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Investigation of the community structure of seagrasses in the coastal areas of Iligan City, Mindanao, Philippines

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Abstract. Investigation of the seagrass community structure was done in twelve coastal Barangays of Iligan City, Lanao del Norte namely: Barangay Buru-un, Maria Cristina, Tominobo, Tambacan, Saray, Canaway, Santiago, Hinaplanon, Sta. Filomena, Acmac, Kiwalan and Dalipuga. The seagrass community structure was assessed using the transect-quadrat method and several parameters were determined namely: species composition, number of species, abundance, occurrence and dominance of species. The distribution pattern of seagrasses in each sampling areas were also determined. Some environmental parameters were obtained such as water temperature, salinity, pH, Total Suspended Solids (TSS) and type of substratum. Among the twelve coastal barangays studied, eight were found to have seagrasses and three were devoid of seagrass growth. Barangay Dalipuga had the highest abundance of seagrasses followed by Samburon with fair seagrass habitat condition. There were five species of seagrass identified namely: *Thalassia hemprichii, Halodule uninervis, Syringodium isoetifolium, Cymodocea serrulata* and *Halophila ovalis*. *T. hemprichii* had the highest percent cover hence, the most abundant and dominant species followed by *S. isoetifolium.* Majority of the seagrass species showed an aggregated or clumped type of distribution. *C. serrulata* showed a close association with Total Suspended Solids (TSS) while *T. hemprichii* and *H. uninervis* showed a close association with temperature, salinity and pH. Moreover, *H. ovalis* and *S. isoetifolium* shows no association to any of the environmental parameters indicating that these species could tolerate to any changes in the environmental parameters measured.
Key Words: Seagrass, community structure, Iligan City, Philippines.

Introduction. Seagrasses are marine angiosperms completely adapted to life in shallow coastal environment (den Hartog 1970) on typically unconsolidated substrates (Phillips 1980). They are grouped within the monocotyledonous plants, the largest subdivision of angiosperms that also include freshwater aquatic plants and most terrestrial grasses (den Hartog 1970; McRoy & Helfferich 1977; Kuo & den Hartog 2001). Globally, about 58 seagrass species belonging to two orders (Hydrocharitales and Najadales), four families (Hydrocharitaceae, Posidoniaceae, Cymodoceaceae and Zosteraceae), and twelve genera are recognized (Kou & McComb 1989). Seven of these genera (*Thalassia*, *Enhalus*, *Syringodium*, *Halodule*, *Halophila*, *Cymodocea* and *Thalassodendron*) are characteristics of tropical seas while the remaining five (*Posidonia*, *Amphibiolis*, *Zostera*, *Heterozostera* and *Phyllospadix*) are exclusive to the temperate regions (den Hartog 1970; Zieman 1975). In the Philippines, a total of 13 species namely; *Halodule uninervis*, *Halodule pinifolia, Thalassodendron ciliatum, Cymodocea rotundata, Cymodocea serrulata, Syringodium iseotifolium, Halophila ovalis, Halophila spinulosa, Halophila decipiens, Halophila minor/ovata, Halophila beccarii*, *Thalassia hemprichii* and *Enhalus acoroides* constitute the country's seagrass flora (Fortes 1989 & 1995).

Studies conducted in Iligan Bay revealed eight species of seagrasses namely: *E. acoroides, T. hemprichii, C. rotundata, C. serrulata, H. uninervis, H. pinifolia, S. isoetifolium* and *H. ovalis* (Jumawan 1997; Rocillo 2002; Milo 2003; Chan 2003; Malugao 2009). Likewise, similar seagrass species were found in Panguil Bay (Uy et al 2006).

Seagrasses are important, but their role has often been overlooked due largely to their submerged state. Thayer et al (1975) gave an overall summary of the importance of seagrasses: seagrass has a high growth rate, producing an average of about 300-600 g dry weight/m^2/year, not including root production, the leaves support a large number of epiphytic organisms, with a total biomass perhaps approaching that of the seagrass itself. Although a few organisms may feed directly on the seagrass and several may graze on the epiphytes, the major food chains are based on seagrass detritus and its resident microbes. The organic matter in the detritus and in decaying roots initiates sulfate reduction and maintains an active sulfur cycle. Seagrass roots bind the sediment together and, with the protection afforded by the leaves, surface erosion is reduced, thereby preserving the microbial flora of the sediment and the sediment-water interface. Seagrass leaves retard the currents and increase sedimentation of organic and inorganic materials around the plants. Seagrass absorbs phosphorus through the roots and the leaves.

