No	Location	Type	Range N.M.	Position	Remarks
T 37	TACLOBAN SOUTH No.5	B	5	11° 06′ 10″ 125° 07′ 44″	
T 38	TACLOBAN SOUTH No.3	B	5	11° 05′ 05″ 125° 10′ 35″	
T 39	TACLOBAN SOUTH No.2	B	5	11° 04′ 34″ 125° 13′ 25″	
T 40	TACLOBAN SOUTH No.1	B		11° 04′ 02″ 125° 13′ 15″	
I 1	TOMONTON Pt.	LBL	15	10° 53′ 45″ 122° 57′ 15″	
I 2	SOJOTON Pt.	LBL	15	9° 58′ 30″ 122° 27′ 00″	
I 3	GUIMARAS I.WEST	LBM	10	10° 35′ 00″ 122° 30′ 45″	
I 4	MALINGIN I. EAST SOUTH END	LBM	10	10° 19′ 48″ 122° 35′ 48″	
I 5	BONDULAN Pt.	LBS	5	10° 40′ 00″ 122° 33′ 40″	
I 6	PULUPANDAN JETTY	LBS	5	10° 31′ 10″ 122° 47′ 27″	
I 7	NAOULAO I.	LBS	5	10° 30′ 18″ 122° 44′ 30″	
I 8	INAMPULUGAN I. EAST END	LBS	5	10° 27′ 18″ 122° 43′ 30″	
I 9	ILOILO NORTH WEST No.1	RLB	5	11° 17′ 30″ 123° 20′ 00″	
I 10	ILOILO NORTH WEST No.2	RLB	5	11° 02′ 45″ 123° 06′ 15″	
I 11	ILOILO EAST No.2	RLB	5	10° 50′ 12″ 122° 49′ 05″	
I 12	PONTEVEDRA SHOAL SOUTH END	RLB	5	10° 21′ 42″ 122° 43′ 16″	
I 13	ILOILO EAST No.4	B	5	10° 46′ 39″ 122° 46′ 17″	
I 14	ILOILO EAST No.8	B	5	10° 46′ 30″ 122° 46′ 22″	
I 15	IOLILO EAST No.6	B	5	10° 46′ 08″ 122° 43′ 20″	
I 16	ILOILO EAST No.10	B	5	10° 46′ 06″ 122° 38′ 33″	
I 17	ILOILO EAST No.7	B	5	10° 45′ 38″ 122° 42′ 12″	
I 18	ILOILO EAST No.5	B	5	10° 45′ 24″ 122° 45′ 09″	
I 19	ILOILO EAST II No.1	B	5	10° 43′ 58″ 122° 43′ 09″	
I 20	ILOILO EAST No.11	B	5	10° 43′ 26″ 122° 36′ 08″	
I 21	ILOILO EAST No.12	B	5	10° 43′ 01″ 122° 36′ 42″	
I 22	ILOILO WEST No.9	B	5	10° 40′ 54″ 122° 34′ 18″	
I 23	ILOILO WEST No.7	B	5	10° 40′ 18″ 122° 32′ 50″	

No	Location	Type	Range N.M.	Position	Remarks
I 24	ILOILO WEST No.5	B	5	10° 39′ 30″ 122° 31′ 36″	
I 25	ILOILO WEST No.3	B	5	10° 37′ 45″ 122° 31′ 42″	
I 26	ILOILO WEST No.1	B	5	10° 35′ 24″ 122° 28′ 35″	
I 27	PULUPANDAN No.1	B	5	10° 31′ 30″ 122° 47′ 10″	
I 28	PULUPANDAN No.2	B	5	10° 28′ 06″ 122° 46′ 00″	
I 29	PULUPANDAN No.3	B	5	10° 23′ 48″ 122° 44′ 38″	
CS 1	DESOLATION Pt.	LBL	15	10° 28′ 05″ 125° 38′ 35″	
CS 2	LIMASAWA I. SOUTH END	LBL	15	9° 53′ 45″ 125° 04′ 30″	
CS 3	BILAA Pt.	LBL	15	9° 49′ 23″ 125° 27′ 25″	
CS 4	KANHANDON Pt.	LBM	10	10° 27′ 40″ 125° 27′ 45″	
CS 5	BUGHO Pt.	LBM	10	10° 18′ 00″ 125° 16′ 00″	
CS 6	KAMIHAAN I.	LBM	10	10° 10′ 20″ 125° 27′ 30″	
CS 7	TANCAAN Pt.	LBM	10	10° 00′ 20″ 125° 01′ 35″	
CS 8	PANAON I. SOUTH END	LBM	10	9° 54′ 45″ 125° 15′ 45″	
CS 9	HIBUSON I. SOUTH END	LBS	5	10° 25′ 32″ 125° 29′ 45″	
CS 10	CALIGANGAN Pt.	LBS	5	10° 07′ 35″ 125° 12′ 50″	
CS 11	PANAON I. SOUTH EAST END	LBS	5	9° 55′ 47″ 125° 17′ 45″	
CS 12	SUMILON I.	LBS	5	9° 54′ 50″ 125° 26′ 28″	
CS 13	BASOL I.	LBS	5	9° 50′ 18″ 125° 28′ 40″	
CS 14	BEELZEBUB REEF	RLB	5	9° 52′ 06″ 125° 30′ 00″	
CS 15	MAASIN No.1	B	5	10° 07′ 48″ 124° 50′ 24″	
CS 16	MAASIN No.2	B	5	10° 07′ 47″ 124° 50′ 43″	
CS 17	BILAA SHOAL	B	5	9° 52′ 00″ 125° 26′ 10″	
CS 18	SULIGAO No.1	B	5	9° 47′ 12″ 125° 31′ 06″	
CS 19	SULIGAO No.3	B	5	9° 46′ 51″ 125° 30′ 03″	
0 1	YOG Pt.	LBL	15	14° 06′ 00″ 124° 12′ 20″	
0 2	DALAYNAY Pt.	LBL	15	13° 47′ 15″ 124° 25′ 00″	

No	Location	Type	Range N.M.	Position	Remarks
0 3	TUBABAO I. EAST END	LBL	15	12° 06′ 07″ 125° 03′ 55″	
0 4	PENISULA Pt.	LBL	15	10° 09′ 50″ 125° 40′ 20″	
0 5	LENUNGAN I. NORTH EAST END	LBL	15	9° 05′ 25″ 126° 11′ 48″	
0 6	SANCO Pt.	LBL	15	8° 14′ 37″ 126° 29′ 18″	
0 7	BANGAI Pt.	LBL	15	7° 43′ 51″ 126° 33′ 28″	
0 8	PUSAN Pt.	LBL	15	7° 17′ 42″ 126° 36′ 06″	
0 9	LAMIGAN Pt.	LBL	15	6° 48′ 15″ 126° 20′ 53″	
0 10	GUTAUANAN I. NORTH WEST END	LBM	10	14° 07′ 35″ 123° 17′ 40″	
0 11	BINGAY Pt.	LBM	10	13° 04′ 00″ 124° 11′ 22″	
0 12	SEMIRARA I. NORTH END	LBM	10	12° 07′ 08″ 121° 21′ 15″	
0 13	SIBOLON I.	LBM	10	12° 06′ 15″ 121° 34′ 45″	
0 14	CARABAO I. NORTH END	LBM	10	12° 05′ 45″ 121° 56′ 40″	
0 15	BOROCAY I. NORTH END	LBM	10	12° 00′ 00″ 121° 55′ 20″	
0 16	SEMIRARA I. SOUTH END	LBM	10	11° 59′ 15″ 121° 23′ 16″	
0 17	SUNGI Pt.	LBM	10	10° 54′ 50″ 125° 50′ 15″	
0 18	HARIAN Pt.	LBM	10	9° 55′ 30″ 125° 48′ 45″	
0 19	HINATUAN I. EAST END	LBM	10	9° 47′ 00″ 125° 44′ 10″	
0 20	LIANGA PIER	LBM	10	8° 38′ 17″ 126° 05′ 47″	
0 21	PUJADA I. EAST SOUTH END	LBM	10	6° 46′ 59″ 126° 16′ 45″	
0 22	EAST Pt.	LBS	5	13° 15′ 35″ 124° 05′ 45″	
0 23	HINATUAN I. NORTH END	LBS	5	9° 48′ 45″ 125° 42′ 50″	
0 24	BITOGAN Pt.	LBS	5	9° 47′ 53″ 125° 38′ 10″	
0 25	WHALE Rk.	LBS	5	9° 29′ 10″ 126° 03′ 50″	
0 26	BICOL Rk.	B or LBS	5	14° 01′ 55″ 123° 11′ 00″	
0 27	BABAYON Pt.	B or LBS	5	13° 12′ 35″ 124° 03′ 40″	
0 28	CAUIT Pt.	B or LBS	5	13° 08′ 35″ 123° 52′ 50″	
0 29	BISLIG BAY No.1	B	5	8° 15′ 35″ 126° 25′ 50″	
0 30	BISLIG BAY No.3	B	5	8° 12′ 40″ 126° 22′ 45″	

4. MARITIME SEARCH AND RESCUE

4.1 Present Situation

4.1.1. The National SAR Organization

The PCG has the primary responsibility for search and rescue services upon the Philippine high seas and waters. However, the response to distress is not the sole responsibility of one agency but rather the cooperative involvement of several government agencies, non-government organizations and individuals as well. This is stressed in the International Convention on Maritime Search and Rescue of 1979 (IMOSAR). Hence, the following organizations have been identified with maritime search and rescue:

Government Agencies

a) Department of National Defense (DND)- provides available facilities, personnel and assets of the Armed Forces of the Philippines to meet civil needs on the basis of non-interference with combat missions. The Philippine Coast Guard having statutory responsibility for maritime search and rescue (MSAR) is the lead agency for MSAR.

b) Department of Interior and Local Government (DILG)- provides available personnel and assets of the local government (usually nearest the scene-of-mishap) to MSAR operations in the disaster area and disposition of survivors and casualties.

c) Department of Health (DOH) -provides available facilities and personnel to the municipal, city and provincial health services to attend to survivors and casualties.

d) Department of Justice (DOJ) - makes available NBI facilities, personnel and assets for the identification of recovered casualties.

e) Department of Social Welfare and Development (DSWD) - provides immediate assistance to survivors and the families of casualties and follow-up support after the survivors and recovered casualties have been transferred to the next of kin or recipient municipal, city or provincial government.

f) Department of Transportation and Communications (DOTC) - provides assistance during MSAR operations through the facilities and capabilities of NTC (for communication) and ATO (for air SAR assistance).

Non-Government Organizations

a) Shipping Companies - provides facilities and personnel of their sea-going vessels which are near the scene of the MSAR.

b) Auxiliary Associations of PCG - composed of owners of private vessels (e.g., yachts, fishing boats, motor bancas, etc.) who provide facilities and personnel during the MSAR within their area of operation or sailing route.

c) The Philippine Red Cross and hospital organizations - provides medical assistance to victims of calamities.

4.1.2 Specific SAR Agencies

The PCG Rescue Coordination Center (RCC) and the Manila Rescue Coordination Center (MRCC) assume primary responsibility for all MSAR incidents within the Philippine Search and Rescue Area. The former is under the DND while the latter is an office under DOTC.

The MRCC is tasked with coordinating search and rescue operations by air nationwide. Although it is under the umbrella of the Air Transportation Office of DOTC, it provides assistance to all types of accidents (land, air and maritime) and coordinates and mobilizes SAR missions as requested by any agency. Figure 4.1 shows the organizational structure of MRCC. Over and above its coordinative relation with national SAR agencies concerned, it is supported by supplementary rescue units such as the United States Air Force and Navy through the U.S. bases here.

The PCG , on the other hand, undertakes maritime enforcement/police functions for about 21 other government agencies. Among others, it is tasked with the overall implementation and coordination of all maritime SAR services through out Philippine waters. The organizational set up of PCG is shown in Figure 4.2. As indicated in said organizational chart, tasks units are immediately created upon occurrence of major maritime accidents to look into SAR requirements and monitor developments of each incident.

In order to carry out its functions, PCG has a network of operating units at strategic areas of the country as shown in Figure 4.3. Since, PCG is the dominant body for maritime SAR operations, central focus on this agency is given hereon.

Figure 4.1
Organizational Structure
of Manila Rescue Coordinating Center

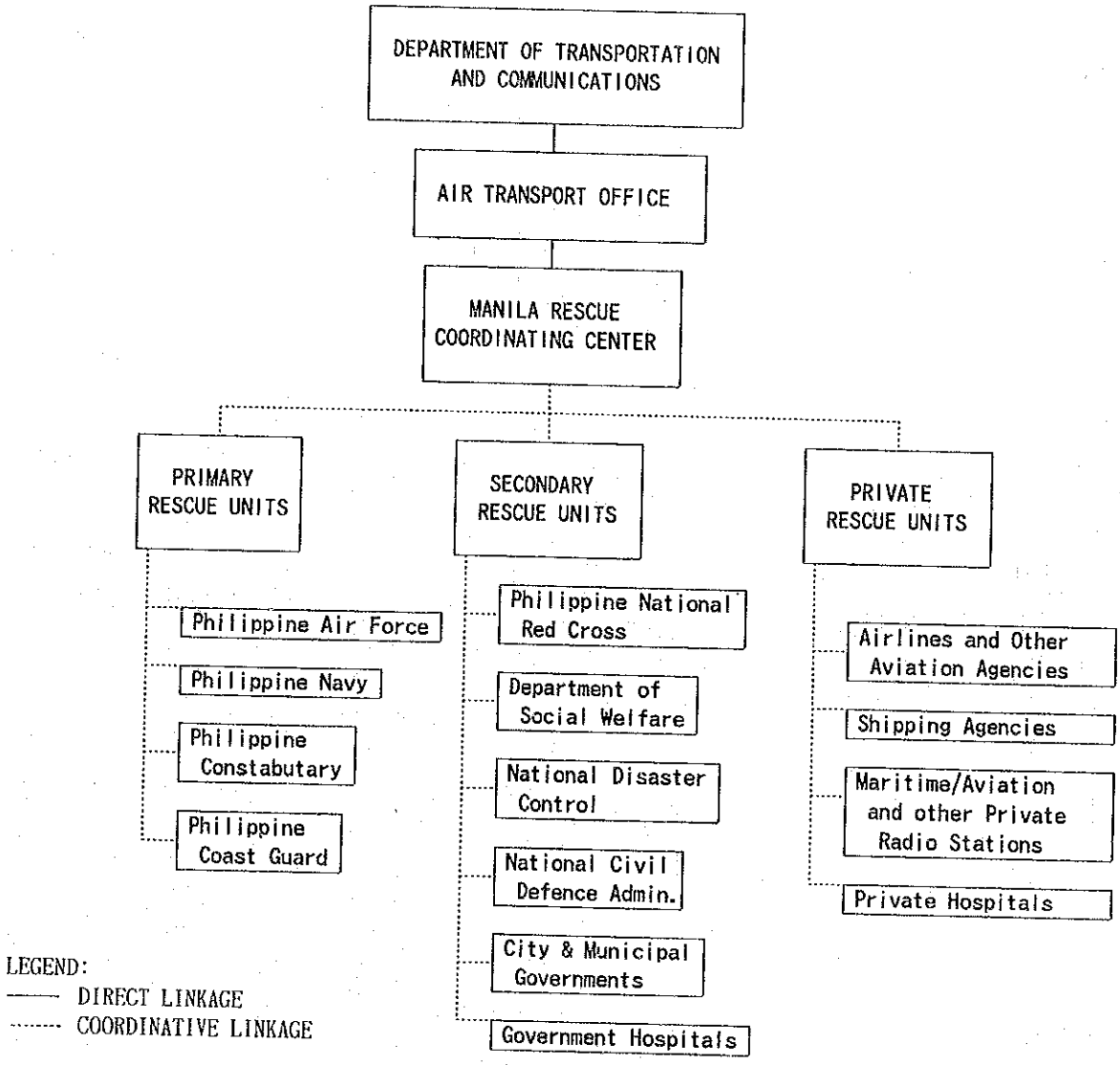


Figure 4.2
ORGANIZATIONAL CHART OF THE PHILIPPINE COAST GUARD

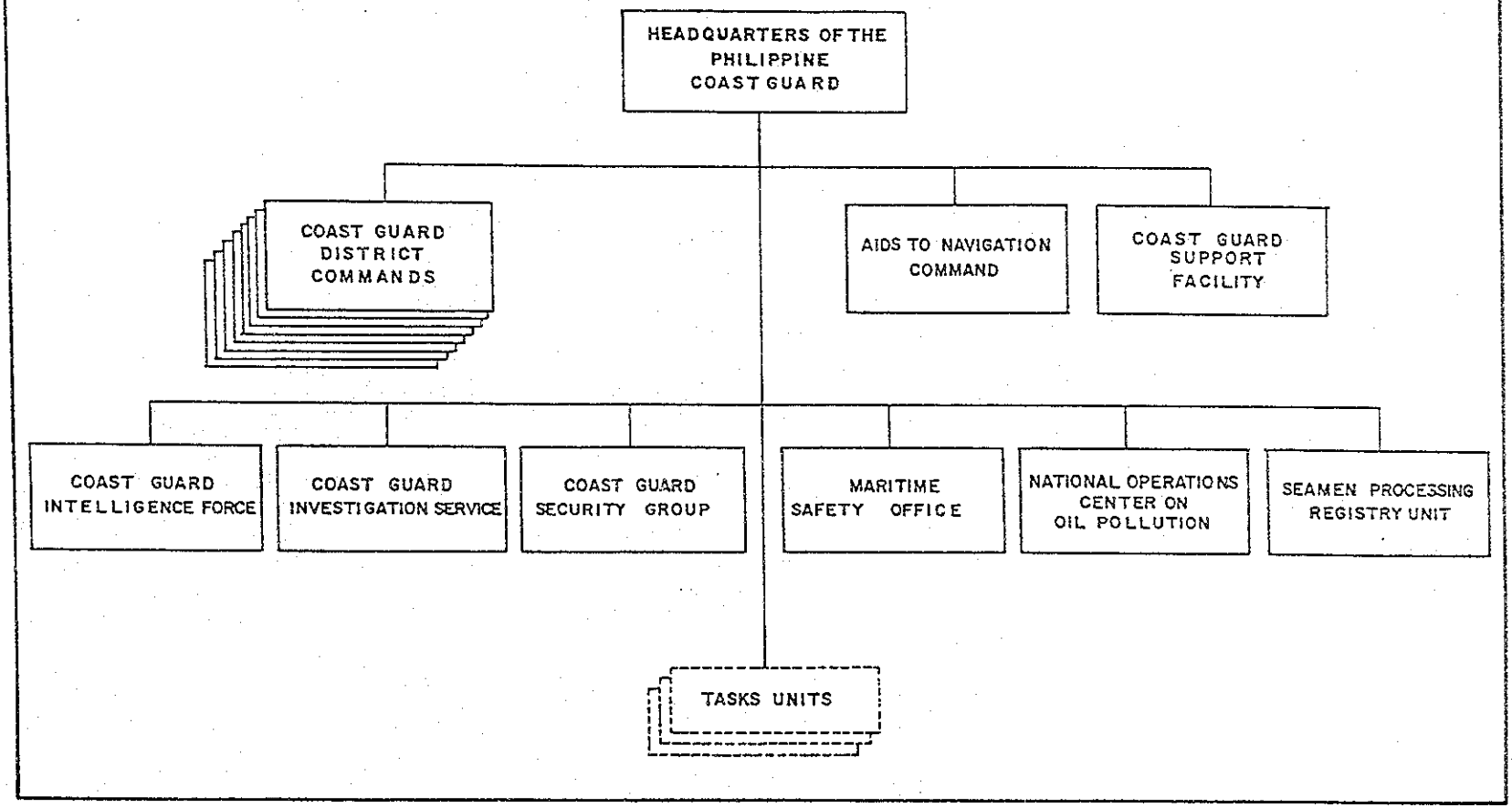
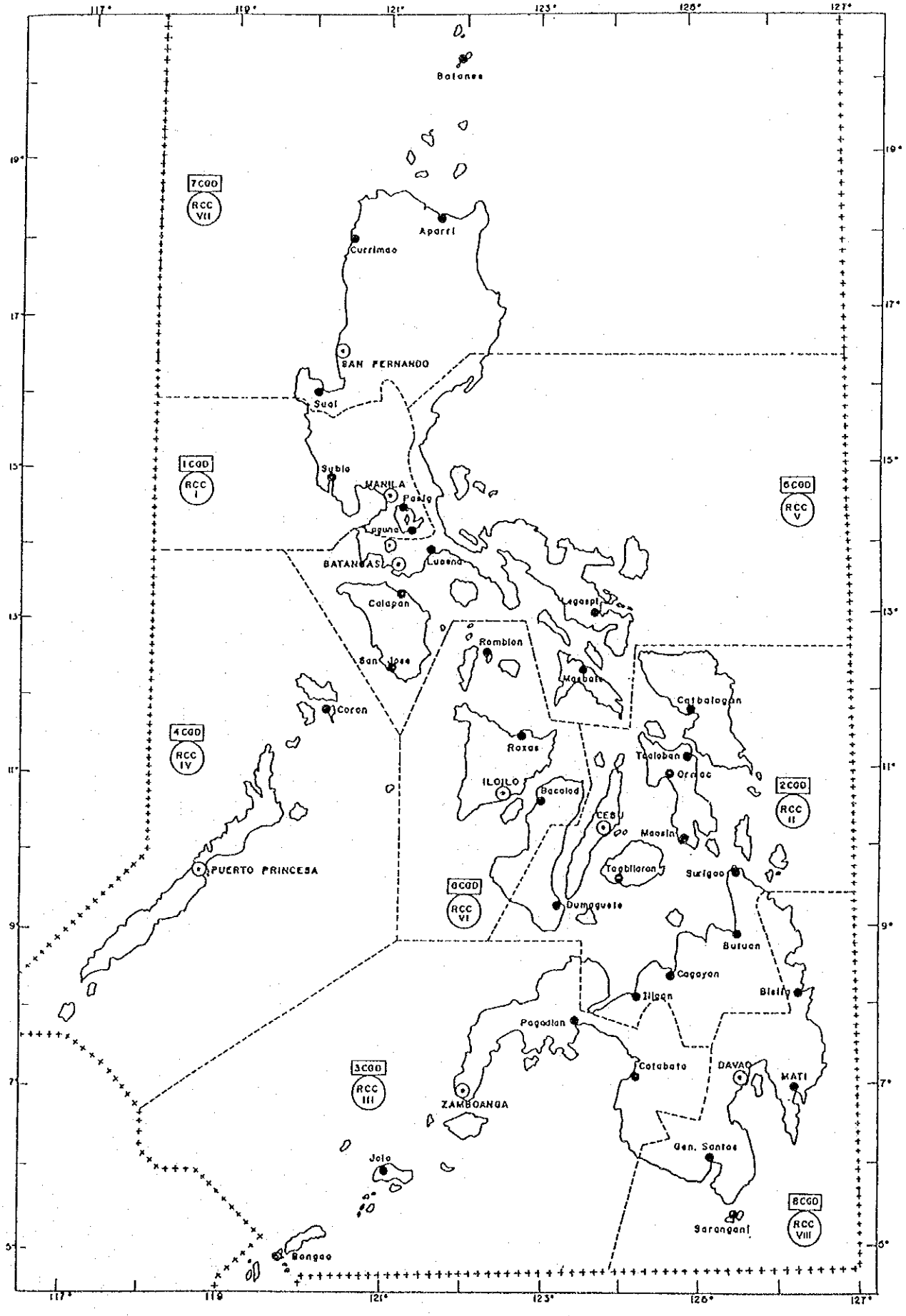


Figure 4.3
PCG MARITIME SAR REGIONS



4.1.3 SAR Resources

The search and rescue services in the Philippines are organized in accordance with international standard and recommended practices of International Maritime Consultative Organization (IMCO) in collaboration with the Ministry, now a Department, of National Defense and United States Coast Guard.

