



Selinog Island Community-based MPA Monitoring Project

(October 2006 - November 2007)

FINAL REPORT

By:

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A. PROJECT BACKGROUND

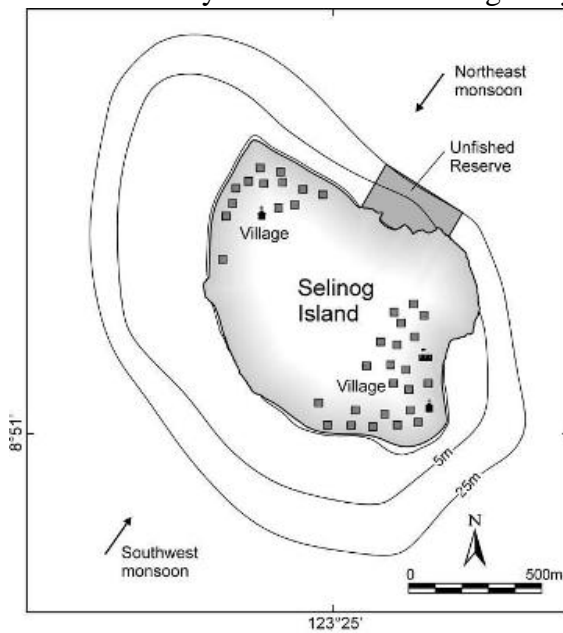
Marine protected areas (MPAs) are currently deemed to be the solution in managing multi-species fishery resources such as in the Philippines. In order for a MPA to be successful, sustainable long-term management has to be done, and this entails a supportive local government, a long-term monitoring program, and a community that is dedicated towards conservation efforts. Oftentimes, it is the lack of skill and equipment, and not the lack of will, that hinders local monitoring efforts.

This pilot project was designed to create and implement a training program for monitoring a community-based MPA in a small island community in the Bohol Sea. This island, which is politically a part of Dapitan, Zamboanga del Norte, is a two-hour boat ride away from one of the oldest, best-known and well-studied MPAs in the Philippines—Apo Island in Dauin, Negros Oriental. It is expected that the training program and materials that are developed for this pilot project, as well as lessons learned in its implementation, will be used in other areas in the country, specifically in the Visayas, which has the highest number of MPAs in the Philippines.

B. SELINOG ISLAND: Community Life, and the MPA

Selinog Island ($8^{\circ} 51' N$, $123^{\circ} 25' E$) (Fig. 1) is a small, flat coralline island with an area of 78 hectares. It is about 22 km north of mainland Dapitan, Zamboanga del Norte. A well-managed, 9-hectare marine reserve was established in 2002 on the north-western side of the island with the help of community organizers from SUAKCREM.

Selinog Island's fringing coral reefs have the typical "ridge and crest" formation. Most of the island's reef is in poor condition (overfished and with a high percentage of dead coral and rubble), but the reef in the sanctuary has been spared because of its protected status. The reef in the sanctuary and the nearby reefs have been regularly monitored by researchers from SUAKCREM since 2002.



Community life in Selinog is typical of most island communities in the country, with fishing and fishing-related enterprises being the main source of livelihood. Other sources of income come from harvesting of copra from coconuts, weaving of sleeping mats, and money that is sent from relatives working in other parts of the Philippines. The island is one *barangay*, the smallest unit of government in the country. It has a total population of about 2,500, majority of which are 18 years old and below. The people of the island live in 4 smaller villages or *sitios* (see Figure 2) connected by a road that goes around the island.



Figure 2. Community spot map of the island.

The head of the community during the project's implementation is Ms. Julieta Cuaresma, who was also instrumental in the establishment of the sanctuary. The local community is keen on protecting their sanctuary, as they have seen the success of nearby Apo Island. Most of the kids here know that the marine reserve was put up so that the fish will have a place to breed and thus provide them with food that they need to survive. The community also has a patrolling system in place for the marine reserve. This system has members of several families conducting a scheduled "night watch" in the sanctuary on a regular basis, ensuring that there will always be a nightly patrol the whole year round.

Selinog Island has the right environment for a well-managed island reserve—a community that is keen on protecting its resources and a supportive local government. The only thing that was lacking was a monitoring system that the community can use to monitor their own marine reserve. And this is where the project came in.

C. TRAININGS

Groundwork for the project started in the October 2006, when the focal persons for the community training were identified. Official communication to the barangay government was also sent out to identify the community members who could take part in the training. Official communication was also sent out to the municipal government unit of Dapitan to invite their fisheries people to take part in the training. Logistic preparations were made with the assistance of contacts in Dapitan and in Selinog.

Selinog Island is located in the open sea and is exposed both the NE and SW monsoons. Because of its exposed location, the water around the island is only calm for several weeks during the interim period between monsoons. The initial training was scheduled for January 2007, on the SW side of the island which would be protected from the prevailing NE monsoon at the period. The follow-up training, which would be done in the sanctuary, was scheduled for May 2007, which would be in the sheltered from the



Figure 3 & 4. Participants during the workshop in the barangay hall; Ms. Nillos-Kleiven giving a lecture on the types of coral reefs.



Figure 5 & 6. Mr. Bebot Dulalas demonstrating how to use the masks and snorkels; Participants practicing the point intercept method during a dry run on the side of the barangay hall.

Follow-up trainings consisted of a half-day refresher lecture on methods which included standardizing of size estimates, a half-day of the actual survey, and then another half-day of guided data analysis.

The method for the training is a mix of short lectures, hands-on approach, facilitated discussions, and guidance during the analysis of data gathered. The survey methods used were simplified versions of the general technical methods. Generally, the participants did not have any problems with the actual survey method, as well as the gathering of data as these were simple and practical. The difficulties were mainly on how to analyze, interpret and present the data. This is why the facilitators always needed to be there, especially after the survey for the analysis of results. With constant practice however, the methods for analysis (see annexed Monitoring Manuals for details) become clear to the participants and lesser assistance is required.

D. ENVIRONMENTAL EDUCATION AND AWARENESS CAMPAIGNS

The environmental education component of the project had several activities that were geared towards increasing the awareness of the community regarding their marine resources. This was achieved through several film showings and informal gatherings for the children of the community. These film showings were scheduled for early evenings, as electricity in the island was



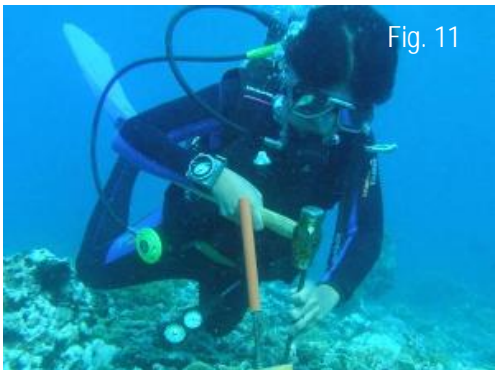
Figure 7. Standing-room-only at the barangay hall during the screening of Selinog's underwater footage.

available only from 6-9 pm, and not daily at that. The film that was shown contained underwater footages not only of the Selinog Island sanctuary but also of other sanctuaries in the Dapitan mainland. The whole of Selinog turned out for the first screening, and they were actually very excited with the film showing, as it was novel thing for them to see what it was like to be underwater. The film showing of the underwater footages, as well as of the film "Finding Nemo" for the kids the following day, was a very effective way to bringing the reef to the consciousness of the community.