In the last 50 years, about 30-40% of seagrass areas in the Philippines have been lost. The decline in coastal water quality, degradation of environment and resources, and human-induced disturbances pose as threats to seagrass communities. In particular, seagrass communities have been destroyed due to siltation or sedimentation, pollution, eutrophication nutrient loading, dredging and unsustainable fishing practices. Other site-based threats are oil pollution, tourism development and boat scour (Fortes 2008).

Iligan City is found in the Northeastern part of Mindanao, Philippines. It is known as the industrialized city of the south, with 12 heavy industries majority of which are found along the coastal areas. Iligan City, being known as the industrialized city of the south, may have brought greater impact on its marine habitat (e.g. seagrass bed). This study investigated quantitatively and qualitatively the community structure of seagrasses in the coastal areas of Iligan City.

The aims of the present study were to: (1) describe the community structure of seagrasses in each coastal barangays in terms of species composition number of species, abundance, occurrence, dominance and distribution of species, (2) to compare the community structure of seagrasses in the different coastal barangays and (3) to determine how some physical factors affect the community structure of seagrasses in the whole coastal areas of Iligan City. The result of this study could serve as a tool in the coastal resource management program in Iligan City.

Material and Method. Iligan City is located in the northeastern part of Mindanao (3° 29' N 124° 39'E) and faces Iligan Bay. It is highly urbanized city north of the Province of Lanao del Norte. It has twelve industrial companies which make it the Industrialized City of the South. The city is comprised of forty four barangays; twelve coastal and thirty-two hinterland barangays. The study was conducted in twelve coastal barangays of Iligan City, Lanao del Norte (Figure 1) namely: Barangay Buru-un (N 08° 11' 31.4'' E 124° 10' 37.4''), Maria Cristina (N 08° 11' 54.0'' E 124° 11' 05.9''), Tominobo (N 08° 12' 38.1'' E 124° 12' 06.5''), Tambacan (N 08° 12' 47.5'' E 124° 13' 24.8''), Saray (N 08° 14' 08.2'' E 124° 14' 08.6''), Canaway (N 08° 14' 22.8'' E 124° 14' 20.4''), Santiago (N 08° 14' 36.5'' E 124° 14' 25.9''), Hinaplanon (N 08° 15' 15.2'' E 124° 14' 35.0''), Sta. Filomena (N 08° 16' 00.7'' E 124° 15' 10.7''), Acmac (N 08° 16' 26.9'' E 124° 15' 41.9''), Kiwalan (N 08° 16' 45.9'' E 124° 15' 49.5'') and Dalipuga (N 08° 17' 23.0'' E 124° 15' 25.7''), respectively.

During the preliminary survey, visual observation was conducted in order to have a general view of the marine vegetation. The seagrass community structure was determined using the transect-quadrat method (English et al 1997). A 100 meter transect line was pegged perpendicular to the shore with a 100 meter interval between transects. A 50 cm x 50 cm quadrat divided into 25 equal squares was laid down at the right side of the transect line. Without moving the quadrat, the percent (%) cover of seagrass was estimated using the method of Short et al (2006).

The condition of the seagrass beds was determined using the criteria set by Fortes (1989) as stated in Table 1.