Todate, the Philippine archipelago is divided into 8 coast guard districts with a total of 42 stations and 144 detachments (refer to Figure 4.4). The SAR strength of these PCG operational units are summarized in Table 4.1 and enumerated in detail in Annex 4.1 to 4.3.

It is evident that the SAR strength of PCG is in a poor state. The decided lack in SAR capability lies in the following areas:

i) The number and distribution of communication equipments are insufficient for proper coverage and monitoring. Moreover, some of the coastal stations do not have any operational communication equipment.

ii) The water transportation of the coastal stations are mostly of the motorized bancas (74%) and small craft (20%) types which are good for island hopping and search mission but are not designed for a swift rescue mission.

iii) The personnel complement of the stations and detachments are mostly of the enlisted men or military men (78% of total personnel). As they are under the military, frequent changes in posts or rotation in assignments are experienced. Hence, search and rescue activities are not properly ingrained into the units concerned.

Table 4.1
PCG SAR Resources

District/ Station	No. of Detachments	SAR Facilities		Manpower
		Radio	Water Trans.	
District 1	18	1	30	392
District 2	47	45	9	474
District 3	12	39	19	215
District 4	10	21	7	103
District 5	29	51	26	465
District 6	13	14	10	254
District 7	11	35	24	163
District 8	5	32	7	132
Total	145	239	132	2,198

4.1.4 Maritime SAR Incidents

Based on the PCG SAR missions of 1989 and 1990 for maritime accidents which occurred during normal weather conditions, SAR responses are still considered low despite calm or normal sea (i.e., 23% of total accidents in 1989 and 36% in 1990).

Table 4.2.
SAR Missions vs. Accidents during Normal Weather

	1989	1990
Accidents during Typhoon	94	164
Accidents during Normal Weather	185	258
No. of SAR Mission	42	92
Overall SAR response (%)	15	22
SAR response to Accidents during Normal Weather (%)	23	36

As to accidents by area of occurrence, it would seem that the territorial area of the Coast Guard Districts 1 and 5 are prone to accidents as shown in Table 4.3. For the years 1989 and 1990, these two CG districts were always in the first 2 areas ranked with the most number of accidents recorded.

Table 4.3
Maritime Accidents by Location*

Coast Guard District	No. of Accidents			
	1989	Rank	1990	Rank
CGD1	45	1	46	2
CGD2	18	5	41	3
CGD3	20	4	40	4
CGD4	10	6	23	5
CGD5	37	2	68	1
CGD6	25	3	17	6
CGD7	10	6	8	8
CGD8	20	4	15	7

* based on accidents occurring during normal weather only.

However, a detailed analysis of accidents by geographical location (as presented in Chapter 4 of Main Report) shows that areas within the vicinities of Metro Manila and Cebu are accident prone areas (see Figure 4.4).

4.1.5 SAR Communication

Transmission of distress signals are received and processed in various ways by different search and rescue entities as shown in Figure 4.5. There are basically four response centers; the owner-shipping company, Philippine Coast Guard, Manila Rescue Coordinating Center and other ships in the area. The radio frequencies used for SAR are listed as follows:

a) 500 KHz (MF band)
b) 2182 KHz (MF and HF band)
c) 121.5 MHz (VHF band)
d) 156.8 MHz (VHF band)

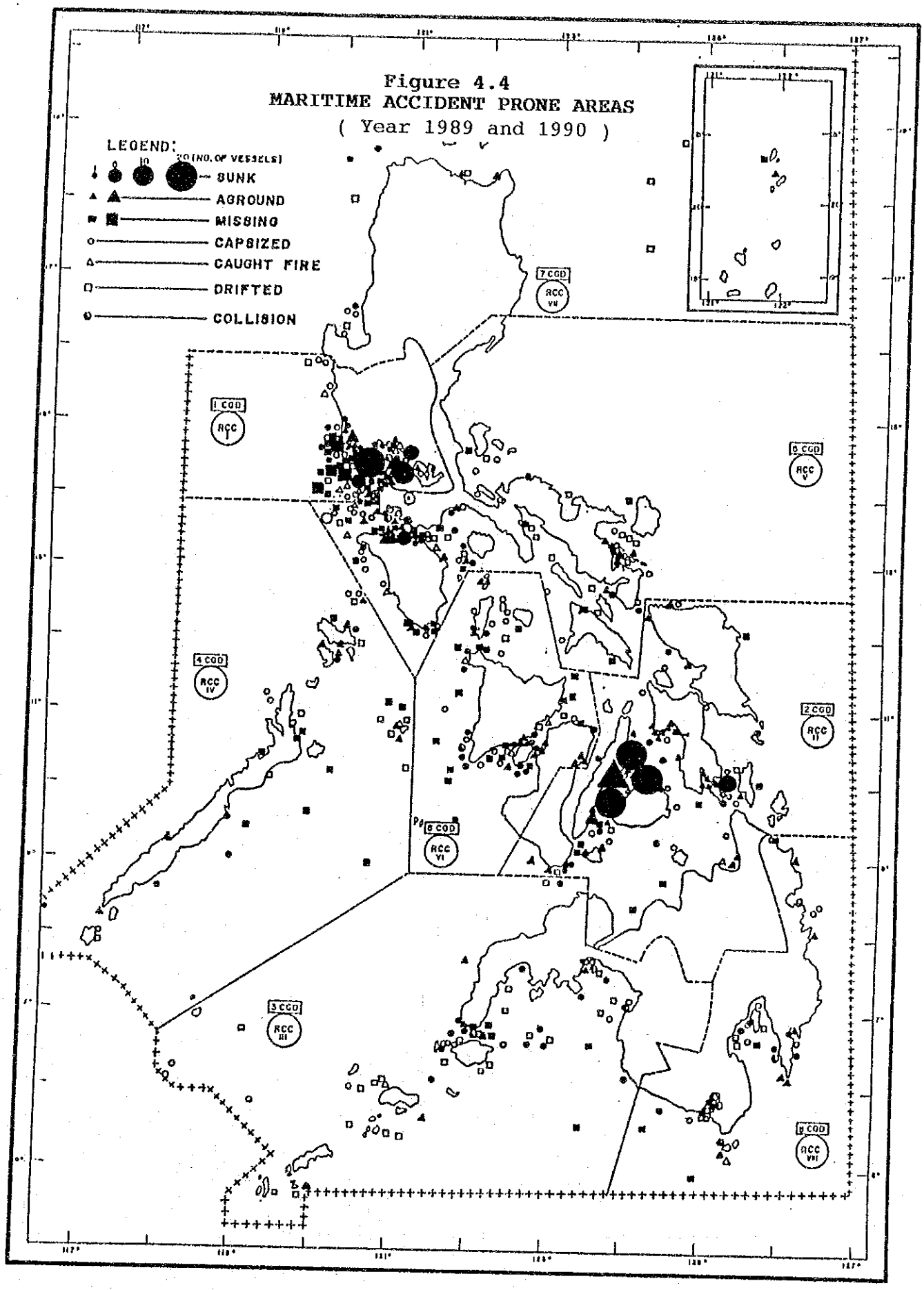
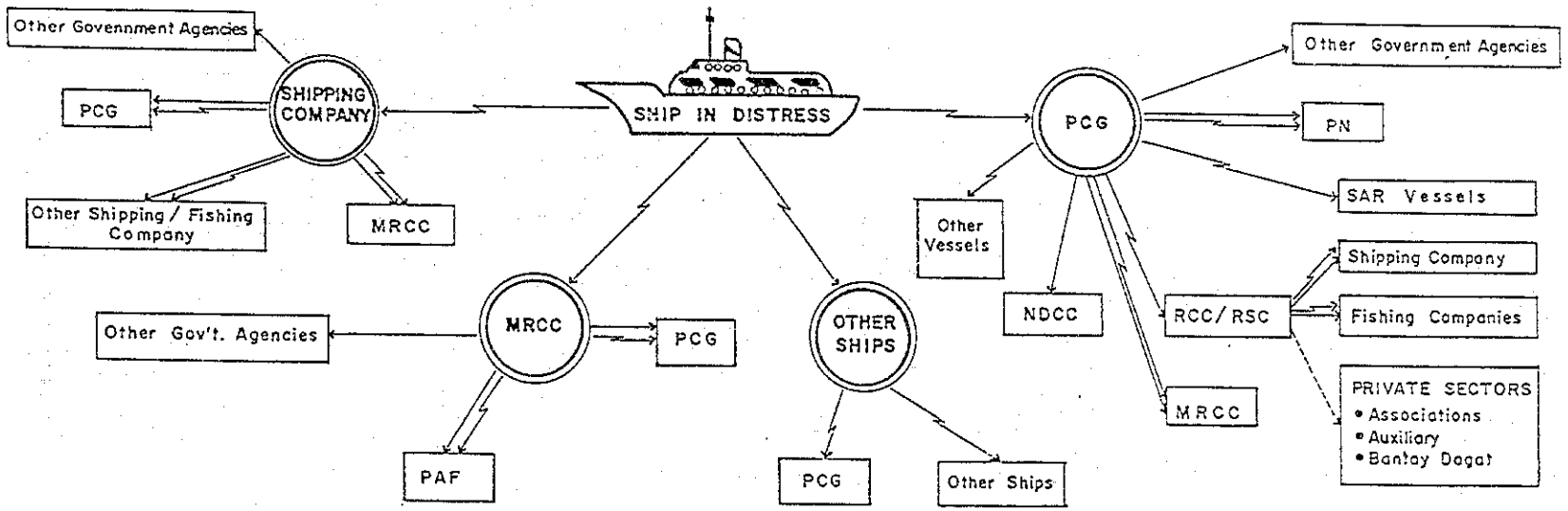


Figure 4.4
MARITIME ACCIDENT PRONE AREAS
(Year 1989 and 1990)
LEGEND:
(NO. OF VESSELS)
SUNK
AGROUND
MISSING
CAPSIZED
CAUGHT FIRE
DRIFTED
COLLISION
1 CGD
RCC I
2 CGD
RCC II
3 CGD
RCC III
4 CGD
RCC IV
5 CGD
RCC V
6 CGD
RCC VI
7 CGD
RCC VII
8 CGD
RCC VIII

Figure 4.5
MARITIME SAR COMMUNICATION



LEGEND:

TELEPHONE
VHF / SSB
COORDINATION

PCG - PHILIPPINE COAST GUARD
MRCC - MANILA RESCUE COORDINATING CENTER
PAF - PHILIPPINE AIR FORCE
PN - PHILIPPINE NAVY
NDCC - NATIONAL DISASTER COORDINATING CENTER
SAR - SEARCH AND RESCUE
RCC - RESCUE COORDINATING CENTER
RSC - RESCUE SUB-CENTER

4.2 Identified Problems and Issues

4.2.1 Current Problems

The problems on organization, operation and resources which directly and indirectly deter the effective delivery of SAR services are as follows:

a) Inasmuch as the various agencies have been placed and given their part or responsibility for search and rescue situations, mobilization and coordination of these entities are not well executed. The central agency which has to take the lead role is the PCG as it is on top of maritime day-to-day traffic. However, as the top operation personnel are military men being posted on rotation basis so often (i.e., with about an average of a one year stint), rapport with the agencies concerned is not well established. Moreover, search and rescue activities are not properly ingrained into PCG units located in many parts of the country.

b) SAR resources such as communication equipments and water transportation are not sufficient to cover the respective territorial responsibility of each Coast Guard Districts. Moreover, most of the resources on-hand are already way past their years of expected service and are frequently under repair. This is especially true for the only two SAR vessels of the country, the small SAR crafts and the communication equipments. As such, SAR responses of the PCG are expectedly deteriorating.

c) Based on all experiences of maritime incidents, accident-prone areas are easily identified. However, vigilance in these areas have not increased neither have safety countermeasures been strongly instituted.

d) PCG has a Search and Rescue Manual which is quite comprehensive content-wise and applicable todate (this was published in 1978 by the then Ministry of National Defense). Inasmuch as this is considered a good manual, it is not a well read and circulated document as there are no training for SAR being undertaken (either regularly or periodically).

4.2.2 Problems to Anticipate

Cognizant of the formation of the Philippine National Police and the creation of a Maritime Unit within said organization, it seems inevitable that problems will arise in the turning over and implementation of the maritime police functions from PCG to PNP. It is expressly stated that it will take 12 months from December 1990

(effective action of PNP) for the guidelines on implementing said functions to be drawn and finalized.

This anticipation is not without basis. Todate, the same problem is being experienced by MARINA and PCG whereby the former has not taken over the functions transferred from the latter. Issues on budget, legal clarity, capability and implementation guidelines delay said transfer of functions.

4.3 Improvement Directions

4.3.1 Search and Rescue Standards

The requirements on search and rescue, which serve as the standards, are embodied in the IMO Search and Rescue Manual as ratified in the International Convention on Maritime Search and Rescue of 1979. The manual provides guidelines for a common maritime search and rescue policy, encouraging all coastal States to develop their organizations on similar lines and enabling adjacent States to co-operate and provide mutual assistance.

On the local SAR standards, the SAR framework of the Philippines conforms to the basic requirements of search and rescue to some extent but the already depleted resources have to be replaced and strengthened. As such, improvements have to be phased in gradually to upgrade the SAR conditions of the country to firstly increase internal capability and to later allow participation in SAR activities of neighboring countries.

It should be noted that SAR activities in the country witness the active participation of the private sector. This constitute the private vessels either forming part of the PCG auxiliary team or on their own individual capacities.

4.3.2. Components to improve present SAR System

As it was already stated, there are only two SAR vessels in the country which has outlived its usefulness. Hence, it is inevitable to plan for the replacement of these vessels. For an effective deployment of SAR vessels, a general idea has been established dividing the Philippines into 3 SAR territories; the areas close to shore or otherwise known as coastal areas, the inland navigational areas and the open sea areas.

The vessel requirements can be set following this division in areas. They are as follows (see Annex 4.6 for their principal dimensions):

a) Large Size SAR Vessels

This type of vessel is fundamentally assigned to be operable in the open sea. Specifications are as follows:

Gross Registered Tonnage	:	1,200 tons
Length	:	90 meters
Maximum Speed	:	20 knots
Period in Action	:	15 days
Endurance	:	3,000 N.M.
Crew	:	60 members
Others	:	with helipad and with fin-stabilizer

These type of vessels can be located in the Pacific Ocean side of the Philippines and in the South China Sea (i.e., Philippine area of SAR responsibility based on the international agreement).

b) Medium Size SAR Vessels

These vessels can cover major inland waterways and thus, form the backbone for the SAR activity in the country. The specifications of these vessels are as follows:

Gross Registered Tonnage	:	350 tons
Length	:	50 meters
Maximum Speed	:	24 knots
Period in Action	:	7 days
Endurance	:	1,400 N.M.
Crew	:	30 members

c) Small Size SAR Crafts

The small size vessels are meant to cover coastal areas or those close to shore. As such, the PCG stations can execute SAR operation mainly for small boats in distress. The technical specifications are as follows:

Gross Registered Tonnage	:	23 tons
Length	:	20 meters
Maximum Speed	:	25 knots
Period in Action	:	2 days
Endurance	:	200 N.M.
Crew	:	10 members

However, some variation in this type of vessel is anticipated as the conditions of territorial waters differ from one station to the other.

Another hardware requirement is aircraft. Fixed wing and

rotating wing aircraft of medium size are necessary. The major responsibility of the fixed wing aircraft is the fast-locate of the vessels in distress. The rotating wing aircraft is meant to undertake rescue at sea.

Another improvement measure is the formation of special groups to undertake search and rescue at sea. Among others, the groups should be able to handle accidents which involve ships loaded with dangerous materials and to rescue trapped passengers. A group is to be composed of 5 members each.

Recognizing the importance of the private sector augmenting the PCG auxiliary force for SAR activities, steps should be taken to organize, train and equip them.

Lastly, the setting up of a training facility is necessary. This is in view of the fast turn-over of personnel in PCG. As such, there is a constant need to train newly assigned personnel.

4.3.3 SAR Improvement Concept

Analysis of maritime accidents shows that 80% of accidents in number are of small vessels (smaller than 250 GRT). However, the rest 20%, which were caused by large vessels, produce the most of victims. Accidents of large vessels are occurred along sea routes and only a large or medium size SAR vessel can patrol en-route.

Due to the limit of budget, sufficient SAR vessel fleet mix to cope with all of type of maritime accidents can not be expected in foreseeable future. Therefore, selection of SAR vessel size becomes very important.

Requirements to SAR vessels of the first selection are:

a) en-route patrol capability to cope with disasters along water routes and
b) quick response capability for frequent accidents in the coastal area.

These requirements point out medium size SAR vessel is definitely appropriate. This type can enjoy high speed of 24 knots and is capable for 7 days, 1400 nautical miles voyage.

The selection of medium size SAR vessel results in smaller fleet formation in number comparing with the case of selection of small size SAR vessel. This fact would give ill effect to the rate of rescue achievement for small boat. To correspond to such a problems, it is important to strengthen PCG auxiliary force (discussion in detail is done in Chapter 6 of Main Report).

In addition preparedness of SAR communication system is necessary condition when total SAR system is studied. This subject, however, is discussed in Chapter 5 of this volume.

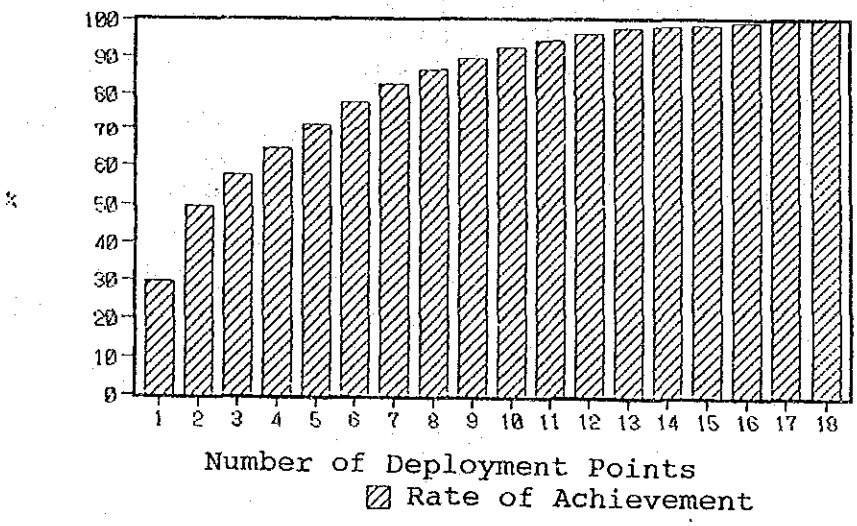
4.3.4 Deployment of SAR vessels

Simulation model for optimal SAR vessels assignment, developed by Japan Maritime Safety Agency was applied to evaluate performance of proposed SAR vessels(see Annex 4.4 for details of simulation logic and Annex 4.5 for simulation results).

Figure 4.6 shows simulation results in terms of rate of achievement corresponding to 1989 and 1990 maritime accidents.

Two (2) SAR vessels show around 50 % of achievement rate. After two (2) vessels allocation, marginal increment becomes dull. Five (5) vessels can achieve more than 70 % of SAR activities.

Figure 4.6
Rate of Achievement and Number of Deployment Points



4.4 SAR Improvement Plan

4.4.1 Short-Term Plan (1992-1995)

In consideration to the renewal of the two existing SAR vessels, two medium sized vessels shall be acquired to form the backbone of SAR activities. One vessel shall be deployed in Manila and the other in Cebu. The area of each vessel's responsibility is shown in Figure 4.7. (401)

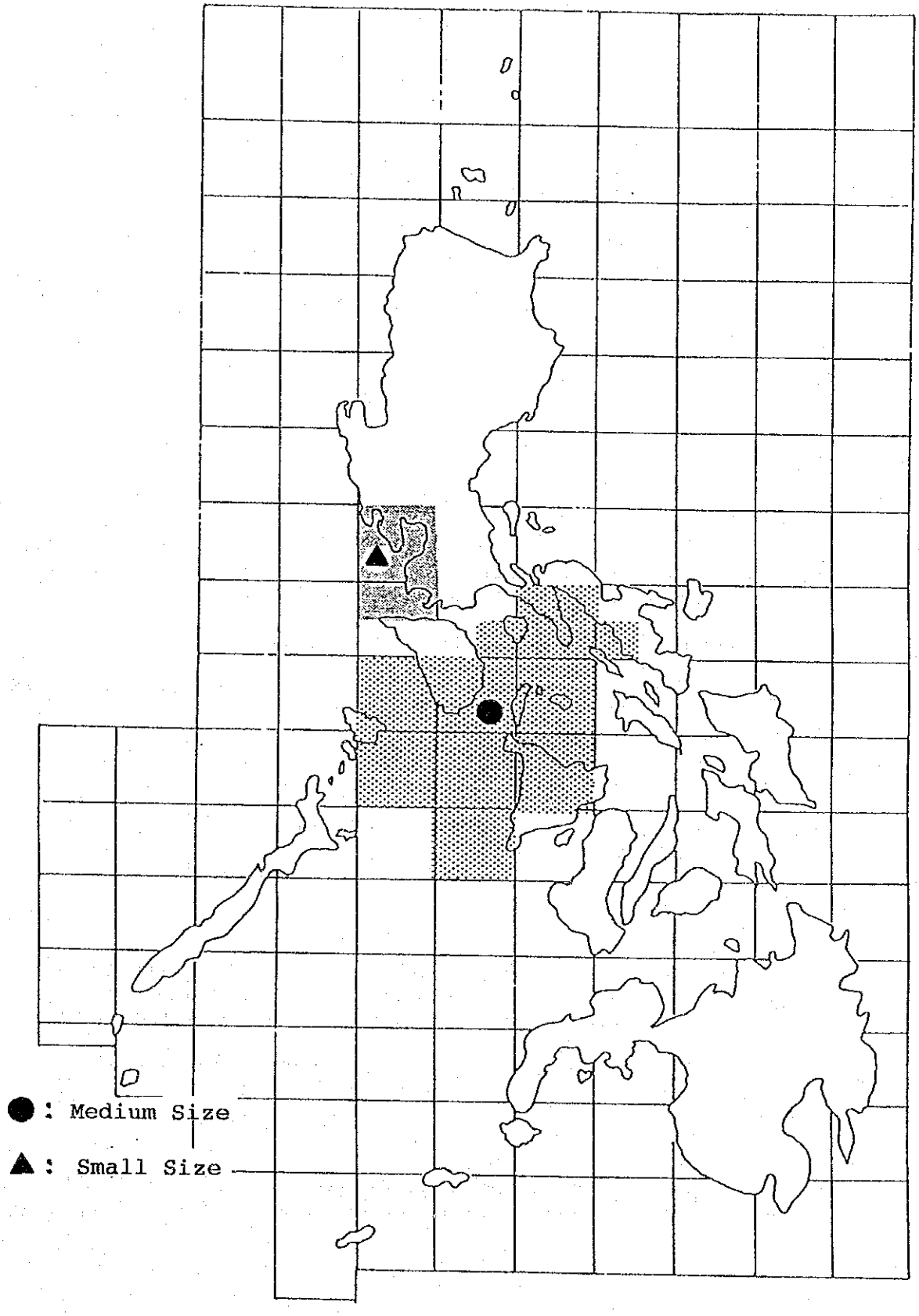
These vessels shall patrol the waters within 180 nautical miles in radius from their home port to cover major sea routes. They can go on operation at sea for seven days straight (sufficient supply stocked on-board). The daily routine operation shall be nine patrol hours at 20 knots and 15 hours at anchorage. When in operation, 10 miles will be under surveillance. Therefore, 3,600 square miles will be covered in two days (10 miles x 180 miles x 2 days). This coverage area is considered sufficient for Manila-Cebu route patrol. With the assumption of seven days in operation at 200 nautical miles per day, the endurance requirement is 1400 N.M.