Part of the line up of activities for the community education component were lectures given during the children's classes in the island's elementary school. However, because the trainings were scheduled during the summer break or during the weekends, these lectures were not done.

E. RESOURCE MONITORING ACTIVITY AND RESULTS

Two days before the community monitoring activity, permanent transect markers made of PVC pipes and concrete were put down in the areas that will be monitored (Figure 11). These markers would ensure that transects would be laid out on the exact same areas all the time to avoid sources of errors especially on monitoring corals.



Figures 8-13. (Counter clockwise from top right) Diving in the drop-off area of the sanctuary; a resource monitor conducting a fish survey on the shallow area; taking a break in the beach; putting down permanent markers for monitoring in the sanctuary, foliose hard corals inside the Selinog Island MPA; the guardhouse and beach fronting the MPA.

Corals

The first community-led survey on May of 2007 conducted in the sanctuary indicate that the area has 57% live hard coral cover (LHC) compared to 24% on the shallow reefs outside (see Figure 14 A&B) The sanctuary had 13% dead coral cover compared to 31% on the reefs outside. Expectedly, there was a bigger percentage of rock and sand cover outside the sanctuary. Macro algae had less than 10% cover both inside and outside the sanctuary. In all, the results indicate that the sanctuary has a healthy reef. The results for the benthic cover monitoring for May and November of 2007 were

similar, indicating that there were no major catastrophes or any destructive incidents that happened to the reefs in and around the MPA during this time.

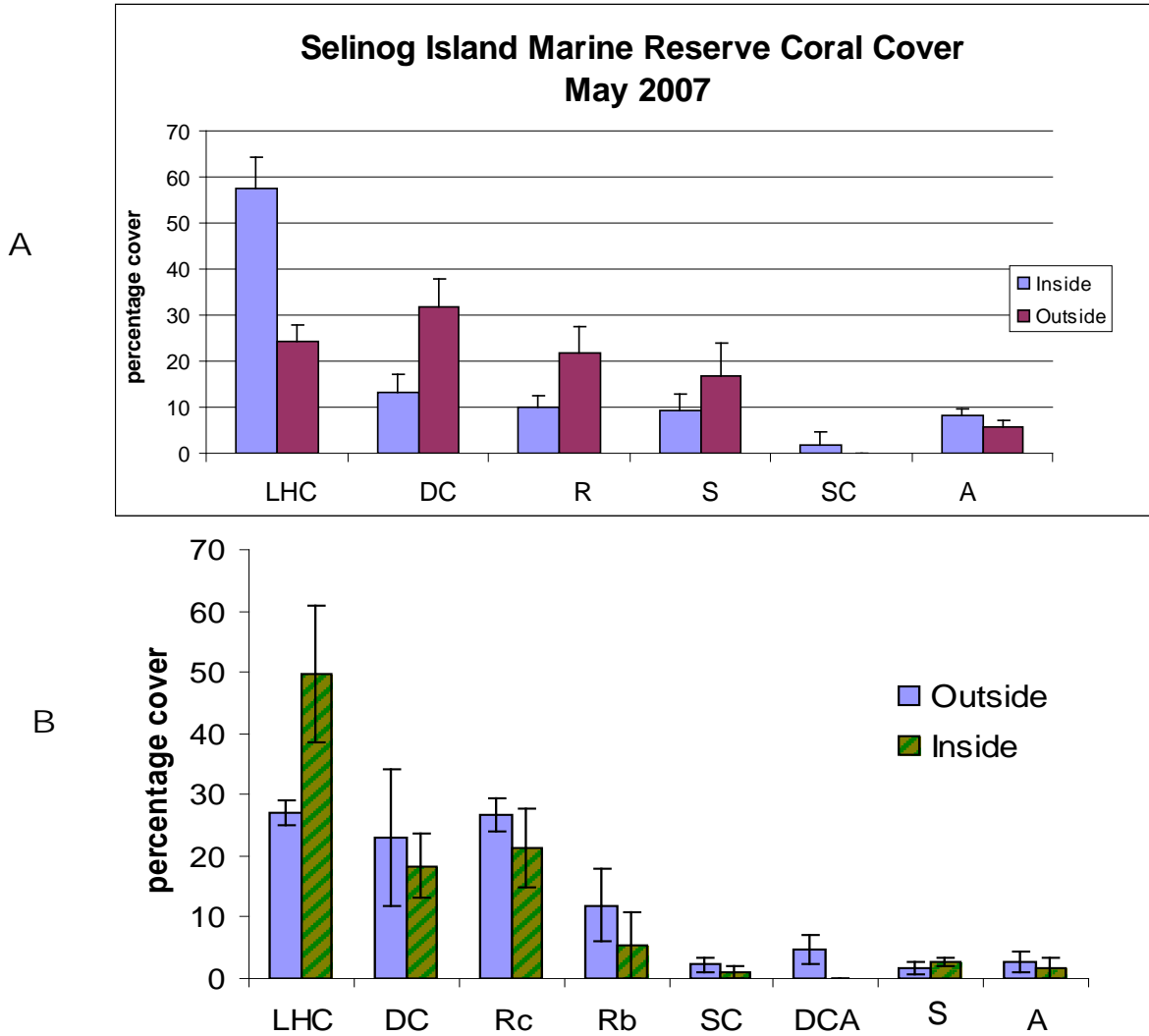


Figure 14. Coral cover inside and outside the Selinog Island Marine Reserve on (A) May 2007 and (B) November 2007. Legend: LHC (live hard coral); DC (dead coral); Rc (rock); Rb (rubble); SC (soft coral); DCA (dead coral with algae); S (sand); and A (algae).

Fish

As the monitoring method employed for this study involves class estimates for lengths and identification on the family level, the data gathered has limitations in terms of knowing the biomass and the species diversity for the area. However, this method is very good for estimating density of target fishes and determining the presence of major fish families, which is sufficient for simple community monitoring needs.

