Coral Cay Conservation Foundation	Conservation	Practitioners	+	High	Collaborate
	Oceana	Conservation & law enforcement	Practitioners	+	High	Collaborate
	World Wildlife Fund	Conservation	Practitioners	+	High	Collaborate
	Fauna and Flora International	Conservation	Practitioners	+	High	Collaborate
	California Academy of Sciences	Research	Research	+	Low	Collaborate
Regional	Asian Development Bank	Development	Funder	+	Medium	Submit proposals
Philippines	Local government of Burdeos	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Local government of Patnanungan	Government	Conservation, law enforcement, resource manager	-	Critical	Collaborate
	Local government of Polillo	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Local government of Jomalig	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Local government of Panukulan	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Local government of Mauban	Government	Conservation, law enforcement, resource manager	-	Critical	Collaborate

Country	Stakeholder	Interest	Current activities	Impact	Intensity	Proposed activities
Philippines	Local government of Real	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Local government of Infanta	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Local government of Silago	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Local government of Hinunangan	Government	Conservation, law enforcement, resource manager	+	Critical	Collaborate
	Fish buyers in Real, Infanta, Patnanungan and Burdeos	Commercial	Funder, buyer and exporter of fishes and marine ornamentals	+/-	Critical	Collaborate
	Fish buyers and exporters in Parañaque	Commercial	Funder, buyer and exporter of fishes and marine ornamentals	+/-	Critical	Collaborate
	Indigenous communities	Conservation	Practitioners	+	Critical	Collaborate
	Northern Lamon Bay Integrated Patrol Team	Conservation	Law enforcement	+	Critical	Collaborate
	Haribon Foundation	Conservation	Practitioners	+	High	Collaborate
	Project Seahorse Foundation	Conservation	Practitioners	+	High	Collaborate
	Sentro ng Ikauunlad ng Katutubong Teknolohiya (SIKAT)	Conservation	Practitioners	+	High	Collaborate
	Institute for Social Order	Conservation	Practitioners	+	High	Collaborate
	Ocean Action Resource Center (ORC)	Conservation	Practitioners	+	High	Collaborate
	Save Philippine Seas	Conservation	Practitioners	+	High	Collaborate
	Philippine Reef & Rainforest Conservation Foundation	Conservation	Practitioners	+	High	Collaborate
	University of the Philippines Marine Science Institute (UP MSI)	Research	Research & extension	+	Medium	Collaborate

Country	Stakeholder	Interest	Current activities	Impact	Intensity	Proposed activities
Philippines	Western Philippines University (WPU)	Research	Research & extension	+	Medium	Collaborate
	University of the Philippines Visayas	Research	Research & extension	+	Medium	Collaborate
	Mindanao State University Naawan	Research	Research & extension	+	Medium	Collaborate
	De La Salle University Bro. Alfred Shields Marine Station	Research	Research & extension	+	Medium	Collaborate
	Silliman University Angelo King Center for Research and Environmental Management (SUAKCREM)	Research	Research & extension	+	Medium	Collaborate
	Visayas State University (VSU)	Research	Research & extension	+	Medium	Collaborate
	University of the Philippines-Tacloban	Research	Research & extension	+	Medium	Collaborate
	Southern Leyte State University	Research	Research & extension	+	Medium	Collaborate
	Tetra-Tech EMI	Conservation	Practitioner (per project)	+	Medium	Collaborate
	MarcVentures Holdings, Inc., Adnama Mining Resources Inc. (AMRI), Shenzhou Mining Group Corporation (SMGC), etc.	Commercial	Mining	-	Critical	Collaborate
	Chamber of Mines of the Philippines	Commercial	Mining	+	Medium	Collaborate
	National Commission on Indigenous Peoples	Government	Conservation	+	Medium	Collaborate
	National Commission on Indigenous Peoples Region IV	Government	Conservation	+	Medium	Collaborate
	Department of Education Region VIII	Government	Education	+	Medium	Collaborate
	Bureau of Fisheries and Aquatic Resoruces Region IV-A	Government	Law enforcement	+	High	Collaborate
	Department of Environment and Natural Resources Region IV-A	Government	Protected area managers, law enforcement	+	High	Collaborate
	Department of Agriculture Bureau of Fisheries and Aquatic Resources (DA-BFAR)	Government	Law enforcement	+/-	Medium	Collaborate

