



Republic of the Philippines
Department of Environment and Natural Resources
Provincial Environment and Natural Resources Office
MIMAROPA Region

Bgy. Sta. Monica, Puerto Princesa City, Palawan

E-mail: penropalawan@denr.gov.ph
Telfax No. (048) 433-5638 / (048) 433-5638

DENR MIMAROPA RECORDS SECTION	
RECEIVED	
BY:	
DATE:	
TIME:	

April 11, 2023

MEMORANDUM

FOR : The Regional Executive Director
DENR MIMAROPA
1515 DENR By the Bay Bldg., Roxas Boulevard,
Barangay 668, Ermita, Manila

THRU : The OIC, ARD for Technical Services

FROM : The Provincial Environment and
Natural Resources Officer

SUBJECT : **PROGRESS REPORT ON THE MONITORING OF CORALS
FOR MALAMPAYA SOUND PROTECTED LANDSCAPE AND
SEASCAPE (MSPLS), TAYTAY-SAN VICENTA, PALAWAN**

Respectfully forwarded is the memorandum dated March 22, 2023 of CENRO Taytay, Palawan re: the above subject.

Please be informed that on February 15-16 and March 17, 2023, the PAMO-MSPLS staffs together with Malampaya Foundation, Inc. conducted monitoring of corals. Three (3) established monitoring sites were monitored covering a total area of 147.708 hectares representing sixty percent (60%) of the coral reef areas of MSPLS.

Based on the monitoring results, the coral cover of each sites surveyed were in excellent condition while a total of 1,119 reef fishes belonging to thirteen (13) families were recorded. In comparison to the previous year (2022), both coral cover and reef fishes were reported to increase recently.

Hence, continuous monitoring with intensified law enforcement and CEPA activities were recommended.

This serves as **Means of Verification (MoV)** for target activities for CY 2023.

For information and record.



FELIZARDO B. CAYATOC

DENR-PALAWAN
PENRO-RECORDS
RELEASED
By: *[Signature]*
Date: 13-APR 2023 CN: 23-976



Republic of the Philippines
Department of Environment and Natural Resources
Region IV- MIMAROPA
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE
by the National Highway, Poblacion, Taytay, Palawan 5312
Contact No.: 09265059335 (Globe) / 09121713889 (Smart)
Email address: cenrotaytay@denr.gov.ph

**DENR PENRO
PALAWAN RECORDS
RECEIVED**

March 22, 2023

MEMORANDUM

FOR : The Provincial Environment and Natural Resources Officer- Palawan

FROM : The Community Environment and Natural Resources Officer

SUBJECT : **ACCOMPLISHMENT REPORT ON ACTIVITY PER WFP
Malampaya Sound Protected Landscape and Seascape (MSPLS)**

Activity: Monitoring of Corals, Mangroves and Seagrass				
Performance Indicator: Hectarage of habitats per PA monitored (Corals)				
Frequency of submission: Quarterly report				
Current submission: Memo report of Protected Area Superintendent/In, Charge CDS/For. III Clarissa P. Pador dated March 21, 2023 2023 (CN 1970 in the eDATS) submitting the progress report on monitoring of corals within the monitoring sites at Bancoro Reef, Barangay Liminangcong, Barge Laot, Barangay Tumbod and Malapeña Island, Barangay San Jose, Taytay, Palawan for Protected Area Management Office of Malampaya Sound Protected Landscape and Seascape (MSPLS).				
Attachment: 1. Memo report of CMEMP E.O Maria Lilibeth E. Arojo dated March 17, 2023. 2. Comprehensive report (8 pages) 3. Maps (3 pages) 4. Raw Data of Corals (9 pages)				
Gender & Development (GaD) data	Male = 11	Female = 1	LGBTQ+ = 0	Prefer not to say = 0
Age Grouping	60 and above	18-59	17 and below	TOTAL
	0	12	0	12
Environmental Management System (EMS Compliance)	✓ Compliant to 5S organization techniques (SORT – keep only necessary items, SET IN ORDER – arrange items to promote efficient workflow, SHINE – clean the work area so it is neat and tidy, STANDARDIZE – set standards for a consistently organized workplace and SUSTAIN – maintain and review standard) ✓ Organizing of travel to maximize conveyance and observance of speed limit to practice the minimized used of fuel ✓ Carpooling ✓ No single use of plastic ✓ PENRO Memo No. 2023-001 dated February 21, 2023			

This shall form as part of the **Means of Verification (MoV)** on the activity. Please confirm your receipt hereof. Thank you.

**DENR CENRO
TAYTAY, PALAWAN
RELEASED**

CONRADO M. CORPUZ

Copy furnished:
PAMO-MSPLS

BY: fu
DATE: MAR 29 2023 CN 1261



Republic of the Philippines
Department of Environment and Natural Resources
MIMAROPA Region
PROTECTED AREA MANAGEMENT OFFICE
MALAMPAYA SOUND PROTECTED LANDSCAPE AND SEASCAPE (MSPLS)
Taytay-San Vicente, Palawan
Barangay Old Guinlo, Taytay, Palawan
Email add: pamomsppls@gmail.com/Contact #: 0938-786-3728 (SMART)



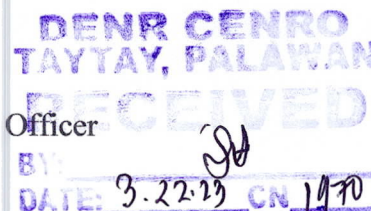
March 21, 2023

MEMORANDUM

FOR : The Community Environment and Natural Resources Officer
Taytay, Palawan

FROM : Chief, CDS/Protected Area Superintendent
Malampaya Sound Protected Landscape and Seascape (MSPLS)
Taytay-San Vicente, Palawan

SUBJECT : **PROGRESS REPORT ON THE MONITORING OF CORALS
FOR MALAMPAYA SOUND PROTECTED LANDSCAPE AND
SEASCAPE (MSPLS), TAYTAY-SAN VICENTE, PALAWAN**

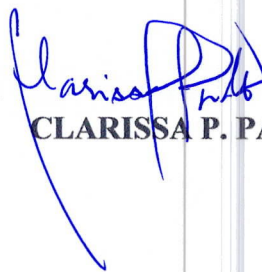


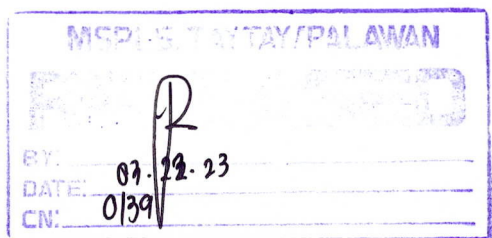
This pertains to the target activity on the Monitoring of Corals, Mangroves and Seagrass under Marine Ecosystems Rehabilitation Sub Program Scaling up Coastal and Marine Management for Malampaya Sound Protected Landscape and Seascape (MSPLS), Taytay-San Vicente, Palawan.

Respectfully forwarded is the memorandum dated March 17, 2023 of CMEMP Extension Officer Maria Lilibeth E. Arojo concerning the above subject. Please be informed that this Office conducted the monitoring coral within the jurisdiction of MSPLS. A total of three (3) established monitoring sites were monitored with a total of 147.708 hectares representing the sixty (60) percent of the coral reef areas of MSPLS. The monitoring sites were located at Bancoro Reef, Bgy. Liminangcong, Barge Laot, Bgy. Tumbod and Malapeña Island, Bgy. San Jose, Taytay, Palawan. The said activity was conducted to monitor the current status of coral reefs within Malampaya Sound.

Hence, this Office recommends to continuously monitor the activity under this target and submit report for review and endorsement.

For his information and record.


CLARISSA P. PADOR





Republic of the Philippines
Department of Environment and Natural Resources
MIMAROPA Region

PROTECTED AREA MANAGEMENT OFFICE
MALAMPAYA SOUND PROTECTED LANDSCAPE AND SEASCAPE (MSPLS)

Taytay-San Vicente, Palawan
Barangay Old Guinlo, Taytay, Palawan

Email add: pamomspls@gmail.com/Contact #: 0938-786-3728 (SMART)



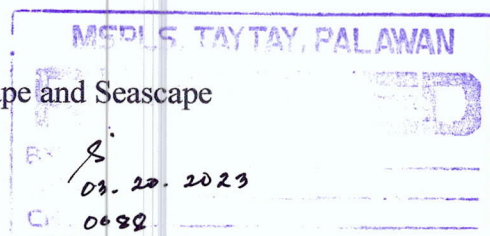
March 17, 2023

MEMORANDUM

FOR : The Protected Area Superintendent
Malampaya Sound Protected Landscape and Seascape
Taytay, Palawan

FROM : CMEMP Extension Officer
MSPLS, Taytay, Palawan

SUBJECT : **PROGRES REPORT ON THE CONDUCTED MONITORING OF
CORALS FOR MALAMPAYA SOUND PROTECTED LANDSCAPE
AND SEASCAPE (MSPLS), TAYTAY-SAN VICENTE, PALAWAN.**



This pertains to the target activity on the monitoring of corals of Coastal and Marine Ecosystems Rehabilitation Sub Program Scaling up Coastal and Marine Management for Malampaya Sound Protected Landscape and Seascape (MSPLS), Taytay, Palawan.

