

CORAL REEF ASSESSMENT OF CATARMAN COASTAL ZONE

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Abstract

Corals along UEP-Cawayan and Puputihon reef occurs mostly in massive forms, which accounts to 13.79 meters of the live corals along UEP- Cawayan area and 11.62 meters at Puputihon reef. Branching, Tabulate and Foliaceous coral occur less, and can only be found at depth of about 3 meters sub-tidally. Fragments of corals rubbles and solid wastes are also observed which connotes high environmental pressures and stresses to the living coral ecosystem of the area.

Series of swim- survey at the drop-off, parallel to the reef crest has been done to capture the entire sampling area. The survey utilizes the variables used in the Manta Tow Survey to determine the 'health status' of the coral communities, to wit: Percent Live coral cover, percent dead coral cover, rubbles, sand and soft corals.

These variables are recorded into data sheets in categorical values:

Category

Cover

Percent

1	0-10%
2	11-30
3	31-50
4	51-75
5	76-100

Cloud cover, water visibility, wave height, water depth, current direction and anthropogenic effects on corals are also noted during the conduct of the survey.

Line Intercept Transect

In the selected representative sites, based on the swim-through survey result, a more focused resource assessment methodology, the Line intercept Transect (LIT) technique is employed in gathering the quantitative description of the coral communities using its life-form categories. According to [1], these life-form categories are the minimum requirements for data base exchange among research institutions worldwide.

The LIT technique is used to estimate the cover of an object, based on its structural attributes or life-form rather on taxonomic level, within a specified area by calculating the fraction of the length of the line as intercepted by the object. The measure of cover, usually expressed as percentages is considered as an unbiased estimate of the proportion of the total area covered by the object.

Fishes

Rapid Fish Visual Census

This method is used to determine species diversity. This is useful to determine which species to include in long-term monitoring.

I. INTRODUCTION

Coral reefs lined the coast of the municipality of Catarman, Northern Samar particularly at its northeastern side. This provide home for the marine fishes, invertebrates and seaweeds that could translate to millions of jobs, livelihood opportunities, tourists attraction, and most importantly a significant food resource for the locality. Yet, this living inheritance passed on by our grandparents is being lost because of sedimentation, destructive fishing methods, pollution and coral quarrying among other anthropogenic environmental stressors.

The Coral reefs fringing the coastline of the municipality are physically and biologically important. Physically, because they play a fundamental role in protecting the coastline and low-lying areas from erosion, and contribute to the formation of sandy beaches. Biologically, because they provide support and sustenance to other coastal habitats, such as the estuary, mangrove forests, algal & seagrass beds and the fisheries that depend on this ecosystems.

As human population grows, anthropogenic activities in the coral reefs increase that pose load of pressures to the reef ecosystem, thus the common belief that marine resources are now becoming scarce needs verification, thus this assessment.

II. METHODOLOGY

Coral cover

Swim-through Survey

Considering the prevailing weather condition of the last quarter of the year is not suitable for a Manta Tow Survey, a rigorous swim-through ocular assessment is opted in the conduct of Rapid Environmental Assessment of the area.

Method description:

A swim survey is done at a constant speed for a fixed time instead of measuring the area with transect tapes. The method is useful to estimate relative abundance and is based on the assumption that the probability of encountering a species increases with its abundance. Therefore, the more common the species, the sooner the observer is likely to encounter it.

General procedures

The observer swims randomly around a reef to locate and record as many fish species as possible; the swim is limited to the specific habitat (depth, reef zone) to determine species richness; Species are only recorded once when first seen in the specific 10 minute time interval, for a total of five 10 minute intervals. The 10 minute search interval allows the observer to obtain estimates of the relative abundance of each species in addition to presence or absence data derived from the species lists. The assumption is that the species occurring in early time intervals are the most abundant in the community; Fishes occurring in the first 10 minute interval receive a score of 5, those in the second interval 4, and so on with the fifth interval fish scoring 1. Species scores are summed to indicate frequency of occurrence.

III. RESULTS AND FINDINGS

Fringing coral reefs occurs throughout Catarman coastline, coexisted with other ecological systems such as the mangrove forest, seagrass and algal communities, and sand beaches. These interspersed diverse natural habitats had traditionally served as an invaluable resource for food for the coastal human settlement of the municipality.