Based on the MERSAR manual, the estimated survival time of a person in water of 15 to 20 degrees centigrade is less than 12 hours, As such, with the assumption that the vessel is cruising at 24 knots, a total of 288 N.M. radius is covered by the SAR vessel in that 12 hours alone.

These two vessels also accommodate wrecked boats in the Manila and Cebu bays and in the vicinities of them. Allocation of these two vessels, thus, can cover 50 % of maritime accidents in 1989 and in 1990.

The schedule for SAR vessel operation can be set at 10 months (including at anchorage) and 2 months in dry dock.

Figure 4.7
Area of the Responsibility for Two Vessels



4.4.2 Long-Term Plan (1995 - 2010)

Four medium sized SAR vessels shall be acquired locally in this time frame. Said vessels shall be located at Manila, Cebu, Davao and Puerto Princesa in the written order. Vessels in Davao and Puerto Princesa shall be operated without alternate vessels.

The specifications of these vessels shall match or be the same as the first two for operational convenience purposes as well as the lowering of logistic costs. (402)

The acquisition of these vessels from domestic sources is to support and promote the local ship building industry. Moreover, vessels of this size can be easily manufactured locally with the present ship building facilities.

Some consideration in personnel administration for maintaining well qualified SAR specialist group are required.

4.4.3 Future Concept (after 2010)

Due to the limit of budget scale accomplishment of optimal deployment of SAR fleet indicated by simulation will become after 2010. In addition of SAR fleet preparedness, aircraft, special rescue group and maritime safety training center shall be acquired/ organized.

1) SAR Vessels

From this point onwards, all the other SAR vessels shall be acquired. That is, the additional 2 medium size SAR vessels, the 6 small size SAR vessels and the 6 large size SAR vessels. The deployment of the SAR fleet are indicated in Appendix 4.5.

The renewal of the SAR vessels shall be phased every 20 years for medium size and for small size vessels, and every 25 years for large size SAR vessels.

2) Aircraft

The acquisition of the 4 aircraft is left for last as it is assumed that this part of the SAR operation is and will continue to be assisted by the Air Force.

Two of the fixed and rotating winged aircraft shall be located at Manila and other two at Cebu.

3) Special Rescue Group

The specialized rescue group to handle accident of a ship loaded with dangerous materials, rescue trapped

survivors, and the like shall start to operate.

4) Maritime Safety Training Center

The establishment of a training center for maritime safety shall be in this plan phase.

4.5 Cost Estimates

Costs are estimated in 1991 fixed price. Foreign exchange rate is assumed as at 5:1 for Japanese Yen to Peso.

a) Medium Size SAR Vessel produced in Japan

(in thousand yen)

Item			1st vessel	2nd vessel
Material,	Hull Part,	Hull Superstructure	49,000	49,000
		Hull Structure	168,000	168,000
	Machinery Part,	Auxiliary Engine	149,000	149,000
		Main Diesel Engine	200,000	200,000
	Electric &	Communication Part	139,000	139,000
	Subtotal		705,000	705,000
Engineer and Clerk Expenses	Hull Part		348,450	333,500
	Machinery Part		103,550	99,100
	Electric & Communication P.		47,800	45,800
	Others		5,095	4,886
	Subtotal		504,895	483,286
General Expenses	Drawings & Plans		30,000	0
	Others		25,000	25,000
	Subtotal		55,000	25,000
Total (1)			1,264,895	1,213,286
General Administrative Expenses (10%)			126,490	121,329
Shipbuilding Costs			1,391,385	1,334,615
Transport Costs		Operation Costs	13,600	13,600
		Insurance Premium	7,630	7,630
Grand Total			1,412,615	1,355,845

Total cost for two vessels becomes 2,768,460,000 yen. In addition cost of spareparts, 84,000,000 yen, and cost for OJT, 30,300,000 yen are necessary.

b) Medium Size SAR Vessel of Local Production

Most of materials are imported goods, mainly from Japan. Because of that reason cost estimation of local construction is done in Japanese currency.

(in thousand yen)

Item			unit price
Material,	Hull Part,	Hull Superstructure	54,000
		Hull Structure	185,000
	Machinery Part,	Auxiliary Engine	164,000
		Main Diesel Engine	200,000
	Electric & Communication Part		153,000
	Subtotal		756,000
Engineer and Clerk Expenses	Hull Part		175,000
	Machinery Part		52,500
	Electric & Communication Part		25,000
	Others		5,000
	Subtotal		257,500
General Expenses	Drawings & Plans		20,000
	Others		25,000
	Subtotal		45,000
Total (1)			1,058,500
General Administrative Expenses (10%)			105,850
Shipbuilding Costs			1,164,350

Total cost for four vessels becomes 4,657,400,000 yen. Additionally cost of spareparts, 164,000,000 yen, and cost for OJT, 60,600,000 yen are necessary.

4.6 Implementation Program

Implementation of projects are scheduled as follows:

Proj. Code	Project	1992-1995	1996-2000	2001-2005	2006-2010
401	Medium Size Vessel (No. 1)	----------			
401	Medium Size Vessel (No. 2)		----------		
402	Medium Size Vessel (No. 3)			----------	
402	Medium Size Vessel (No. 4)				----------
402	Medium Size Vessel (No. 5)				----------
402	Medium Size Vessel (No. 6)				-------

Annex 4.1
PCG COMMUNICATIONS EQUIPMENT[a]
Operational as of April 1991

Dist.	Stations	PRC77	RF2301	URC187	VHF	Handhld	Others
HCG D1		-	1	-	-	-	-
	Manila	-	-	-	-	-	-
	Pasig	-	-	-	-	-	-
	Laguna	-	-	-	-	-	-
	Subic	-	-	-	-	-	-
HCG D2		2	2	1	1	2	-
	Surigao	-	1	2	1	1	-
	Cebu	2	-	2	1	2	-
	Dumaguete	-	1	1	1	2	-
	Maasin	-	1	-	1	2	-
	Catbalogan	-	1	1	1	1	-
	Tagbilaran	-	1	-	1	1	-
	Cag. de Oro	-	1	-	1	1	-
	Tacloban	-	1	-	1	1	-
	Ormoc	-	1	-	1	1	-
	Iligan	-	-	-	-	-	-
HCG D3		1	2	-	-	3	1
	Pagadian	-	-	2	2	-	2
	Cotabato	-	1	2	1	4	4
	Zamboanga	-	-	-	-	-	-
	Tawi Tawi	-	-	3	-	-	-
	Bongao	3	-	2	1	1	-
	Jolo	-	-	1	1	1	1
HCG D4		-	1	2	1	2	1
	Pto Princesa	-	-	9	-	-	-
	Conon	-	1	4	-	-	-
HCG D5		-	1	3	1	1	-
	Batangas	-	1	1	3	2	-
	Legaspi	-	1	4	1	1	-
	San Jose	-	1	1	1	1	-
	Calapan	1	1	2	1	-	-
	Masbate	1	1	-	-	1	2
	Romblon	3	1	7	1	-	-
	Lucena	3	1	1	3	1	-
HCG D6		-	1	1	1	5	-
	Bacolod	-	-	-	-	-	-
	Iloilo	-	-	-	-	1	-
	Roxas	-	1	2	2	1	-
HCG D7		-	4	19	3	9	-
	San Fernando	-	-	-	-	-	-
	Currimao	-	-	-	-	-	-
	Aparri	-	-	-	-	-	-
	Batanes	-	-	-	-	-	-
HCG D8		-	1	7	7	17	-
	Bislig	-	-	-	-	-	-

[a] Except for the district offices, all stations do not have any operational communications equipment.

Annex 4.2
PERSONNEL COMPLEMENT, COAST GUARD
As of April 1991

Districts	Officers	Enlisted Personnel	Civilian	Total
CG D1	17	320	55	392
CG D2	16	350	108	474
CG D3	10	195	10	215
CG D4	5	76	22	103
CG D5	12	337	116	465
CG D6	7	209	38	254
CG D7	8	113	42	163
CG D8	13	115	4	132
Total	88	1,715	395	2,198
Percentage	4%	78%	18%	100%

Annex 4.3
PCG WATER TRANSPORTATION FACILITIES
As of April 1991

Dist	Status[a]	CGC	DB	DF	MB	PCF	UC	AU	PG	VU	RB	VJ	VV
CGD1	NRFS	-	-	-	5	-	-	-	-	-	-	-	-
	RFS	6	-	1	13	-	-	-	-	-	-	-	-
	LRFS	2	1	1	-	-	-	1	-	-	-	-	-
CGD2	NRFS	-	-	-	4	-	-	-	-	-	-	-	-
	RFS	-	-	-	5	-	-	-	-	-	-	-	-
	LRFS	-	-	-	-	-	-	-	-	-	-	-	-
CGD3	RFS	-	-	-	4	-	-	-	1	-	-	-	-
	RFS	-	-	3	7	-	-	-	-	-	1	-	-
	LRFS	-	-	1	1	-	-	-	-	1	-	-	-
CGD4	NRFS	-	-	-	4	-	-	-	1	-	-	-	-
	RFS	-	-	-	2	-	-	-	-	-	-	-	-
	LRFS	-	-	-	-	-	-	-	-	-	-	-	-
CGD5	NRFS	-	-	-	7	-	-	-	1	-	-	1	-
	RFS	-	-	3	13	-	-	-	-	-	-	-	1
	LRFS	-	-	-	-	-	-	-	-	-	-	-	-
CGD6	NRFS	-	-	-	3	-	-	-	-	-	-	-	-
	RFS	-	-	-	4	2	-	-	-	-	1	-	-
	LRFS	-	-	-	-	-	-	-	-	-	-	-	-
CGD7	NRFS	-	-	-	6	1	2	-	-	-	-	-	-
	RFS	-	-	-	14	-	-	-	-	-	-	-	-
	LRFS	-	-	-	1	-	-	-	-	-	-	-	-
CGD8	NRFS	-	-	-	-	-	-	-	-	-	-	-	-
	RFS	-	-	-	5	2	-	-	-	-	-	-	-
	LRFS	-	-	-	-	-	-	-	-	-	-	-	-
Total		8	1	9	98	5	2	1	3	1	2	1	1

Percentage of Water Craft

CG Cutter	8	6.1%
Small Craft	26	19.7%
Motorized Banca	98	74.2%
Grand Total	132	100.0%

Legend

CGC	Coast Guard Cutter	AU	Auxiliary Utility	NRFS	Not Ready for Sea
DB	Dumb Barge	PG	Patrol Gunboat	RFS	Ready for Sea
DF	Diesel (Fast)	VU	Vehicle Utility	LFRS	Light Ready for Sea
MB	Motorized Banca	RB	Diesel Boat		
PCF	Patrol Craft, Fast	VJ	Vietnamese Junk	CGD	Coast Guard District
UC	Utility Craft	VV	Voltes V		

Annex 4.4
Methodology of Optimal SAR Vessels Deployment Model

We consider the following SAR vessel location problem: how many and how should the Maritime Safety Agency locate SAR vessels to the surrounding sea area of Japan as example so that any wrecked ships can be reached within a certain amount of time?

In formulating the above problem as a mathematical programming optimization problem, the assumptions follow:

(i) surrounding sea area of Japan is divided into small regions (see Figure A.4.1). Each region is represented by a point, thus we obtain a graph in Figure A.4.2. All accidents in the region are assumed to occur at the representative point. Each SAR vessel is to be locate at the representative point of the region.

(ii) Each SAR vessel has the equal capability, and deals with the accident by herself.

Figure A.4.1
Surrounding Sea Area of Japan

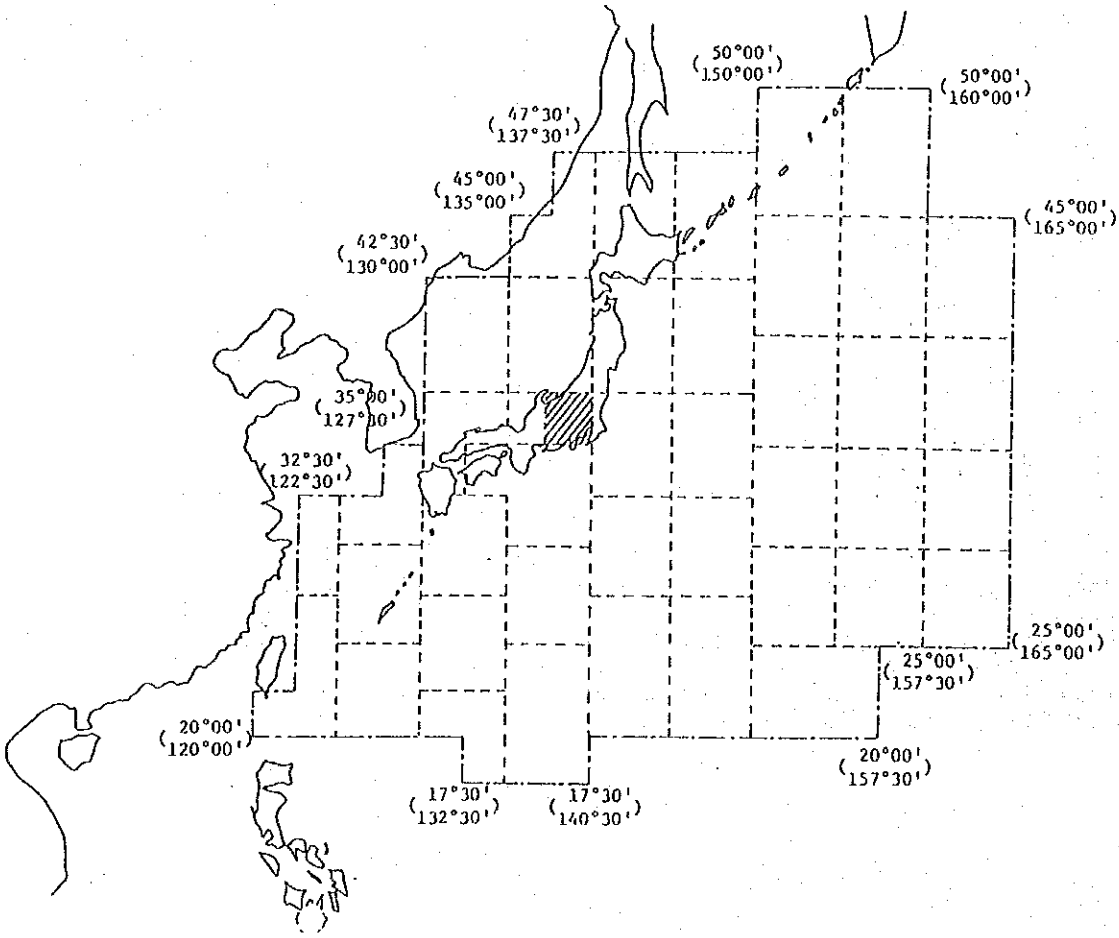
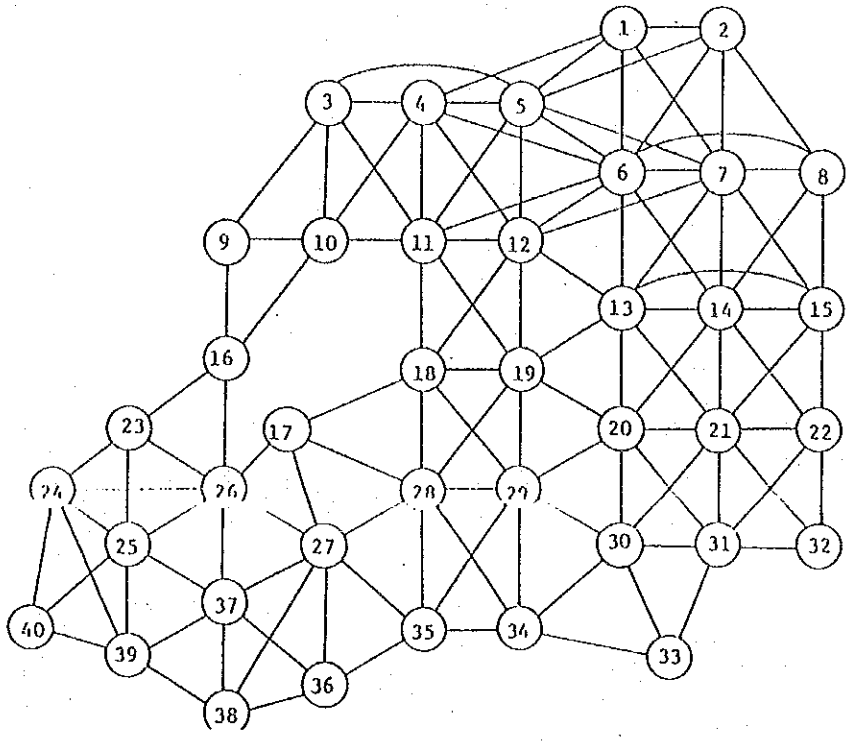


Figure A.4.2
Graph Representation of Sea Regions



Mathematical programming problem finding an optimal location of SAR vessels is formulated as follows.

Variables:

X_j=1: SAR vessel is located at region j
=0: SAR vessel is not located at region j
j=1,...,m (number of regions)

Problem:

$$\text{minimize} \quad \sum_{j=1}^{m} x_j$$

$$\text{subject to} \quad \sum_{j=1}^{m} a_{ij} x_j \geq 1 \qquad i=1,\ldots,m$$

$$x_j \in \{0,1\} \qquad j=1,\ldots,m$$

where a_{ij}=1 if region j is reachable from region i within a certain amount of time
=0 otherwise.

The above optimization problem is generally called a set-covering problem. Applying the above formulation to the case of Figure A.4.1 and Figure A.4.2, 34 variables and 34 constraints IP problem is defined. Definition of coefficients $\{a_{ij}\}$ corresponds to the adjacency of nodes in the graph of Figure A.4.2 i.e., $a_{ij}=1$ if nodes i and j are adjacent and $a_{ij}=0$ otherwise. Solving the IP problem using the MPSX (Mathematical Programming System Extended) program on the HITAC M200H computer, we obtain an optimal solution within a minute as given in Figure A.4.3. the solution implies that we need at least seven SAR vessels to cover the whole sea area of Japan so that any wrecked ships, wherever it may be located, can be reached within a certain amount of time (e.g.24 hours). coverage relation is also shown in Figure A.4.3.

The above problem has a very close relation with graph theoretical results. For example, given a graph G=(V,E), V: a set of vertices and E: a set of edges, a set D V is called a dominating set when any vertex V D is connected with some vertex V' D. A set of vertices I V is called an independent set when any two vertices in I are not connected (not adjacent) each other. Then we know that the above set-covering problem is equivalent to finding a minimum dominating set of the graph is Figure A.4.2. Also we know that when an independent set is maximal, it has to be a dominating set. Incidentally, a minimum dominating set is not necessarily an (maximal) independent set.

(Maximize the Accident handling Capability Model)

Mathematical programming problem finding an optimal location of SAR vessels is formulated as follows.

Variables:

$X_j=1$: SAR vessel is located at region j
$=0$: SAR vessel is not located at region j
$j=1,\ldots,m$ (number of regions)

Problem:

$$\text{maximize} \quad \sum_{j=1}^{m} C_{ij}X_j$$

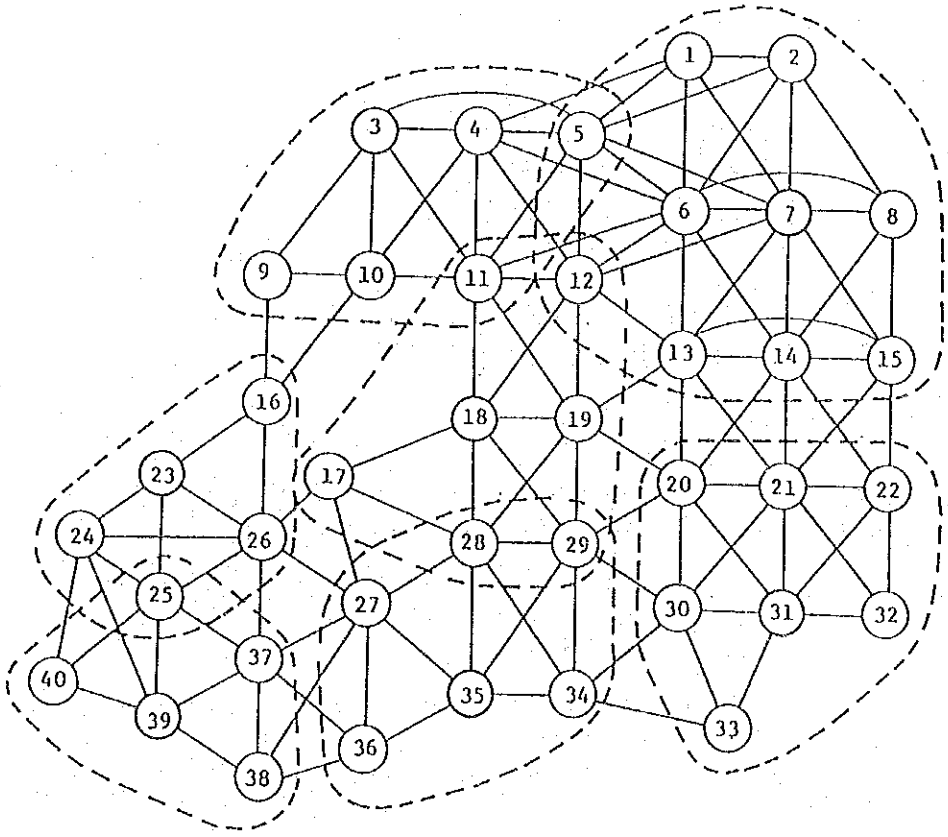
$$\text{subject to} \quad \sum_{j=1}^{m} a_{ij}\, x_j \leq 1 \qquad i=1,\ldots,m$$

$$\sum_{j=1}^{m} x_j = K$$

$$x_j \in \{0,1\} \qquad j=1,\ldots,m$$

where a_{ij}=1 if region j is reachable from region i within a certain amount of time
=0 otherwise.
c_{ij} : the accident handling capability of SAR vessel which is located at region j.
K : number of deployment points

Figure A.4.3
An Optimal Allocation of Salvage Boats



Same mathematical procedure was applied to optimal SAR vessels allocation problems in the Philippines territorial waters using maritime accident data in 1989 and 1990. Results are shown in Annex 4.5.