Please be informed that the undersigned together with Forest Technician I Voltaire M. Delos Angeles, Forest Rangers Ricardo S. Tandoc, Francis Abe G. Bose, John Gil C. Lagrana and Office Support Staff of Protected Area Management Office in collaboration with Malampaya Foundation Inc. conducted monitoring of corals on February 15-16, 2023 and March 7, 2023 within the jurisdiction of MSPLS in accordance with Technical Bulletin No. 2019-04. The team were composed of eleven (11) males and one (1) female during the conduct of the activity. A total of three (3) established monitoring sites were monitored with a total area of 147.708 hectares representing the sixty (60) percent of the coral reef areas of MSPLS. The monitoring sites were located at Bancoro Reef, Bgy. Liminangcong; Barge Laot, Bgy. Tumbod; and Malapeña Island, Bgy. San Jose, Taytay, Palawan. The activity was conducted to monitor the current status of coral reefs within Malampaya sound.

Based on the result of monitoring, the coral cover of three (3) sites were in excellent condition where the Malapeña Island obtained the highest value of 91.14 followed by Barge Laot with a value of 87.43 and Bancoro Reef with 71.09 coral cover. A total of 1,119 reef fishes were recorded belonging to thirteen (13) families. The dominant fish recorded are the Pomacentridae (Damsel/Palata) followed by Caesionidae (Fusiliers/Dalagang bukid) groups. As compared to previous record, more fishes were recorded and increased coral cover were observed during the activity.

Attached are the maps, photos and complete corals data monitoring sheet using CPCe.

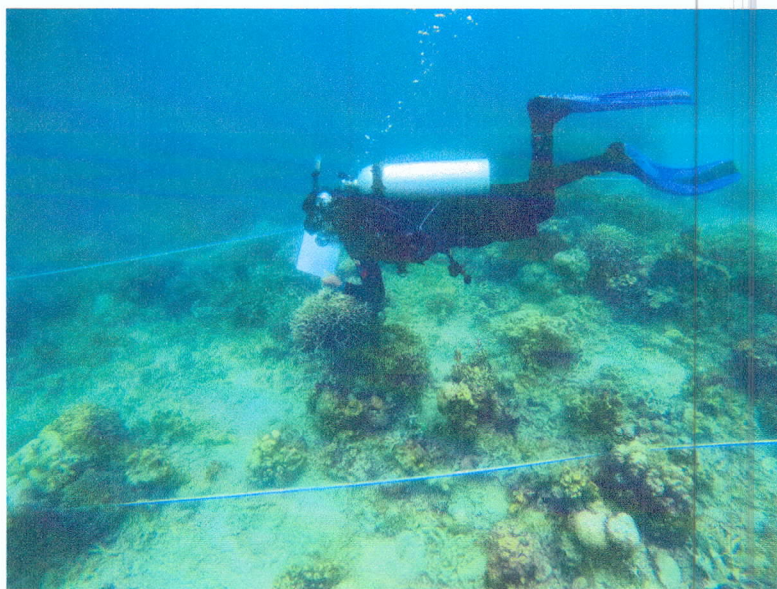
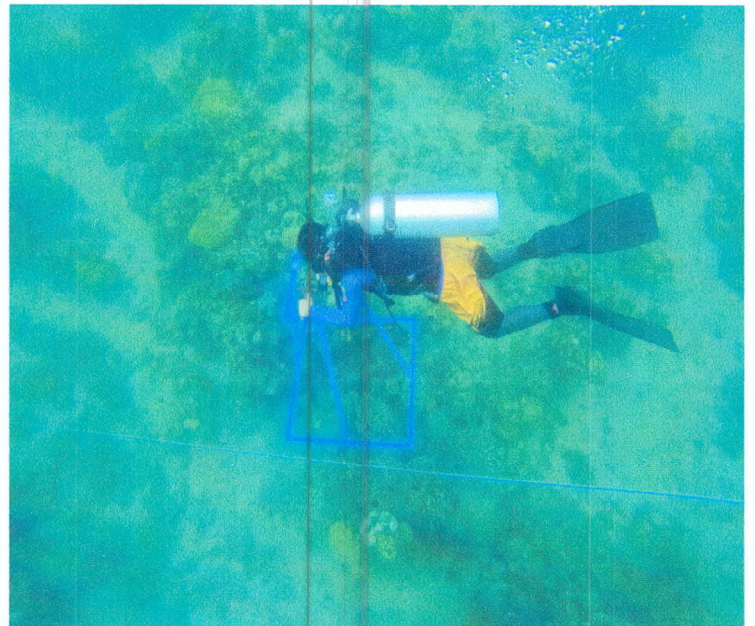
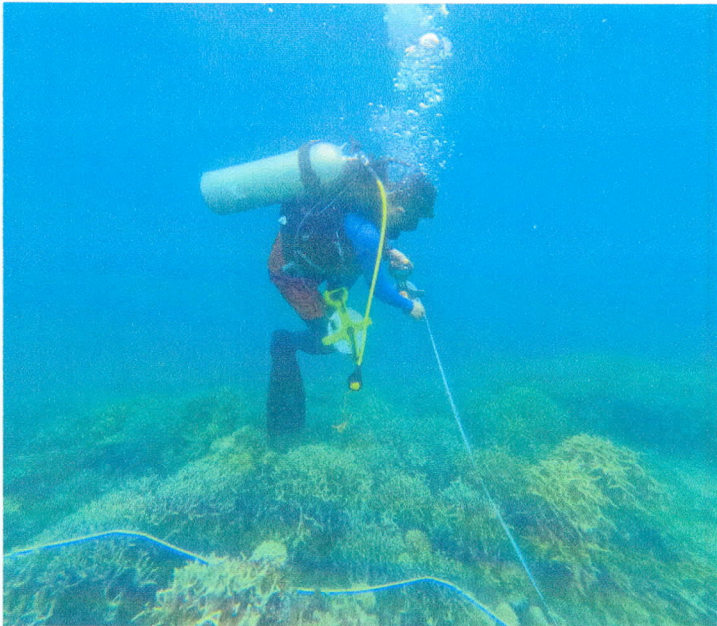
For information and record.


MARIA LILIBETH E. AROJO

I. Monitoring

The activity was conducted on February to March, 2023 in Bancoro Reef, Bgy. Liminangcong; Barge Laot, Bgy. Tumbod and Malapeña Island, Bgy. San Jose, Taytay, Palawan.

The 100-meter base transect were deployed following the contour of the reef, and was adjusted to 5m depth. A 50-meter transects on the shallower side of the base transect following random numbers were also deployed. Documentation and recording of coral reef at every 1m interval using tetrapod were done for the three to five transect per station. Identification and counting of the fishes with 2.5 m interval from the transect base observed within the area were also recorded.



II. Data analysis

Coral cover

Table 1. Coral cover were computed using Coral Point Count with Excel extensions (CPCe). The following are the result of tabulated and graphed coral reefs in established monitoring sites.

	Sites	Bancoro Reef, Bgy. Liminangcong	Barge Laot, Bgy. Tumbod	Malapeña Island, Bgy. San Jose
Coral (HC)		71.09	87.43	91.14
Dead Coral (DC)		1.03	5.00	0.98
Soft Coral (SC)		0.27	3.20	0.08
Other Organisms (OO)		0.14	0.90	0.04
Algae (AL)		3.94	0.72	0.12
Abiotic Component (AB)		23.53	2.75	7.64
Tape, Water, Block (TWB)		1.14	0.79	0.74
Sum (excluding tape+shadow+wand)				

Results of the coral cover in terms of hard coral revealed that Malapeña Island Bgy. San Jose, Taytay, Palawan has obtained the highest value of 91. 14 followed by Barge Laot, Bgy. Tumbod with a value of 87.43 and Bancoro Reef, Bgy. Liminangcong with 72.09 coral cover. The monitoring sites were also identified as Strict Protection Zone covered by a Conservation Agreement between the Peoples Organization (PO’s), Malampaya Foundation Inc. and the department.

Table 2. Hard Coral Cover (HCC) of five reefs within MSPLS.

Sites	Category	% Range of Coral Cover	No. of transect
Bancoro Reef, Bgy. Liminangcong	HCC Category A > 44% HCC	72.09	3
Barge Laot, Bgy. Tumbod	HCC Category A > 44% HCC	87.43	3
Malapeña Island, Bgy. San Jose	HCC Category A > 44% HCC	91.14	5

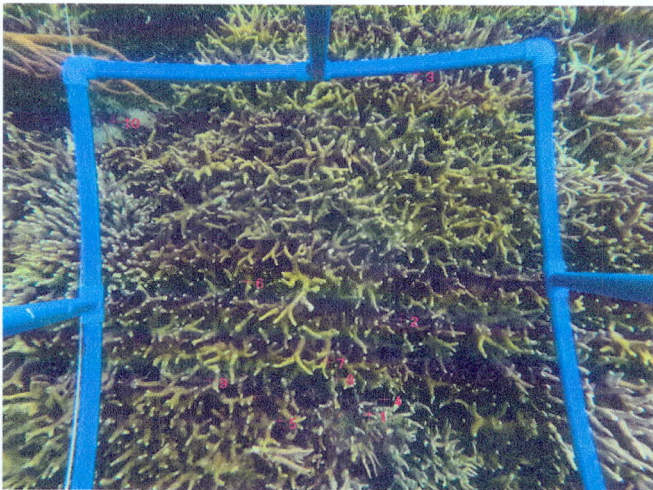
Result shows that Bancoro Reef, Bgy. Liminangcong; Barge Laot, Bgy. Tumbod; and Malapeña Island, Bgy. San Jose belongs to HCC Category A. The reefs are classified as excellent condition based on (Licuanan et al. 2019).