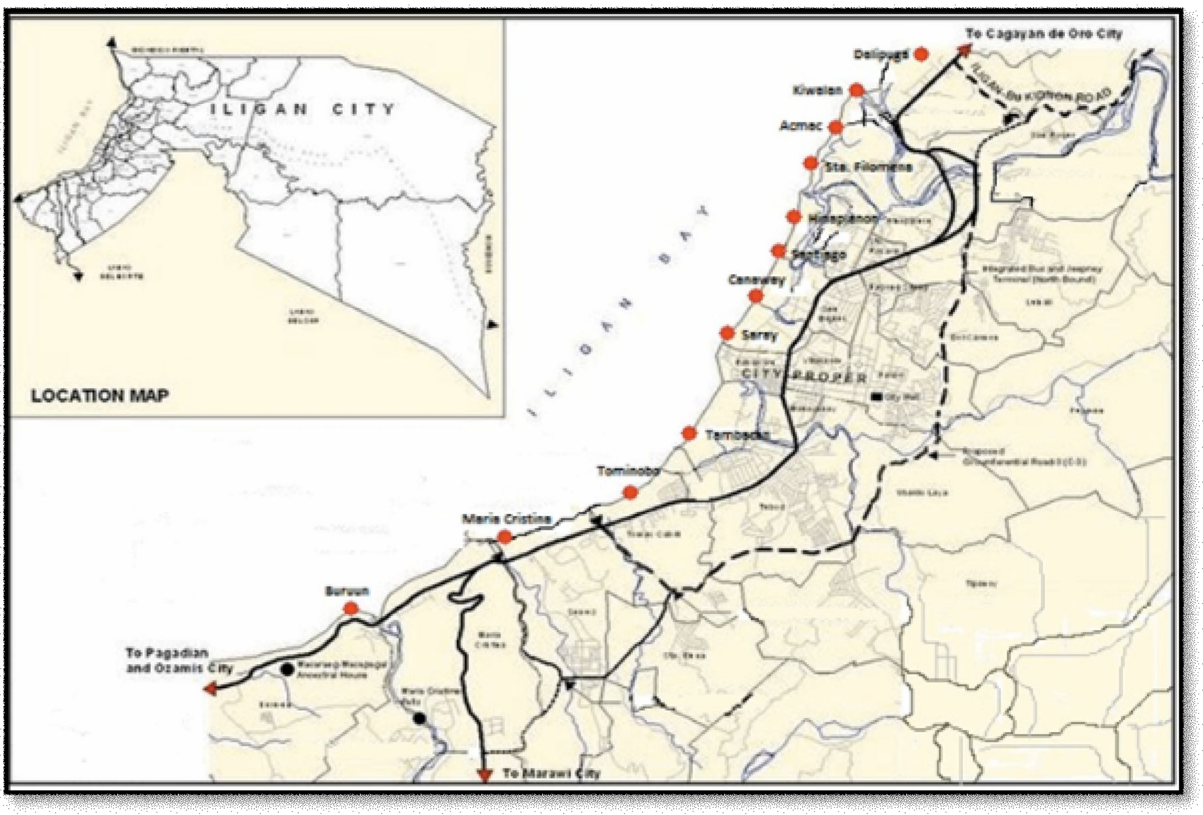

Figure 1. Geographical map of Iligan City showing the twelve coastal barangays.

Table 1

Condition of the seagrass criteria by Fortes (1989)

Condition	*Criteria*
Excellent	76 – 100%
Good	51-75%
Fair	26 – 50%
Poor	0 – 15%

Seagrass samples were collected and brought to the laboratory for identification. All seagrass samples were identified using the taxonomic keys of Calumpong & Meňez (1997) and Phillips & Meñez (1988). The following environmental parameters were determined: (1) water temperature, salinity, pH, total suspended solids (TSS) and substratum type. A non-parametric Kruskal-Wallis Test was used in determining the detailed difference in the species composition and abundance of seagrass in each of the sampling sites (level of significance, P of 0.05). The occurrence, dominance and distribution pattern of seagrass species was analyzed using the Paleontological Statistics software (PAST version 2.16). Canonical correspondence analysis (CCA) was used in determining the association of seagrass abundance and the environmental parameters.

Results and Discussion. Transect lines were established every 100 m interval for the entire coastline of Iligan City. Variability in coastline length of barangays resulted to variability in number of transects established per barangay. A total of 128 transects were laid for the whole coastline of Iligan City: ten were deployed in Barangay Buru-un, nineteen in Maria Cristina, fourteen in Tominobo, nine in Hinaplanon, six in Sta. Filomena, three in Acmac, six in Kiwalan and twenty nine in Dalipuga. Among the twelve coastal barangays, only eight barangays were found to have seagrasses and these were Barangay Buru-un, Maria Cristina, Tominobo, Hinaplanon, Sta. Filomena, Acmac, Kiwalan and Dalipuga. No seagrasses were found in Barangay Tambacan, Saray, Canaway and Santiago, respectively (Table 2).

Table 2

Occurrence of seagrasses in each coastal barangays of Iligan City, Mindanao

				Coastal barangays							
Bu	Mc	To	Tm	Sr	Cn	Sn	Hi	Stf	Ac	Kw	Dl
+	+	+	-	-	-	-	+	+	+	+	+

Bu - Buru-un, Mc - Ma. Cristina, To - Tominobo, Tm - Tambacan, Sr - Saray, Cn - Canaway, Sn - Santiago, Hi - Hinaplanon, Stf - Sta. Filomena, A - Acmac, K - Kiwalan, Dl – Dalipuga.

As observed, the coastal barangays which were devoid of seagrasses are known to be highly populated areas. Overpopulation does not just affect the standard of living, but also the environment. People, especially those living in the coast, excrete wastes and pollution that flow into the marine water systems, polluting water and destroying marine habitats (e.g. seagrass habitat). According to reports, human pollution has contributed most to seagrass declines around the world (McKenzie & Yoshida 2009) and this could be the possible reason for the absence of seagrasses in Barangay Tambacan, Saray, Canaway and Santiago. Barangay Dalipuga had the highest seagrass abundance based on its percent cover (42.6%) followed by Buru-un (33.55%, Figure 2).

