



Republic of the Philippines
Department of Environment and Natural Resources
MIMAROPA Region
PROVINCIAL ENVIRONMENT AND NATURAL RESOURCES OFFICE

APR 04 2023

MEMORANDUM

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

THRU : The ARD for Technical Services

FROM : The OIC, PENR Officer

SUBJECT : **SUBMISSION OF THE PRELIMARY ECOTOURISM
IMPACT MONITORING REPORT OF APO REEF
NATURAL PARK**

DENR MIMAROPA RECORDS SECTION RECEIVED	
APR 28 2023	
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BY: _____	DATE NO. _____
TIME: _____	

Forwarded is the memorandum dated March 31, 2023 of CENRO Sablayan regarding submission of the Preliminary Ecotourism Impact Monitoring Report of Apo Reef Natural Park (ARNP). The report contains the initial results of the Trail Resource Assessment and Monitoring (TRAM) in Apo Island and artificial reef monitoring in Barkong Lutang. The field surveys were conducted within the off-peak season of tourism in ARNP. The final report will be submitted after another set of field surveys are conducted after the peak season of this year.

For information and record.

ERNESTO E. TAÑADA

TSD-CDS4/4/2023
Copy furnished:
1. Planning Section
2. File

So. Pag-asa, Brgy. Payompon, Mamburao, Occidental Mindoro
Email: penroccmin@denr.gov.ph



Republic of the Philippines
Department of Environment and Natural Resources
MIMAROPA Region
COMMUNITY ENVIRONMENT AND NATURAL RESOURCES OFFICE

March 31, 2023

MEMORANDUM

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

THRU : The OIC, PENR Officer
Mamburao, Occidental Mindoro

FROM : The CENR Officer

SUBJECT : SUBMISSION OF THE PRELIMINARY ECOTOURISM
IMPACT MONITORING REPORT OF APO REEF
NATURAL PARK

Respectfully forwarded is the Preliminary Ecotourism Impact Monitoring Report of Apo Reef Natural Park. This report contains the initial results of the field surveys that they conducted within March 2023. The final report will be submitted after the peak season of this year

For your information and record.

FOR. ANASTACIO A. SANTOS, MPA

RECORDS	
RECEIVED BY: <i>N</i>	
DATE: <i>3/31</i>	TIME: _____
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TSD	
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DATE: <i>4/3/23</i>	TIME: <i>9:57 am</i>
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CDS	
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DATE: <i>4/4/23</i>	TIME: <i>8:30 AM</i>



Department of Environment and Natural Resources
MIMAROPA Region
APO REEF NATURAL PARK
Protected Area Management Office



March 31, 2023

MEMORANDUM

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

THRU : The OIC, PENR Officer
Mamburao, Occidental Mindoro

The CENR Officer

FROM : The Protected Area Superintendent

SUBJECT : SUBMISSION OF THE PRELIMINARY ECOTOURISM
IMPACT MONITORING REPORT OF APO REEF
NATURAL PARK

Respectfully submitted is the Preliminary Ecotourism Impact Monitoring Report of Apo Reef Natural Park. The report contains the initial results of the Trail Resource Assessment and Monitoring (TRAM) in Apo Island and artificial reef monitoring in *Barkong Lutang*. The field surveys were conducted within the off-peak season of tourism in ARNP. The final report will be submitted after another set of field surveys are conducted after the peak season of this year.

For your information and record.


KRYSTAL DAYNE T. VILLANADA



Ecotourism Impact Monitoring

Preliminary Report

March 2023

I. Introduction

Apo Reef Natural Park (ARNP), a 15-799.23-hectare Marine Protected Area (MPA) in Occidental Mindoro, hosts a diverse range of flora and fauna. In fact, it is identified as one of the 228 Key Biodiversity Areas (KBAs) and 117 Important Bird Areas (IBAs) in the Philippines (Mallari et al., 2001; Ambal et al., 2012). It was also recently given a platinum-level Blue Park Award, the second to receive the international distinction in the Philippines. Its rich biodiversity has drawn tourists to visit ARNP. In turn, revenue from ecotourism has been financing biodiversity protection initiatives, both in ARNP and other national parks, through the Integrated Protected Area Fund (IPAF).