Figure 1. Photos of coral reef using scoring images of CPCe

A. Bancoro Reef



B. Barge Laot



C. Malapeña Island

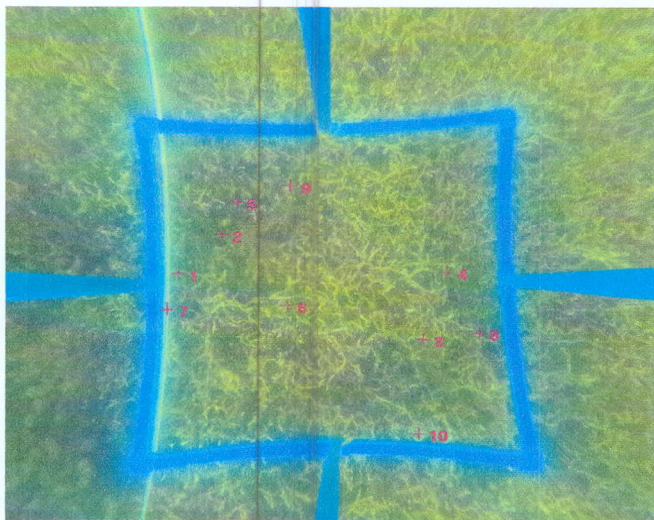
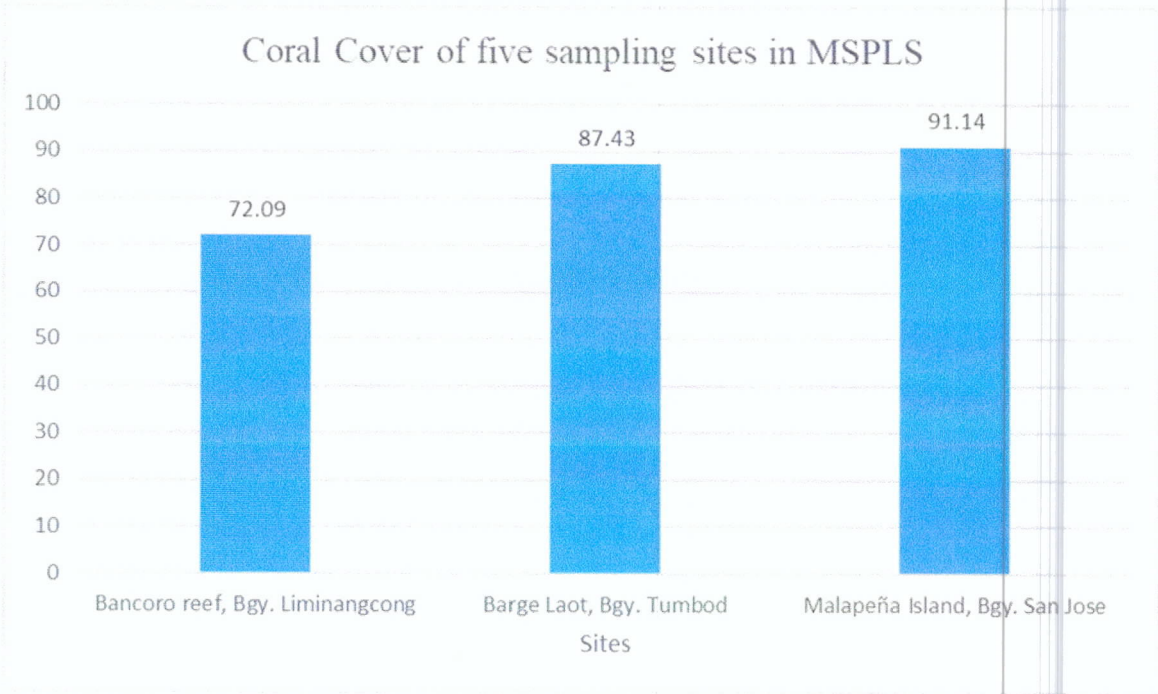


Figure 2. Coral cover of three (3) sampling sites in MSPLS.



Graph showing the hard coral cover of three (3) monitoring sites in MSPLS where in Malapeña Island Bgy. San Jose, Taytay, Palawan had the highest coral cover with a total of 91.14 followed by Barge Laot, Bgy. Tumbod with a value of 87.43 and Bancoro reef, Bgy. Liminangcong with 72.09 coral cover.

Associated Reef Fishes

Fish visual census were done in three (3) stations of coral reef monitoring sites. Transect lines were laid between 3m to 7m depths. Fishes were recorded using Line Intercept Transect (LIT) method. The length of all fishes encountered within 2.5 left and 2.5 meters right of the transect line were estimated and recorded.

Figure 3. Fish abundance/density computation of 5 sites.

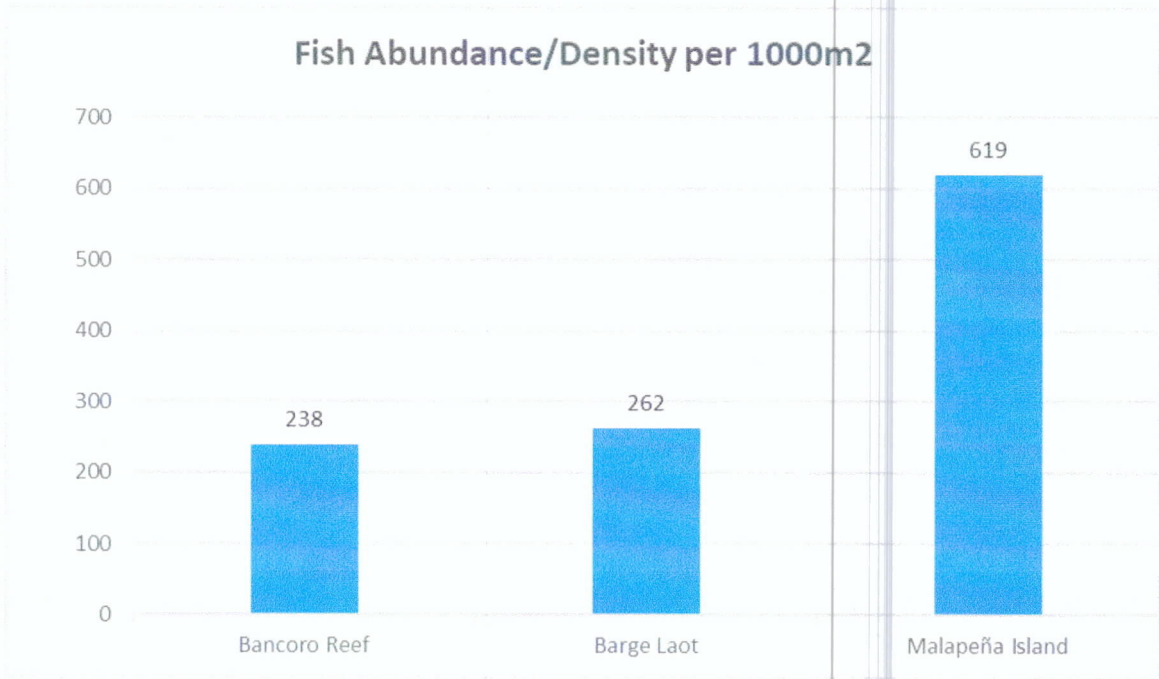
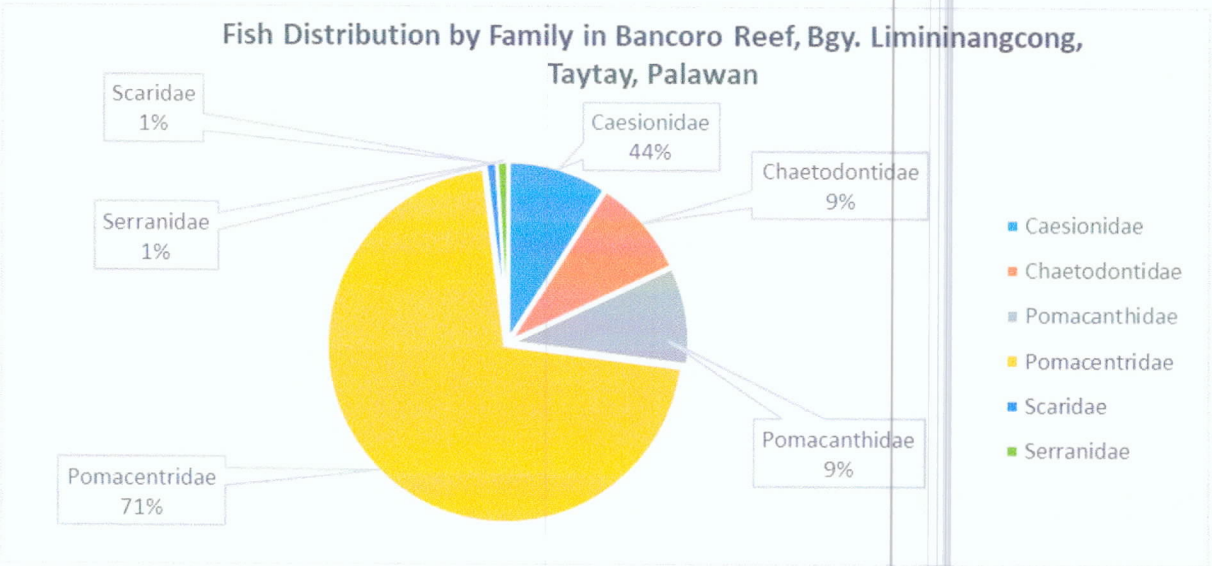
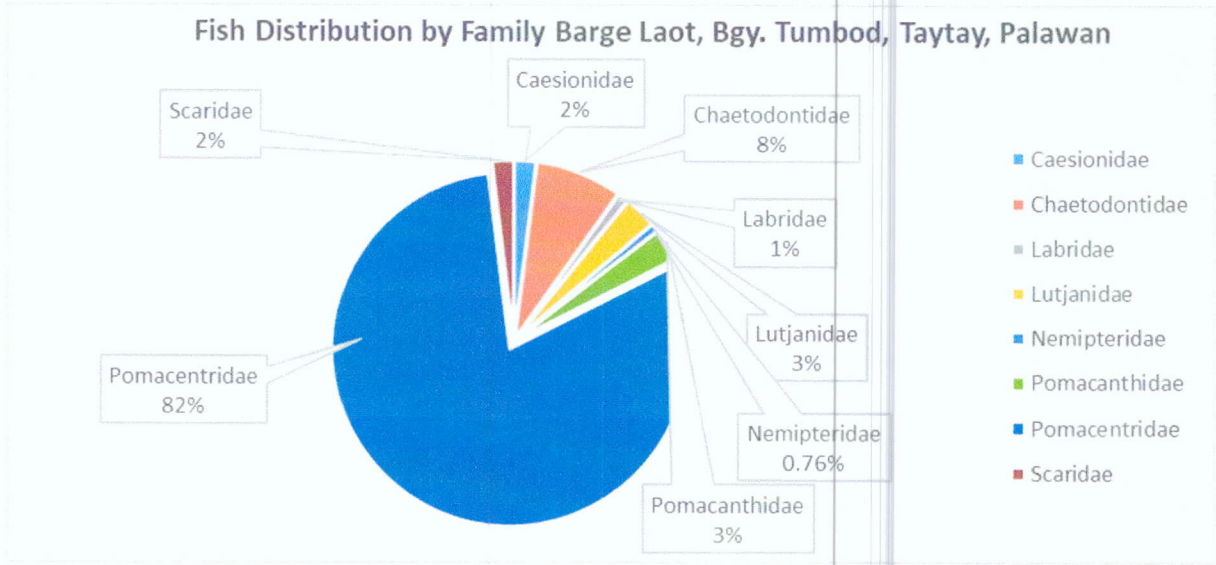