Country	Stakeholder	Interest	Current activities	Impact	Intensity	Proposed activities
Philippines	Department of Environment and Natural Resources Protected Areas and Wildlife Bureau (DENR-PAWB)	Government	Protected area managers, legislation	+	Medium	Collaborate
	Department of Environment and Natural Resources Coastal and Marine Management Office (DENR-CMMO)	Government	Protected area managers, conservation	+	Medium	Collaborate
	National Fisheries and Development Institute (NFRDI)	Government	Research	+	Low	Collaborate
	Department of Science and Technology Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARD)	Government	Research, funder	+	Low	Submit proposals
	Marine Protected Area Support Network (MSN)	Conservation	Advocacy	+	Medium	Lobby and collaborate
	NGOs for Fisheries Reform (NFR)	Conservation	Advocacy	+	Medium	Lobby and collaborate
	Silago Federation of Civil Society Organizations and People's Organizations	Development & conservation	Development & conservation	+	Medium	Lobby and collaborate
	Municipal Fisheries and Aquatic Resources Management Council	Development & conservation	Development & conservation	+	Medium	Lobby and collaborate

1.8 Factors influencing success of survival blueprint implementation:

	Description	Threats	Opportunities
Socio-cultural effects	Seafood is an important source of protein in the Philippines. Most of the fishing areas in the Philippines are heavily exploited (Green *et al.* 2003; Nañola *et al.* 2010). Overexploitation of fishery resources has led to the use of destructive methods such as dynamite and cyanide fishing on coral reefs.	Destructive fishing is one of the main causes of the decline of Philippine reefs (Tun *et al.* 2008; Burke *et al.* 2011). This decline is a loss of habitat to fish, reduces a reef's aesthetic value and decreases its ability cushion the effects of storm surges.	There are an increasing number of areas in the Philippines that are establishing local or community- and local government-conserved reef areas to protect and conserve coral reef resources (Arceo *et al.*2008). These are supported and recognized by the local and national governments, non-government organizations and other stakeholders.
Economic implications	Pearl bubble corals and coral reefs in general are affected by the aquarium and live reef food fish trades. In addition, coastal development for tourism, mining activities and port development also affects coral reefs. They also provided protection of houses and other structures from storm surges by decreasing wave energy.	Coastal development and siltation smothers reefs. Cyanide reduces the photosynthetic ability of the symbiotic zooxanthellae and slowly detaches coral tissue from the skeleton over time (Jones 1997; Jones and Steven 1997; Wabritz *et al*. 2003). Corals are used as home décor in some areas, particularly in Burdeos and in remote areas in the Philippines.	The total monetary value of the coral reefs is 352,915 Int.$/ha/year (de Groot *et al.* 2012*).* By informing and lobbying with local government units and legislators, businesses of the indirect economic benefits of conserving reefs, this will increase support. This could create and increase sustainable livelihood opportunities such as tourism, medical research and other derivatives through equitable access and benefit sharing.