Tourism does not always benefit a Protected Area as it may also drive biodiversity loss (Habibullah et al., 2016). More specifically, it can have direct impacts such as habitat loss, the introduction of non-native species, and increased transmission of diseases (Shannon et al., 2017). Identifying such impacts on a local scale will better inform the management of a Protected Area.

Ecotourism Impact Monitoring is an activity under the Natural Resources Conservation and Development Program of the Department of Environment and Natural Resources (DENR). This activity is being implemented in ARNP this year, covering the off-peak and peak season of tourism in the MPA. Specifically, the objectives of the monitoring activity in ARNP are to a) detect long-standing and recent impacts of ecotourism and b) develop immediate management actions to address them.

II. Methodology

a. Trail Resource Monitoring and Assessment

The DENR - Biodiversity Management Bureau (BMB) Technical Bulletin No.2014-03 or the *Prescribed Tools for Impact Monitoring of Ecotourism* was followed in conducting a Trail Resource Assessment and Monitoring (TRAM) in ARNP. TRAM was conducted from March 14 to 15, 2023 on Apo Island, the only island accessible to tourists in ARNP. Specifically, the field surveys were done at the north and south trails (including two boardwalks), lighthouse, and picnic ground. Signages, facilities, and signs of visitor impact or damage from natural calamities were photographed and recorded. The trail width and soil type at 6 random points were determined.

Two 25 m² permanent monitoring plots were established in Apo Island, ARNP following the criteria set by DENR-BMB (2014). The picnic ground was assigned as the location of the monitoring plots because it is the designated resting station for tourists. The monitoring plots were subdivided into smaller 1 m² plots using a nylon wire to ensure a systematic survey (Figure 1). All flora and fauna within each subplot were counted and identified to the highest taxonomic level possible. The diameter-at-breast height (dbh) of large trees (>5 cm dbh) within the plots and birds seen or heard even from outside the monitoring plots were also noted. The same monitoring plots will be surveyed after the peak of tourist visitation.



Figure 1. One of the two 25 m² monitoring plots divided into 1 m² subplots.

b. Monitoring of Artificial Reef

The artificial reef formed from a sunken ship near *San Antonio* (hereafter referred to as *Barkong Lutang*) was also surveyed. This site was selected among others because it is one of the most visited dive sites in the MPA. Apart from this, other dive sites in the MPA are already included in the fifteen permanent coral reef monitoring stations that are monitored regularly. The benthic invertebrate and reef fish community in this artificial reef was surveyed on March 11, 2023.

Two 20-meter transects were laid on the horizontal surface of the ship, specifically one on each side of the fore- and after-hatch (Figure 2a). Following the photo-quadrat method of van Woesik et al. (2009), an image of the benthos was taken every meter, starting at the 0-m mark of each transect. All images were taken from a fixed distance with the use of a Canon G15 digital camera in a RECSEA underwater housing and mounted on a monopod (Figure 2b). The images were analyzed for benthic cover using Coral Point Count with Excel extensions (CPCe) version 4.1 (Kohler & Gill, 2009). 10 points were randomly placed in each photo and the benthos intercepted by the points were identified. The frequency of each benthic category was averaged across transects to acquire the percentage cover.

To assess reef fish communities, a 20-m transect that ran through the ship deck hatch was surveyed following the method for fish visual census described in English et al. (1997). A 2.5 m corridor was also established on each side of the transect. All fishes observed within the belt transects were identified to species level whenever possible and counted. Field guides including Randall (2005) and Allen et al. (2015) were used in the identification of species. The total lengths (TL) of fishes were also estimated and the biomass for each species was computed using the following formula:

$$W = (aL^b)n$$

where W is body weight (g), L is TL (cm), a and b are species-specific growth constants derived from length-weight relationships, and n is the number of individuals. The a and b parameters of length-weight relationships were based on available publicly available information from FishBase (Froese & Pauly, 2022).