Annex 4.5
SAR Vessels Deployment Model in the Philippines

1. Objective Area

   Objective area is the SAR region (SRR) of the Philippines.

2. Size of SAR vessels and response time in each small region

   (1) Coastal areas around Manila and Cebu ports

   - small size SAR vessels in charge
   - response time to accident point is less than 3 hours

   (2) Inland areas

   - medium size SAR vessels in charge
   - response time to accident point is less than 6 hours

   (3) Other areas

   - large size SAR vessels in charge
   - response time to accident point is less than 12 hours

3. Calculation Conditions

   (1) Surrounding sea area of Philippine is divided into small regions, and the deployment point of SAR vessel is to be center of each small regions.

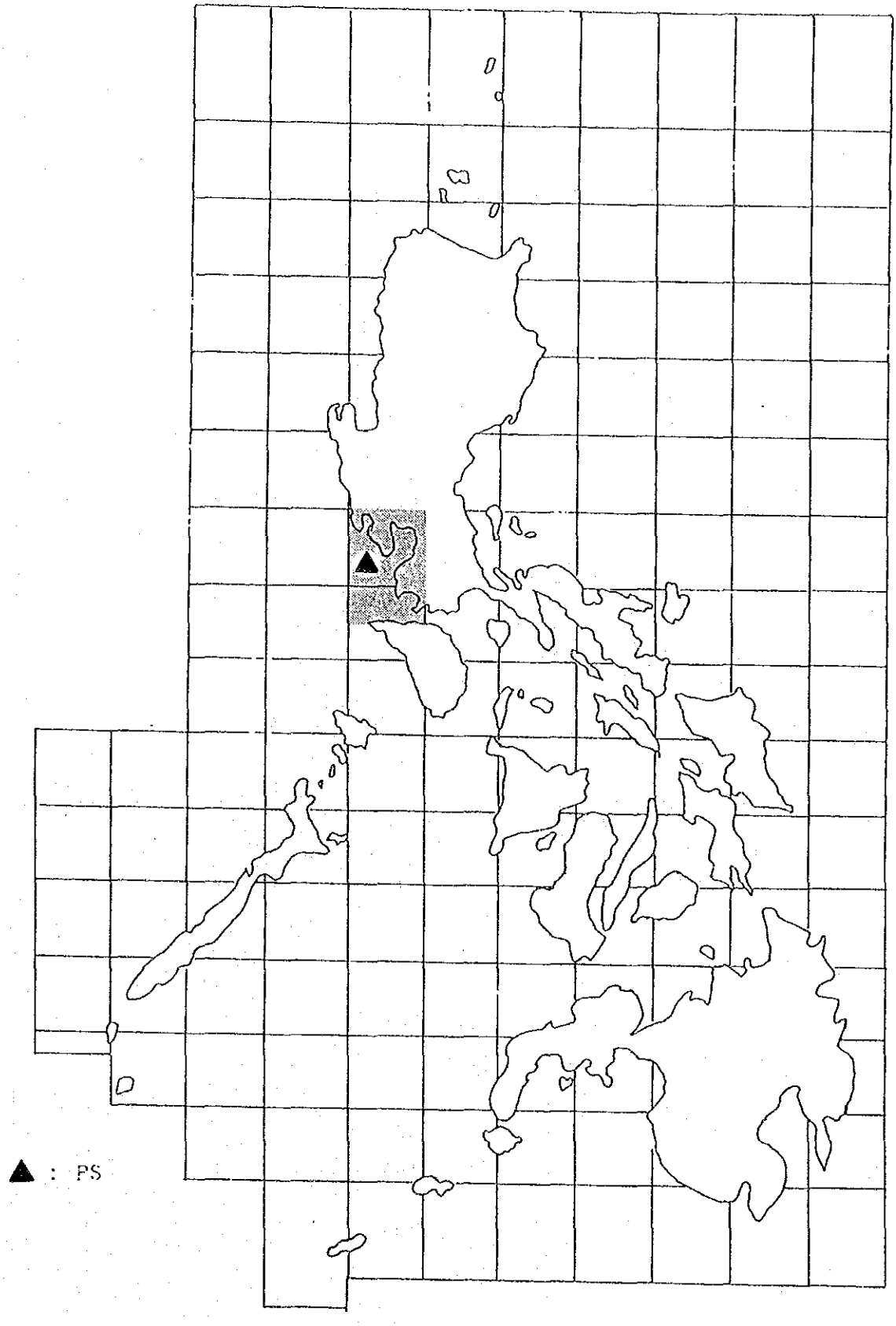
   (2) Speed of each SAR vessel is 20 knots.

   (3) Cover area of each SAR vessel is a range of distance which is calculated by the product of response time and speed of each SAR vessel.

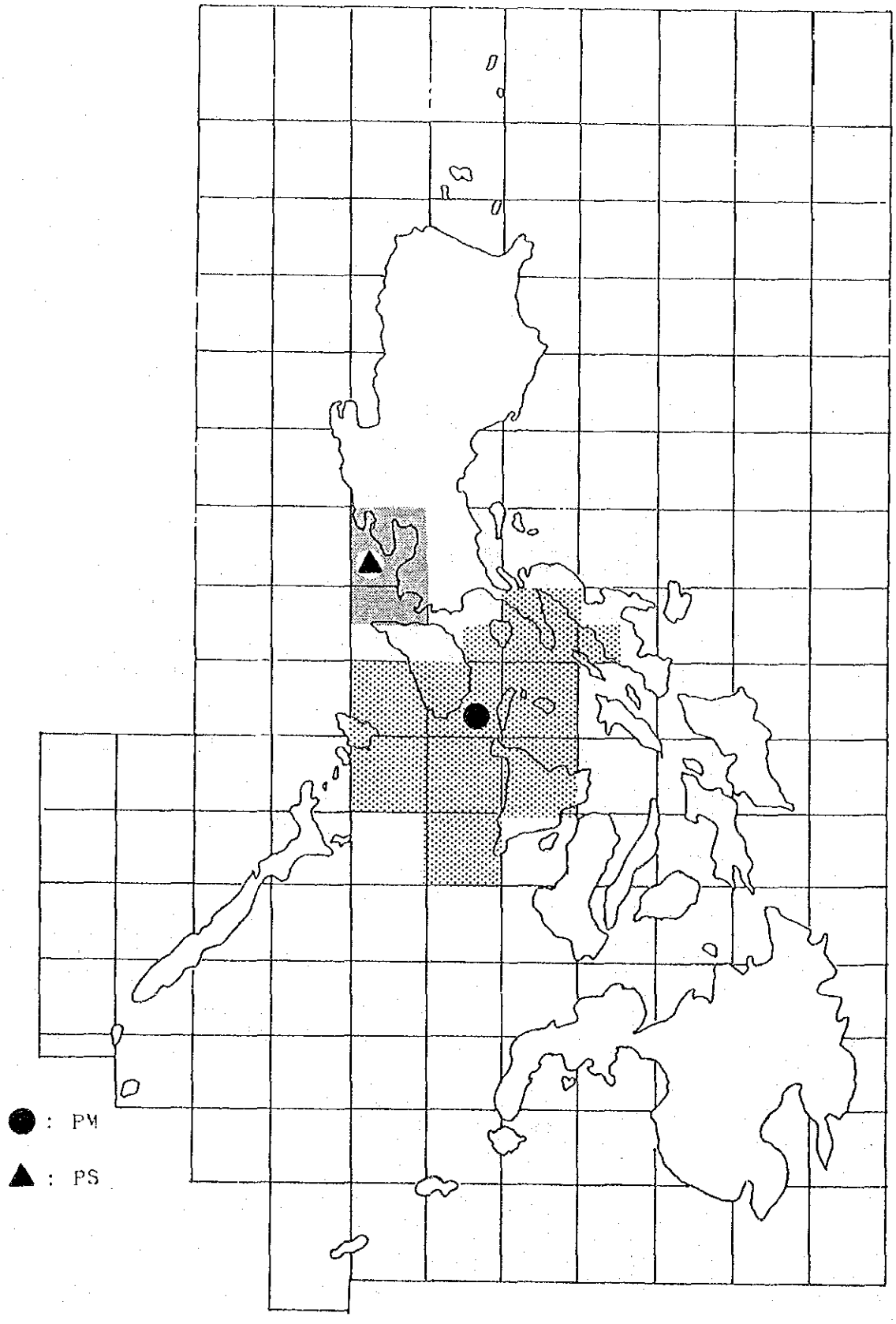
   cf. small size : 3 hours x 20 knots = 60 miles
   medium size : 6 hours x 20 knots = 120 miles
   large size : 12 hours x 20 knots = 240 miles

   (4) Covered area of each SAR vessel is not overlapped, and the accident handling capability of each vessel is the total number of normal accident in 1989 and 1990 which is happened in each area covered by one SAR vessel.

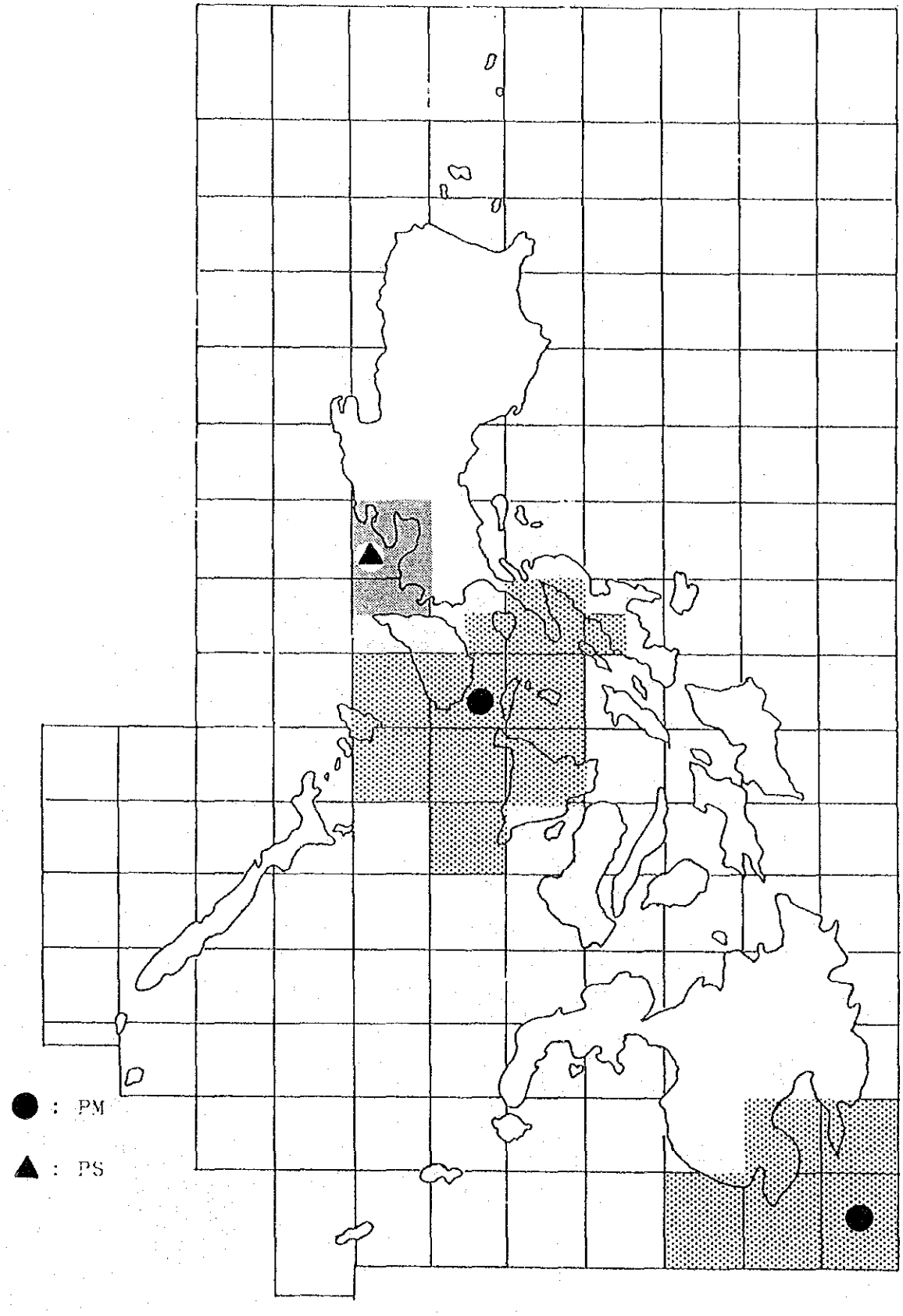
(Number of Deployment Point : 1)



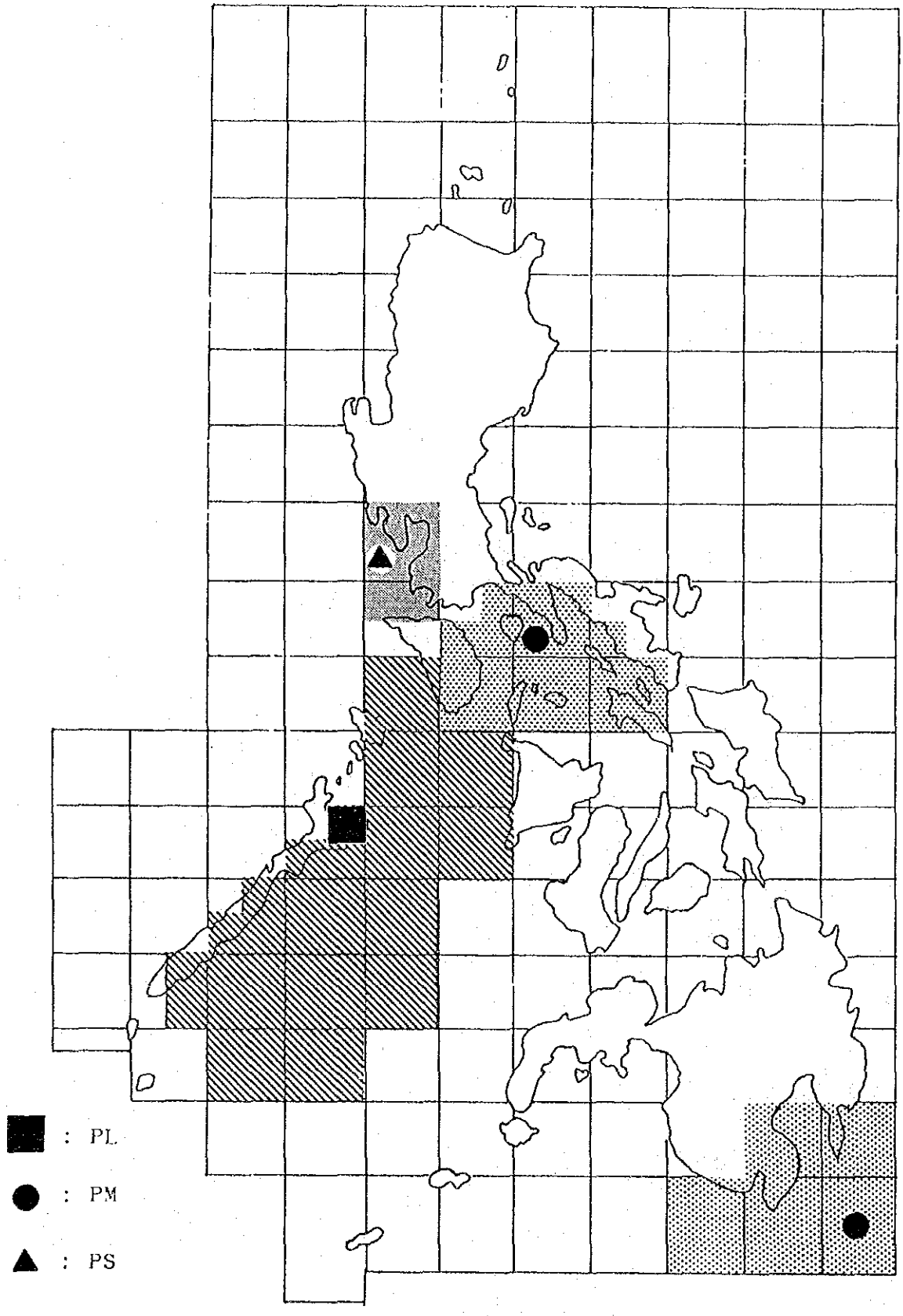
(Number of Deployment Point : 2)



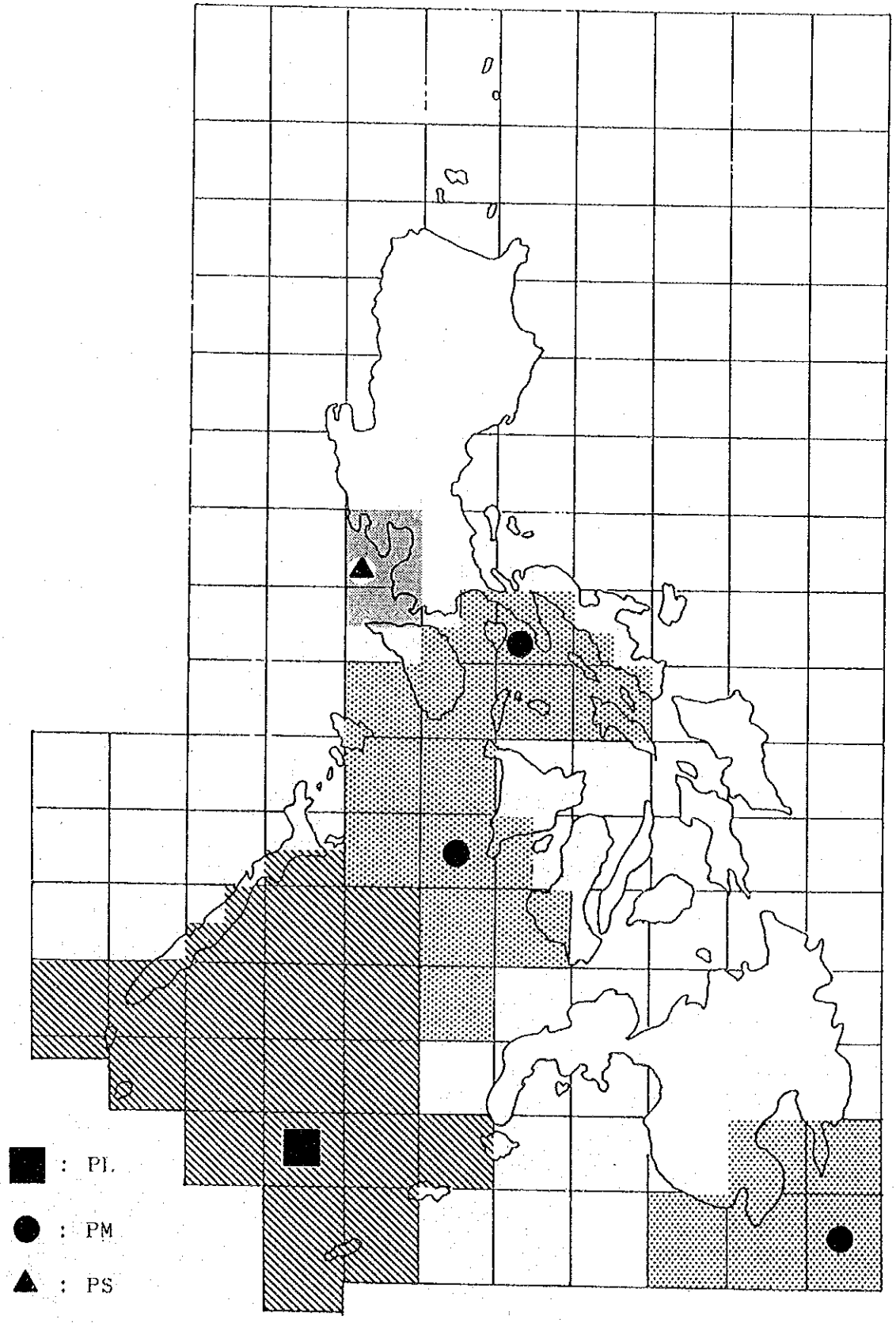
(Number of Deployment Point : 3)



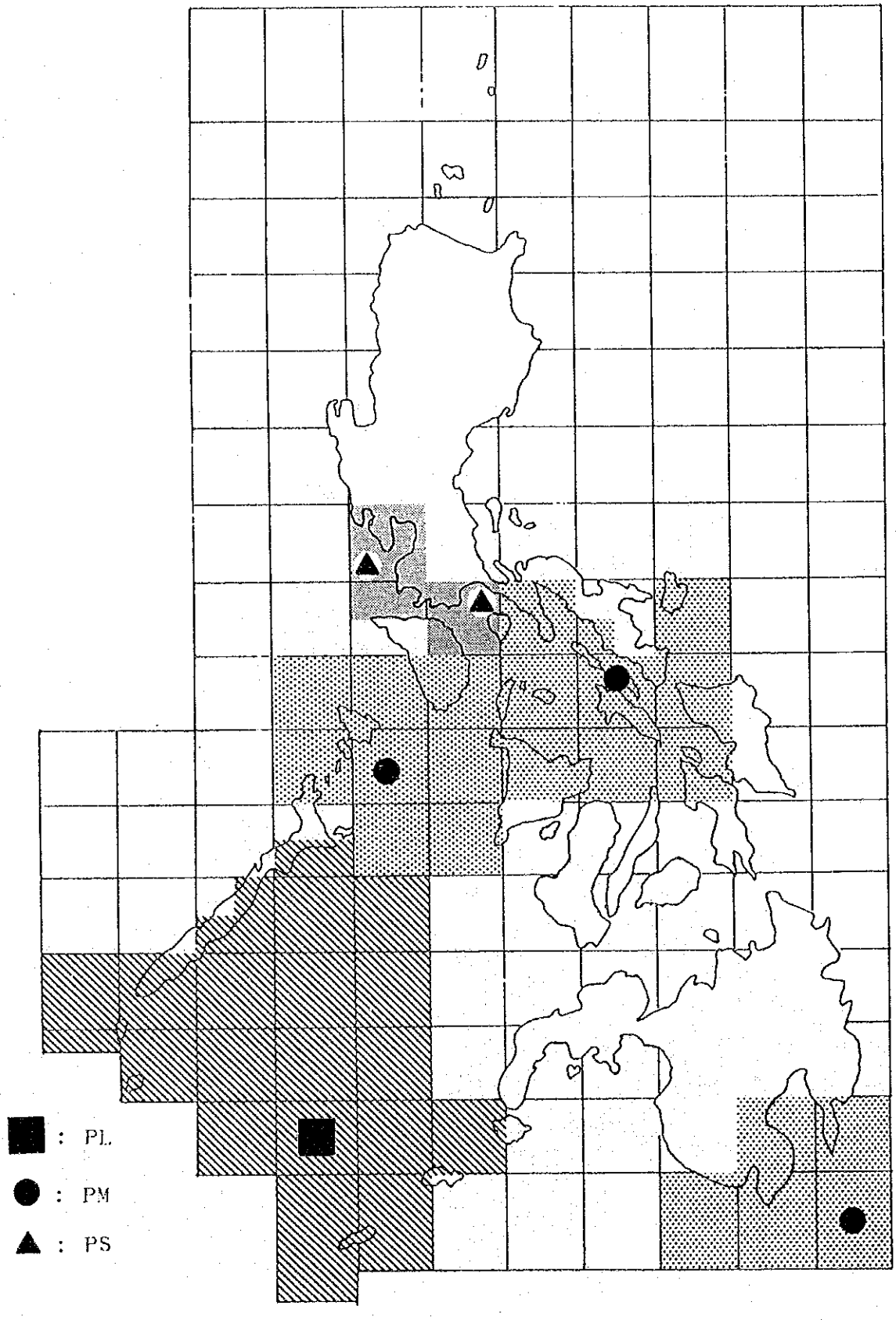
(Number of Deployment Point : 4)