As expected, there are more fish in the sanctuary compared to the nearby fished areas (Figure 15 A & B below). However, these fishes are small (less than 10 cm). The presence of Class 4 fishes (bigger than 30 cm) were noted inside the sanctuary, but in very small numbers, and only during the May monitoring activity. It should be noted however, that the surveys for fish were done in the shallow area (less than 5m), where mostly juveniles are found. The author has conducted several surveys in Selinog, and has constantly noted a big herd of parrotfishes and other commercially important species present in the drop-off and deeper areas of the sanctuary.

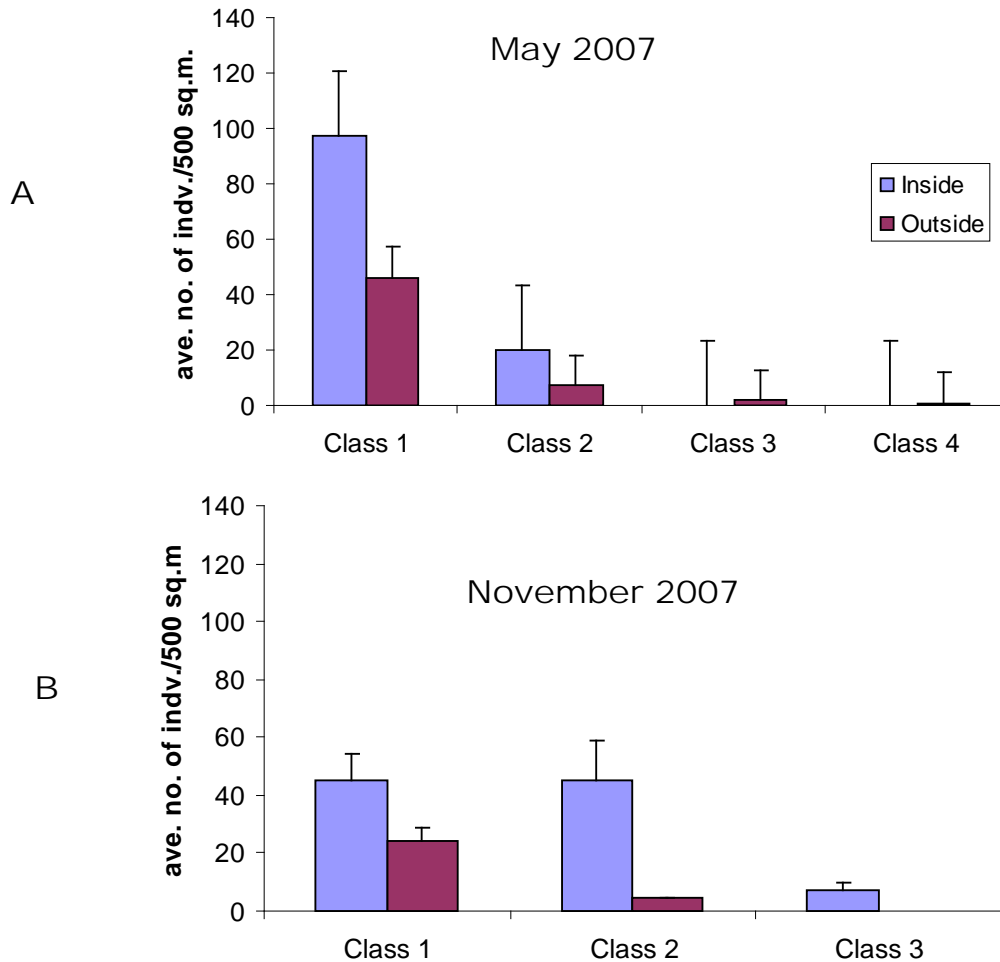


Figure 15. Density of target fish inside and outside the Selinog MPA. Class 1 (less than 10 cm); Class 2 (11-20 cm), Class 3 (21-30cm), Class 4 (bigger than 30 cm).

Follow-up surveys on November 2007 indicate that there was very little change in the coral cover and fish density, indicating that management of the sanctuary is effective in maintaining the status quo. As coral cover takes many years to improve in a well-managed reef, the results for Selinog are quite good. There were also no storms or outbreaks of crown-of-thorn starfish between the surveys—both of which would have caused coral cover to decline sufficiently. However, the results for fish, which indicate that there were fewer bigger fish in the same area outside the sanctuary after 8 months, are indicating an alarming trend which could be the result of increasing fishing pressure

in the reefs surrounding the sanctuary. The good news though is that the fish inside the sanctuary seem to be breeding and growing—as evidenced by the increased number of smaller fish inside the sanctuary—although it remains to be seen if they will “spill-over” to the fished area outside.

These results indicate the importance of constant monitoring as an essential feedback mechanism on the effectivity of managing the MPA. Events such as storms, a coral disease outbreak, and poaching of fish inside the sanctuary can easily be seen in the results, and thus prompt immediate action without the need of asking natural scientists from the nearby island to conduct the survey and interpret the results.

F. Set-backs and Challenges

Although the project implementation was generally smooth, the project team experienced several set-backs, largely due to the weather and the location of the site (remote and exposed to monsoon winds) The initial training was postponed a week later (January 2007) because the conditions for travel to Selinog Island were not favorable, and the safety of everybody has to be considered above everything else. The final trainings that were scheduled for May 2008 also had to be postponed because 4 storms hit the Visayas area one after the other, making travel on the open sea on small boats very unsafe. May of 2007 was a perfect time for training, with calm seas and good weather. The abrupt change of climate the following year had a big impact on our field work and training schedule, and really opened our eyes to the reality of climate change. The stormy summer also brought the NE monsoon winds early, which will make monitoring the sanctuary area very difficult, prompting the locals to advise the team to cancel the last training.

A big challenge that we faced during implementation was also making sure that there was always a pool of trained resource monitors in the island so that monitoring can be sustained. During the course of the training, it was noted that several of the resource monitors that were trained the first time did not attend the proceeding sessions because they were working or studying in the mainland. The resource monitors with consistent attendance were the older ones who already had families and were established fishers. However, the problem with the older monitors was that they were not as trainable as the younger ones, and were not as efficient during the actual surveys as the younger people. These factors (age, tendency to stay in the community, capacity in conducting the survey) should be considered seriously in selecting participants for similar trainings in the future, as they have a bearing in the long-term sustainability of similar projects. Based on the profile of the participants, the best candidates for these trainings are those between 20-30 years old, high school graduates or with a bit of college education, married, and starting a family. More than the expected number of monitors should also be trained. A mixed age-group is also preferable, as this would ensure that there will always be a ready pool of resource monitors for regular monitoring of the reserve.

G. Next Steps and Long-term Plans

The Selinog Island Community-based MPA Monitoring Project was a pilot project that aimed to developing materials and protocols for simple resource monitoring methods that could be used by the community. The materials that were developed for this project are currently being used in other community trainings in mainland Negros and in other areas in the Visayas. The methods that were used in Selinog, as outlined in the manual, were easy enough to be replicated in other areas that have marine reserves.