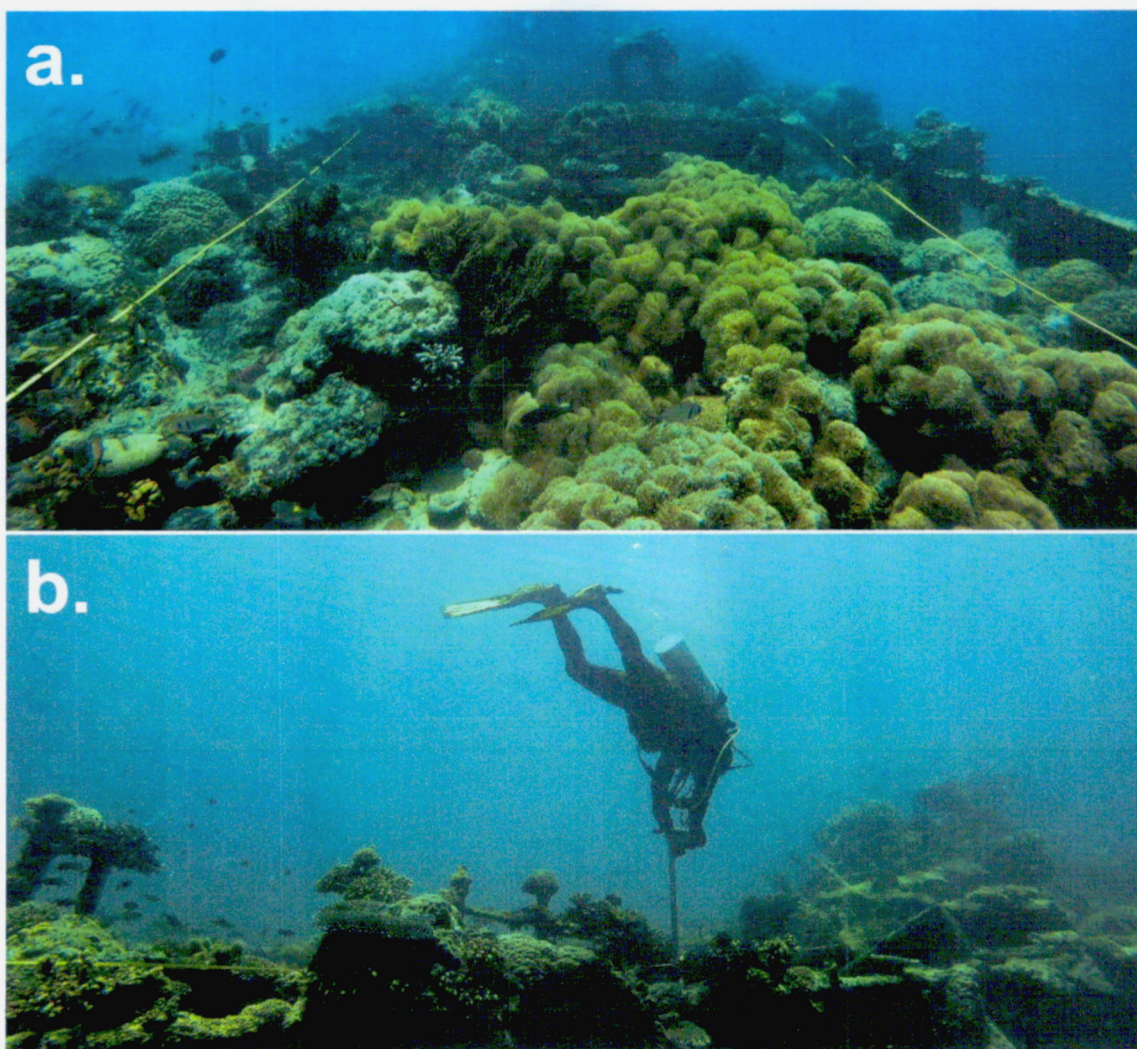


Figure 2. Two 20 m transects laid at the sides of the ship deck hatch (a) and photographed using a digital camera with underwater housing mounted on a monopod (b).