Figure shows the fish abundance/density per 1000m² of three (3) monitoring sites of which the Malapeña Island had the highest value of 619 m² falling under moderate. The Barge Laot with a value of 262 m² and Bancoro Reef with a value of 238 m² had the least value which falls under poor category based on Hilomen et al., 2000. This could be attributed to the location of the monitoring site which is surrounded by the community and frequently visited by the fishers.

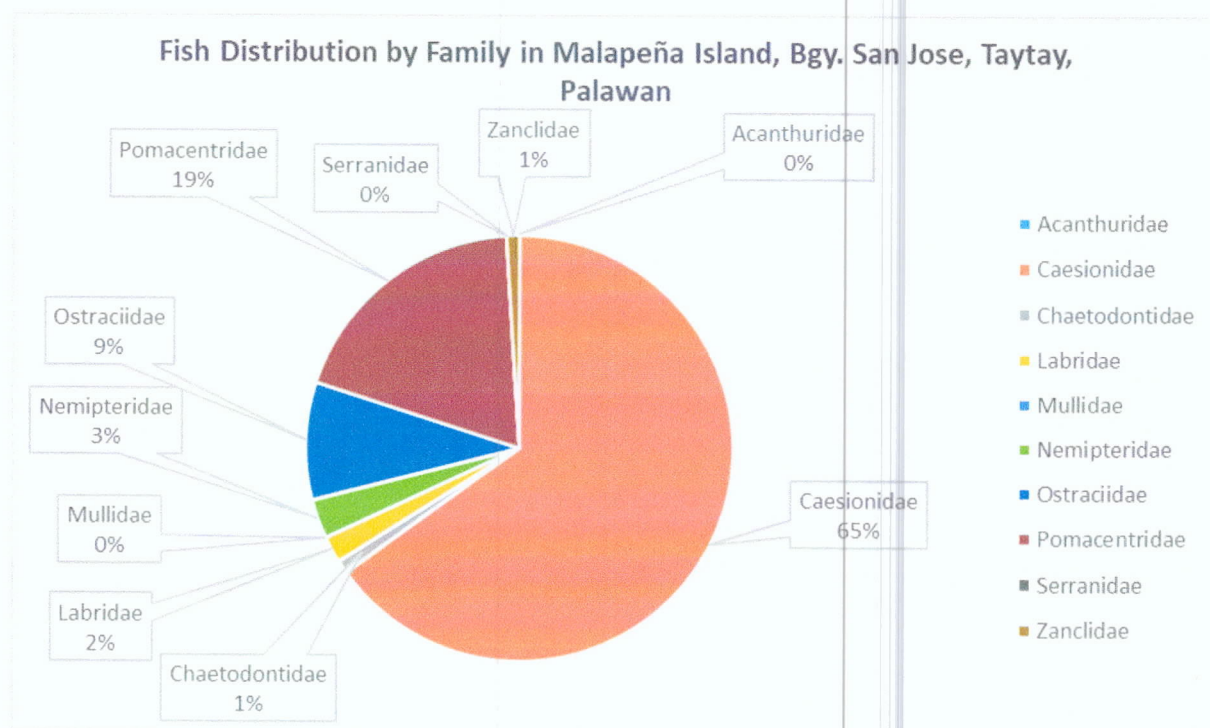
Figure 4. Pie graph of fish distribution per family in three (3) sites.



Pie graph showing the fish distribution by family in Bancoro Reef, Bgy. Liminangcong, Taytay, Palawan. A total of six (6) families were identified and recorded of which Damsel (Pomacentridae) had the highest value of 71% followed by Fusilier (Caesionidae) with a value of 44%.



Pie graph showing the fish distribution by family in Barge Laot, Bgy. Tumbod, Taytay, Palawan. A total of eight (8) families were identified and recorded of which Damsel (Pomacentridae) had the highest value of 82% compared to other species.



Pie graph showing the fish distribution by family in Malapeña Island, Bgy. San Jose, Taytay, Palawan. A total of ten (10) families were identified and recorded of which Fusilier (Caesionidae) had the highest value of 65% followed by Damsel (Pomacentridae).

Table 3. Fish biomass (MT/km2) in the five sites.

Sites	Biomass (MT/km2)	Category
Bancoro Reef, Bgy. Liminangcong, Taytay, Palawan	5. 2245	Very Low
Barge Laot, Bgy. Tumbod, Taytay, Palawan	3. 2137	Very Low
Malapeña Island, Bgy. San Jose, Taytay, Palawan	55.5509	Very High

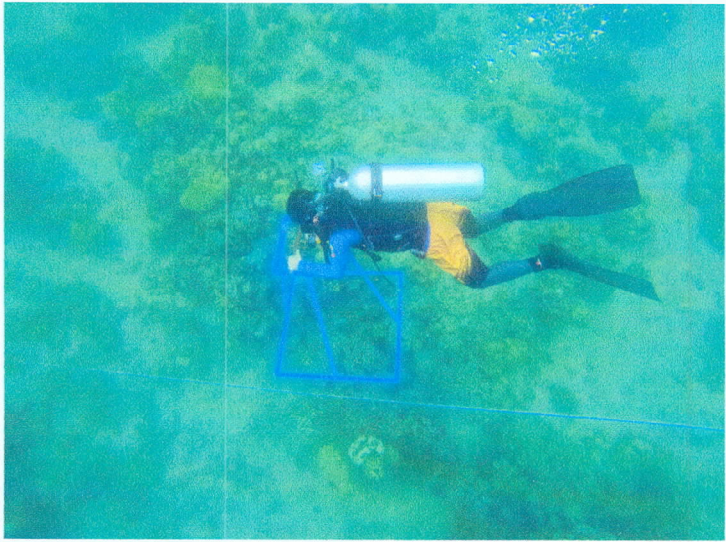
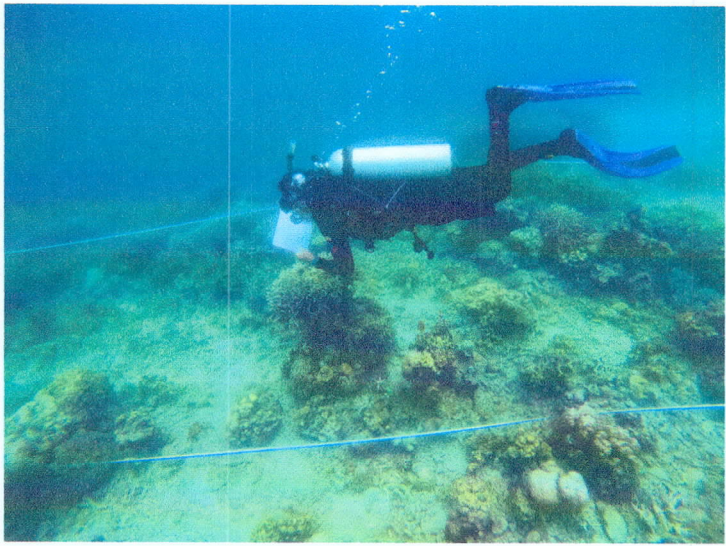
The highest biomass was recorded in Malapeña Island, Bgy. San Jose, Taytay, Palawan with a value of 55.5509 MT/km2 belonging to very high category dominated by the Caesionidae (Fusilier). The Bancoro Reef with 5.2245 MT/km2 and Barge Laot with 3.2137 MT/km2 have the least biomass falling under very low category based on Nanola et al., 2006 fish visual census categories.

III.Conclusion and Recommendation

The undersigned recommends the following.