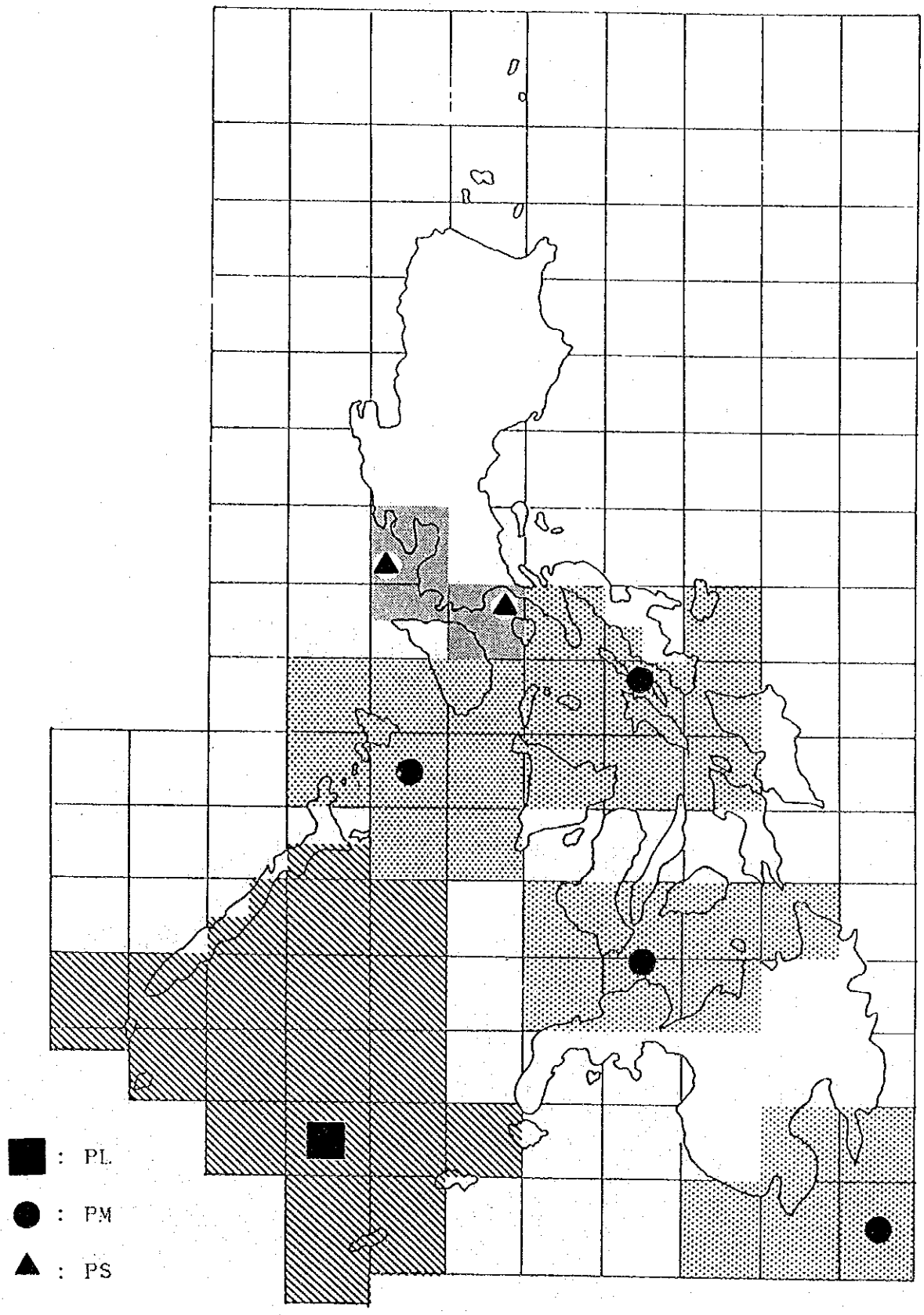
(Number of Deployment Point : 5)



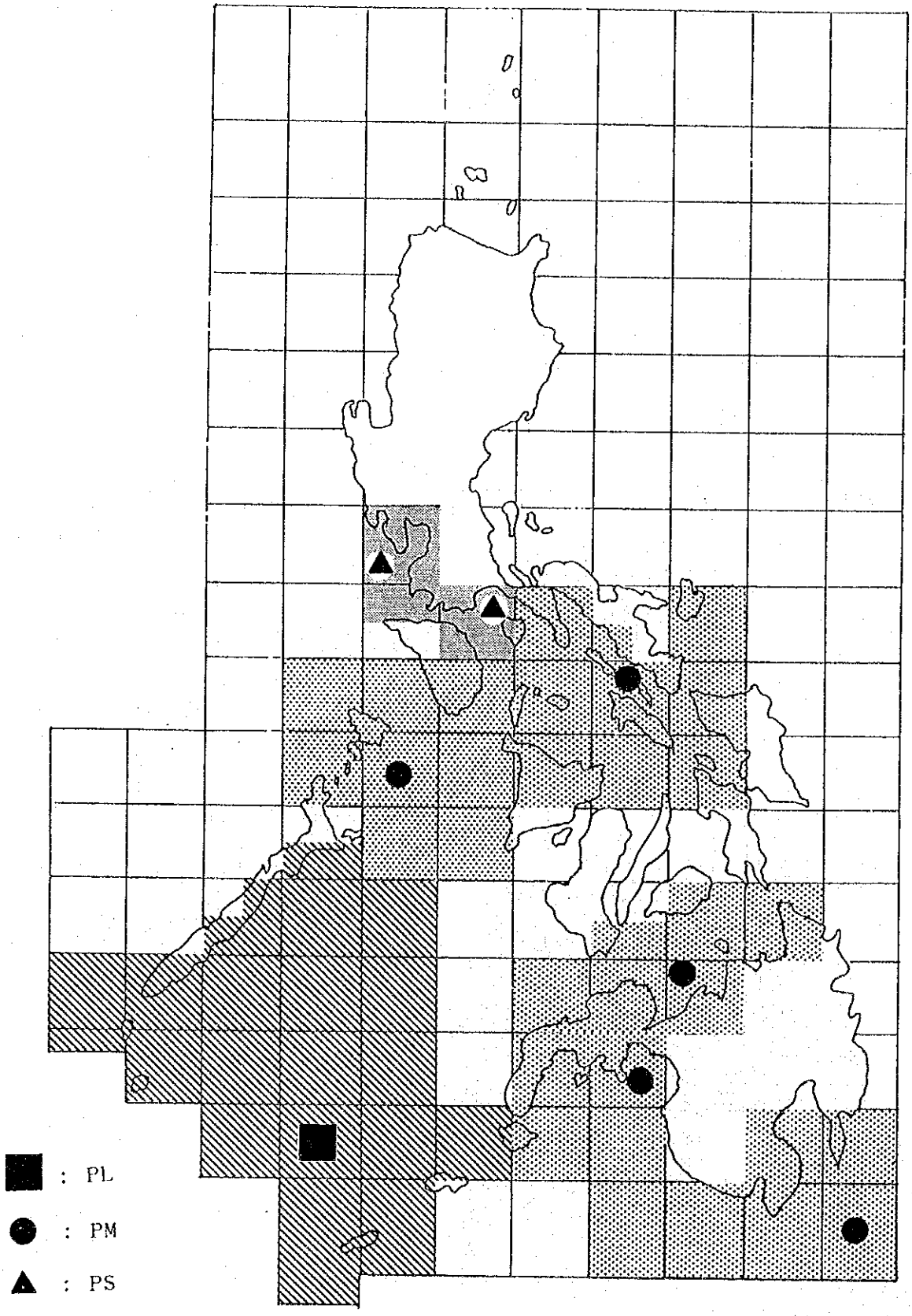
(Number of Deployment Point : 6)



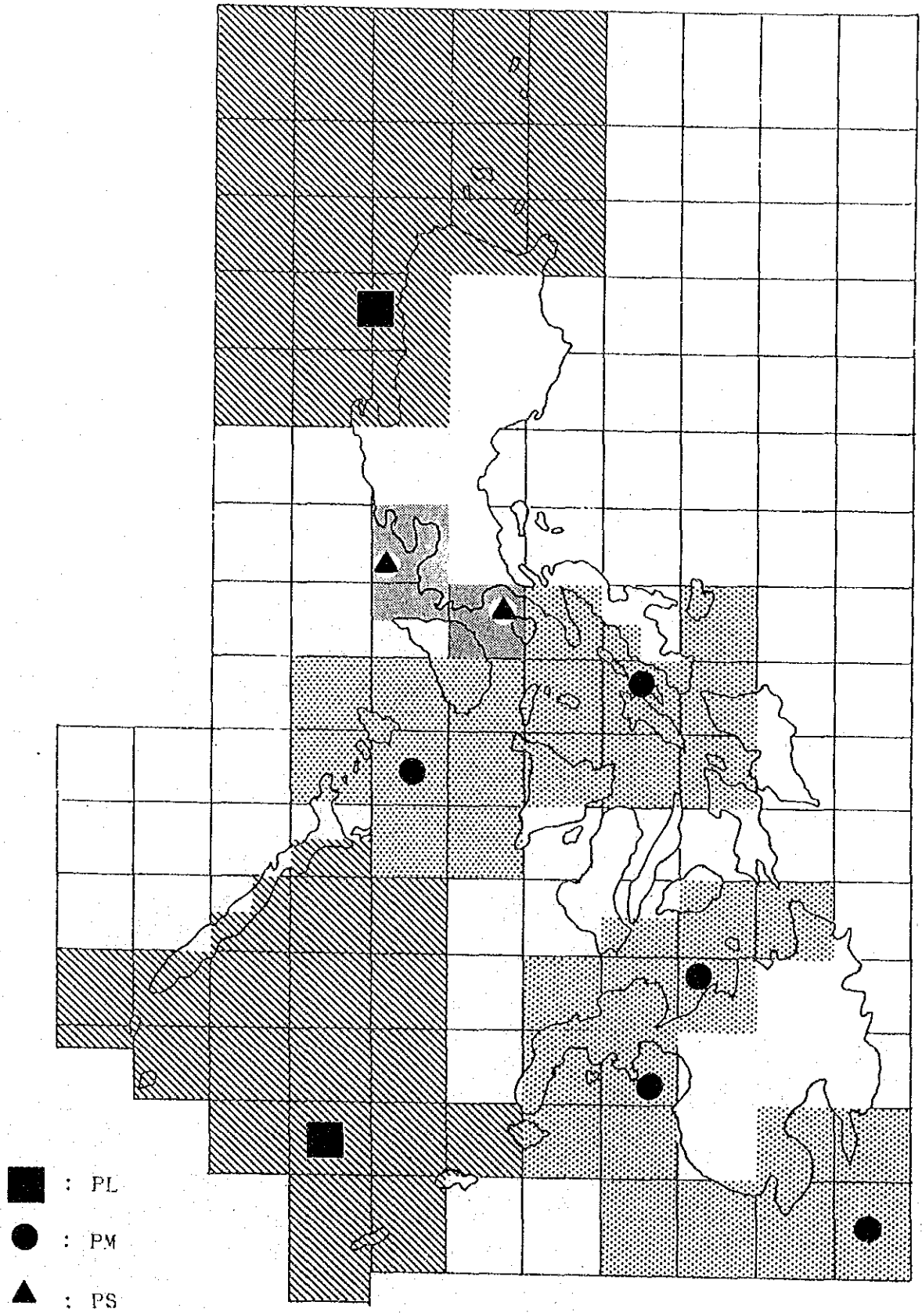
(Number of Deployment Point : 7)



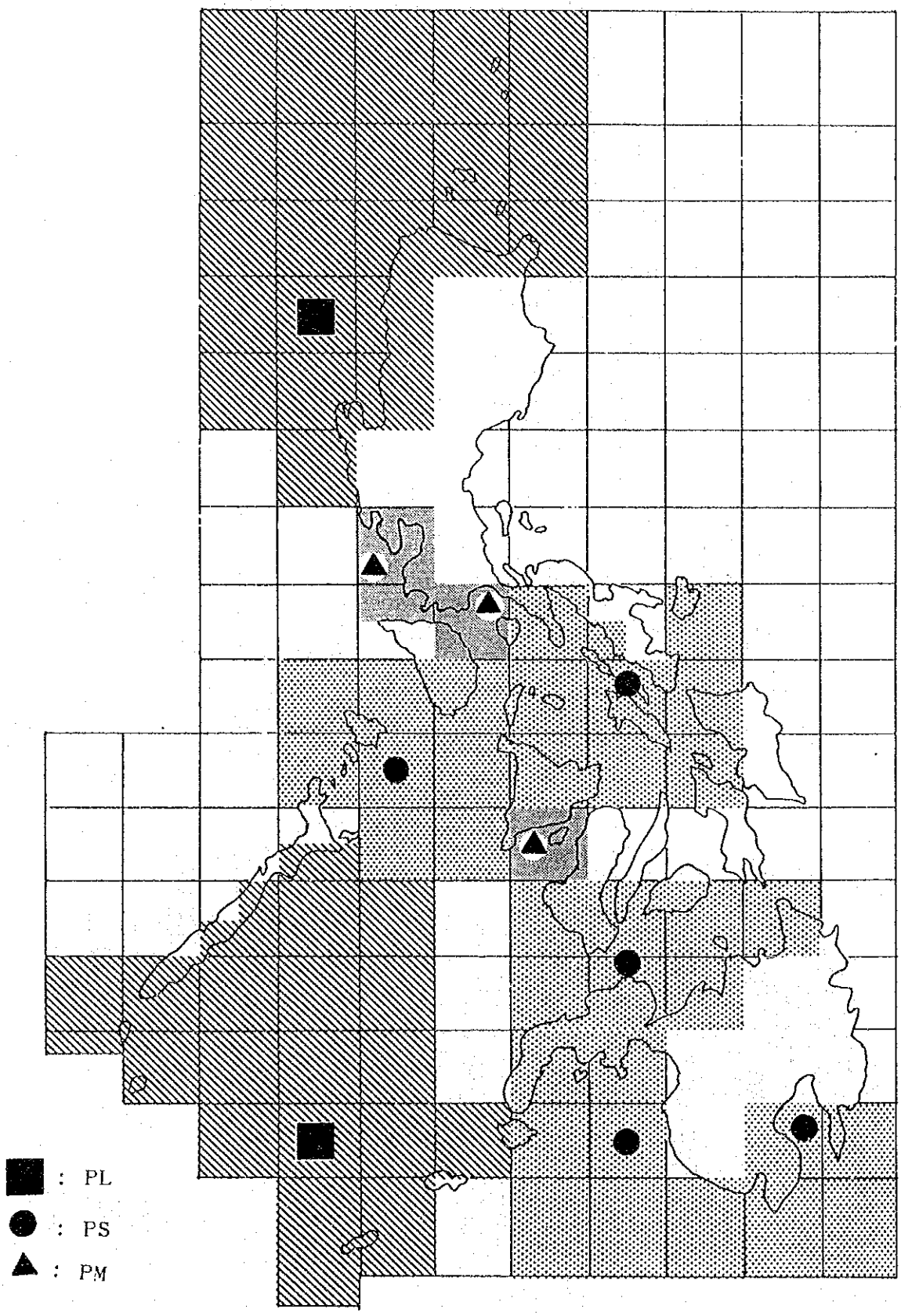
(Number of Deployment Point : 8)



(Number of Deployment Point : 9)



(Number of Deployment Point :10)

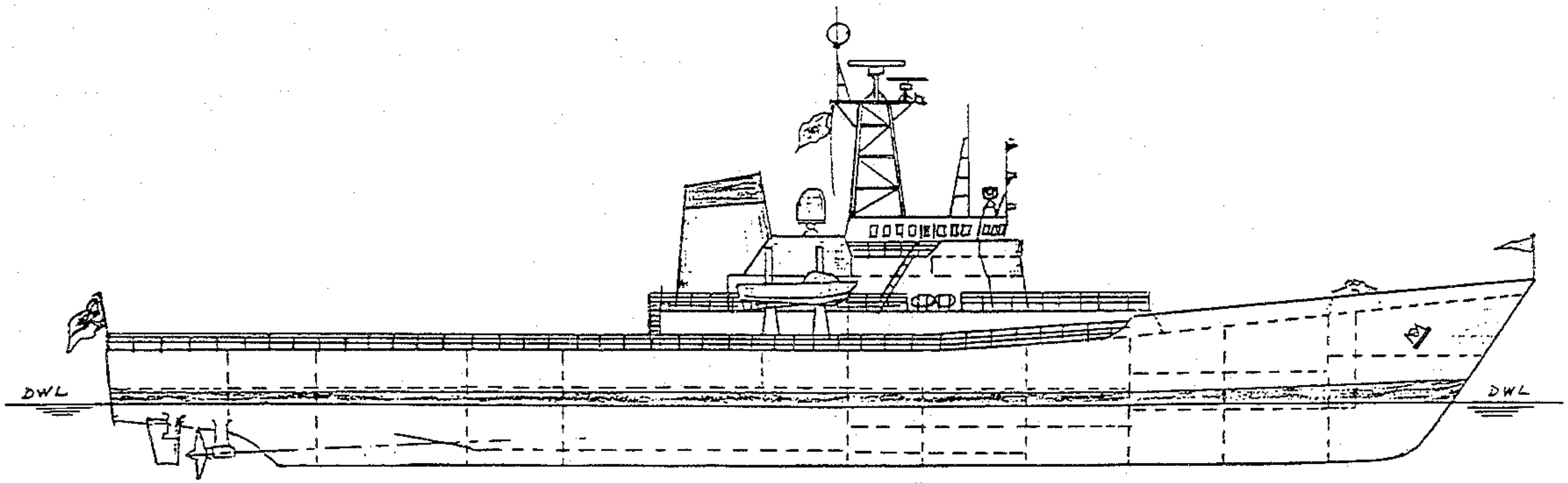


Annex 4.6
Principal Dimensions of Proposed SAR Vessels

LARGE TYPE SAR VESSEL

PRINCIPAL DIMENSIONS

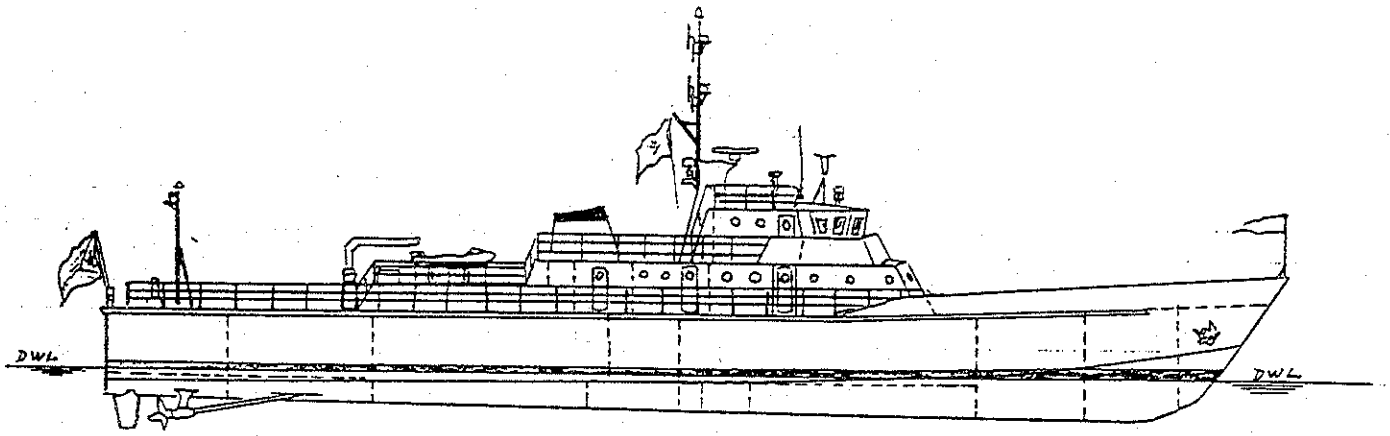
GROSS TONNAGE	1200t
LENGTH(p.p)	90.00m
BREADTH	11.00m
DEPTH	5.50m
DRAFT	3.50m
MAIN ENGINE	3,500ps X2
SPEED	20k'ts
CRUSING RANGE	3,000MILES
COMPLEMENT	60p
OTHERS	HELICOPTER DECK FIN STABILIZER



MEDIUM TYPE SAR VESSEL

PRINCIPAL DIMENSIONS

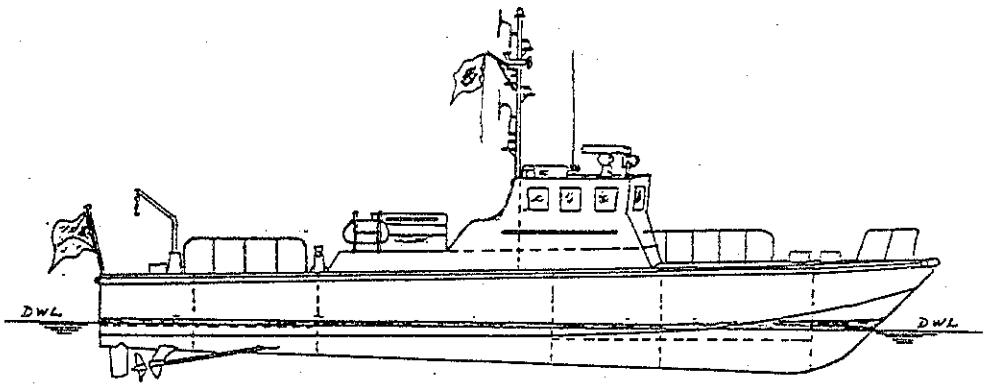
GROSS TONNAGE	350t
LENGTH(p.p)	50.00m
BREADTH	7.30m
DEPTH	3.90m
DRAFT	1.40m
MAIN ENGINE	2,500ps X2
SPEED	24k'ts
CRUSING RANGE	1,400NM
COMPLEMENT	30p
OTHERS	



SMALL TYPE SAR VESSEL

PRINCIPAL DIMENSIONS

GROSS TONNAGE	23t
LENGTH(p.p)	20.00m
BREADTH	4.30m
DEPTH	2.30m
DRAFT	0.90m
MAIN ENGINE	700ps X2
SPEED	25k'ts
CRUSING RANGE	200NM
COMPLEMENT	10p
OTHERS	



5. MARITIME SAFETY COMMUNICATION

5.1 Present Situation

Maritime Mobile Service, which is radio communication service between coast stations and ship stations, constitute an essential means for the stable management of ports and their further enhancement. Coast stations are land-based stations provided with radio equipment while ship stations are mobile stations located on-board a vessel. Maritime communications in the Philippines is being handled through public, private and gov't. coast stations.