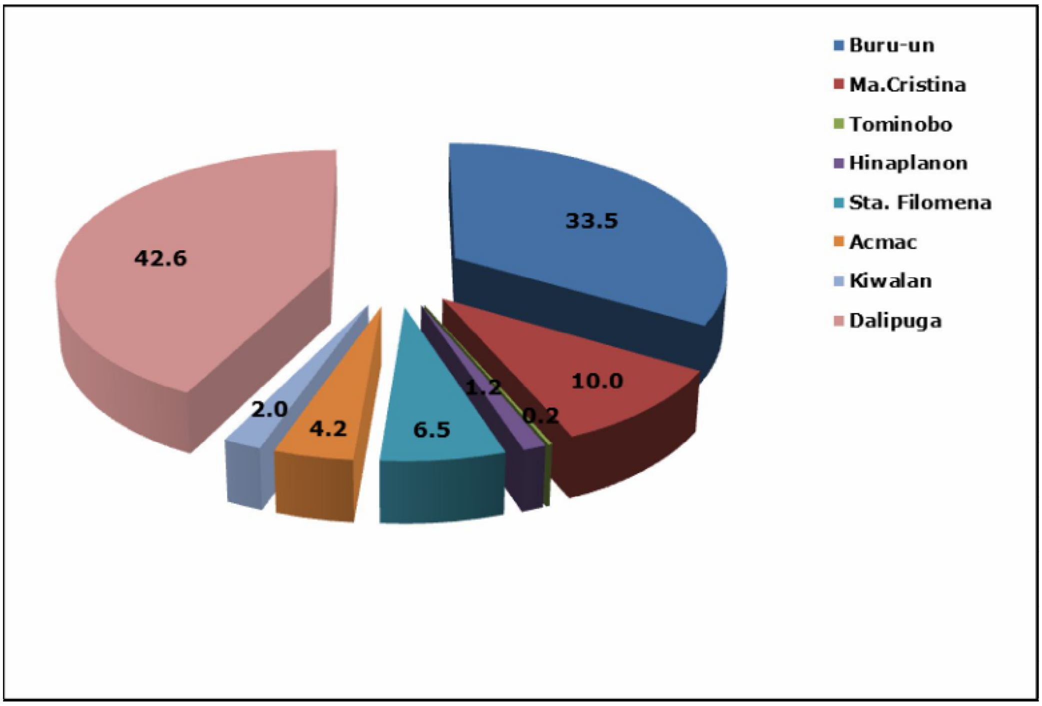

Figure 2. The percent cover of seagrasses from each coastal barangays of Iligan City.

The seagrass coverage for Barangay Dalipuga and Samburon was considered fair based on the criteria set for habitat assessment by Fortes (1989). The seagrass abundance on these areas may be attributed to the establishments of marine sanctuaries in both areas. Being a protected area, destruction of marine organisms and the whole ecosystem is highly prohibited hence, seagrass growth was preserved. In contrast, the seagrass coverage for the rest of the coastal barangays was considered poor. Majority of those areas with poor seagrass cover are near the industries.

There were five species of seagrasses that were identified from the eight coastal barangays of Iligan City (Barangay Buru-un, Maria Cristina, Tominobo, Hinaplanon, Sta. Filomena, Acmac, Kiwalan and Dalipuga) and these were *T. hemprichii, H. uninervis*, *S.*

isoetifolium, *C. serrulata* and *H. ovalis*. Barangay Buru-un had five species, Maria Cristina also five, Tominobo two, Hinaplanon three, Sta. Filomena four, Acmac two, Kiwalan four and Dalipuga five species (Table 3).

Table 3

Species composition and occurrence of seagrass found in Barangay Buru-un, Maria Cristina, Tominobo, Hinaplanon, Sta. Filomena, Acmac, Kiwalan and Dalipuga

Site	*Species*				
	Thalassia hemprichii	*Halodule uninervis*	*Syringodium isoetifolium*	*Cymodocea serrulata*	*Halophila ovalis*
Buru-un	+	+	+	+	+
Maria Cristina	+	+	+	+	+
Tominobo	+	-	+	-	-
Tambacan	-	-	-	-	-
Saray	-	-	-	-	-
Canaway	-	-	-	-	-
Santiago	-	-	-	-	-
Hinaplanon	+	+	-	+	-
Sta. Filomena	+	+	+	+	-
Acmac	+	-	+	-	-
Kiwalan	+	+	+	+	-
Dalipuga	+	+	+	+	+

(+) present, (-) absent.

The seagrass composition was comparable to those in Linamon, Lanao del Norte with five species of seagrass (Malugao 2009). In Kauswagan and Bacolod, Lanao del Norte seven species of seagrass were found (Antonio 2000) while in Panguil Bay there were eight species of seagrass (Uy et al 2006) which was much higher compared to Iligan City.