1. Intensify law enforcement activity and;
2. To allocate more funds for diving materials and other resources to be used in coral protection activity.
3. Collaboration with Barangay, POs, NGOs for the enforcement activity within Strict Protection Zone; and
4. Intensify the Communication and Education and Public Awareness (CEPA) activities within Malampaya Sound Protected Landscape and Seascape (MSPLS).

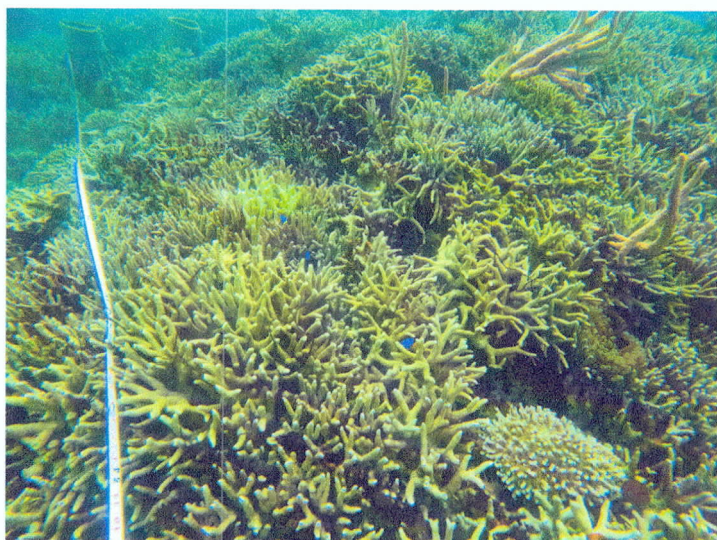
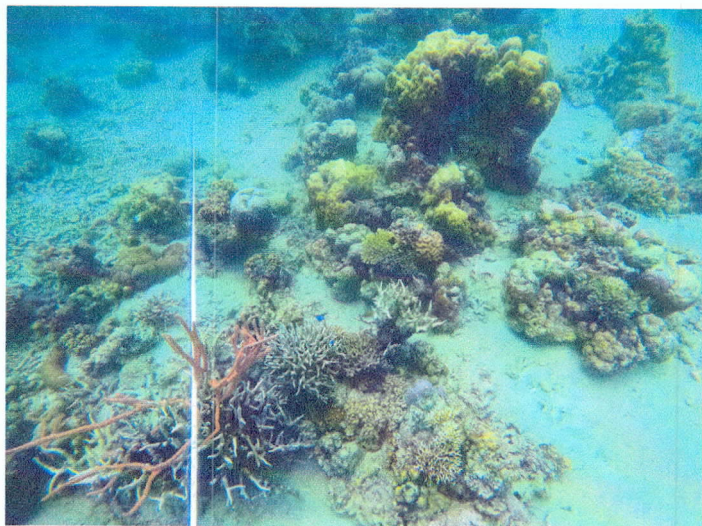
Photo Documentation



I hereby certify that the photos are true and correct and taken during the conduct of coral monitoring on February 15 to March 7, 2023 within MSPLS.

MARIA LILIBETH E. AROJO

IV. Photos of fish monitored within the three (3) monitoring sites.



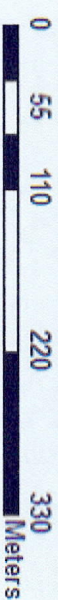


Republic of the Philippines
Department of Environment and Natural Resources
MALANGPAPA REGION
PROTECTED AREA MANAGEMENT OFFICE
MALAMPAYA SOUND PROTECTED LANDSCAPE AND SEASCAPE (MSPLS)
Taytay, San Vicente, Palawan
Barangay Old Guijo, Taytay, Palawan
Email add: pamomsp@denr.gov.ph; Contact # 0938-786-3728



LOCATION MAP SHOWING THE CORAL REEF MONITORING SITE LOCATED AT BANCORO REEF, BARANGAY LIMINANGCONG TAYTAY, PALAWAN.

SCALE:1:5,000



Projection: Transverse_Mercator

Projected Coordinate System: WGS_1984_UTM_Zone_50N

MONITORING SITE

TRANSECT LINE

MSPLS CORAL REEF AREAS

MSPLS TERRESTRIAL ZONE

CERTIFICATION

THIS IS TO CERTIFY that this track is within the
MALAMPAYA SOUND PROTECTED
LANDSCAPE AND SEASCAPE (MSPLS)
per Presidential Proclamation No. 342, dated July 12, 2000

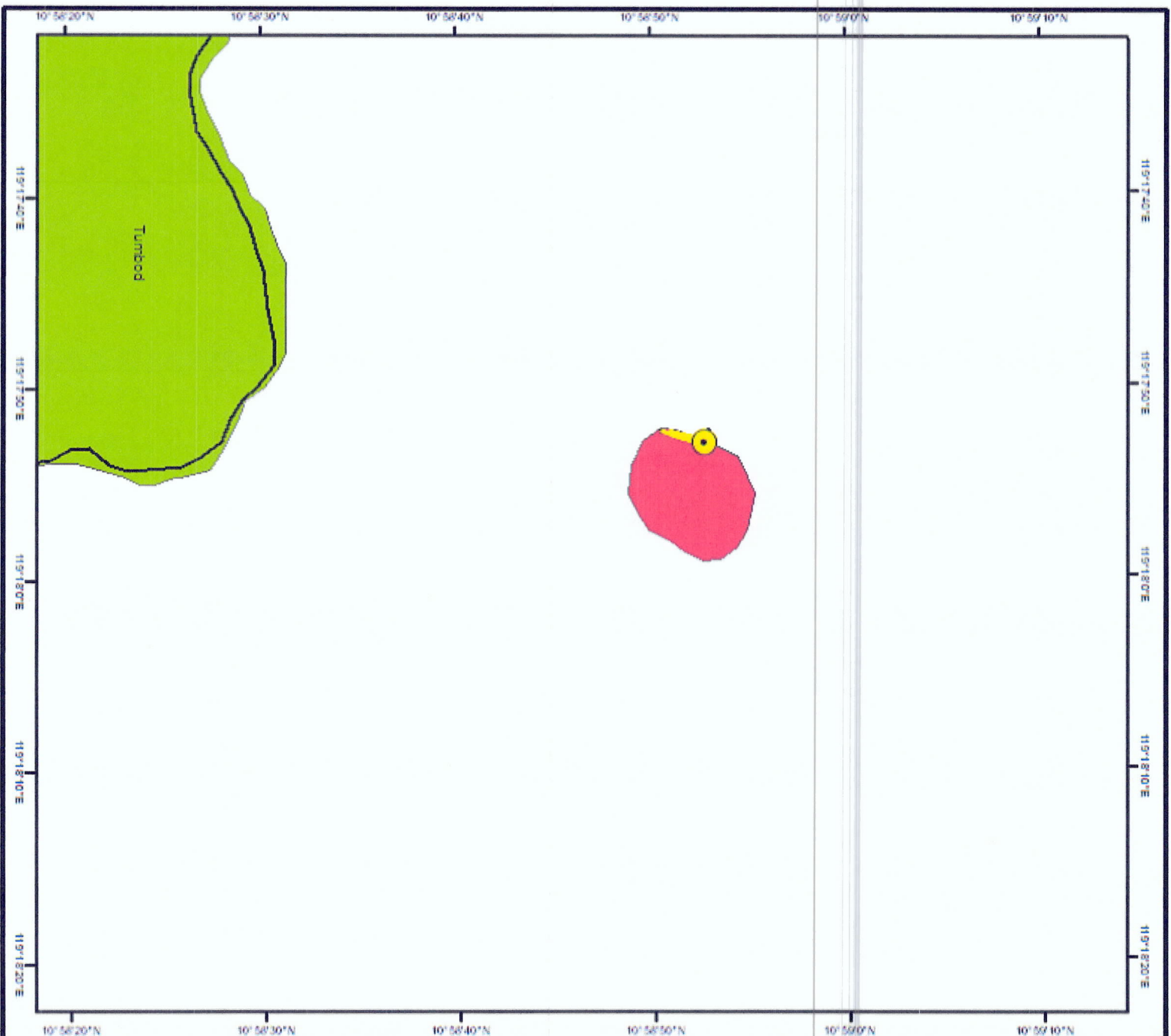
Digitized by:

ROYTEL C. SOLANA
GIS SPECIALIST

Checked/Verified:

CLARISSA P. PADOR
For: III/PASu, MSPLS

NAME	LONGITUDE	LATITUDE
T1	119°18'27.345"E	10°59'12.828"N
T2	119°18'27.258"E	10°59'12.405"N



Department of Environment and Natural Resources
MALAMPAYA SOUND PROTECTED AREA MANAGEMENT OFFICE
Barangay Dadiawan, Taytay, Palawan
Email: adn.pmalampaya@denr.gov.ph



LOCATION MAP SHOWING THE CORAL REEF MONITORING SITE LOCATED AT BARGE LAOT, BARANGAY TUMBOD, TAYTAY, PALAWAN.