At present, existing maritime communication in the Philippines is highly fragmented and ill-equipped draining the country's meager resources. With the current program implementation of the Maritime Communications Project Phases I and II (MCP I,II) of the Department of Transportation and Communications (DOTC), it is hoped that a total public maritime communications system would be established taking into account the present and future plans of a total telecommunications system in the Philippines.

In the Philippines, privately operated ship/coast stations play a lead role in sea communications. At present, there are about 4,417 domestically operated ships and 4,975 fishing boats. Domestic ships communicate mainly through private coast stations owned by their company or through public coast stations. The percentage of communication traffic for Distress/Safety Communication can not be ascertained at this point. As soon as a station receives a distress signal, the station operator reports it immediately to the PCG. In response, PCG immediately dispatches a lifeboat to the distress site.

5.1.1 Maritime Safety Communication System

Maritime Mobile Service has been managed and maintained by authorized public coast stations established by licensed private enterprises, private coast stations established by private enterprises, shipping or fishing companies and gov't coast stations established by government authorities.

- Public Coast Stations

  Authorized public coast stations are the facilities established by private communication enterprises licensed to handle public correspondence by the National Telecommunications Commission (NTC). Public coast stations handle the international public correspondence by means of A1 telegram and telephone

in the MF and HF band, and by means of F3 telephone in the VHF band. The may also handle official correspondence as entrusted by government agencies.

- Private Coast Stations

  Private coast stations handle private communications of private enterprises, shipping or fishing companies, e.g., shipping company's communications related to the needs and safety of its vessels and their cargoes, maintenance and navigations. Private correspondence is handled by means of A1 telegram in the HF band, SSB telephone in the MF or HF band and/or VHF telephone for the ships being registered by each private company coast station.

- Government Coast Stations

  Government Coast Stations are under the jurisdiction of gov't authorities. Official correspondence services are being handled by means of A1 telegram in the HF band. Government owned public coast stations should be established considering future demand of communication traffic. This will partly be realized in the Maritime Communication Project, Phase I and Phase II.

  The coast stations of the Philippine Port Authority are responsible for port control service of vessel entry and departure from the ports. The coast stations of the Philippine Coast Guard are responsible for emergency communications involving search and rescue services to secure safety of life at sea in the Philippine waters.

5.1.2 Philippine Coast Guard Station (PCG c/s)

The PCG acts as the National Maritime Rescue Coordination Center which responds at all aviation and shipping disasters at sea. The coast guard has eight (8) districts namely,

CGD	I	Manila
CGD	II	Cebu
CGD	III	Zamboanga
CGD	IV	Puerto Princesa
CGD	V	Batangas
CGD	VI	Iloilo
CGD	VII	San Fernando
CGD	VIII	Davao

situating a Rescue Coordinating Center (RCC) in each district. The RCC refers to units that coordinate and plan the Search and and Rescue Operation to vessels in

distress. The distress frequencies to be guarded by the PCG coast stations (as per the SAR communication system shown in Figure 5.1) are the following :

BANDS	FREQUENCY
VHF/FM Marine Band	Channel 16 (156.8 MHz)
MF/Voice (TP)	2182 KHz (SSB)
Medium Frequency (TG)	500 KHz (CW)

At present, the Radio Communication Center of the Headquarters PCG in Manila and the PCG Operation Center are equipped with the following :

1	HF radio transceiver (primary radio) synthesized
1	HF radio transceiver (backup radio)
1	VHF (Marine band) FM Base radio with repeater
4	VHF (Marine band) FM Hand held
1	Unit EPABX Telephone System 200 lines capacity
48	Lines PLDT Telephone Lines with 10 trunk lines

The PCG has 42 coastal stations but only 37 are recorded with radio equipment (see Figure 5.2). Most of the stations use two (2) radios, one (1) VHF (FM) radio and one (1) HF transceiver. These stations have two (2) frequencies on HF: one (1) primary frequency for operations and administration and one (1) listening frequency operating at 2182 KHz tuned for distress signals/calls. PCG has a medium frequency at 500 KHz which is not monitored by lack of equipment.

The two (2) radios in each station are insufficient. PCG needs an additional transceiver especially a watch receiver dedicated for the 2182 KHz frequency. PCG uses 5 channels that are commonly used in each PCG District Station, 3 of them for MF/HF equipments, 2 for VHF radios, as follows:

1. Primary Frequency - Administrative/ Operational Net (USB or LSB) HF.
2. Secondary Frequency - Administrative/ Operational Net (USB or LSB)HF
3. Listening Frequency - 2182 KHz Distress Monitoring MF (MHF)

Figure 5.1
PCG SAR Communication System

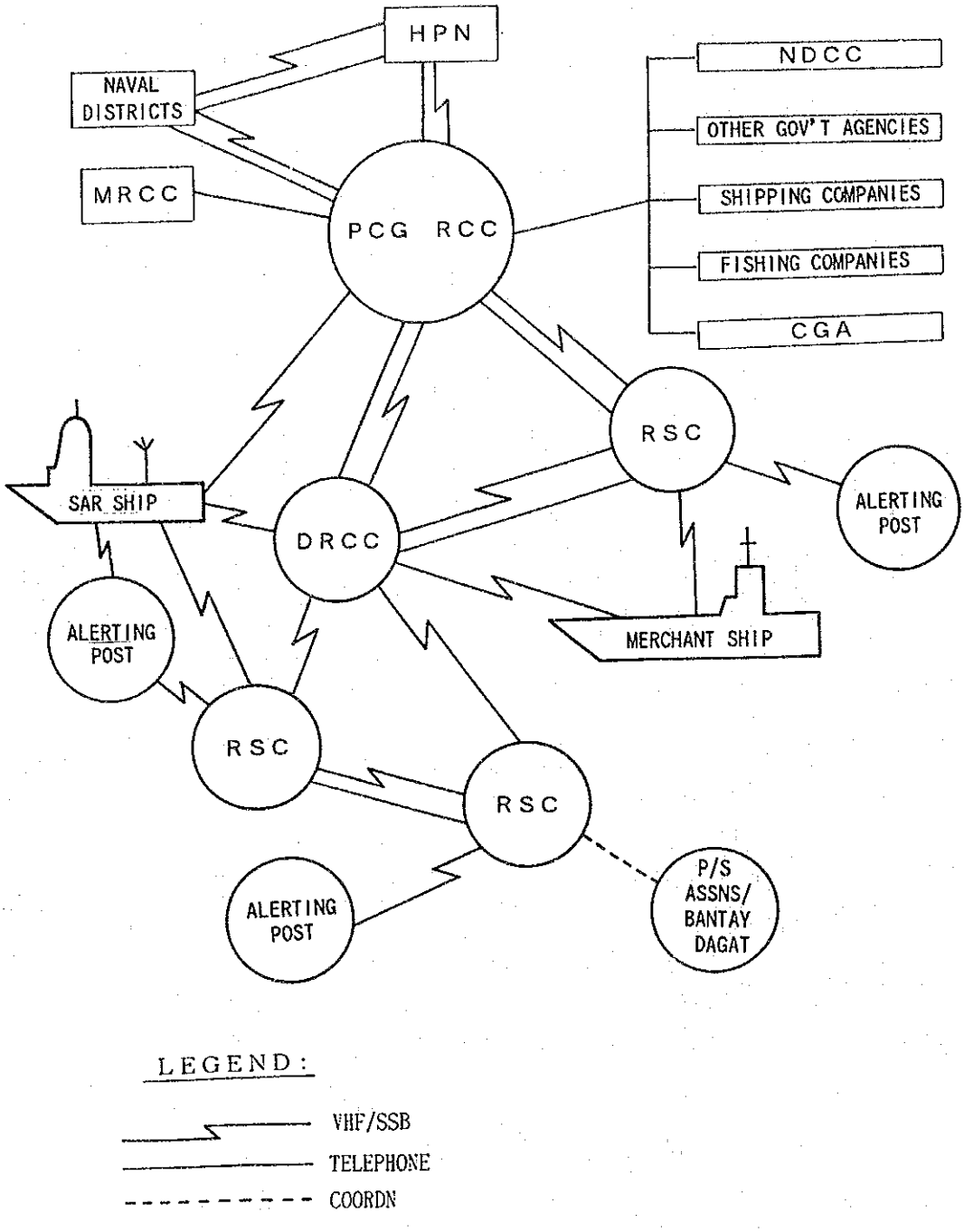
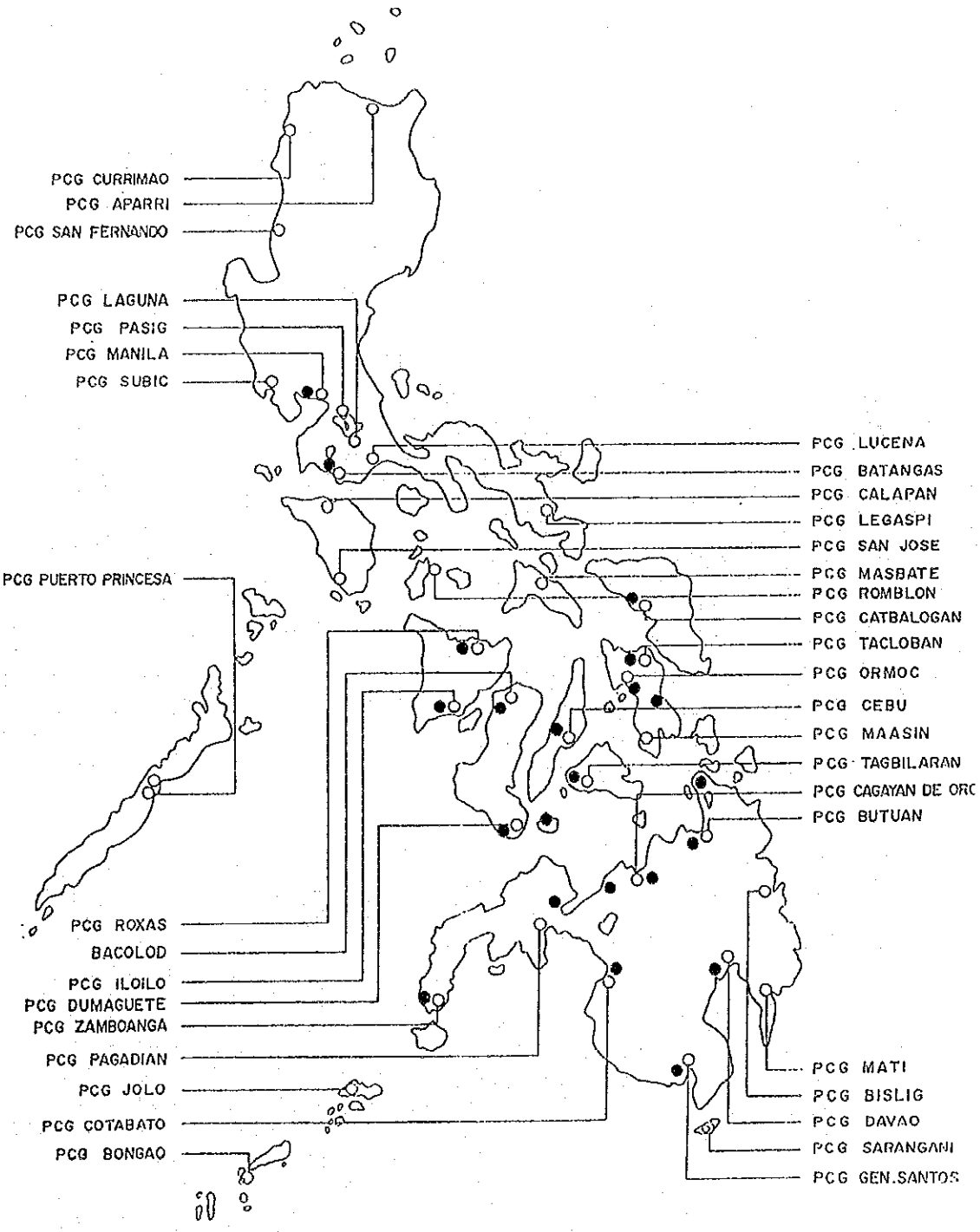


Figure 5.2
Coastal Stations



LEGEND:
○ PCG
● PISA / CISO

4. Listening Frequency _ CH (156.80 MHz) VHF/FM Marine Band

5. Tactical Frequency - VHF/FM Marine Band Channel Inter Coast Guard Network

In the PCG Detachments (133) only 30 detachments out of 133 are equipped with URC-187 radio, No RF-2301 transceivers are issued to detachments. Only coast guard stations (42) are equipped with RF-2301 radio transceivers (Note: data from PCG Headquarters communication office/CG Weapon Electronics Office (CGWEO)).

5.1.3 Maritime Mobile Service Improvement and Expansion Plan (DOTC-TELOF, Maritime Communication Project-MCP)

DOTC will request JTEC (Japan Telecommunications Engineering and Consulting Services) to conduct a study concerning the Maritime Mobile Service Improvement and Expansion Plan. Based on this study report by JTEC, a basic plan for nationwide maritime mobile service improvement and expansion will be formulated.

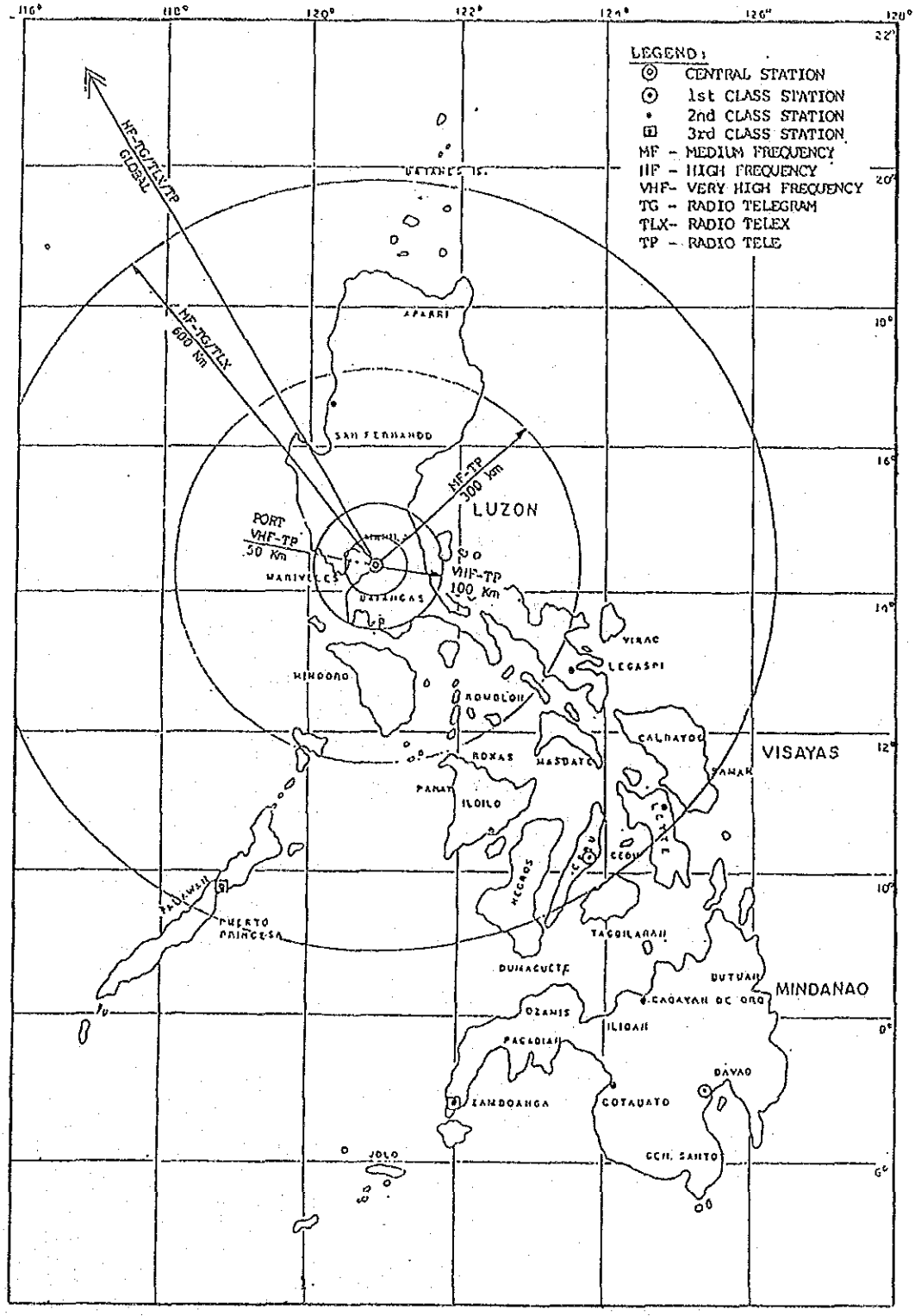
The plan to be named the Maritime Communication Project includes the construction of coast stations in 12 main port areas throughout the country using the Telecommunications Office (TELOF) of DOTC as executing agency. The operation and maintenance of these coast stations shall be undertaken by an organization to be newly established in TELOF. In other words, the plan was to place the management of maritime mobile service throughout the country under a single competent authority.

a) Maritime Communication Project-MCP Phase I

Concept

Maritime Mobile service is made possible by means of radio communication between a coast station and a ship station or between ship stations. The public and port coast stations to be constructed under the Phase I consists of the following four (4) sites: a) transmitting station located at Taguig, Metro Manila, b) receiving station located at Balagtas, Bulacan c) operation center located at Mandaluyong, Metro Manila, d) port station located at PPA Port Area, Manila.

Figure 5.3
Service Area Coverage
Phase I - Central Coast Station
(Metro Manila)



Service Area Coverage

The service area coverage for the MCP Phase I is shown in Figure 5.3. The station shall provide a coverage of 600 kilometers for MF telegraph and 300 kilometers for MF telephone. coverage area of HF telegraph and telephone shall be from the west coast of United States to the east coast of Africa. The coverage of the VHF telephone shall be 100 kilometers. Telegrams and telex calls from/to ship stations shall be connected to PT&T Exchange through the operation center. Telephone calls from/to stations shall be connected to/from the nearest telephone exchange of PLDT through the operation center.

The port radio station shall provide the radio telephone communication in VHF band with ship station in or near the port in which messages are restricted to those relating to the operational handling, movement and safety of ships and in emergency to the safety of persons. The coverage of the VHF telephone shall be about 50 kilometers.

Operating Frequency

Radio frequency whereby to operate Maritime Mobile Service are to be selected out of MF, HF, VHF bands. Frequency allocation in each frequency band is specified by radio regulation (RR) according to the regions (the whole world is divided into 3 regions and the Philippines is in Region 3 - KR392). Therefore, based on frequency allocation given in RR, selection is made for the operating frequency range in each frequency band in the plan. The selected operating frequency range is shown in Table 5.1.

Table 5.1
Operating Frequency Range

Band	Service Category	Frequency Range
MF	Radiotelegram and Radiotelex	405 - 535 khz
MF	Radiotelephone	1,606.5 - 3,900 khz
HF	Radiotelegram Radiotelephone and Radiotelex	4,000 - 4,438 khz(4 MHz) 6,200 - 6,525 khz(6 MHz) 8,100 - 8,815 khz(8 MHz) 12,230 -13,200 khz(12 MHz) 16,360 -17,410 khz(16 MHz) 22,000 -22,855 khz(22 MHz)
VHF	Radiotelephone	156 - 174 MHz

Concept

MCP Phase II will involve the construction of the other remaining eleven (11) stations, namely;

Cebu
Davao
Puerto Princesa
Zamboanga
Iloilo
San Fernando
Batangas
Cotabato
Legaspi
Cagayan De Oro
Tacloban

Service Area Coverage

This includes provision of public correspondence, distress and safety communication, port operation and ship movement services to the total coverage of 12 ports. Classified into the central stations, first class, 2nd and 3rd class stations by MF telegraph with a coverage of 600 kilometers, by MF telephone at 300 kilometers, VHF telephone at 100 kilometers and 50 kilometers. (see Figure 5.6)

Operating Frequency

The same operating frequency range as referred to Table 5.1. will be followed.