All in all, the project was successful, as main project goals were attained. The next steps are to scale-up the trainings, involving more communities in the Bohol Sea. Currently, there is a network of marine reserve managers in the area (Hukbo sa mga Tagadumala sa Kadagatan sa Bohol or HUTASAKAB). Although this network is currently non-functional, there are plans of reactivating it. Training for the members of this network would be more cost-effective in the long-term, as skilled monitors as well as equipment can be shared among member communities in the network.

H. Financial Statement

Budget Items	Allotted Expense	Actual Expense
Equipment (underwater camera w/ casing, 12 sets of snorkeling equipment, slates, transect lines)	£ 1,100	£ 1,100
Operations (travel and related expenses)	£ 800	£700
Personnel stipends	£ 800	£800
Trainings, production and reproduction of manuals and education materials	£2,000	£1,950
Total	£ 5,000	£ 4,900

There is a balance of about £150 pounds (roughly P13,950) that was supposed to be used for travel and training expenses for the cancelled May 2008 monitoring activity. This amount will be used for reproduction of training materials for use in other communities in the Visayas.

Project Team Composition

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Renclar Jadloc
Julius Guirjen
Arne Willy Kleiven

Project Team Leader
Field Manual Development
& Translation, Training Facilitator
Training Facilitator
Training Facilitator
Field Assistant

Selinog Island Community Resource Monitoring Team
(List of members who have taken part in all trainings)

1. Frederick Senit - Lead Resource Monitor
2. Carl Jul Alabata
3. Luciano C. Patoy
4. James F. Balucan
5. RJ Laranjo
6. Jubie Balucan
7. Domingo Dulanas
8. Junjun Cañete
9. Raymund Cañete

Acknowledgements

The Team would like to gratefully acknowledge the assistance provided by many people in the successful implementation of this project: Brgy. Captain Julieta Cuaresma of Selinog Island, Loloc Abellon for transport and logistics, Mr. Cyril Patangan and the DA-BFAR Office in Dapitan, the women of Purok Kalachuchi for providing us with food during the activity (Manang Aida, Ate Carmen and the rest), Bantay Dagat of Selinog, Liberty Pascobello-Rhodes of Apo Island and the staff of the dive shop for diving gear, and the all the community members of Selinog Island for the tremendous support. Thank you all!

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Selinog Island Community-based MPA Monitoring Project

GABAY SA KOMUNIDAD PARA SA PAGSUSI SA KAGASANGAN

Gisulat ni:
Portia Joy Nillos-Kleiven

Pagbalhin sa Bisaya: Analie P. Candido



Ngano nga importante ang pag-susi o monitor sa kagasangan?

Ang gasang ug kagasangan nagahatag og kapuy-an ug pagkaon sa mga isda ug uban pa nga mga mananap nga naa sa dagat. Ang kahimsog o ang pisikal nga kondisyon sa kagasangan mao ang kinahanglan sa malungtaron nga panagatan, ug kini mahibaloan pinaagi sa pagmonitor sa mga buhi nga gasang ug sa mga uban pang mananap na makita sa salog sa dagat (*benthic lifeforms*).

Unsaon man nato pagmonitor ang buhi nga gasang?

Adunay daghang pamaagi sa pagsusi sa kabag-on sa buhi nga gasang. Usa niini mao ang *manta tow*. Ang *quadrat method* gikonsiderar nga maayo pud sa pag-survey sa mga *invertebrates*. Pero ang pinakamaayong paagi para sa pang-komunidad nga pagmonitor mao ang *point intercept survey*, ug mao kini ang ato pagatun-an sa pagkakaran.

Unsa man ang Point Intercept Method ug ang katuyuan sa pag-gamit niini para sa pagmonitor sa hibag-on sa mga buhing gasang?

Ang *point intercept* nga pamaagi gigamit para sa pagbana-bana sa kinadul-an nga hidaghanon sa mga buhi ug patay nga organismo ingon man usab ang mga diling buhing butang na makit-an sa kagasangan nga naobserbahan sulod sa usa ka lugar.

Ang pamaagi gamiton sa pinakaduol nga pagbana-bana sa duol nga bahin (*percentage*) sa klase-klaseng buhi nga gahi na gasang (*hard corals*), mga lapa-lapa (*soft corals*), patay na corals, dakal-dakal (*rubble*), lumot ug uban pang *reef substrates* isip mga spongha, mga *invertebrates*, balas, bato ug uban pa. Ang resulta sa survey mohatag sa kahimsog nga pagkabutang sa kagasangan: mas dako ang porsyento sa buhi na gahi na corals, mas maayo ang kahimtang.

Unsa ang mga katuyuan sa paghimo sa pagmonitor sa Live Coral Cover (kadaghanon sa buhi na gasang) and Invertebrates?

Pagkahuman sa ining kalihukan, ang mga nanambong makahimo na sa:

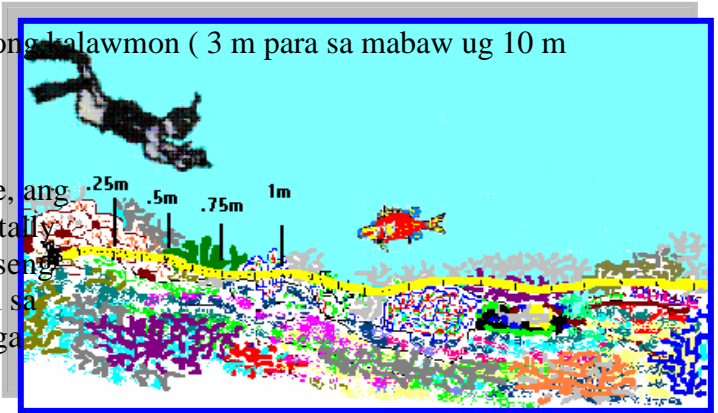
1. Pagkabalo sa mga naglangkob og ang *percent cover* sa mga lain-laing klaseng mananap sa salog sa dagat (*benthic lifeforms*) sulod sa usa ka lugar.
2. Pagbana-bana sa gidaghanon sa ubang organismo nga kauban sulod sa lugar.
3. Pagsusi ug pagsabot (*analysis*) sa mga datos na nakuha.

Kinsa man ang magmonitor?

Mga resource volunteers nga pamilyar sa mga mosunod:

1. Mga konsepto sa pagmonitor sa atong mga gamit-kinaiyahan (natural resources)
2. Pamaagi sa Point intercept transect para sa kagasangan
3. Pag-ila sa mga nagkalain-laing *benthic/coral lifeforms* sa kagasangan ug mga *invertebrates*.