SCALE: 1:9,000



Projection: Transverse_Mercator
Projected Coordinate System: WGS_1984_UTM_Zone_50N

MONITORING SITE

TRANSECT LINE

MSPLS CORAL REEF AREAS

MSPLS TERRESTRIAL ZONE

CERTIFICATION

THIS IS TO CERTIFY that this track is within the
MALAMPAYA SOUND PROTECTED
LANDSCAPE AND SEASCAPE (MSPLS)
per Presidential Proclamation No. 342, dated July 12, 2000

Digitized by: RONIEL C. SORIANO

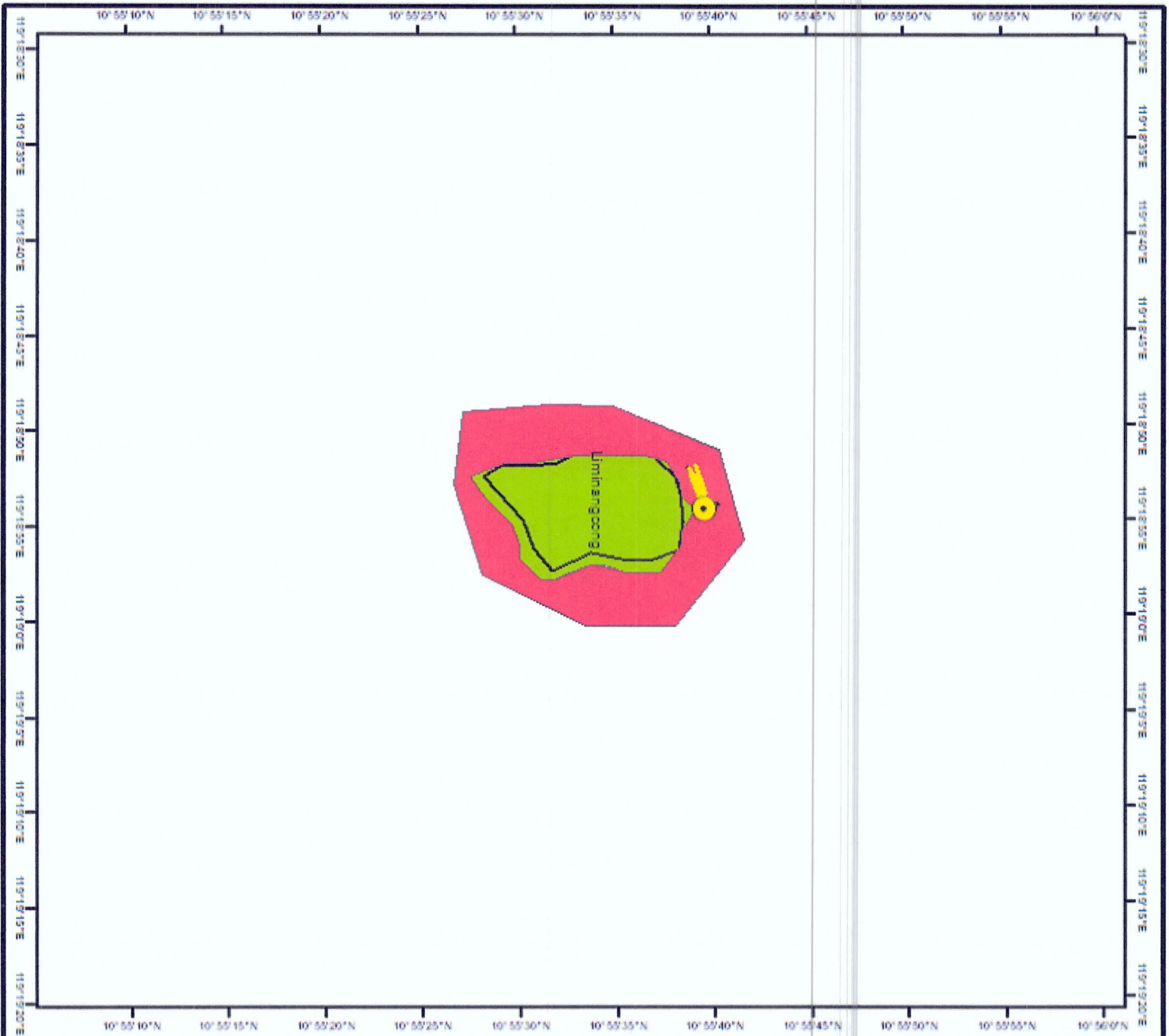
SIS SPECIALIST

Checked/Verified: CLARISSA P. PADOR

For: III/PPASu, MSPLS

Clarissa P. Pador

NAME	LONGITUDE	LATITUDE
T1	119°17'52.408"E	10°58'51.666"N
T2	119°17'52.229"E	10°58'51.274"N
T3	119°17'52.239"E	10°58'51.673"N



Republic of the Philippines
Department of Environment and Natural Resources
MALAPENYA SOUND PROTECTED LANDSCAPE AND SEASCAPES
BAYAN-CAN, TAYTAY, PALAWAN
Email: malapenya@denr.gov.ph



LOCATION MAP SHOWING THE CORAL REEF MONITORING SITE LOCATED AT MALAPEÑA ISLAND, BARANGAY LIMINANGCONG, TAYTAY, PALAWAN.

SCALE: 1:9,000



Projection: Transverse_Mercator
Projected Coordinate System: WGS_1984_UTM_Zone_50N

●

MONITORING SITE

—

TRANSECT LINE

■

MSPLS CORAL REEF AREAS

■

MSPLS TERRESTRIAL ZONE

CERTIFICATION

THIS IS TO CERTIFY that this track is within the
MALAPENYA SOUND PROTECTED
LANDSCAPE AND SEASCAPES (MSPLS)
per Presidential Proclamation No. 342, dated July 12, 2000

Digitized by: RONIEUC. SELANA

Checked/Verified: CLARISSA P. PADOR

For: IUP/ASU, MSPLS

NAME	LONGITUDE	LATITUDE
T1	119°18'53.01"E	10°55'39.29"N
T2	119°18'52.589"E	10°55'39.209"N
T3	119°18'52.925"E	10°55'39.431"N
T4	119°18'53.011"E	10°55'39.567"N
T5	119°18'52.406"E	10°55'39.492"N

RAW DATA OF CORALS IN BANCORO REEF USING CPCe

TRANSECT NAME	T1	T2	T3			
Number of frames	49	29	39			
Total points	490	290	390			
Total points (minus tape+wand+shadow)	485	286	386			
MAJOR CATEGORY (% of transect)				MEAN	STD. DEV.	STD. ERROR
CORAL (HC)	73.20	78.67	61.39896373	71.09	8.83	8.83
DEAD CORAL (DC)	1.03	0.00	2.07253886	1.03	1.04	1.04
SOFT CORAL (SC)	0.21	0.35	0.259067358	0.27	0.07	0.07
OTHER ORGANISMS (OO)	0.41	0.00	0	0.14	0.24	0.24
ALGAE (AL)	2.68	5.24	3.886010363	3.94	1.28	1.28
ABIOTIC COMPONENT (AB)	22.47	15.73	32.38341969	23.53	8.37	8.37
TAPE, WATER, BLOCK (TWB)	1.02	1.38	1.025641026	1.14	0.21	0.21
Sum (excluding tape+shadow+wand)	100.00	100.00	100			
SUBCATEGORIES (% of transect)				MEAN	STD. DEV.	STD. ERROR
CORAL (HC)						
Acropora branching (ACB)	56.91	74.83	52.33160622	61.35	11.89	11.89
Acropora digitate (ACD)	0.00	0.00	0	0.00	0.00	0.00
Acropora submassive (ACS)	0.00	0.00	0.259067358	0.09	0.15	0.15
Acropora tabulate (ACT)	0.00	0.00	0	0.00	0.00	0.00
Bleached coral (BLEC)	0.00	0.00	0	0.00	0.00	0.00
Heliopora (CHL)	0.00	0.00	0	0.00	0.00	0.00
Millepora (CME)	0.00	0.00	0	0.00	0.00	0.00
Mushroom coral (CMR)	1.24	1.05	3.626943005	1.97	1.44	1.44
Other branching corals (CB)	1.65	0.00	0.518134715	0.72	0.84	0.84
Other encrusting corals (CE)	0.21	0.00	0.259067358	0.16	0.14	0.14
Other foliose corals (CF)	0.41	0.00	0.518134715	0.31	0.27	0.27
Other massive corals (CM)	0.00	0.00	0	0.00	0.00	0.00
Other submassive corals (CS)	12.78	2.80	3.886010363	6.49	5.48	5.48
DEAD CORAL (DC)						
Dead Coral (DC)	0.82	0.00	0.777202073	0.53	0.46	0.46
Dead coral with algae (DCA)	0.21	0.00	1.295336788	0.50	0.70	0.70
SOFT CORAL (SC)						
Soft coral (SC)	0.21	0.35	0.259067358	0.27	0.07	0.07
OTHER ORGANISMS (OO)						
Other animals (OT)	0.00	0.00	0	0.00	0.00	0.00
Sponge (SP)	0.41	0.00	0	0.14	0.24	0.24
Zoanthids (ZO)	0.00	0.00	0	0.00	0.00	0.00
ALGAE (AL)						
Algal assemblages (AA)	0.00	0.00	0.259067358	0.09	0.15	0.15
Coralline algae (CA)	2.68	5.24	3.626943005	3.85	1.30	1.30
Halimeda (HA)	0.00	0.00	0	0.00	0.00	0.00
Macroalgae (MA)	0.00	0.00	0	0.00	0.00	0.00
ABIOTIC COMPONENT (AB)						
Rubble (R)	7.84	5.94	13.21243523	9.00	3.77	3.77
Sand (S)	14.64	9.79	19.17098446	14.53	4.69	4.69
Silt (SI)	0.00	0.00	0	0.00	0.00	0.00
TAPE, WATER, BLOCK (TWB)						
Tape, Water, Block (TWB)	1.02	1.38	1.025641026	1.14	0.21	0.21
NOTES (% of transect)				MEAN	STD. DEV.	STD. ERROR
Bleached coral (BLEC)	0.00	0.00	0	0.00	0.00	0.00
NOTES (% of coral)						
Bleached coral (BLEC)	0.00	0.00	0	0.00	0.00	0.00