The reef flat of the Catarman coast is of variable width, consisted of sand, rubbles, rocks, mangrove swamp, seagrass beds, algal communities, and scattered coral heads. Usually, every four (4) to (6) hours reef flats are submerged due to influx of tidal water. The outer edge of the reef flat, the reef crest is often the most biologically diverse and productive zone being exposed to waves, currents, and clean seawater.



Note: white dots are the sampling stations, from right to left direction. Dots in red are collection points for substrate samples.

Fig. 1. Sampling points at UEP-Cawayan Fringing reef and Puputihon Patch reef

Relative Coral Cover

With the swim-through survey conducted last September, 2011 along the reef crest that stretches from UEP White Beach to Parola, Cawayan more than half (60)% of the total coral cover are observed to be in advanced state of destruction with only about 20 percent of the coral cover

is alive, that is with coral polyps that exude lively colors. The condition ranges from sites with coral heads that are broken down to rubbles, about 10% of the entire area (that could be assumed as an evidence of dynamite or blast fishing in the recent past) to areas which has standing but dead coral heads engulfed by algae or simply dead white in color (60%), probably due to high siltation rate, turbidity and low salinity associated with areas adjacent to river mouth.

Fronting Sitio Cataogan of Brgy. Cawayan, approximately a kilometer away from the shore stands a patch reef (Puputihon reef) with an average depth of 20 meters. It supports a reef community with a relative live coral cover of about 40 percent. The live coral cover is extensive at its northern side being exposed to the interchange of cool clear waters from the open sea and the warm nutritious water from the coastal zone. The reef islet and the surrounding sub tidal patch reef could comprise about some square kilometers of potential site for a marine sanctuary zone establishment.

Coral Life Forms

Corals along UEP-Cawayan and Puputihon reef occur mostly in massive forms, which accounts to 13.79 meters of the live corals along UEP- Cawayan area and 11.62 meters at Puputihon reef. Branching, Tabulate and Foliaceous coral occur less, and can only be found at depth of about 3 meters sub-tidally. Fragments of corals rubbles and solid wastes are also observed which connotes high environmental pressures and stresses to the living coral ecosystem of the area.

TABLE I: .LINE INTERCEPT TRANSECT CORAL ASSESSMENT

Life Form Category	Ave. Transect points (m)		Remarks (Total cover/species)	
	UEP-Cawayan Reef	Puputihon Reef	UEP- Cawayan reef	Puputihon reef
Coral Encrusting	.50	1.80	4.87	9.61
Dead coral	.97	.98	4.16	3.48
Tabulate coral	1.67	1.37	5.32	5.80
Encrusting coral	1.48	2.91		
Rubbles	1.90	1.22	4.7	5.42
Dead corals	1.32	1.30		
Tabulate corals	1.68	1.53		
Digitate corals	2.98	2.34	4.84	5.61
Tabulate corals	1.97	2.90		
Coral foliose	2.84	1.60	8.65	6.70
Branching corals	2.4	1.3	2.4	1.3
Digitate corals	1.86	3.27		
Massive corals	4.97	4.82	13.79	11.62
Encrusting corals	2.89	4.90		
Massive corals	4.61	10.00		
Coral foliose	5.81	5.10		
Dead Corals	1.87	1.20		
Mushroom/slipper corals	1.27	3.00	1.27	3.00
Sand/rubbles	2.8	4.2		
Massive corals	4.21	6.8		

Reef Associated Fishes

Within 10 minute observation dives repeated 5 times in 3 different schedules, 15 families of 19 fish species with 95 individuals were recorded in the 2 sampling areas, the UEP-Cawayan fringing reef and the Puputihon patch reef. The most common fish that were noted occurring in the first 10 minute dive were non-target species or the fish species that are least preferred by fishermen due to their small sizes (e.g., *Chaetodontids*, *Labriids*, *Pomacantiids*). The high importance value of the aforementioned fish species indicates that fishing pressure is high in the area yet ecologically rich enough to accommodate the presence of these fish species, an indication of the relatively healthy

status of the coral reef. Commercial Fish species which were in least abundance were observed at greater depths, e.g. *Scariids*, *Acanthuriids*, Groupers, and others.