- Ihikot ang transect line sa may parehong kalawmon (3 m para sa mabaw ug 10 m para sa lalom). Isulat ang kalawmon.
- Sugod sa usang tumoy sa transect line, ang manug-susi (observer) mo-ila ug mo-tally ngadto sa data form sa mga klase-klaseng *benthic lifeforms* na makita sa ilalom sa kada 0.25 m interval sulod sa 50 m nga katas-on sa transect line.
- Himuon ino sa uban pang transect stations hangtud sa tanang giplanohan nga stations mahuman.



DATA ANALYSIS

- I-total ang tanang numero sa kada points nga naa ang lifeform category kada transect na naobserbahan dayon i-divide kini sa kintaibuk-ang ihap (100 points dapat sa usa ka transect) para makakuha sa gibana-bana nga porsiyento sa kabag-on sa kagasangan.

Pananglitan: $\frac{25 \text{ ka ihap sa "tunukon" na gasang}}{100 \text{ ka ihap sa kinatibuk-an}} \times 100 = 25\%$

- I-grupo ang lain-lain nga mga transects base sa katuyuan sa pagkuha sa datos.
Pananglitan: Pagdumala: sanktuwaryo o pangisdaanan; Oras sa pagkuha sa data: Bulan, Tuig; Kalawmon: mabaw, lalom.

- I-lista ang mga grupo sa klase-klaseng gasang sa walang bahin sa Summary Form.

- Gikan sa mga data forms kada transect kopyahon ang mga posiyento sa kada klase sa lifeforms ngadto sa Summary Form.

- Sumahon ang tanan ang mga subtotals para sa kada benthic lifeform sa kada transect group (gawas o sulod sa sanktuwaryo).

Benthic Lifeforms	Lalawigan (NTZ)			Total
	1	2	3	
coral branching (CB)	15%	12.5%	35%	62.5
soft coral (SC)	57%	16%	61%	134
white dead coral (DC)				

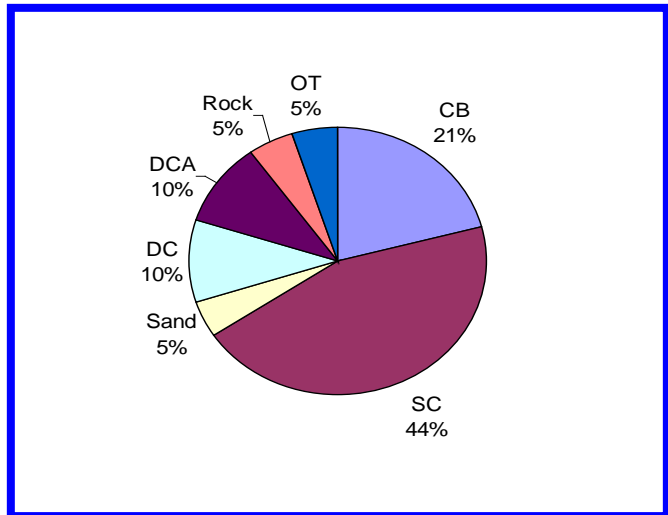
- Parehoon ang tanang sub-total base sa sample size: i-divide ang total nga porsiyento sa number sa transects nga tinud-anay nga giobserbahan. Isulat kini sa column para sa *averages*.

Example:

$$\frac{57\% + 16\% + 61\%}{3 \text{ transects}} = 44.7\%$$

Benthic Lifeforms	Transects (NTZ)			Total	Average
	1	2	3		
coral branching (CB)	15%	12.5%	35%	62.5	20.8%
soft coral (SC)	57%	16%	61%	134	44.7%
white dead coral (DC)					

- Maghimo og pie charts para sa mga average na porsiyento para sa kada grupo (ex. sulod ug gawas sa marine reserve, 3 ka transect kada lugar) ngadto sa Benthos Graphing Form.



Pangutana para sa Evaluation

- Base sa mga data unsa ang porsiyento sa kabag-on sa mga benthic lifeforms? Sa buhi nga mga gasang? Patay nga gasang? Lumot? Mga soliot?
- Unsa ang uban pa nga mga organismo nga naobserbahan sulod sa transect line/area? Unsa ang mga grupo sa mga benthic organisms ang daghan/abunda sulod sa lugar?
- Unsa ang mga kausaban gikan sa una ug katapusang pagmonitor nga gihimo?
- Unsa ang uban pa nga mga factors nga naobserbahan nga makahatag sa kausaban sa kahimtang sa buhi nga kabag-on sa gasang, kana kung duna man?

Location:				Transect No:		Depth:	
Site:			Date:		Remarks:		
Observer:							
Transect 1	20.5	41.5	10.5	31.5	Transect 3	20.5	35.5
	21	42	11	32		21	36
0.5	21.5	42.5	11.5	32.5	0.5	21.5	36.5
1	22	43	12	33	1	22	37
1.5	22.5	43.5	12.5	33.5	1.5	22.5	37.5
2	23	44	13	34	2	23	38
2.5	23.5	44.5	13.5	34.5	2.5	23.5	38.5
3	24	45	14	35	3	24	39
3.5	24.5	45.5	14.5	35.5	3.5	24.5	39.5
4	25	46	15	36	4	25	40
4.5	25.5	46.5	15.5	36.5	4.5	25.5	40.5
5	26	47	16	37	5	26	41
5.5	26.5	47.5	16.5	37.5	5.5	26.5	41.5
6	27	48	17	38	6	27	42
6.5	27.5	48.5	17.5	38.5	6.5	27.5	42.5
7	28	49	18	39	7	28	43
7.5	28.5	49.5	18.5	39.5	7.5	28.5	43.5
8	29	50	19	40	8	29	44
8.5	29.5		19.5	40.5	8.5	29.5	44.5
9	30		20	41	9	30	45
9.5	30.5	Transect 2	20.5	41.5	9.5	30.5	45.5
10	31		21	42	10	31	46
10.5	31.5	0.5	21.5	42.5	10.5	31.5	46.5
11	32	1	22	43	11	32	47
11.5	32.5	1.5	22.5	43.5	11.5	32.5	47.5
12	33	2	23	44	12	33	48
12.5	33.5	2.5	23.5	44.5	12.5	33.5	48.5
13	34	3	24	45	13	34	49
13.5	34.5	3.5	24.5	45.5	13.5	34.5	49.5
14	35	4	25	46	14	35	50
14.5	35.5	4.5	25.5	46.5	14.5	Code:	
15	36	5	26	47	15		
15.5	36.5	5.5	26.5	47.5	15.5		
16	37	6	27	48	16		
16.5	37.5	6.5	27.5	48.5	16.5		
17	38	7	28	49	17		
17.5	38.5	7.5	28.5	49.5	17.5		
18	39	8	29	50	18		
18.5	39.5	8.5	29.5		18.5		
19	40	9	30		19		
19.5	40.5	9.5	30.5		19.5		
20	41	10	31		20		

Selinog Island Community-based MPA Monitoring Project

GABAY SA KOMUNIDAD PARA SA PAGSUSI SA MGA ISDA

Gisulat ni:
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Pagbalhin sa Bisaya: Analie P. Candido



Unsa ang pasgsusi sa isda o fish visual census?