	Description	Threats	Opportunities
Existing conservation measures	There are several legislations that have been enacted to support coral reef and coastal management in general. One of these is the presidential Executive Order No. 533, enacted in 2007, stating that the Integrated Coastal Management (ICM) mechanism be used as a planning and management tool for all cities and municipalities in the Philippines. Other existing laws include the Fisheries Code of 1998 or Republic Act 8550 which includes sections on establishing at least 25% of the municipal waters as a Marine Protected Area (MPA), ban on coral exploitation and exportation, and the ban of fishing methods and fishing gears that are destructive to coral reefs.	There is a lack of additional funds at the local level, particularly for patrolling and enforcement. There are also conflicting laws that allow extractive activities such as mining that severely affects coral reefs. In addition, there is weak implementation for the monitoring and evaluation of these laws.	At the local level, the local government can improve conservation by establishing management zones, including MPAs, through the comprehensive land use planning and ICM planning. This will reduce adverse effects to coral reefs. Other local opportunities include the establishment of flagship species for conservation through municipal and barangay ordinances focusing on protecting Pearl bubble corals.
Administrative/ political set-up	Government focus on generating revenues from development projects such as mining. Lack of funds for the monitoring of mining and patrolling and enforcement activities. Mining areas overlap with terrestrial and marine conservation priority areas.	Weak law enforcement and corruption. Conservation activities aren't a priority in some areas.	Some of the local government units are enthusiastic to engage in conservation and even ask to have projects implemented in their area.
Local expertise and interest	There is a high awareness of the importance of expertise on coral reefs both in research and the diving industry, as well as with photography enthusiasts. On the other hand, there is a low awareness of the importance of the Pearl bubble coral to coral reefs.		Researchers, photographers and the wider public may be influenced to look at conserving this species. There are currently a small number of Pearl bubble coral experts in the Philippines and there are only a small percentage of organizations working specifically on Pearl bubble corals. In addition, photographers and their dive guides may be influenced to note species abundance per dive site.

	Description	Threats	Opportunities
Appeal of species			Pearl bubble coral (or EDGE coral species) can be used as flagship or umbrella species in several conservation programs. They can help build community pride and become iconic species in a dive site (i.e. “Pearl bubble coral city”) or as an icon in town celebrations.
Resources			There is a need to elevate the status of the Pearl bubble coral as a flagship species to increase awareness amongst the wider public. In addition, population studies can be integrated into monitoring protocols of several institutions. There is also a need to develop and/or increase the number of Pearl bubble coral and/or coral taxonomist

2. ACTION PROGRAMME

Vision (30-50 years)	
The pearl bubble coral is valued and protected in the Philippines and in the Indo-Pacific Coral Triangle eco-region, fulfilling its ecological role in a healthy, stable ecosystem.	
Goal(s) (5-10 years)	
To increase and maintain the functional population of *Physogyra lichtensteini* in self-sustaining marine habitats in the Philippines	
Objectives	**Prioritisation**
1. To develop research database on *P. lichtensteini*	Critical
2. To raise awareness of *P. lichtensteini* (and EDGE coral species), elevating them as flagship or umbrella species in the Philippines, to help strengthen marine conservation and promote protection of MPAs	Critical
3. To strengthen legislation and enforcement in various political and geographical areas in the Philippines	Critical
4. To develop and improve conservation strategies that aim to maintain healthy, diverse habitats and restore and rehabilitate degraded ones	Critical
5. To enhance capacities of local communities in environmental conservation and protection	Critical

Activities	Country / region	Priority	Associated cost	Time scale	Responsible stakeholders	Indicators	Opportunities and threats	Activity type
1. To develop research database on *P. lichtensteini*								
1.1 Implement continuous monitoring, assessment and evaluation of *P.lichtensteini*	Philippines	Critical			Government agencies, NGOs, academics	Reports per site	Opportunities-ZSL program and EDGE fellows in the Philippines	Improving knowledge
1.2 Develop scientific and technical capacities for advanced research on *P.lichtensteini*	Philippines	High			Government agencies, NGOs, academics; ZSL, Haribon, ORC	Methodology established and disseminated; number of trained and actively participating personnel	Opportunities-ZSL program and EDGE fellows in the Philippines and their network	Improving knowledge, skills and sustainability
1.3 Enhance networks, linkages and coordination among academic centres and conservation partners in the region	Philippines	Critical			Government agencies, NGOs, academics	Collaborative projects and research programs;	Lack of focal people, initiators, coordinators	Partnership and network building
2. To raise awareness of pearl bubble corals and EDGE coral species), elevating them as flagship or umbrella species in the Philippines, to help strengthen marine conservation and promote protection of MPAs								
2.1 Develop basic CEPA and IEC strategies on *P.lichtensteini* and EDGE coral species for dissemination, information campaigns and education	Philippines	High			ZSL, Haribon, ORC and Connect Coalition for Conservation Education, other partners in EDGE coral conservation	Communication plan,CEPA materials such as posters, infographics, and fact sheets	Opportunities—EDGE fellows in the Philippines and initial educational materials developed by ORC	Education & awareness
2.2. Integrate protection and promotion of *P. lichtensteini* in wide institutionally-supported framework of conservation inititatives such as MPA Management Plans and in Integrated Coastal Resource Management Plans (ICRMP) in both local and national levels	Philippines	High			Government agencies, NGOs, academics		Threat-disinterest, lack of focal people, initiators, coordinators	Education & awareness, lobbying, partnership building