III. Results and Discussion

a. Apo Island

The trail width across the north and south trails ranged from 1-4 meters and the soil type was mostly sandy. 10 signages were photographed, eight of which were located within the Picnic Ground. Most signages were newly constructed and they did not show any signs of damage such as graffiti. Contrastingly, graffiti were found on the lighthouse railings and deck of one of the boardwalks (Figure 3). These are highly likely from tourists. Marine litter were found along the trails however, they were possibly just carried by currents and waves to the island and not directly from tourists.

The two monitoring plots within the Picnic Ground generally had low counts of flora and fauna. Three floral species were recorded including *Talisay* (*Terminalia catappa*) and *Portia Tree* (*Thespesia populnea*) (Figure 4). On the other hand, the majority of the fauna recorded were insects (Class Insecta). Only one of the insect individuals was identified up to species level: the Red Cotton-stainer (*Dysdercus cingulatus*) (Figure 5a). Black-naped Orioles (*Oriolus chinensis*) were heard from the two monitoring plots (n=2). This was the lone non-insect fauna recorded.



Figure 3. Graffiti on the railing of the lighthouse and the seat at the boardwalk deck.



Figure 4. Three plant species recorded within the monitoring plots: unidentified tree (a), Portia Tree (b), and *Talisay* (c).

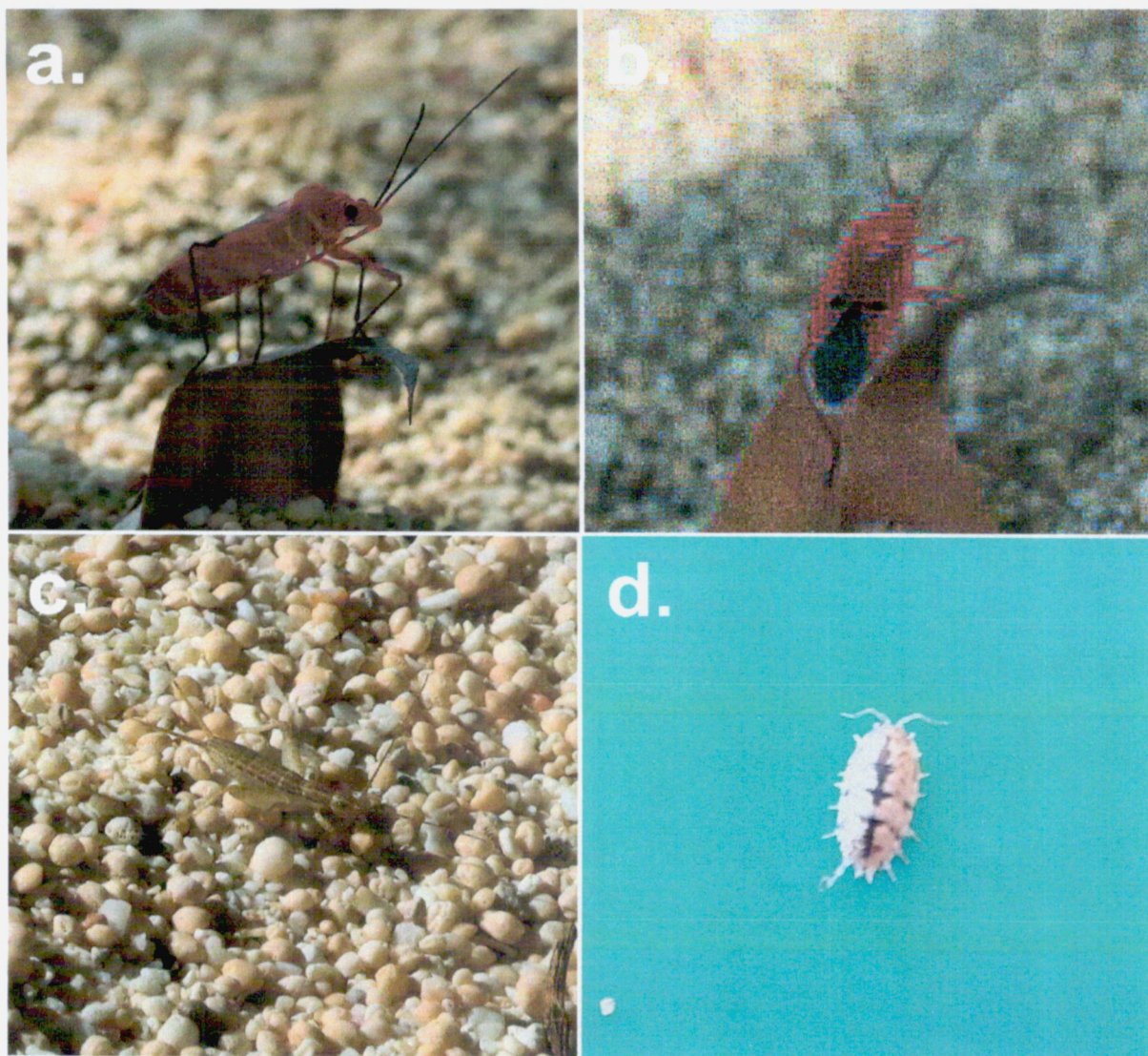


Figure 5. Insects recorded within the monitoring plots: Red Cotton-stainer (a-b), cricket sp. (c), and wood louse sp. (d).

b. Barkong Lutang

The species abundance and richness in the artificial reef was 768 individuals/100 m² and 51 species/100 m², respectively. Apart from the species abundance, the biomass in the area was also high due to the Harlequin Sweetlips (*Plectorhincus chaetodonoides*) and Shoulderbar Soldierfish (*Myripristis kuntze*) (Figure 6). These two species are primarily nocturnal feeders and the wreck provides them a structurally complex shelter during the day.

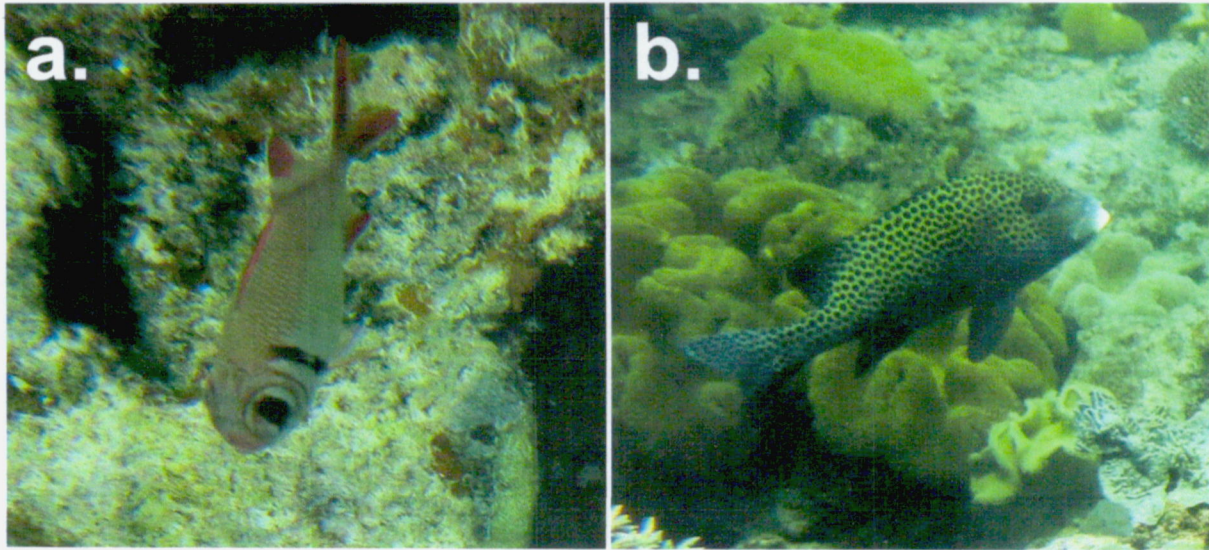


Figure 6. Fish species with the highest biomass: Shoulderbar Soldierfish (*Myripristis kuntze*) and Harlequin Sweetlips (*Plectorhinchus chaetodonoides*)