The seagrass abundance among species varied significantly in three sampling sites such as Barangay Buru-un, Sta. Filomena and Dalipuga (Kruskal-Wallis test, $P<0.05$, Table 4).

Table 4

Comparison in the seagrass abundance among species per sampling site

Site	*Species*	*Abundance (% cover)*	*Rank*	*P value*	*Analysis*
Buru-un	*S. isoetifolium*	48.0	1	<0.05	Sig.
	H. uninervis	22.9	2		
	T. hemprichii	20.4	3		
	C. serrulata	6.0	4		
	H. ovalis	2.7	5		
Maria Cristina	*S. isoetifolium*	47.8	1	>0.05	N.S.
	T. hemprichii	24.6	2		
	C. serrulata	11.9	3.5		
	H. ovalis	11.3	3.5		
	H. uninervis	4.4	5		
Tominobo	*S. isoetifolium*	60.0	1	>0.05	N.S.
	T. hemprichii	40.0	2		
Hinaplanon	*H. uninervis*	58.6	1	>0.05	N.S.
	T. hemprichii	34.3	2		
	C. serrulata	7.1	3		
Sta. Filomena	*T. hemprichii*	75.6	1	<0.05	Sig.
	H. uninervis	13.4	2		
	C. serrulata	6.1	3		
	S. isoetifolium	4.9	4		

Site	*Species*	*Abundance (% cover)*	*Rank*	*P value*	*Analysis*
Acmac	*S. isoetifolium*	92.2	1	>0.05	N.S.
	T. hemprichii	7.8	2		
Kiwalan	*S. isoetifolium*	50.0	1	>0.05	N.S.
	T. hemprichii	41.9	2		
	C. serrulata	4.5	3.5		
	H. uninervis	3.6	3.5		
Dalipuga	*T. hemprichii*	49.2	1	<0.05	Sig.
	H. uninervis	27.6	2		
	C. serrulata	18.1	3		
	H. ovalis	3.9	4		
	S. isoetifolium	1.2	5		

Sig. – Significant, N.S. – Not Significant

S. isoetifolium had the highest percent cover in Barangay Buru-un (48.0%), Maria Cristina (47.8%), Tominobo (60.0%), Acmac (92.2%) and Kiwalan (50.0%), hence rank as first. On the other hand, *T. hemprichii* had the highest percent cover in Barangay Sta. Filomena (75.6%) and Dalipuga (49.2%). Moreover, *H. uninervis* had the highest percent cover in Barangay Hinaplanon (58.6%).

T. hemprichii had the highest percent cover (36.8%) hence the most abundant (Kruskal-Wallis test, $P<0.05$, Table 5) followed by *S. isoetifolium* (26.5%) and *H. uninervis* (21.5%).

Table 5

The percent cover of seagrass species for the entire coastal barangays of Iligan City

Species	*Abundance (% cover)*	*Rank*	*P value*	*Analysis*
T. hemprichii	36.8	1	<0.05	Significant
S. isoetifolium	26.5	2		
H. uninervis	21.5	3		
C. serrulata	11.5	4		
H. ovalis	3.7	5		

This result is comparable with the result of Malugao (2009), Milo (2003), Rocillo (2002) and Uy et al (2006) where *T. hemprichii* was the most abundant, most dominant, most productive and seasonally regular of all species surveyed in Linamon, Bacolod, Lanao del Norte and Panguil Bay, respectively.

T. hemprichii does not act as a pioneer species but as a constant species which can stand considerable stress and disturbance, thus behaving as a competitor-stress tolerant (Nienhuis et al 1989).

Majority of the seagrass species found in the coastal barangays of Iligan City exhibited an aggregated or clumped type of distribution (Table 6, Figure 3). According to Odum (1971), clumping is the most common pattern of distribution. This type of distribution is a response to local habitat differences or a response to daily and seasonal weather changes or as a result of social attraction to other organism. Aggregation may increase competition between individuals for nutrients and space but this often more than counterbalanced by increased survival of the group.