Activities	Country / region	Priority	Associated cost	Time scale	Responsible stakeholders	Indicators	Opportunities and threats	Activity type
2.2. Develop communication and training modules on EDGE coral conservation for different sectors (e.g. media, teachers, schools, youth clubs, corporate partners)	Philippines	High			Government agencies, NGOs, academics	Communication plans established Coral reef conservation integrated in elementary school education; training modules established for coastal management practitioners per site	Threat-Disinterest	Education & awareness
3. To strengthen legislation and enforcement in various political and geographical areas in the Philippines								
3.1 Develop laws and enforcement that restrict harvesting of *P.lichtensteini* and other EDGE coral species	Philippines	Critical			Government agencies, NGOs, communities, local government	Environmental laws passed and enacted.	Threat-Lack of political will and external pressure	Law & Policy
3.2 Improve enforcement of laws that restrict aquarium trade and destructive fishing methods and that strengthen MPA management at local and national levels	Philippines	Critical			Government agencies, NGOs, local government; development partners	Multi-stakeholder support in enforcing laws, number of participants and partners	Threat-Lack of political will and external pressure	Law & policy and enforcement
3.3. Increase local enforcement capacity in coastal protection and conservation especially within community level	Philippines	High			Government agencies, NGOs, local government	.	Threat-Lack of political will and external pressure	Capacity building, law & policy and enforcement
4. To develop and improve conservation strategies that aim to maintain healthy, diverse habitats and restore and rehabilitate degraded ones								
4.1 Foster scientific and technical support to improve conservation strategies and enhance of effectiveness of MPA assessment	Philippines	High			Government agencies, NGOs, academics	Workshops, reports, networking meetings and conventions	Threat-lack of technical capacity, training, information dissemination, coordination, sharing of resource and communication	Management and assessment and coordination

Activities	Country / region	Priority	Associated cost	Time scale	Responsible stakeholders	Indicators	Opportunities and threats	Activity type
4.2 Encourage plantation and protection of mangroves and seagrass and restoration of coral reefs where appropriate	Philippines	High			Government agencies, NGOs	Habitat restoration and rehabilitation projects	Threat-lack of scientific, technical capacity, training, lack of interest and political will, especially among local government units	Management and implementation of conservation
4.3 Support and strengthen MPA establishment, management and network	Philippines	High			Government agencies, NGOs, academics	Coordination, enforcement of MPA laws and policies, community-initiated MPA improvement with support from government	Threat-lack of interest, political will, coordination, understanding of the importance of MPAs, especially within community level	Management and implementation of conservation
5. To enhance capacities of local communities in environmental conservation and protection								
5.1 Improve dissemination and accessibility of accurate scientific information to targeted communities	Philippines				Government agencies, NGOs, academics	IEC, workshops and CEPA	Threats-weak information platform and systems; e.g. database that make information accessible	Information management and education
5.2 Enhance participatory assessment among local communities	Philippines				Government agencies, NGOs, academics	Trained local personnel, trainings and workshops		Capacity-building
5.3 Enhance and support opportunities for livelihood augmentation for coastal communities to decrease fishing pressure	Philippines				Government agencies, NGOs	Increase of livelihood options and opportunities	Opportunities- More development partners and NGOs that support livelihood program especially after 2013 Super-typhoon Yolanda	Livelihood augmentation

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