The overall mean hard coral cover on the horizontal surface of the artificial reef was 24.4% and the dominant hard coral growth form was massive (15.66%). Soft corals were also present in the artificial reef with a 15.43% overall mean cover. No fresh signs of damage on corals (e.g. dislodged, fractured, or overturned colonies) were recorded. However, we documented one portion of the shipwreck which is often touched by tourists (Figure 6). It was observed that the one side of the horizontal bar had fewer coral colonies and other benthic fauna, highly likely because of frequent disturbance from tourists. Although it is unlikely that such little disturbance on an artificial reef affects the coral reef complex at large, tourists touching parts of the reef either artificial or natural should not be tolerated.

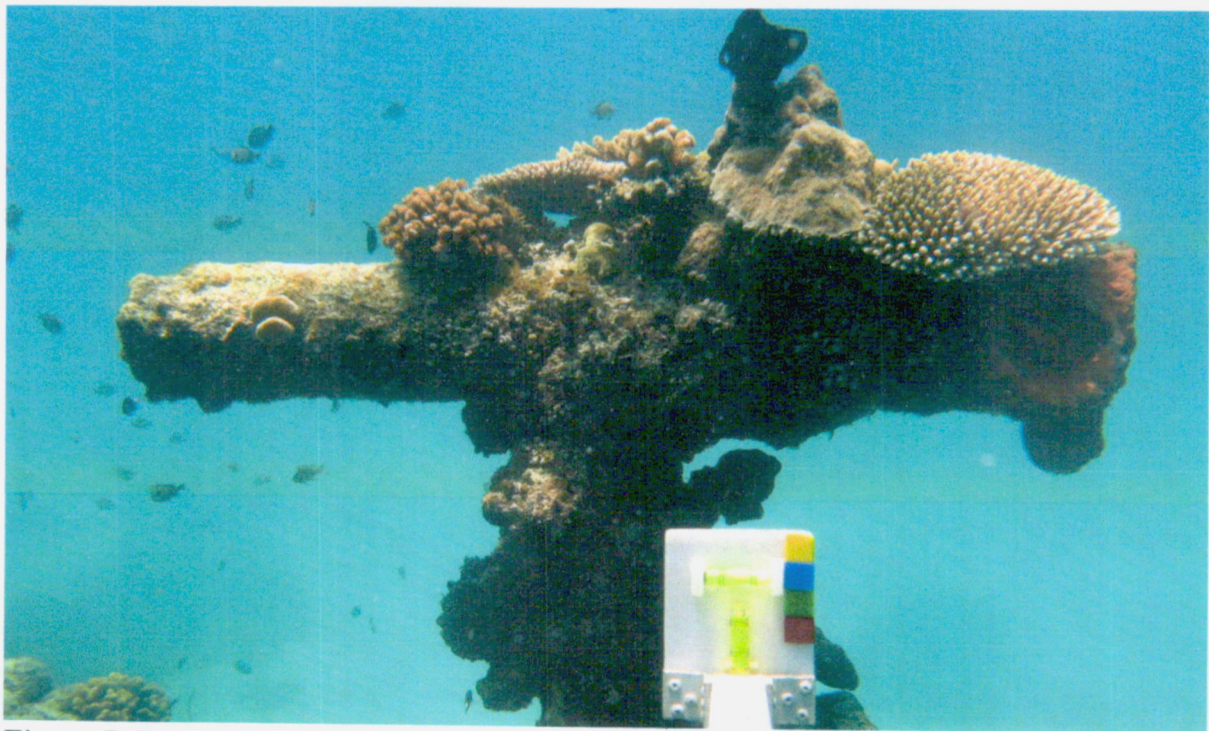


Figure 7. Portion of the shipwreck frequently touched by tourists.