Ang *fish visual census* mao ang pag-ila ug pag-ihap sa mga isdang makita sa usa ka lugar na gitakda sa sulod ug gawas sa sanktuaryo o MPA. Ang kaning kalihukan ginausob sa regular na beses sama sa kaduha sa usa ka tuig. Ang kaning klase sa pag monitor labing importante sa pagdumala sa usa ka sanktuaryo o marine protected area.

Unsang klase na datos ang ginakuha sa fish visual census?

1. Klase-klase sa isda
2. Kadak-on (cm)
3. Kadaghanon sa kada klase sa isda

Ngano man kinahanglan aning datos sa pagdumala sa usa ka sanktuaryo?

Usa sa nga rason kung nganong gitukod ang sanktuaryo o MPA mao ang pagsiguarado nga ang komunidad adunay makuhang isda sa pagkakaran ug sa mga moabot na mga panahon. Ang pinakamaayong pamaagi sa paghibalo kung tinuod ang pag-amping sa usa ka sanktuaryo mao ang pagsusi sa kadak-on, kadaghanon ug ang klase-klaseng isdang makita sa sulod ug gawas sa usa ka sanktuaryo. Kung tinuod ang magdumala ug pag-amping sa atong sanktuaryo, sa kadugayon sa panahon, modaghan ug modako ang mga isda sa sulod sa sanktuaryo kung ikompara sa mga isda sa gawas. Ang usa ka sanktuaryo ngadugay na gitukod pero mubo ang ihap sa isda sa sulod naay mga "pagkawat sa isda" nga nagakahitabo, usa ka indikasyon na dili maayo ang pag-amping. Mao kini ngayong kinahanglan na adunay regular monitoring ang atong sanktuaryo.

Kinsa ang mga puede magsusi ani?

Mga resource volunteer na pamilyar sa mga mosunod:

1. Konsepto sa regular na pag monitor
2. Pamaagi sa pag monitor (fish visual census)
3. Kaila sa mga klase klaseng isda
4. Kahibalo sa pagbanta sa kadak-on sa isda sa mata lamang
5. Kahibalo sa sa pagsusi ug pagsabot (analyze) sa datos na nakuha

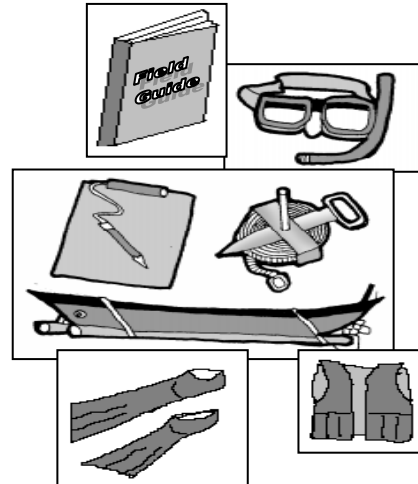
Unsa ang mga tumong sa Fish Visual Census?

Pagkahuman aning kalihukan, ang mga naka-apil dapat:

1. Makaila sa mga klase-klaseng isda sa usa ka lugar
2. Maka banta sa kabug-aton ug kadaghan sa isda.
3. Maka-sabot sa datos na ilang gikuha sa fish visual census.

Unsa ang mga kinahanglan?

- ❖ Fish identification guide
- ❖ antipara, or mask and snorkel
- ❖ 3 ka 50-m line transects
- ❖ Underwater slates na dunay lapis



Optional

- ❖ Baroto
- ❖ Life jacket
- ❖ kampak

Pagpili sa lugar:

1. Pag-ila sa lugar nga himuon nga sampling station (sulod og gawas sa sanktuwaryo) ug ang mga klase sa isda nga i-census. Ang lugar na pili-on puede na pareho sa lugar kung asa pagabuhaton ang pagsusi sa kagasangan.

Pagkuha mga impormasyon

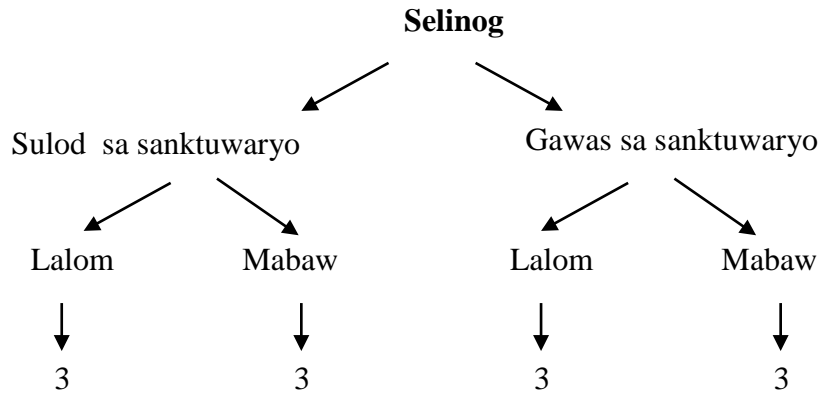
1. Bag-o molangoy, kopyahon ang data form nga naa sa slate board. Para sa katuyuan sa pag-analyze sa mga data, ibalhin kini gikan sa slate board ngadto sa data sheet.

Ang desinyo sa *sampling*

Factors	Levels
Lokasyon	e.g. Selinog sanctuary, gawas sa sanctuary

Kalalumon	Mabaw (3 m) Lalom (10m)
Kadaghanon	Tulo ka tig 50m na transect sa kada kalalumon

Pananglitan:



Ang pagkuha sa datos

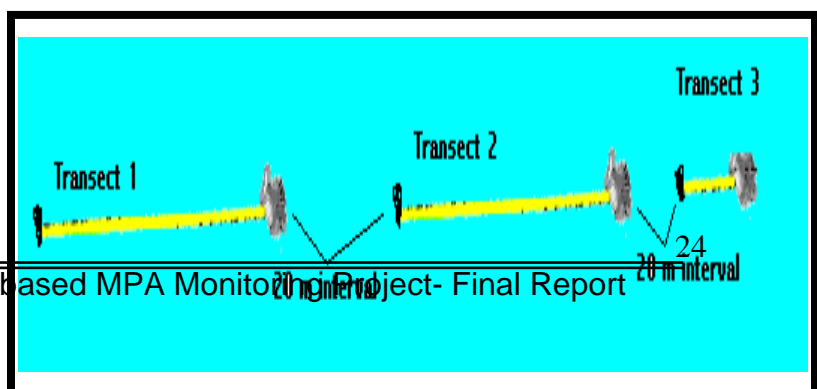
1. Usa molangoy, kopyahon usa ang mga kinahanglang impormasyon sa slateboard.