TABLE 2.RAPID FISH VISUAL CENSUS

Fish species	Ave. Count	Relative Frequency	Relative Abundance	Relative dominance	Importance Value	Rank
POMACENTRIDAE (Damsel Fish)	15	100	10.86957	123.6665	0.097400	1
POMACANTHIDAE (Angelfish)	6	60	6.521739	160.2385	0.091055	2
ANTHINAE (Fairy basslets)	17	80	8.695652	98.2082	0.089601	3
LABRIDAE (wrasses)	6	100	10.86957	12.83731	0.083401	4
CHAETODONTIDAE (Butterflyfish)	10	60	10.86957	64.0209	0.080158	5
SIGANIDAE (Rabbitfish)	12	100	10.86957	97.16431	0.075626	6
BALLISTIDAE (Triggerfish)	4	40	8.695652	98.2082	0.073846	7
Zanclus cornutus (Moorish idol)	4	100	10.86957	13.19897	0.072947	8
LUTJANIDAE (Snapper)	3	60	6.521739	28.46016	0.062547	9
ACANTHURIDAE (Surgeonfish)	3	40	4.347826	68.22842	0.059892	10
NEMIPTERIDAE(Coral breams)	3	20	2.173913	26.15542	0.058771	11
SCARIDAE (Parrot Fish)	3	60	4.347826	22.294	0.044368	12
MULLIDAE (Goatfish)	4	60	6.521739	93.3156	0.043071	13
SERRANIDAE (Groupers)	3	40	4.347826	13.34736	0.039466	14
LETHRINIDAE(Emperors)	2	20	2.173913	38.74744	0.027851	15
Total				940.0394		

Based on the data gathered, the Ichthyofaunal biomass around Puputihon patch reef and UEP -Cawayan fringing reef at 1-4 meters depth range is estimated to be at 9.87 kg per ha. The data range comprises fish species that were observed within 1- 4 meters depth only due to the limited water visibility during the time of sampling. Though the data gathered might not depict the true picture of the fish stock in the area due to the lacking data set for the fish species occurring at greater depths, the fish species observed could be considered as major contributors to the total fish stock in the area and plays a significant role in the trophodynamics processes and fish production as suggested by its dominant share in the fish catch of the resource users from the nearby fishing communities of So. Cataogan, and Parola of Brgy. Cawayan, Catarman, Northern Samar.



Fig. 2. Some of the bounty catches in the coastal waters of Catarman, Northern Samar.

Conclusion

The municipality has an estimated aggregate coral reef area of 2,558 square meters with only 20% live coral cover that is mostly concentrated at the seaward side of reef edge, and with massive coral as its dominant life-form structure.

The death of coral reefs (60 percent of the cover) is generally presumed to be an aftermath of heavy siltation that is brought about by the influx of fresh water from Catarman River and other tributaries as evidenced by the brownish color of the silted coral heads. However, sites of coral rubles (about 10%) believed to be a remnant of the blast fishing in the area had been noticed. Non-biodegradable Solid wastes such as cellophanes and plastics were also observed neck-tied on some coral heads.

Most of the fishes observed within 1-4 depth range along UEP- Cawayan Fringing reef and Puputihon patch reef are non-commercial reef fish species, such as *Palata*,

Gono, *Alibangbang*, *Lubayan* while those fish species that are most preferred by fishermen are in least abundance and can only be observed at greater depth range (*Molmol*, *Baraka*, *Mayamaya*). Commonly, the sizes of the reef fish that were observed ranges from 6- 30 centimeters fork length suggesting that the fish stock in the area is still young. The volume of the fish stock within the reef system of Puputihon and UEP-Cawayan area is estimated to be at 15 kilograms per hectare. The high importance value of the "non-target" reef species connotes that the surrounding reef habitat has still the capability to carry out the necessary ecological processes of reef fish reproduction.

THE AUTHOR

Over 28 years' experience in teaching and community organizing; Accredited Environmental Impact Assessment/EIS preparer and an active adviser and Environmental consultant for Critical Environmental Projects of Private institutions/ businesses, Local Government Units/ NGOS and Peoples' Organization (PO); Fisheries Board examination reviewer for "Water Quality Assessment and Pollution Sources". Considerable experience in conducting community resource assessments; coastal ecological assessments and profiling; water quality assessments, pollution and toxicological studies; forming and developing cooperatives; conceptualizing and developing projects; designing, preparing and implementing training modules; formulating operational policies at the organizational level; planning, managing, monitoring and evaluation of environmental projects and cooperatives, income generation projects, and other environmental related education and advocacy programs. Conduct trainings and seminars related to environmental issues and problems especially climate change and solid waste, cooperative formation and development, leadership, internal control and values education.