IV. Summary and Recommendations

Apo Island and *Barkong Lutang* were surveyed in March 2023 as part of the assessment of ecotourism visitor impacts in ARNP. This was within the northeast monsoon season which coincides with the off-peak season for tourism in the MPA. Several impacts of ecotourism have already been identified including vandalized structures in Apo Island and disturbance to a small portion of the shipwreck. The Rangers have also been reporting disorientation/misorientation events involving adult sea turtles and sea turtle hatchlings within the Picnic Ground. Immediate management actions should be taken for the identified impacts.

Field surveys using the methods used in this report will be conducted again after the peak season of tourism in ARNP. Data from other monitoring initiatives in ARNP (e.g. waterbird monitoring surveys, coral reef monitoring surveys, nesting beach surveys, and water quality monitoring) will be integrated into the final report to provide a more extensive picture of the impacts of ecotourism in ARNP. Additionally, the behavior of recreational divers within the MPA will also be examined following the methods used by Roche et al. (2016) to quantify the impacts of ecotourism in the reef complex.

Prepared by:


HUGO IGNACIO G. SALVADOR
CMEMP Extension Officer

Reviewed and submitted by:


KRYSTAL DAYNE T. VILLANADA
Protected Area Superintendent

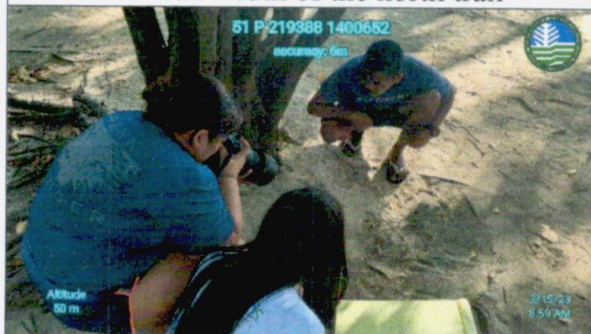
VI. Appendix

Appendix A: Photo-documentation of the TRAM and artificial reef monitoring in ARNP.

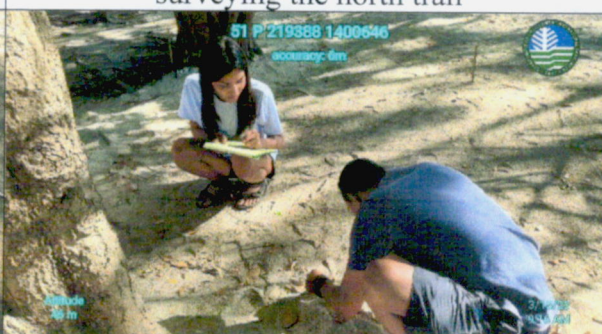


CMEMP Extension Officer Hugo Salvador and Park Ranger Sherwin Benoza measuring the trail width of the north trail

Park Ranger Sherwin Benoza (left) assisting CMEMP Extension Officer Hugo Salvador in surveying the north trail



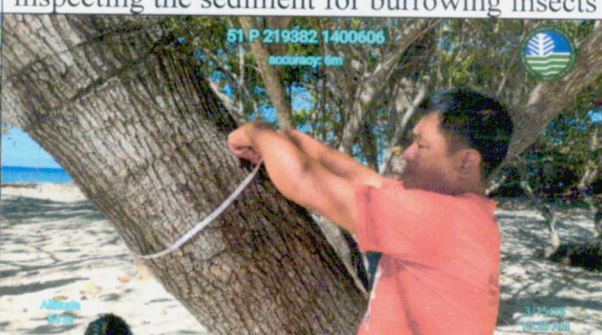
PASu Krystal Villanada (left) taking photos of the Red Cotton-stainer in Plot 1



Park Ranger Ricky Dantayana (right) inspecting the sediment for burrowing insects



ARNP-PAMO and MENRO Personnel demarcating Plot 2



Park Ranger Federico de Jesus measuring the dbh of the *Talisay* in Plot 2



Park Maintenance Foreman Roberto Beringuela taking photographs of the benthos



Boat Captain Mark Dennis Barretto reeling the transect laid on the artificial reef