MAJOR CATEGORY (occurring in transect)				MEAN	STD. DEV.	STD. ERROR	SW INDEX
CORAL (HC)	355	225	237	272.33	71.84	71.84	0.60
DEAD CORAL (DC)	5	0	8	4.33	4.04	4.04	0.66
SOFT CORAL (SC)	1	1	1	1.00	0.00	0.00	0.00
OTHER ORGANISMS (OO)	2	0	0	0.67	1.15	1.15	0.00
ALGAE (AL)	13	15	15	14.33	1.15	1.15	0.24
ABIOTIC COMPONENT (AB)	109	45	125	93.00	42.33	42.33	0.68
TAPE, WATER, BLOCK (TWB)	5	4	4	4.33	0.58	0.58	
TOTAL TRANSECT POINTS	490	290	390				
SUBCATEGORIES (occurring in transect)				MEAN	STD. DEV.	STD. ERROR	SW INDEX
CORAL (HC)							0.60
Acropora branching (ACB)	276	214	202	230.67	39.72	39.72	0.14
Acropora digitate (ACD)	0	0	0	0.00	0.00	0.00	0.00
Acropora submassive (ACS)	0	0	1	0.33	0.58	0.58	0.02
Acropora tabulate (ACT)	0	0	0	0.00	0.00	0.00	0.00
Bleached coral (BLEC)	0	0	0	0.00	0.00	0.00	0.00
Heliopora (CHL)	0	0	0	0.00	0.00	0.00	0.00
Millepora (CME)	0	0	0	0.00	0.00	0.00	0.00
Mushroom coral (CMR)	6	3	14	7.67	5.69	5.69	0.17
Other branching corals (CB)	8	0	2	3.33	4.16	4.16	0.04
Other encrusting corals (CE)	1	0	1	0.67	0.58	0.58	0.02
Other foliose corals (CF)	2	0	2	1.33	1.15	1.15	0.04
Other massive corals (CM)	0	0	0	0.00	0.00	0.00	0.00
Other submassive corals (CS)	62	8	15	28.33	29.37	29.37	0.17
DEAD CORAL (DC)							0.66
Dead Coral (DC)	4	0	3	2.33	2.08	2.08	0.37
Dead coral with algae (DCA)	1	0	5	2.00	2.65	2.65	0.29
SOFT CORAL (SC)							0.00
Soft coral (SC)	1	1	1	1.00	0.00	0.00	0.00
OTHER ORGANISMS (OO)							0.00
Other animals (OT)	0	0	0	0.00	0.00	0.00	0.00
Sponge (SP)	2	0	0	0.67	1.15	1.15	0.00
Zoanthids (ZO)	0	0	0	0.00	0.00	0.00	0.00
ALGAE (AL)							0.24
Algal assemblages (AA)	0	0	1	0.33	0.58	0.58	0.18
Coralline algae (CA)	13	15	14	14.00	1.00	1.00	0.06
Halimeda (HA)	0	0	0	0.00	0.00	0.00	0.00
Macroalgae (MA)	0	0	0	0.00	0.00	0.00	0.00
ABIOTIC COMPONENT (AB)							0.68
Rubble (R)	38	17	51	35.33	17.16	17.16	0.37
Sand (S)	71	28	74	57.67	25.74	25.74	0.31
Silt (SI)	0	0	0	0.00	0.00	0.00	0.00
TAPE, WATER, BLOCK (TWB)							
Tape, Water, Block (TWB)	5	4	4	4.33	0.58	0.58	
NOTES (occurring in transect)				MEAN	STD. DEV.	STD. ERROR	
Bleached coral (BLEC)	0	0	0	0.00	0.00	0.00	
NOTES (occurring in coral)							
Bleached coral (BLEC)	0	0	0	0.00	0.00	0.00	
Shannon-Weaver Index				0.74	0.65	0.88659966	
CORAL (HC)	0.23	0.19	0.299490164				
DEAD CORAL (DC)	0.05	0.00	0.08033981				
SOFT CORAL (SC)	0.01	0.02	0.01542963				
OTHER ORGANISMS (OO)	0.02	0.00	0				

ALGAE (AL)	0.10	0.15	0.126209346
ABIOTIC COMPONENT (AB)	0.34	0.29	0.36513071
TAPE, WATER, BLOCK (TWB)			
Simpson Index of Diversity (1-D)	0.41	0.35	0.516201777
CORAL (HC)	0.54	0.62	0.376983275
DEAD CORAL (DC)	0.00	0.00	0.000429542
SOFT CORAL (SC)	0.00	0.00	6.71159E-06
OTHER ORGANISMS (OO)	0.00	0.00	0
ALGAE (AL)	0.00	0.00	0.001510108
ABIOTIC COMPONENT (AB)	0.05	0.02	0.104868587
TAPE, WATER, BLOCK (TWB)			

RAW DATA OF CORALS IN BARGE LAOT USING CPCe

TRANSECT NAME	T1	T2	T3			
Number of frames	56	38	35			
Total points	560	379	350			
Total points (minus tape+wand+shadow)	556	377	346			
MAJOR CATEGORY (% of transect)				MEAN	STD. DEV.	STD. ERROR
CORAL (HC)	74.82	91.512	95.954	87.43	11.14	11.14
DEAD CORAL (DC)	13.67	1.3263	0	5.00	7.54	7.54
SOFT CORAL (SC)	2.70	3.4483	3.4682	3.20	0.44	0.44
OTHER ORGANISMS (OO)	0.54	1.8568	0.289	0.90	0.84	0.84
ALGAE (AL)	0.54	1.3263	0.289	0.72	0.54	0.54
ABIOTIC COMPONENT (AB)	7.73	0.5305	0	2.75	4.32	4.32
TAPE, WATER, BLOCK (TWB)	0.71	0.5277	1.1429	0.79	0.32	0.32
Sum (excluding tape+shadow+wand)	100.00	100	100			
SUBCATEGORIES (% of transect)				MEAN	STD. DEV.	STD. ERROR
CORAL (HC)						
Acropora branching (ACB)	65.11	87.003	91.618	81.24	14.16	14.16
Acropora digitate (ACD)	0.00	0	0	0.00	0.00	0.00
Acropora submassive (ACS)	0.00	0	0	0.00	0.00	0.00
Acropora tabulate (ACT)	0.00	0	0	0.00	0.00	0.00
Bleached coral (BLEC)	0.00	0	0	0.00	0.00	0.00
Heliopora (CHL)	0.00	0	0	0.00	0.00	0.00
Millepora (CME)	0.00	0	0	0.00	0.00	0.00
Mushroom coral (CMR)	6.65	2.9178	0.578	3.38	3.06	3.06
Other branching corals (CB)	2.34	0.2653	1.1561	1.25	1.04	1.04
Other encrusting corals (CE)	0.00	0	0	0.00	0.00	0.00
Other foliose corals (CF)	0.00	0	1.1561	0.39	0.67	0.67
Other massive corals (CM)	0.00	0.2653	0.578	0.28	0.29	0.29
Other submassive corals (CS)	0.72	1.061	0.8671	0.88	0.17	0.17
DEAD CORAL (DC)						
Dead Coral (DC)	13.13	0.7958	0	4.64	7.36	7.36
Dead coral with algae (DCA)	0.54	0.5305	0	0.36	0.31	0.31
SOFT CORAL (SC)						
Soft coral (SC)	2.70	3.4483	3.4682	3.20	0.44	0.44
OTHER ORGANISMS (OO)						
Other animals (OT)	0.54	0	0	0.18	0.31	0.31
Sponge (SP)	0.00	1.8568	0.289	0.72	1.00	1.00
Zoanthids (ZO)	0.00	0	0	0.00	0.00	0.00
ALGAE (AL)						
Algal assemblages (AA)	0.00	0	0	0.00	0.00	0.00
Coralline algae (CA)	0.54	1.3263	0.289	0.72	0.54	0.54
Halimeda (HA)	0.00	0	0	0.00	0.00	0.00
Macroalgae (MA)	0.00	0	0	0.00	0.00	0.00
ABIOTIC COMPONENT (AB)						
Rubble (R)	0.36	0.5305	0	0.30	0.27	0.27
Sand (S)	7.37	0	0	2.46	4.26	4.26
Silt (SI)	0.00	0	0	0.00	0.00	0.00
TAPE, WATER, BLOCK (TWB)						
Tape, Water, Block (TWB)	0.71	0.5277	1.1429	0.79	0.32	0.32
NOTES (% of transect)				MEAN	STD. DEV.	STD. ERROR
Bleached coral (BLEC)	0.00	0	0	0.00	0.00	0.00
NOTES (% of coral)						
Bleached coral (BLEC)	0.00	0	0	0.00	0.00	0.00