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No. 1, 2013 •Co-author- 2nd National Conference and Workshop on Environmental Science at the College of Forestry and Natural Resources, University of the Philippines Los Baños, College, Laguna, Philippines on November 25-26, 2013, sponsored by Philippine Consortium on Environmental Science, CHED Technical Committee on Environmental Science, UPLB-School of Environmental Science and Management Environmental Impact Assessment of Guguness Farm Project Author- Community Structure of Forest Stand in the UEP Forest Reserved Co-author Watershed Rehabilitation Project Using threatened/Endangered Philippines Trees Author- Catarman Resource Ecological Assessment Author- Environmental Impact Assessment of Chiara’s Garden Resort, Lavezares, Northern Samar Author- Environmental Impact Assessment of Abanes Fishpond, Lavezares, Northern Samar Author-Environmental Impact Assessment of Stimson Family Fishpond, Lavezares, Northern Samar Co-author Analysis- Water Sanitation and Health (WASH) Project Co- author- Laoang –Catubig Agrarian Reform Beneficiary Organizations Needs Assessment Co-author- Calbiga Agrarian Reform Beneficiary Organization Needs Assessment and Design Assessment Report Author- Initial Environmental Examination / Assessment for Catarman Doctors Hospital Author- Initial Environmental Examination/ Assessment for Haven of Fun Resort Author- Initial Environmental Examination/ Assessment for Seashore Spring Resort Socio Economic Impact Assessment of Macagtas Dam in Barangay Macagtas, Catarman, Northern Samar Disaster Risk Reduction Adaptation in the Municipality of Catarman, Northern Samar Coastal Resource Assessment in Barangay San Luis, Capul Northern Samar Author – Environmental Impact Assessment Studies to the following projects Catarman Oilmill Project Uy Gas Up Station Project Espina Gasoline Station Project Catarman Doctors Hospital	<table><tr><td></td><td>Environmental Studies, UP Los Banos, Laguna, Philippines with full scholarship Bachelor of Science in Agricultural engineering, UEP, Philippines- Leadership Award</td></tr><tr><td>Award & Fellowships</td><td>Climate change hero awardee Instrumental in the crafting of the University as Champion Sustainable and Eco-friendly University.</td></tr><tr><td colspan="2">Working Experience</td></tr><tr><td colspan="2">Nov, 2008 to present Director, Center for Environmental Studies and Advocacy, University of Eastern Philippines (UEP) Jan 2009 – present Associate Professor II, UEP Jan 2007 to present President, Northern Samar Environmental Protectors Inc .(NSEP) Province of Northern Samar June 2009 to 2012- Regional Advisory Council Member (RAC),Foundation for Philippine Environment (FPE), National NGO Jan 2005 – Jan, 2009, Assistant Professor IV,University of Eastern Philippines, Catarman, Northern Samar, Philippines Jun 2003 – present Chairman, Environmental Science Department University of Eastern Philippines, Catarman, Northern Samar, Philippines June 2010- present Chairman, Technical Working Group, Provincial Coastal Development Council, Province of Northern Samar June, 2008 – present, Member, Executive Board- Academe Representative, Biri-Larosa, Protected Area, Northern Samar</td></tr><tr><td colspan="2">Departmental Duties & Activities</td></tr><tr><td colspan="2">-As Professor and Chairman of Environmental Science: Prepares teaching load assignments, modules, conduct meetings, plan, implement and monitor the departments’ programs and projects; -Assist the university President in the preparation of environmental education and advocacy framework -Formulate necessary education, promotion and information campaign activities and strategies related to environmental issues and problems; -Establish linkages with environmental networks, local, national and international agencies for a more collaborative action towards environmental conservation, protection and advocacy; -Provide technical expertise on environmental concerns, consultancy, impact assessment, ecological resource assessments to critical projects; -Develop project proposals related to environmental advocacy and education for funding support.</td></tr><tr><td colspan="2">Professional Memberships/Activities</td></tr><tr><td colspan="2">1. 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