Table 6

Spatial pattern analyses of the distribution of seagrass species in the coastal barangays of Iligan City

Site	*Species*	*Ir value*	*Distribution Pattern*
Buru-un	*S. isoetifolium*	434	aggregated/clumped
	H. uninervis	98	aggregated/clumped
	T. hemprichii	78	aggregated/clumped
	C. serrulata	6.8	aggregated/clumped
	H. ovalis	1.3	aggregated/clumped
Maria Cristina	*S. isoetifolium*	129	aggregated/clumped
	T. hemprichii	18	aggregated/clumped
	C. serrulata	4.3	aggregated/clumped
	H. ovalis	3.8	aggregated/clumped
	H. uninervis	0.56	random
Tominobo	*S. isoetifolium*	2.3	aggregated/clumped
	T. hemprichii	1.3	aggregated/clumped
Hinaplanon	*H. uninervis*	23	aggregated/clumped
	T. hemprichii	8	aggregated/clumped
	C. serrulata	0.28	random
Sta. Filomena	*T. hemprichii*	207	aggregated/clumped
	H. uninervis	6.4	aggregated/clumped
	C. serrulata	1.3	aggregated/clumped
	S. isoetifolium	0.83	random
Acmac	*S. isoetifolium*	195.34	aggregated/clumped
	T. hemprichii	1.34	aggregated/clumped
Kiwalan	*S. isoetifolium*	27.25	aggregated/clumped
	T. hemprichii	18.99	aggregated/clumped
	C. serrulata	0.18	random
	H. uninervis	0.11	random
Dalipuga	*T. hemprichii*	580.9	aggregated/clumped
	H. uninervis	182.4	aggregated/clumped
	C. serrulata	78.7	aggregated/clumped
	H. ovalis	3.6	aggregated/clumped
	S. isoetifolium	0.32	random

Interpretation of results:

Ir < 1, random distribution

Ir > 1, aggregated or clumped distribution

Ir = 1, uniform distribution

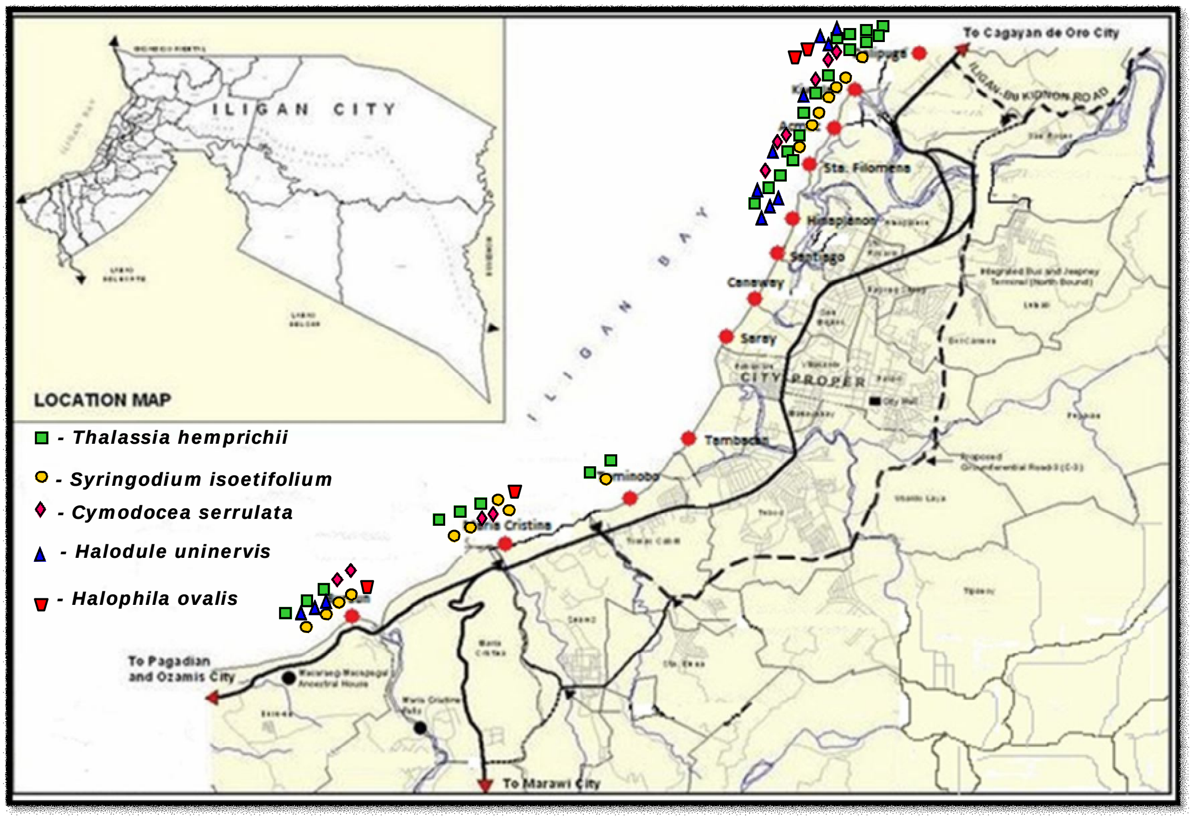

Figure 3. Horizontal distribution of seagrasses in the eight coastal barangays of Iligan City.