5.1.4 Public Coast Station and Private Coast Station Operated by Private Company

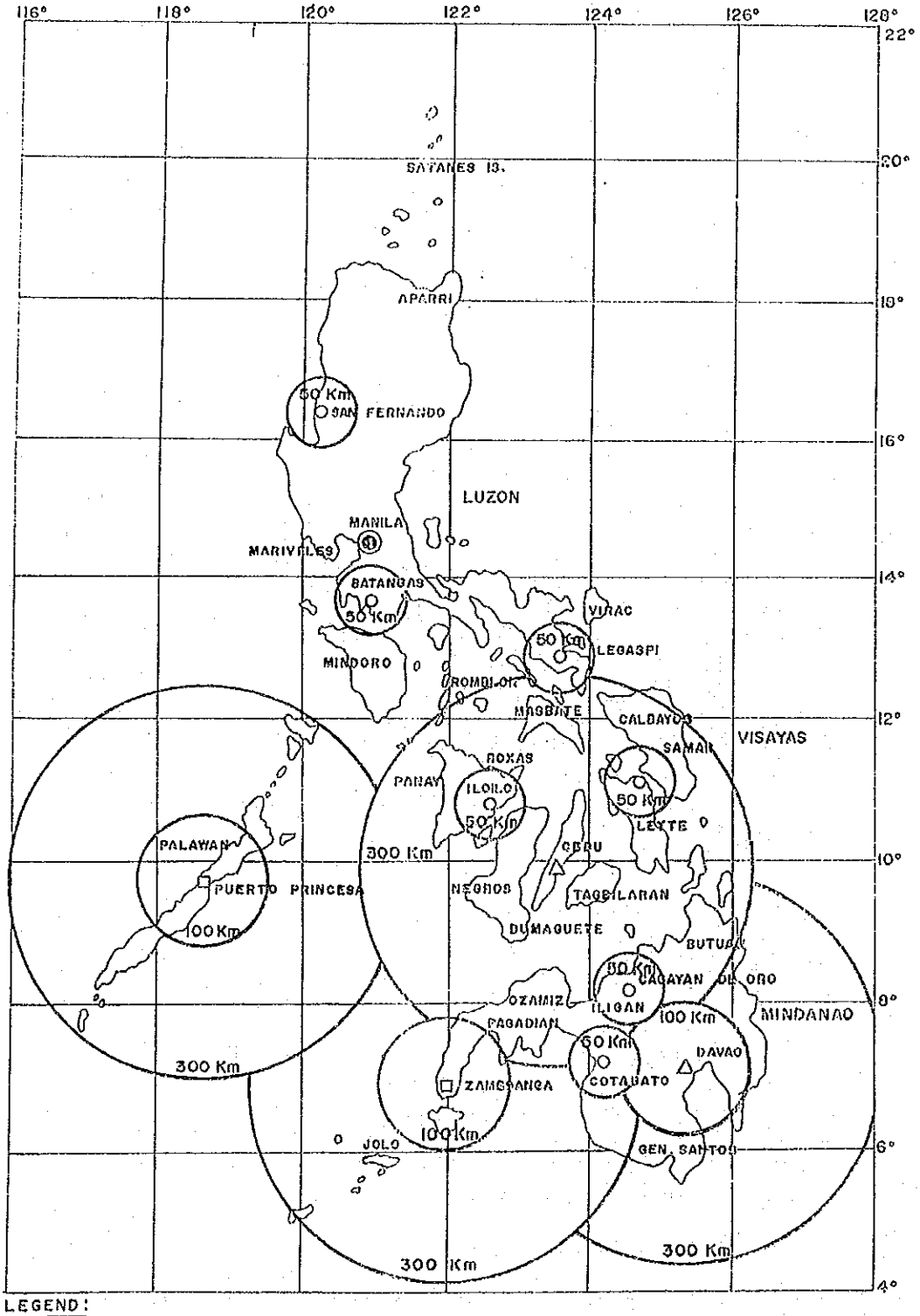
Public Coast Station

At present, there are 12 public Coast Stations licensed to operate by NTC. These are managed by private companies. Public Coast Stations utilize power output that could be as high as 25 W to 10 KW, using VHF, MF and HF frequencies. They handle mainly communication of ocean going vessels and foreign registered ships. As per Radio Regulation for Philippine Public Coast Stations, these stations are obliged to monitor the emergency radio frequencies 500 KHz, 2182 KHz and CH 16.

Private Coast Stations

Private Coast Stations are maintained and operated by major shipping companies that install radio stations in their branch offices located in major ports in the country, i.e., Cebu, Iloilo, Davao, etc.

Figure 5.4
Service Area Coverage MCP Phase II



NTC has at present duly licensed about 185 private coast stations. Most of these are fishing, shipping companies or related companies in marine transportation or shipping.

Private coast stations' services are limited to its own ships or its related shipping group or services, free of charge. When such services cease, for one reason or another, the coast station simply remains closed. Private coast stations' licenses are issued freely through application. Licenses' validity is for three (3) years. This free issuance of station application would be indicative of the expansion of business, thus, of economic activity.

5.1.5 Radio Equipment on Board (Domestic Ship)

Regulation pertinent to installation duty referring only to domestic ships, as contained in ACT 3396 and NTC circular 4-09-88, are shown in Table 5.2.

Table 5.2
Radio Equipment On-Board Domestic Ships

Tonnage	Distance to be	Obligation (Radios)
PASSENGER		
less 350 ton	less 5 Hrs	CH16, CH12, CH6
more 350 ton	more 5 Hrs	CH16, CH12, CH6
less 350 ton	more 5 Hrs	CH16, CH12, CH6 2182 KHz, 4125/6215.5 KHz
more 350 ton	more 5 Hrs	CH16, CH12, CH6 2182 KHz, 4125 KHz, 6215.5KHz
CARGO		
less 350 ton	less 5 Hrs	
more 350 ton	more 5 Hrs	CH16, CH12, CH6
less 350 ton	more 5 Hrs	CH16, CH12, CH6 2182KHz, 4128KHz, 6215.5KHz 500KHz
more 350 ton	more 5 Hrs	CH16, CH12, CH6 2182KHz, 4125KHz, 6215.5KHz 1 ST BY
SPECIAL		
less 350 ton	less 60 NM	CH16, CH12, CH6
more 350 ton	more 60 NM	CH16, CH12, CH6 2182KHz, 4128KHz, 6215.5KHz 500KHz
less 350 ton	more 60 NM	CH16, CH12, CH6 2182KHz, 4125KHz, 6215.5KHz 1 ST BY
more 350 ton	more 60 NM	CH16, CH12, CH6 2182KHz, 4125KHz, 6215.5KHz 1 ST BY

In cases of violation regarding inspection of equipment regulation, a penalty clause is contained in APPENDIX B, Section 2 of Legislative Enactment entitled:

AN ACT TO MAKE THE INSTALLATIONS OF RADIO APPARATUS OBLIGATORY FOR SHIPS OF PHILIPPINE REGISTER, PROVIDE FOR THE OPERATION THEREOF AND ESTABLISH PENALTIES FOR VIOLATIONS.

"Section 2. Vessels of Philippine register engaged in coastwise trade and authorized to carry passengers and/or freight and cargo vessels of Philippine register of three hundred fifty tons gross or over engaged in coastwise trade, the number of crew complement notwithstanding, except vessels plying exclusively on rivers, lakes, and bays, and on straits when the distance traversed is not greater than sixty miles point to point and its voyage does not last over five hours, shall be equipped with radio apparatus capable of sending and receiving communications over a distance of not less than two hundred nautical miles by day and night. (As amended by Act No. 4072 and by Rep. Act No. 1539, approved 16, 1956.)"

However, there is an exception to this regulation. This applies to ships that navigate a river, a lake, within a bay, and a strait within a navigation distance of 60 miles. This means wooden size small ships or bancas are exempted from this regulation. They are not required to install radio equipment on board. (ACT 4072; REP ACT 1539)

Ironically, accidents occur most for bancas.

The list and type of current radio equipment on board ships, operated by major shipping companies that are members of a shipowners alliance, CISO (Conference of Interisland Operators), are shown in Table 5.3.

Table 5.3
Quantity of Radio Equipment and RADAR installed on board

(set)

Radio Situation	M F Telegraphy	MHF Telephony	H F Telegr/Teleph	V H F (FM)	Total	RADAR
Operational	67	39	145	268	519	175
Non - Operational	0	0	18	1	19	3
Sub Total	67	39	163	269	538	178

Total shipping company : 63
(No. of ship: 308, Average tonnage/ship: 1075)

Most of the radio equipment are obsolete. Shipping companies are replacing them to new model VHF/FMs.

5.1.6 PAGASA Information Network

PAGASA is the Agency mainly responsible for reporting weather bulletins. This office also, predicts/give out information on the occurrence of typhoons which is the main cause of distress or disaster. At present, PAGASA delivers information on Maritime Safety, via: 1) general broadcast by BC band 2) broadcast for 12 Public Coast Stations which are operated privately 3) warning or safety information to ships then communicated to commercial coastal radio stations that are privately operated by fishing or shipping companies. PAGASA relays the information to media through telephone, FAX and TELEX.

The number of telephone lines, FAX and TELEX transmission links are not sufficient. Immediate response to an information demand that increases in cases of emergency is not met. Usual communication of information from PAGASA coming from the region is done through public telephone lines or the use of PAGASA HF network. This requires some time before communication is transmitted.

However, at present, PAGASA plans to establish its own nationwide microwave link. When completed, this will render the transmission of typhoon predictions, from the Manila Weather Center to a user, through the PAGASA office in the regions, at a faster rate. Likewise, speedier transmission of information obtained from media broadcast to the Public Coast Stations and the District PCG Coast Station shall be achieved. (Fig.5.5, 5.6)

5.2 Problems and Issues

5.2.1 Public and Private Coast Stations

In almost all public coast stations, the radio equipment are of World War II vintage, therefore, timeworn and unreliable to provide public communication. Spare parts for these equipment are often out of stock.

In terms of message and voice delivery, the public coastal stations make use of the public communication network for lack of capital to invest on or lease private message companies and private or dedicated telephone lines.

Figure 5.5
PAGASA Dissemination and Information Network

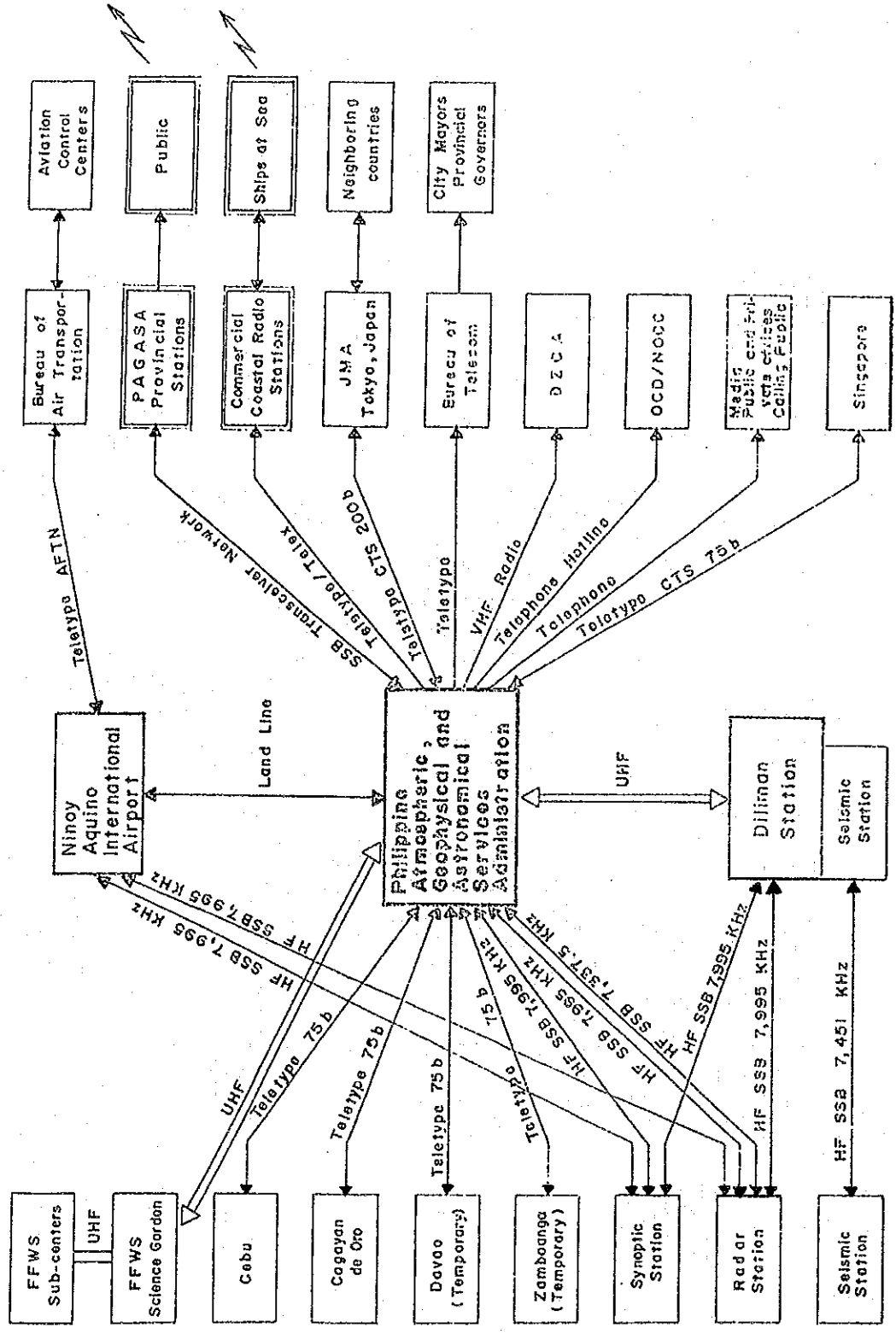
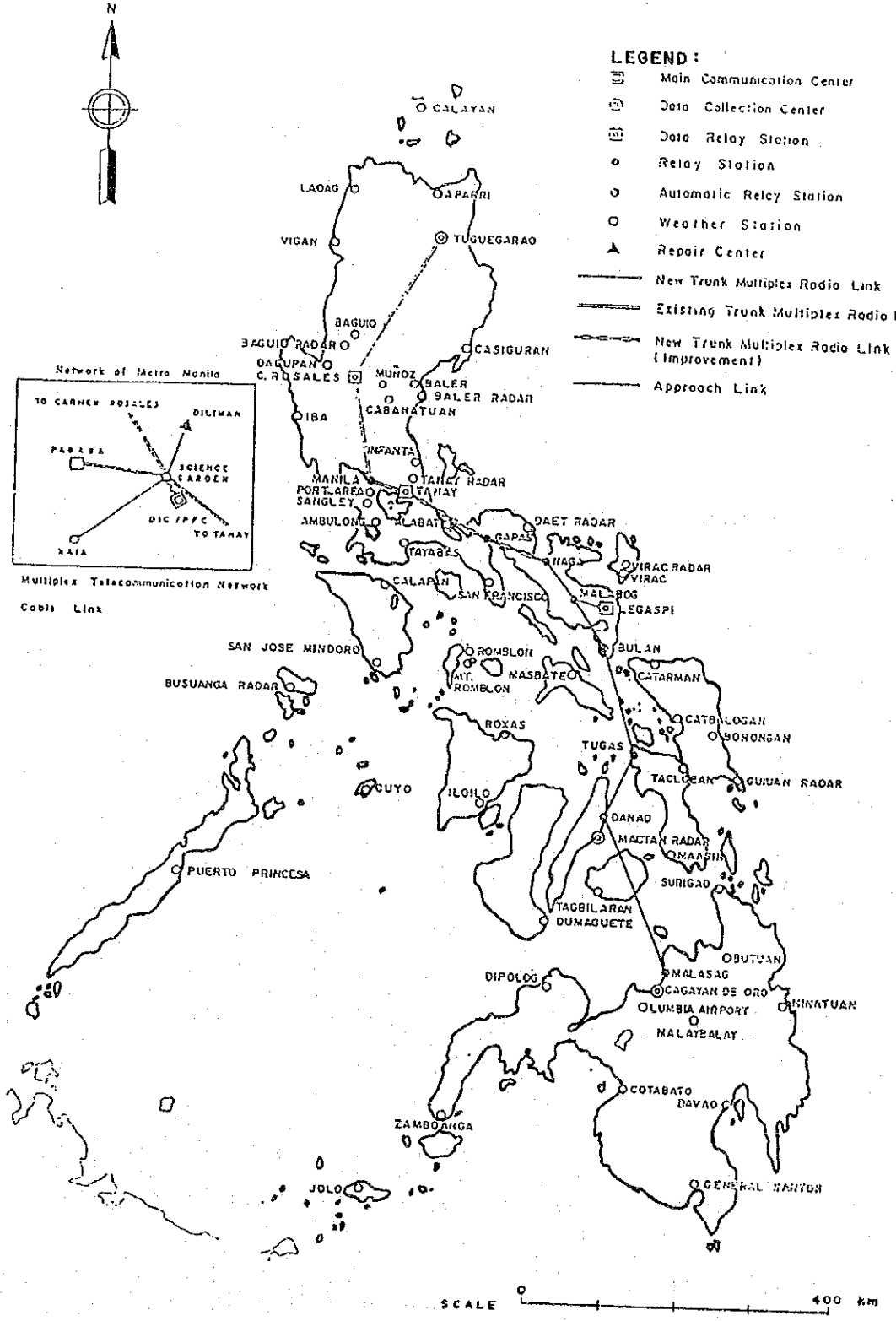


Figure 5.6
PAGASA Project Plan



Because of these, it is difficult for the existing public coast stations to offer quick and stable services to public users.

On the other hand, the private coast stations are better equipped than the public coast stations. The reasons for the growing number of private coast stations is revealing of the sorry state of the public coast stations, as follows:

a. Existing public maritime communication services are not sufficient.

b. Existing public coast stations operate independently from each other with each public coast station having its own limited number of customers limiting the area of service offered to ships,

c. Private companies are wary of breach in privacy of business secrecies by using the public coast station.

The Multiplicity of Coast Stations that handle public correspondence in one port area, not only inconvenience the public/users, but also has largely been uneconomical in terms of balance of operations and profitability. The shipping depression brought about by two consecutive oil crises, both in 1973 and in 1979 has made maintenance and operation of coast stations more difficult. They had to manage themselves with outdated and worn-out equipment.

The government coast stations are in sorrier state. The PCG stations are ill-equipped aside from the fact that its radio communication capability is limited. Aside from additional needs of transceivers, the PCG needs to upgrade its existing equipment and needs an additional frequency to monitor distress signals. Also, the Maritime Rescue Coordination Center and its district RCCs have no linkages with COSPAS-SARSAT and INMARSAT for the GMDSS SAR Systems; have no radio direction capability; no LUT to monitor EPIRB at 406 MHz (but most Philippine vessels are not equipped with EPIRB); and, no capability to watch the MF/HF distress frequencies with Digital Selective Calling (DSC).

5.2.2 On Board Radio Facilities

Radio facilities on board for over 350 GRT vessels are compulsory. However, PCG statistics show that about 50% of accidents are accounted for by small boats that are less than 300 GRT.

Non-availability of radio facilities for less than 300 GRT vessels causes delay in accident reporting and/or request for rescue.

5.3 Improvement Plan

Two (2) dominant issues/problems have been identified in this study plan concerning Maritime Safety Communication. First, is the issue on communication equipment on board Philippine ships, while the second, is that on the provision of Maritime Mobile Service in the country, which is radio communication between coast stations and ships stations. Both bespeaks of the insufficient and inadequate maritime communication facilities in the country.

On Board Radio Facilities

There is an urgent need to improve the communication equipment of Philippine ships. At present, it is sufficient to have VHF as the standard radio equipment prescribed by the Radio Regulation of the Philippines. However, PCG statistics record a very high incidence of accidents (75 percent) from vessels below 250 tons i.e., from motor bancas most of which are below 20 tons. It should be noted that 60% of ships are boats below 20 tons which are mostly fishing vessels/boats. Fishing boats are exempted from the Philippine Radio Regulation that "exempts ships that navigate a river, lake, a bay or a strait", from installing radio equipment.

Installation of radio equipment to small sized ships of 10 tons and those under 350 tons should be considered. The international standard VHF CH 16 that is required of more than 350 ton ships applies to international voyage vessels, therefore, it cannot be applied to small coastal ships.

Maritime Mobile Service

Existing Maritime Communications in the Philippines is highly fragmented and ill-equipped draining the country's meager resources. Problems identified largely center on the provision of Maritime Mobile Service managed and maintained by authorized public coast stations, private coast stations and government coast stations.

Steps to improve the situation is currently undertaken with the on-going implementation of the MCP I,II, a DOTC - TELOF project. The basic plan includes the formulation of a nationwide Maritime Mobile Service improvement and expansion program which incorporates provisions for Maritime Safety Communication. However, it has been observed that provisions for Maritime Safety Communication in particular, search and rescue are insufficient with the project concentrating highly on public correspondence. The project plan, for instance, has not included the possibility of remote reception and transmission to the PCG (via the PPA extension in the MCP) which is a

very important link. PCG should request the MCP to reconsider, as part of the MCP coast station equipment, provisions for direct reception and transmission of communication from the MCP coast station to the PCG (PPA extension).

The short and long term plans of Maritime Safety Communication, therefore have been drawn with the view of strengthening and improving Safety Communications for Search and Rescue. To this end, the Philippine Coast Guard, which is the government agency directly responsible for the management and operations of the RCCs tasked for search and rescue, should consider putting up its own coast station, and its own nationwide communication network. The laid out plans, both on the short and long term, are geared towards PCG's own coast station and its own nationwide communication network.

5.3.1 Short Term Plan (1992-1995)

On Board Radio Facilities (501)

To improve the communication equipment of Philippine ships, and in view of the recorded high incidence of accidents from vessels below 250 tons, it is recommended that the 27 MHz CB (AM/SSB) Radio telephone be installed to small sized ships. The usage and technology standard are contained in Radio Law APP z 106. The 26.065 MHz(CH 9) and an emergency channel may be adopted, with the radio installed both on land and on ships. PCG watch on CH 9 should be done on a 24-hour basis. Coverage of CB 27MHz is approximate 50Km from 50m height antenna tower of the base station and is approximate 20Km from 10m height antenna tower.

On a short term basis, Philippine authorities should look closely into above, and come up with a policy requiring vessels to be equipped with small powered radio equipment. Implementation of such radio regulation requirements should be within the jurisdiction of the Bureau of Fisheries.

Maritime Mobile Service

Provisions for Maritime Safety Communication will be towards improving the PCG's capability on its search and rescue operations. In the future, this should consider a plan for PCG to put up its own nationwide communication network.

In consideration of the above, the following are proposed to be looked into as a short-term plan covering the period 1992-1995 :

a) An HF Network that will link the 8 CG districts to the PCG Manila Headquarters and subsequently, to the 133 PCG detachments, as follows: (502)

- HF 400 w + antenna + ARQ equipment, P-P system for 8 CG districts

- HF 100 w + antenna + power supply equipment, P-P system for 133 PCG detachments

- 27 MHz CB radio + antenna, maritime mobile system for 12 PCG Stations and 133 detachments.

b) At present, as an improvement to the MCP Phase I, 5 KW transmitter (3 units), receivers (3 units), A/A receiver (6 units), to provide a direct link from the Manila Central Coast Station to the PCG/RCC room will be added. However, to reinforce the safety communication provision of MCP Phase I, a complete set of NAVTEX transmitter and 518 khz + terminal corresponding to GMDSS, which is an effective navigation warning system for domestic ships should be installed. (503)

c) An INMARSAT SES (Ship Earth Station) introduced as a communication equipment in the RCC/PCG HQ, the regional RCCs and the RCCs of neighboring countries. This is proposed in 4 PCG/RCCs, namely: Manila, Cebu, Davao and Zamboanga to operate as a public terminal using the dial system, via Telephone, FAX and TELEX. (504)

5.3.2 Long Term Plan (1996-2010)

Maritime Search and Rescue (MSAR) responsibility is vested in the Coast Guard. The PCG communication network centering around the RCC is shown in Figure 5.1. It is to be noted, however, that the present communication system on Maritime Safety is focused mainly on communication transmission and response only at the time of distress. Broadcast equipment, for instance, used in issuance of navigational warnings as a preventive measure used in overall maritime safety is not at all considered in maritime safety communication.

The Philippine Coast Guard in its paper submitted to the North Eastern Pacific Conference on SAR, submitted its proposal to establish a communication network and its communication facilities, as follows:

a) Establishment of a linkage between the PCG's MRCC and other satellite SAR network.

b) Acquisition of additional communication equipment and a radio direction finding equipment for national MSAR at HQ. of PCG, 8 RCCs of the CGD and 45 Rescue subcenters of the CG Stations.

c) Prescription of EPIRB for RP registered vessels of over 250 tons.