Ihemplo sa impormasyong kinahanglan sa slateboard

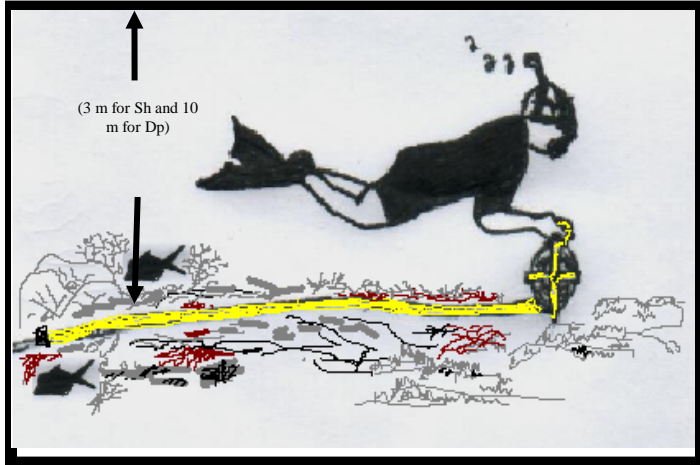
SITE: Babangcao No-Take-Zone						
DATE: September 2004			DEPTH: 10 m			
FISH FAMILY	TRANSECT 1		TRANSECT 2		TRANSECT 3	
	Number	Size (cm)	Number	Size (cm)	Number	Size (cm)
Lapu lapu (Serranidae)	2	15	3	23	2	20
	1	14	1	20	4	15
	2	20	1	18	1	18
Asangluman (Serranidae)						

Data sheet para sa analysis

2. Tulo ka mga transect lines ang himuon sa usa ka lugar (3m sa mabaw ug



6-10 m para sa lalom). Ang mga transect lines dapat mahimutang **nga walay bias** ug dili magsapawanay. Ang kada transect kinahanglan nga dunay distansiya nga dili momenens og 10m.

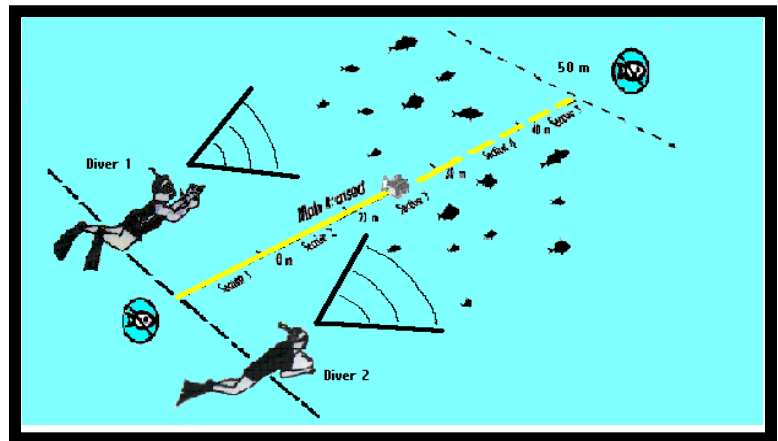


3. Sa pag-abot sa ilalom, ihikot ang usa ka tumoy sa transect line sa usa ka bato or sa usa ka puthaw ug itugway ang transect line sa permanenteng kalawomon (3m para sa mabaw ug 6-10m para sa lalom). Isulat ang gilawomon. Mohulat og 10-15 minutos human nataod ang transect line para ang mga nadisturbong isda mobalik sa naandan nila nga lihok. Kinahanglan nga magmatngon

ang atong lihok para di madisturbo ang mga isda samtang nagcensus.

4. Duha ka tawo ang molangoy subay o sulod sa transect kada kilid. Sugod sa unang tumoy sa transect, kada observer mosnorkel sa inig ka kilid sa transect samtang nag-observa og 5 m sa iyang kilid sa kada transect. Ayaw paghunong samtang ga-census.

5. Ang mga observer molangoy sa transect para morecord sa mga naihap nga isda ug sa hindak-on sa matag isda. Ang paspas nga molangoy nga isda mao ang iphon dayon bag-o ang mga hinay nga isda. Ang kada transect naay kalapdon nga 500m² (50 m x 10 m).



Ang pagbana-bana sa gidak-on sa isda mahimo pinaagi sa pag-grupo:

Class 1	0 - 10 cm
Class 2	0 - 20 cm
Class 3	0 - 30 cm

PAHINUMDUM:

Ang mga bagay sa ilalom sa tubig murag mas daku kaysa sa tinuod nilang kadak-on!



☺ Dapat ang observer ²⁵ adunay pamaagi sa pag-banta sa tinuod na kadak-on sa mga isda gamit ang iyang kamot ug ubang bagay na layo ug lapit sa iyaha.

Ang isda nga dunay hitas-on nga sobra sa 30 cm (usa ka ruler) kinahanglan nga mabana-bana og maayo, kay daku kaayo ang diperensiya sa isda nga 35 cm ang katas-on sa isda na 40 cm ang katas-on.

Ang pagtrabaho ug pagsabot sa data

1. Ilhon ang mga transects base sa mga lugar para sa pagsummarize sa mga data (sulod o gawas sa sanktuwaryo). Ibalhin ang mga data sa matag transect ngadto sa Transect Summary Data Sheet.
2. Ilista ang mga grupo o klase sa isda sa walang bahin sa data summary form.
3. Sumahon ang tanang naihap nga mga klase sa isda sa matag transect.
4. Isulat ang subtotals sa angayng mga kahon ngadto sa kopya sa summary form.
5. Sumahon ang tanang subtotals para sa kada klase/grupo sa matag grupo sa transect.
6. Parehoon ang subtotal kada sample size. I-divide ang total nga naihap sa transects nga giobserbahan.

Panaglitan:
 $12 + 11 + 15 = 12.7$ ka isda / transect (500m²).