On the other hand, mixed vegetation of *S. isoetifolium, T. hemprichii, H. uninervis, C. serrulata* and *H. ovalis* were found in the sandy middle intertidal flat of Barangay Buru-un (<1m). In Barangay Maria Cristina, mixed vegetation of *T. hemprichii*, *C. serrulata* and *H. ovalis* was found and they were followed by monospecific stands of *S. isoetifolium* and *H. uninervis*. These monospecific stands of seagrasses grew on sandy-rubble mid-intertidal flat (<1m). Mixed vegetation of *S. isoetifolium* and *T. hemprichii* was found in the sandy-rubble middle intertidal flat (<1m) of Barangay Tominobo. In Barangay Hinaplanon, clumps of either monospecific bed of *H. uninervis, T. hemprichii* and *C. serrulata* were found in the sandy-muddy middle intertidal flat (<1m). Mixed vegetation of *T. hemprichii, H. uninervis, S. isoetifolium and C. serrulata* were found in the sandy middle intertidal flat (<1m) of Sta. Filomena. On the other hand, monospecific bed of *S. isoetifolium* and mixed vegetation of *T. hemprichii* was found in the sandy mid-intertidal flat (<1m) of Barangay Acmac. In Barangay Kiwalan, monospecific bed of *S. isoetifolium* and *C. serrulata* was found in sandy upper intertidal flat (<1m) while mixed vegetation of *T. hemprichii* and *H. uninervis* was found in sandy-rubble middle intertidal flat (<1 m). Lastly, mixed vegetation of *T. hemprichii*, *S. isoetifolium*, *H. uninervis*, *C. serrulata* and *H. ovalis* were found in the sandy-rocky middle and lower intertidal flat (<1m) of Barangay Dalipuga.

The mean values of the environmental parameters measured from the coastal barangays of Iligan City are shown in Table 7. Water temperature influences the rate of growth and the health of seagrass in the marine environment (McKenzie & Yoshida 2009). The mean water temperature measured from each sampling site was within the limit for seagrass growth. Seawater temperatures above 40^{0}C will stress seagrass and death occurs at temperatures above 43^{0}C (McKenzie & Yoshida 2009). The mean water salinity was considerably low in the following coastal barangays: Barangay Buru-un, Maria Cristina, Tominobo and Santiago. The low salinity measured from these areas was due to the great influx of freshwater coming from the adjacent streams and rivers. However, the mean salinity values obtained from those coastal barangays is tolerable to seagrass growth because this group of marine angiosperms can tolerate a wide range of salinity, from full-strength seawater to either brackish or hypersaline waters (Hemminga & Duarte 2000). The water pH was quite high in all of the sampling sites indicating that the water was highly basic. The high value of pH could be due to high inputs of nutrients that have alkaline properties such as organic phosphates, nitrates and nitrites from domestic waste. As observed, most of the coastal barangays in Iligan City has river tributaries which contributed to the input of nutrients in the coastal areas thus increases it pH. The total suspended solids (TSS) were highest in Barangay Santiago (0.09 g/L) and exceeded the normal value set by the DENR (DAO 34 1990) for coastal waters (< 0.06 g/L). This result was considerable since the area is polluted as it has been used as dumping site for garbage coming from the entire city. In fact, no seagrass was found inhabiting this area. The type of substrate varies from one sampling site to another. Barangay Buru-un had sandy type of substrate, Ma. Cristina and Tominobo had sandy-rubble substrate, Tambacan, Saray and Canaway had sandy substratum, Santiago and Hinaplanon had sandy-muddy type, Sta. Filomena and Acmac had sandy type, Kiwalan had sandy-rubble and Dalipuga had sandy-rocky type of substrate.

Table 7

Measured values of some environmental parameters and type of substratum

Site	*Temperature (^0C)*	*Salinity (‰)*	*pH*	*TSS (g/L)*	*Substrate*
Buru-un	27.8	24.0	9.2	0.004	Sandy
Ma. Cristina	28.0	15.0	9.3	0.007	Sandy-rubble
Tominobo	28.7	29.0	9.2	0.005	Sandy-rubble
Tambacan	28.7	30.3	9.2	0.036	Sandy
Saray	29.4	31.0	9.1	0.010	Sandy
Canaway	29.0	30.0	9.1	0.008	Sandy
Santiago	27.9	23.3	9.2	0.090	Sandy-muddy
Hinaplanon	30.3	30.3	9.3	0.008	Sandy-muddy
Sta. Filomena	30.0	34.1	9.4	0.004	Sandy
Acmac	28.0	34.0	9.3	0.005	Sandy
Kiwalan	28.3	31.9	9.3	0.005	Sandy-rubble
Dalipuga	26.5	31.8	9.2	0.010	Sandy-rocky