MAJOR CATEGORY (occurring in transect)				MEAN	STD. DEV.	STD. ERROR	SW INDEX	SIMPSON (1-D)
CORAL (HC)	416	345	332	364.33	45.21	45.21	0.24	0.09
DEAD CORAL (DC)	76	5	0	27.00	42.51	42.51	0.67	0.48
SOFT CORAL (SC)	15	13	12	13.33	1.53	1.53	0.00	0.00
OTHER ORGANISMS (OO)	3	7	1	3.67	3.06	3.06	0.00	0.00
ALGAE (AL)	3	5	1	3.00	2.00	2.00	0.00	0.00
ABIOTIC COMPONENT (AB)	43	2	0	15.00	24.27	24.27	0.00	0.00
TAPE, WATER, BLOCK (TWB)	4	2	4	3.33	1.15	1.15		
TOTAL TRANSECT POINTS	560	379	350					
SUBCATEGORIES (occurring in transect)				MEAN	STD. DEV.	STD. ERROR	SW INDEX	SIMPSON (1-D)
CORAL (HC)							0.24	0.09
Acropora branching (ACB)	362	328	317	335.67	23.46	23.46	0.05	0.90
Acropora digitate (ACD)	0	0	0	0.00	0.00	0.00	0.00	0.00
Acropora submassive (ACS)	0	0	0	0.00	0.00	0.00	0.00	0.00
Acropora tabulate (ACT)	0	0	0	0.00	0.00	0.00	0.00	0.00
Bleached coral (BLEC)	0	0	0	0.00	0.00	0.00	0.00	0.00
Heliopora (CHL)	0	0	0	0.00	0.00	0.00	0.00	0.00
Millepora (CME)	0	0	0	0.00	0.00	0.00	0.00	0.00
Mushroom coral (CMR)	37	11	2	16.67	18.18	18.18	0.11	0.00
Other branching corals (CB)	13	1	4	6.00	6.24	6.24	0.02	0.00
Other encrusting corals (CE)	0	0	0	0.00	0.00	0.00	0.00	0.00
Other foliose corals (CF)	0	0	4	1.33	2.31	2.31	0.00	0.00
Other massive corals (CM)	0	1	2	1.00	1.00	1.00	0.02	0.00
Other submassive corals (CS)	4	4	3	3.67	0.58	0.58	0.05	0.00
DEAD CORAL (DC)							0.67	0.48
Dead Coral (DC)	73	3	0	25.33	41.31	41.31	0.31	0.36
Dead coral with algae (DCA)	3	2	0	1.67	1.53	1.53	0.37	0.16
SOFT CORAL (SC)							0.00	0.00
Soft coral (SC)	15	13	12	13.33	1.53	1.53	0.00	1.00
OTHER ORGANISMS (OO)							0.00	0.00
Other animals (OT)	3	0	0	1.00	1.73	1.73	0.00	0.00
Sponge (SP)	0	7	1	2.67	3.79	3.79	0.00	1.00
Zoanthids (ZO)	0	0	0	0.00	0.00	0.00	0.00	0.00
ALGAE (AL)							0.00	0.00
Algal assemblages (AA)	0	0	0	0.00	0.00	0.00	0.00	0.00
Coralline algae (CA)	3	5	1	3.00	2.00	2.00	0.00	1.00
Halimeda (HA)	0	0	0	0.00	0.00	0.00	0.00	0.00
Macroalgae (MA)	0	0	0	0.00	0.00	0.00	0.00	0.00
ABIOTIC COMPONENT (AB)							0.00	0.00
Rubble (R)	2	2	0	1.33	1.15	1.15	0.00	1.00
Sand (S)	41	0	0	13.67	23.67	23.67	0.00	0.00
Silt (SI)	0	0	0	0.00	0.00	0.00	0.00	0.00
TAPE, WATER, BLOCK (TWB)								
Tape, Water, Block (TWB)	4	2	4	3.33	1.15	1.15		1.00
NOTES (occurring in transect)				MEAN	STD. DEV.	STD. ERROR		
Bleached coral (BLEC)	0	0	0	0.00	0.00	0.00		
NOTES (occurring in coral)								
Bleached coral (BLEC)	0	0	0	0.00	0.00	0.00		
Shannon-Weaver Index	0.84	0.4138	0.19					
CORAL (HC)	0.22	0.0812	0.0396					
DEAD CORAL (DC)	0.27	0.0573	0					
SOFT CORAL (SC)	0.10	0.1161	0.1166					
OTHER ORGANISMS (OO)	0.03	0.074	0.0169					

ALGAE (AL)	0.03	0.0573	0.0169
ABIOTIC COMPONENT (AB)	0.20	0.0278	0
TAPE, WATER, BLOCK (TWB)			
Simpson Index of Diversity (1-D)	0.41	0.1606	0.0781
CORAL (HC)	0.56	0.8374	0.9207
DEAD CORAL (DC)	0.02	0.0002	0
SOFT CORAL (SC)	0.00	0.0012	0.0012
OTHER ORGANISMS (OO)	0.00	0.0003	8E-06
ALGAE (AL)	0.00	0.0002	8E-06
ABIOTIC COMPONENT (AB)	0.01	3E-05	0
TAPE, WATER, BLOCK (TWB)			

[illegible]

MAJOR CATEGORY (occurring in transect)						MEAN	STD. DEV.	STD. ERRORV IND		SIMPSON (1-D)
CORAL (HC)	408	411	308	488	384	399.80	64.52	64.52	1.02	0.49
DEAD CORAL (DC)	0	0	17	0	0	3.40	7.60	7.60	0.00	1.00
SOFT CORAL (SC)	0	0	0	2	0	0.40	0.89	0.89	0.00	1.00
OTHER ORGANISMS (OO)	1	0	0	0	0	0.20	0.45	0.45	0.00	1.00
ALGAE (AL)	3	0	0	0	0	0.60	1.34	1.34	0.00	1.00
ABIOTIC COMPONENT (AB)	83	16	23	5	43	34.00	30.69	30.69	0.25	0.13
TAPE, WATER, BLOCK (TWB)	5	3	1	5	3	3.40	1.67	1.67		
TOTAL TRANSECT POINTS	500	430	349	500	430					
SUBCATEGORIES (occurring in transect)						MEAN	STD. DEV.	STD. ERRORV IND		SIMPSON (1-D)
CORAL (HC)									1.02	0.49
Acropora branching (ACB)	336	341	231	381	264	310.60	61.30	61.30	0.26	0.47
Acropora digitate (ACD)	4	11	13	0	2	6.00	5.70	5.70	0.03	0.00
Acropora submassive (ACS)	9	0	0	0	10	3.80	5.22	5.22	0.10	0.00
Acropora tabulate (ACT)	0	0	0	0	2	0.40	0.89	0.89	0.03	0.00
Bleached coral (BLEC)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Heliopora (CHL)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Millepora (CME)	0	0	0	1	0	0.20	0.45	0.45	0.00	0.00
Mushroom coral (CMR)	0	1	0	0	1	0.40	0.55	0.55	0.02	0.00
Other branching corals (CB)	2	3	22	8	9	8.80	7.98	7.98	0.09	0.00
Other encrusting corals (CE)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Other foliose corals (CF)	3	14	5	4	0	5.20	5.26	5.26	0.00	0.00
Other massive corals (CM)	27	23	20	64	61	39.00	21.62	21.62	0.29	0.03
Other submassive corals (CS)	27	18	17	30	35	25.40	7.77	7.77	0.22	0.01
DEAD CORAL (DC)									0.00	1.00
Dead Coral (DC)	0	0	17	0	0	3.40	7.60	7.60	0.00	0.00
Dead coral with algae (DCA)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
SOFT CORAL (SC)									0.00	1.00
Soft coral (SC)	0	0	0	2	0	0.40	0.89	0.89	0.00	0.00
OTHER ORGANISMS (OO)									0.00	1.00
Other animals (OT)	1	0	0	0	0	0.20	0.45	0.45	0.00	0.00
Sponge (SP)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Zoanthids (ZO)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
ALGAE (AL)									0.00	1.00
Algal assemblages (AA)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Coralline algae (CA)	3	0	0	0	0	0.60	1.34	1.34	0.00	0.00
Halimeda (HA)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Macroalgae (MA)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
ABIOTIC COMPONENT (AB)									0.25	0.13
Rubble (R)	0	0	1	0	3	0.80	1.30	1.30	0.19	0.00
Sand (S)	83	16	22	5	40	33.20	30.59	30.59	0.07	0.87
Silt (SI)	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
TAPE, WATER, BLOCK (TWB)										
Tape, Water, Block (TWB)	5	3	1	5	3	3.40	1.67	1.67		1.00
NOTES (occurring in transect)						MEAN	STD. DEV.	STD. ERROR		
Bleached coral (BLEC)	0	0	0	0	0	0.00	0.00	0.00		
NOTES (occurring in coral)										
Bleached coral (BLEC)	0	0	0	0	0	0.00	0.00	0.00		
Shannon-Weaver Index	0.50	0.16	0.44	0.08	0.33					
CORAL (HC)	0.16	0.04	0.11	0.01	0.10					
DEAD CORAL (DC)	0.00	0.00	0.15	0.00	0.00					
SOFT CORAL (SC)	0.00	0.00	0.00	0.02	0.00					
OTHER ORGANISMS (OO)	0.01	0.00	0.00	0.00	0.00					

ALGAE (AL)	0.03	0.00	0.00	0.00	0.00
ABIOTIC COMPONENT (AB)	0.30	0.12	0.18	0.05	0.23
TAPE, WATER, BLOCK (TWB)					
Simpson Index of Diversity (1-D)	0.29	0.07	0.21	0.03	0.18
CORAL (HC)	0.68	0.93	0.78	0.97	0.81
DEAD CORAL (DC)	0.00	0.00	0.00	0.00	0.00
SOFT CORAL (SC)	0.00	0.00	0.00	0.00	0.00
OTHER ORGANISMS (OO)	0.00	0.00	0.00	0.00	0.00
ALGAE (AL)	0.00	0.00	0.00	0.00	0.00
ABIOTIC COMPONENT (AB)	0.03	0.00	0.00	0.00	0.01
TAPE, WATER, BLOCK (TWB)					