3

Transect Summary Data Sheet													
Location: Limbayan				Transect Number: 1				Depth: Shallow (3 m)					
Site: NTZ				Date: 02/12/04				Remarks:					
Observer: Angkop Bandar													
Family	Fish Counts / Class												Total
	1-10 cm			11-20 cm			21-30 cm			>30 cm			
	L	R	ST	L	R	ST	L	R	ST	L	R	ST	
Lapu lapu (Serranidae)	2	0	2										
Asangluman (Lutjanidae)	1	0	1										
Katambak (Lethrinidae)	4	7	11										
Talakitok (Carangidae)	1	4	5										
Timbongan (Mullidae)	3	3	6										
Mol mol (Scaridae)	6	1	7										
Solig (Caesionidae)	23	31	54										
Kumay (Acanthuridae)	7	4	11										
Dangit (Siganidae)	7	3	10										
Marapunti (Haemulidae)	1	0	1										
Others													
Lindigan (Labridae)	11	9	20										
Kamisita (Chaetodontidae)	2	4	6										
Katibok (Pomacentridae)	45	21	66										
Papakul (Balistidae)	2	1	3										

DATA SUMMARY FORM		
Location: Limbayan		
Month & Yr.: February		
Observer: Angkop Bandar		
Family	Subtotal	
	1	2
Lapu lapu (Serranidae)		
Asangluman (Lutjanidae)		
Katambak (Lethrinidae)		
Talakitok (Carangidae)		
Timbongan (Mullidae)		
Mol mol (Scaridae)		
Solig (Caesionidae)		
Kumay (Acanthuridae)		
Dangit (Siganidae)		
Marapunti (Haemulidae)		
Others		
Lindigan (Labridae)		
Kamisita (Chaetodontidae)		
Katibok (Pomacentridae)		
Papakul (Balistidae)		

































26

- Pilion ang pila ka mga klase sa isda nga importante ug ilista sa walang bahin sa Fish Graphing Form.
- Ilista ang lugar, dapit, bulan, ug tuig sa giandam nga space nga naa sa form.
- Gamiton ang mosunod nga guide para morepresenta sa average number sa mga isda nga naobserbahan sa kada lugar/dapit ug bulan/tuig.

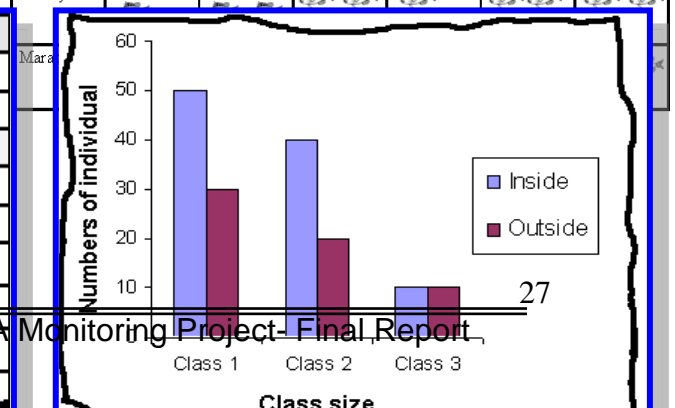
Number of fishes	Pictograph
1	
2 - 5	
>5 - 25	
>25 - 125	
>125 - 625	
>625	

Ang Pagsummarize sa Class Size Data

- I-add ang subtotals sa kada size class pahigda sa kada transect line (basehan ang Transect Summary Data Sheet).
- Ibalhin ang total sa kada size class ngadto sa Size Class Data Summary Form.
- I-plot ang data pinaagi sa pag-graph para makit-an kung unsa nga class size ang pinkadaghan sulog ug gawas sa sanktuwaryo.

FISH GRAPHING FORM (filled-out-example)						
Site Name: <i>Limbayan Fish Sanctuary</i>				Municipality & Province: <i>Parang Maguindanao</i>		
Family (Local Name)	No-Take Zone			Take Zone		
	Oct. 2003	Oct. 2004	Oct. 2005	Oct. 2003	Oct. 2004	Oct. 2005
Lapu-lapu						
Timbongan						
Molmol						
Solig						
Dangit						
Kumay						

Size Class Data Summary Form										
Location:		Municipality & Province:								
Observer:			Date:							
Class Size	Fish Counts									
	Inside (NTZ)					Outside (TZ)				
	1	2	3	Total	Ave.	1	2	3	Total	Ave.
1-10 cm	45	52	53	150	50	24	36	30	90	30
11 - 20 cm	38	56	26	120	40	15	22	25	60	20
21 - 30 cm	7	12	11	30	10	12	14	4	30	10
>than 30 cm										



Pangutana ug Evaluation:







1. Unsa ang mga klase sa isda nga naa sulod sa lugar?
2. Unsa ang igong kadaghanon og kakadak-on sa mga isda sa kagasangan kada 500m² nga makit-an niining lugara?
3. Pila ka klase sa mga target nga isda sa kagasangan (makaon nga isda) nga makita aning lugara?
4. Aduna bay kausaban sa hidak-on sa mga isda sulod sa tulo ka tuig?
5. Unsa nga zone nga dunay nakit-an nga dagkong mga isda?

Location:		Transect Number: 1	Transect side: L or R	
Site: NTZ		Date: 02/12/04	Remarks:	
Observer: Left Right				
Family	Fish Counts / Class			
	1-10 cm	11-20 cm	21-30 cm	>than 30 cm

(Lethrinidae)										
Talakitok (Carangidae)										
Timbongan (Mullidae)										
Mol mol (Scaridae)										
Solig (Caesionidae)										
Kumay (Acanthuridae)										
Dangit (Siganidae)										
Marapunti (Haemulidae)										
Others										
Lindigan (Labridae)										
Kamisita (Chaetodontidae)										
Katibok (Pomacentridae)										
Papakul (Balistidae)										

FISH GRAPHING FORM						
Site Name: Selinog Island Fish Sanctuary				Municipality & Province: Dapitan. Zamboanga del Norte		
Family (Local Name)	No-Take Zone			Take Zone		
	Mar. 2004	Oct. 2004	Mar. 2005	Mar. 2004	Oct. 2004	Mar. 2005
Lapu-lapu						
Timbongan						
Molmol						

Solig						
Dangit						
Kumay						
Marapunti						

Number of fishes	Pictograph
1	
2 - 5	
>5 - 25	
>25 - 125	
>125 - 625	
>625	

FISH GRAPHING FORM (filled-out-example)						
Site Name: <i>Limbayan Fish Sanctuary</i>				Municipality & Province: <i>Parang Maguindanao</i>		
Family (Local Name)	No-Take Zone			Take Zone		
	Oct. 2003	Oct. 2004	Oct. 2005	Oct. 2003	Oct. 2004	Oct. 2005
Lapu-lapu						
Timbongan						
Molmol						
Solig						
Dangit						
Kumay						
Marapunti						

Size Class Data Summary Form										
Location:					Municipality & Province:					
Observer:						Date:				
Class Size	Fish Counts									
	Inside (NTZ)					Outside (TZ)				
	1	2	3	Total	Ave.	1	2	3	Total	Ave.
1-10 cm	45	52	53	150	50	24	36	30	90	30
11 – 20 cm	38	56	26	120	40	15	22	23	60	20
21 – 30 cm	7	12	11	30	10	12	14	4	30	10
>than 30 cm										