The Canonical Correspondence Analysis (CCA) was used to determine the association of abiotic factors (temperature, salinity, pH and TSS) and seagrass abundance represented by percent cover for the entire coastal barangays. The diagram is composed of four quadrants – Q_1, Q_2, Q_3 and Q_4 (Figure 4). Each quadrant has a different weight in terms of significance of the results. The order of the significance is from most to least – $Q_1>Q_2>Q_3>Q_4$. In the first quadrant (Q_1), *H. ovalis* shows no association to any of the environmental parameters indicating that this species is tolerant to any changes in the environmental parameters. It has been reported that this species has great tolerance in varying degrees of temperature and salinity (McMillan 1984; den Hartog 1970; Hillman et al 1995). Quadrant 2 enclosed *C. serrulata* which was closely associated with Total Suspended Solids (TSS) suggesting that this parameter would limit the abundance of this species. *T. hemprichii* and *H. uninervis* which is in quadrant 3 shows close association with temperature, salinity and pH. These seagrass species are closely associated with each other, that is, they have the same environmental characteristics. The result is similar with the study of Lin & Shao (1998) in which *T. hemprichii* which was found in the seagrass bed of southern Taiwan showed a close association with temperature and salinity. Also, *H. uninervis* which was found in the coastal lagoon of Mauritius showed a close association with temperature (Daby 2003). Moreover, *S. isoetifolium* shows no association to any of the environmental parameters suggesting that this species could stand whatever changes in the environmental parameters. According to Green & Short (2003), this species can survive in a moderate level of disturbance.

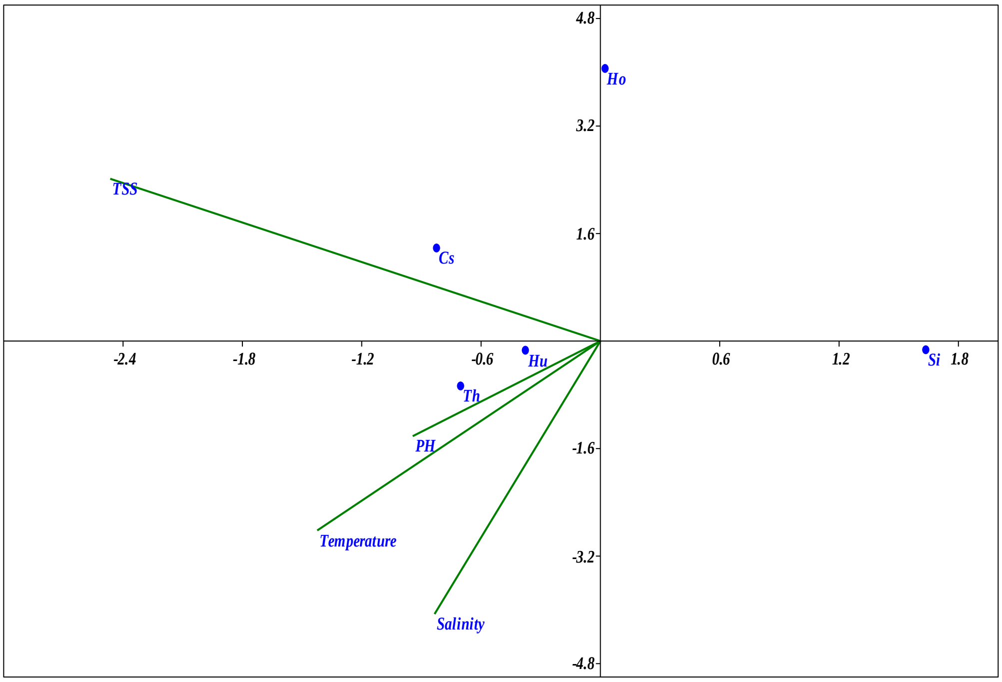

Figure 4. Ordination diagram showing the relationship between seagrass abundance per species (Ho – *Halophila ovalis*, Cs – *Cymodocea serrulata*, Hu – *Halodule uninervis*, Th – *Thalassia hemprichii* and Si – *Syringodium isoetifolium*) and the different environmental parameters.

Conclusions. Majority of the coastal barangays in Iligan City have poor community structure of seagrasses. This could be due to the increasing pressures brought about by the anthropogenic activities of the community impacting the surrounding waters of the area. It is suggested that proper monitoring of seagrasses should be done especially in Barangay Dalipuga and Samburon in which seagrass coverage was fair. The water quality should be improved for those areas which do not have seagrasses as to allow growth and colonization of the plant. Moreover, the local government units of Iligan City should conduct an intensified education campaign along with the establishment of sanctuaries and protected areas in other coastal barangays to help ease pressures on this important marine habitat.

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