Included as proposals for a long-term plan (1996-2010), and taking the above PCG requirements into serious consideration, are the following three:

a) COSPAS/SARSAT LUT station in Cebu ; construction of an EPIRB/406MHz earth station corresponding to GMDSS that enables one to confirm the precise/real time position of an emergency beacon. The success of the system, however, is highly dependent on the EPIRB installed for every RP vessels of over 250 tons (at present, RP vessels are not equipped with EPIRB). (505)

b) Construction of PCG exclusive coast stations in the 8 PCG districts equipped with a NAVTEX Broadcasting (BC) system, P-P system. It would be important for the PCG to operate its own coast stations as the traffic volume increases through the years. (506)

c) Introduction of electronic equipment to RCC, an ECD (Electronic Chart Device), a MES linkage line to LUT. The message exchange system/MES in each district will have the RCC as the center of communication, directly connected with agencies operating telex. An exclusive circuit will be set-up between RCC and LUT. The ECD enables the display of the sea area to be carried out immediately. (507)

In addition to these three projects, other three projects are recommended to be continued the formers even though the latters will be initiated to introduce after the year 2010. These three future concepts are:

a) Introduction of INMARSAT Standard-C CES.
Standard-C is a newly developed INMARSAT system/digital corresponding to GMDSS where only telex communication is possible.

However, a Ship Earth Terminal is easier to operate, is lighter in weight, and is small, that can easily be installed in small sized ship. Construction of an earth station, accessing to a Pacific Satellite would be necessary. Also, the

terminal should connect with the RCC/PCG in order to carry out automatic transmission of distress signal.

b) Construction of a PCG Microwave Trunkline which coverage is nationwide. The microwave link of 2 GHz PCM 30 CH will be constructed following a route from San Fernando to Zamboanga.

c) Introduction of PHILREP/Ship Reporting System as prescribed in the SAR treaty. Appealing for reporting of ship's position to every ship that leave/enter port territorial waters contributes highly to search and rescue at the time of distress. This will also provide PCG data on foreign and national ships inside our territorial waters. Ship information outside of our territorial waters is reported to AMVER, JASREP and AUSREP.

5.4 Costs

Disregarded are land acquisition costs and building cost. Costs of installment, adjustment, final check and training are included.

Fixed price in 1991 is used for costings and 5:1 for Japanese Yen to Peso assumed as changing rate.

5.4.1 Short Term Improvement Plan (1992-1995)

a) HF networks between PCG HQ., HQ of regions and detachments (502)

1. HF 400 W and ARQ System

HF SSB 400 W Transmitters
MF/HF Receivers
ARQ Teletype Equipments
HF Dipole Antennas
Installation Materials

Subtotal 56,000,000 yen for 8 stations

2. HF 100 W System

HF SSB 100 W Transceivers
AC/DC Power Supplys
HF Dipole Antennas
Installation Materials

Subtotal 199,500,000 yen for 133 stations

3. 27 MHz CB Radio System

27 MHz 10W CB Radios
AC/DC Power Supplys
27 MHz Whip Antennas
Installation Materials

Subtotal 87,500,000 yen for 175 stations

Total Cost of HF network 343,000,000 yen

b) Reinforcement of MCP Phase I (503)

MF 5 KW Transmitter
MF/HF 5 KW Transmitter
MF Antenna
MF/HF Antenna
NAVTEX Terminal
500 KHz A/A Remote Control Receiver
2182 KHz A/A Remote Control Receiver
MF/HF Receiver

Total Cost 80,000,000 yen

c) INMARSAT SES Terminal (504)

Upper Deck Equipments
Lower Deck Equipments
Facsimile Equipments
Installation Materials

Total Cost for 4 Units 50,000,000 yen

5.4.2 Long Term Improvement Plan (1996-2010)

a) LUT for COSPAS/SARSAT (505)

Local User Terminal
MCC System
Installation Materials

Total Cost 600,000,000 yen

b) PCG Coast Radio Stations (506)

Manila Central Station

MF/HF Transmitters $ Receivers
Remote Control System
Antennas for Tx $ Rx
Operation Consoles
VHF Transmitters $ Receivers
NAVTEX Terminal
DSC Terminal
Emergency Power System
Installation Materials
Subtotal for Manila Station 1,000,000,000 yen

Regional Stations

MF/HF Transmitters $ Receivers
Remote Control Systems
Antennas for Tx $ Rx
Operation Consoles
VHF Transmitters $ Receivers
NAVTEX Terminal
DSC Terminal
Emergency Power System
Installation Materials

Subtotal for 3 Local Stations 350,000,000 yen x 3
for 4 Local Stations 250,000,000 yen x 4

Total for PCG Coast Radio Stations 3,058,000,000 yen

c) MRCC Electronic Equipments (507)

Electronic Chart Devices
Electronic Telex Exchangers
Mimic Panels
G III Facsimiles
Teletypewriters

Total for 8 Units 500,000,000 yen

5.4.3 Personnels required for Projects

Projects required additional personnels are HF networks between PCG HQ., HQ. of regions and detachments (502), COSPAS/SARSAT LUT station (505), PCG radio stations (506) and MRCC electronic equipments installation (507).

a) HF Networks between PCG HQ., HQ. of regions and detachments (502)

Station	Radio Operator	Maintenance Staff	Administration	Total
Manila	4psn x 3shift+2psn	4psn+1psn	8psn	27psn
A class (3 stn)	2psn x 3shift+1psn	2psn	5psn	14 x 3 psn
B class (4 stn)	2psn x 3shift+1psn	1psn	4psn	12 x 4 psn
Other (34stn)	1psn x 2shift+1psn	1psn	2psn	6 x 34 psn
Detachment	1psn+1psn			2 x133 psn

b) COSPAS/SARSAT LUT Station (505)

Station	Radio Operator	Maintenance Staff	Administration	Total
LUT	-	4psn + 1psn	1psn	6psn
MCC	3psn + 2psn	2psn + 1psn	2psn	10psn

c) PCG exclusive Coast Radio Station (506)

Station	Radio Operator	Maintenance Staff	Administration	Total
Manila	5psn x 3sift +3psn	6psn+1psn	8psn	33psn
A class (3 stn)	3psn x 3sift +1psn	3psn+1psn	7psn	21 x 3 psn
B class (4 stn)	3psn x 3sift +1psn	1psn+1psn	4psn	16 x 4 psn

d) MRCC Electronic Equipments Installation (507)

Station	Operator	Maintenance Staff	Administration	Total
Manila	2psn x 3shift+1psn	2psn+1psn	1psn	11psn
Region (7 stn)	1psn x 3shift+1psn	1psn+1psn	1	7 x 7 psn

5.5 Implementation Schedule

Implementation of the six projects are proposed as follows;

Proj. Code	Project	1992-1995	1996-2000	2001-2005	2006-2010
501	Regulation of on board radio for below 250 GRT vessels	-----			
502	HF network between PCG HQ., HQ of regions and detachments	--------			
503	Reinforcement of MCP phase I	-----			
504	INMARSAT SES to Manila, Cebu, Davao and Zamboanga	---			
505	COSPAS/SARSAT LUT station in Cebu		----------		
506	PCG exclusive coast stations in eight (8) districts			---------	
507	Electronics equipments to RCC				-----

Figure 5.7 Implementation Schedule

6. THE ORGANIZATION FOR MARITIME SAFETY

6.1 Legal Framework for Maritime Safety

Without going into detailed legalities, this section presents the various legislative instruments which empowers the organizations to carry out their functions relative to maritime safety. These legal instruments, which command nationwide adherence, come in the following forms:

1) Commonwealth Acts
2) Republic Acts
3) Presidential Decrees
4) Executive Orders
5) Letter of Instructions

The differentiation of each form from the other is in the period by which they were passed or signed into law and the source of said laws. Commonwealth Acts and Republic Acts are drawn by the legislative body (Lower House/House of Congress and Upper House/Senate House) while the Presidential Decrees, Executive Orders and Letter of Instructions are passed by the executive office or the President's office.

During the Marcos Regime, the legislative power was not only confined to the House of Congress but was also exercised by the President. As such, a good number of Presidential Decrees (PDs) and Executive Orders (EOs)/Letter of Instructions (LOIs) form part of the country's legislation.

The government agencies, on the other hand, issue Memorandum Circulars which are inter-office memos but are, in most cases, de-facto laws and regulations (e.g., the fixing of charges/fees and setting of penalties).

Table 6.1 enumerates the various legislative forms relating directly or indirectly to maritime safety.

Table 6.1
Maritime Safety Laws

Legislative Form & No.	Description of Contents
Commonwealth Acts	
606	Regulate the transfer of vessels and of shipping facilities.
182	Creation of the National Development Company.
146	Reorganization of Public Service Commission
65	Act on Carriage of Goods by Sea
Republic Acts	
6975	Creation of the Philippine National Police
6106	Amending RA No. 1407 prescribing rules for financing the acquisition or construction of vessels to be used for overseas shipping.
5963	Amending Sec. 2 of RA 1407 known as the Philippines Overseas Shipping Act of 1955.
5173	Creation of the Philippine Coast Guard.
3680	Conversion of the Philippine Nautical School into the Philippine Merchant Marine Academy.
3396	Installation of radio apparatus obligatory for ships of Philippine Register, provide for the operation thereof, and establish penalties for violations.
2754	Creation and promotion of a National Merchant Marine.
2616	An act on salvage and rendering of assistance to vessels and cargoes.
1909	The Philippine Coastwise Shipping Act of 1956.

(Cont. Table 6.1)

Legislative Form & No.	Description of Contents
1539	Requiring certain vessels of Philippine Register to be equipped with radio apparatus and to employ radio/telegraph operators.
1407	The Philippine Overseas Shipping Act of 1955.
913	Law on Philippine Ships and Shipyards.
128	Requiring District Health Officers to inspect the sanitary conditions of coast wise passenger vessels calling at ports in their district.
123	Prescribing the reorganization and operation of the Bureau of Quarantine Service, and promulgating regulations thereof.
70	Making it obligatory the employment of a physician in certain vessels engaged in coastwise trade.
Presidential Decrees	
1460	A decree to consolidate and codify all Insurance Laws of the Phils.
1416	Granting continuing authority to the President of the Phils.
1369	Creation of a National Maritime Polytechnic
1221	Requiring all Phil. owned and/or registered vessels to undertake repairs and dry-docking with MARINA registered ship repair yards.
1110	Amending RA 3680 otherwise known as the Act converting the present Philippine Nautical School into the Philippine Merchant Marine Academy.
1064	Transferring the functions of registration and documentation of Philippine vessels to the Philippine Coast Guard.
1059	Regulating the operations of shipbuilding and ship repair yards.

(Cont. Table 6.1)

Legislative Form & No.	Description of Contents
917	Establishing a freight booking and cargo consolidation center in the Phil. Shippers' Council.
900	Creation of Phil. National Lines.
890	Penalizing the unauthorized salvage of vessels, wrecks, derelicts and other hazards to navigation as well as cargoes of sunken vessels.
878	Authorizing the Nat'l. Development Company to assist local shipbuilders and persons and entities engaged in inter-island shipping.
857	Providing for reorganization of port administration and operation functions in the Phils., revising PD 505 dated July 1974, creating the Philippine Port Authority.
852	Defining the conditions under which persons or corporations may engage in the business of salvage.
833	Amending PD 165 which created the Phil. Shippers' Council.
764	Amending Sec. 2 of The Philippine Overseas Shipping Act of 1955.
760	Allowing the temporary registration of foreign-owned vessels under time charter or lease to Philippine nationals for use in the Philippine coastwise trade.
744	Amending The Philippines Overseas Shipping Act of 1955.
704	Revising and consolidating all laws and decrees affecting fishing and fisheries.
666	Providing incentives to the ship building and ship repair industry.
664	Amending Sec. 12 of the Philippines Overseas Shipping Act of 1955.
656	Declaring unlawful the use of high-powered inboard/outboard engines in

(Cont. 6.1)

Legislative Form & No.	Description of Contents
	watercraft of less than 100 gross tons that are capable of providing propelling power/speed in excess of 15 knots and providing certain exceptions and penalties thereof.
612	Ordaining and Instituting and Insurance Code of the Philippines.
602	Establishing Oil Pollution Operations Center in the Phil. Coast Guard Headquarters.
601	Providing for the revision of RA 5173 commonly known as the Coast Guard Law, consolidating fragmented functions.
600	Prevention and Control of Marine Pollution.
505	Creation of the Philippine Ports Authority
474	Providing for the reorganization of maritime functions in the Philippines, creating the Maritime Industry Authority.
214	Further amending the Philippine Overseas Shipping Act of 1955.
165	Creation of the Phil. Shippers' Council
97	Regulating the practice of marine profession in the Phils.
43	Providing for the accelerated development of the Fishing Industry of the Philippines.
Letter of Instructions	
538	Establishment of a National Maritime Manpower Training System for the upgrading of the Maritime profession, maritime research and development, and consolidation of all sea-faring training centers in the Philippines.

(Cont. 6.1)

Legislative Form & No.	Description of Contents
530	Creation of an ad-hoc committee with the Administrator of MARINA as Chairman to formulate an integrated shipbuilding industry development program.
524	Directing the DPWH to undertake the survey, design and construction of an access road to a shiprepair dockyard in Cabangan Point, Subic Bay, Zambales (January 1977).
371	Directing the Secretary of National Defense to exercise the authority to approve all salvage permits.
341	Directing the MARINA to act as an agency to oversee and coordinate the various activities/programs of the government offices relative to the establishment in the Phil. of lay-up centers.
294	Authorizing the National Development Company to grant loans from the amount provided for financial assistance to the long-range shipbuilding program to qualified citizens or private corporations duly registered with the BOI.
263	Directing the PCG as the sole authority to issue permits to salvage derelicts and sunken vessels or wrecks and the Bureau of Customs as the sole authority to issued permits to salvage cargoes carried by sunken vessels.
208	Coordination between PCG and MARINA in the exercise of supervision and regulation of the operation of water transport utilities.

6.2 Recent Development and Pending Bills/Acts

As of December 1990, the bill on the creation of the Philippine National Police (PNP) was enacted into law under Republic Act 6975. It established a national civilian police organization under the administration and control of a new National Police Commission. One of the functions of the PNP is the enforcement of laws and ordinances and to absorb the police functions of the Coast Guard. Since enforcement of R.A. 6975 it is considered that the Coast Guard deputizes for PNP in the territorial waters.

The Bills that have some bearing on maritime safety but which are still pending in the legislative process are as follows:

a) Bill on the Creation of a Maritime Industry Commission (SB 421/HB 12635). This bill envisions the placing of all related maritime functions under the jurisdiction of the Commission to simplify policy making, regulatory and developmental functions for the maritime industry.

b) Bill on the Creation of a National Transportation Safety Board (HB 4737). This bill seeks to create a board which shall undertake thorough and impartial investigations of transportation accidents and be primarily responsible for the independent examination, analysis, evaluation and prevention of air, land and marine transportation accident for the effective promotion of safety of life and property.

c) The Coast Guard is preparing a new act draft to transfer the Coast Guard from under control of the Philippine Navy to under umbrella of DOTC. When this act is enacted ship inspection works presently executed by PCG are expected to be transferred to MARINA.

6.3 Organizations on Maritime Safety

A number of government agencies comprise the National Maritime Safety Organization as shown in Figure 6.1 They are enumerated as follows:

a) Department of Transportation and Communications: MARINA, PPA, and NTC;

b) Department of National Defense: PCG
c) Department of Labor: POEA;
d) Department of Education, Culture and Sports: BHE;
e) Department of Natural Environment and Resources: NAMRIA;
f) Professional Regulatory Commission and
g) Department of Science and Technology: PAGASA

Figure 6.1
National Maritime Safety Organization

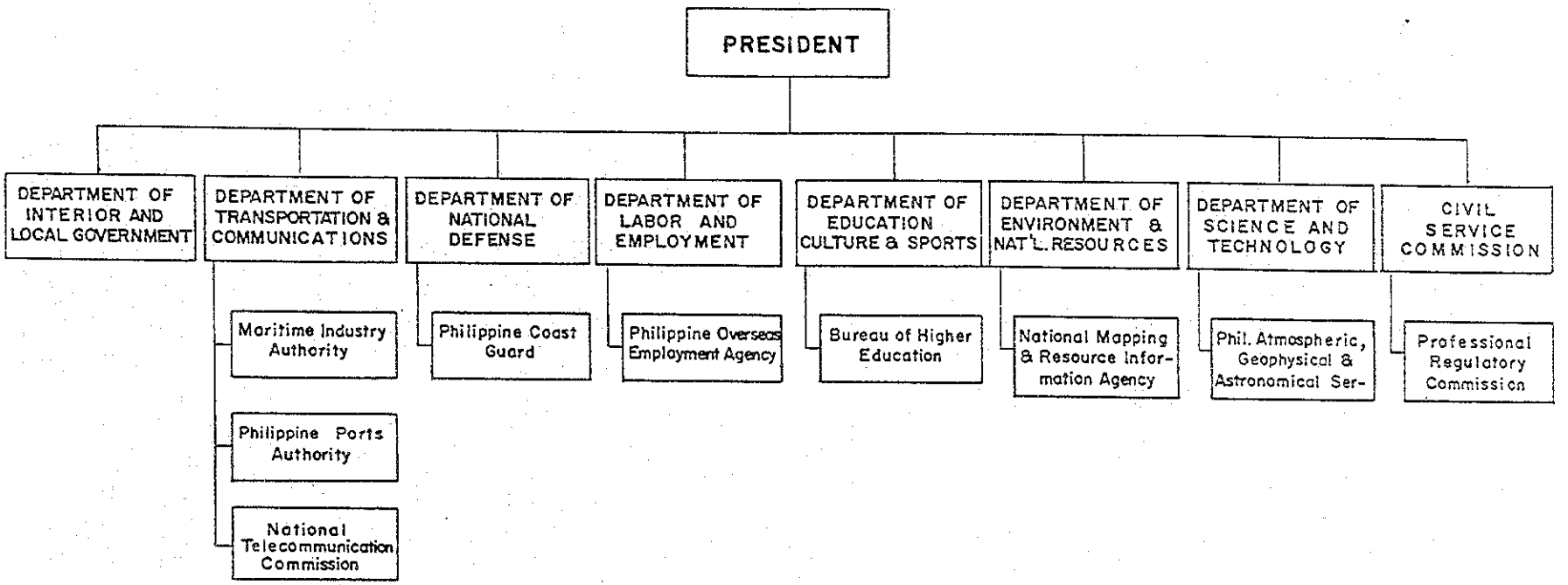


Table 6.2
Functional Matrix

Functions	A G E N C Y								
	MARINA	PAGASA	PCG	NTC	POEA	PRC	PPA	NAMRIA	BHE
Planning/Coordination									
Transport Devmt.	PPO		MSO						
Communication Devmt.				TPDD					
Overseas Shipping									
Policies/Guidelines	OSO								
Interisland Shipping									
Policies/Guidelines	DSO								
Regulatory (Fare/Route)	FS								
Voyage Clearance			MSO						
Seafarers Administration									
Employment & Welfare					WEO				
Education/Training	MDO								MS*
Licensing						LEO			
Service Record Book			SPRU						
Ship Technology									
Regulations/Guidelines	RLO								
Technical Evaluation	TSO		MSO						
Cert./License	RLO		MSO						
Port									
Port Planning							EO		
Port Design/Construction									
Port Management							OO		
Port Devmt./Maint.							EO		
Pollution Control			NOCOP						
Security									
Patrol			DC						
Search & Rescue			HPCG						
Communication									
Regulatory				RRLD					
License				RRLD					
Maritime Information									
Nautical Charts								CGSD	
Surveys								CGSD	
Navigation Aid									
Planning	EO		HPCG						
Design/Construction									
Operation			ANC						
Maintenance			ANC						
Climatology									
Weather Monitoring		CB							
Weather Advisories		FS							
Accident Reporting/Inv.			HPCG						
Reg./Prov. Offices	6		40 sta. 144 det.		6				

Abbreviations:

MARITIME INDUSTRY AUTHORITY (MARINA)
- MSS - Management Services Staff
- MLAO - Maritime Legal Affairs Office
- AFO - Administrative & Finance Office
- PPO - Planning & Policy Office
- OSO - Overseas Shipping Office
- DSO - Domestic Shipping Office
- FS - Franchising Staff
- RLO - Registration & Licensing Office
- TSO - Technical Services Office
- EO - Enforcement Office

PHILIPPINE COAST GUARD (PCG)
- HPCG - Headquarters Phil. Coast Guard
- DC - District Commands
- ANC - Aid to Navigation Command
- CGSF - Coast Guard Support Facility
- CGIF - Coast Guard Intelligence Force
- CGIS - Coast Guard Investigation Service
- CGSG - Coast Guard Security Group
- MSO - Maritime Safety Office
- NOCOP - National Operations Center on Oil Pollution
- SPRU - Seamen Processing Registry Unit

PHIL. ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADM. (PAGASA)
- CB - Climatology Bureau
- FS - Field Service

NATIONAL MAPPING AND RESOURCE INFORMATION AUTHORITY (NAMRIA)
- CGSD - Coast and Geodetic Surveys Department

NATIONAL TELECOMMUNICATIONS COMMISSION (NTC)
- TPDD - Telecommunications Planning/Development Department
- RRLD - Radio Regulation Licensing Department

PHILIPPINE OVERSEAS EMPLOYMENT ADMINISTRATION (POEA)
- WEO - Welfare and Employment Office

PHILIPPINE PORTS AUTHORITY (PPA)
- EO - Engineering Office
- OO - Operations Office

BUREAU OF HIGHER EDUCATION (BHE)
- MS* - Maritime Schools such as the National Maritime Polytechnic, Phil. Merchant and Maritime Academy which are under DECS, funded by DILE and coordinately supervised by MARINA.

PROFESSIONAL REGULATORY COMMISSION (PRC)
- LEO - Licensure and Exams Office

At the helm of this national organization is the Department of Transportation and Communications with its regulatory agencies on maritime industry, ports and telecommunications. Equally important at the present moment is the Philippine Coast Guard (PCG) of the Department of National Defense. Equal of duplication is in factors affecting Ship Technology.

6.4 Organization Mandates

As shown in Table 6.3, The overlap in functions is historically based on the passing and repealing of certain laws. Due to the difficulty posed by the transferring of some functions from one organization to another (i.e., in terms of budgets, organizational changes, technical preparedness, coordination, etc.), the lag in turn over brought about the overlap in functions.

6.5 Maritime Safety Capabilities

Presidential Decree No. 474 known as the Maritime Industry Decree (of June 1974) specifically provides that all functions and powers of the Philippine Coast Guard are retained by said agency until such time (i.e., within two years from the issuance of the decree) the President transfers the regulatory maritime affairs as may be necessary for the achievement of the aims and purposes of MARINA. It was for this reason that MARINA by virtue of Presidential Decree 761 (of July 1975) took over from the PCG the functions of registrations and licensing of vessels and the approval of vessel plans. However, both agencies came up with an agreement that these functions be delegated to PCG so as not to disrupt the registration and licensing practices since MARINA did not have, at that time the machinery to undertake said task. In 1987, EO125 and EO125-A was passed affirming that the above mentioned functions and other functions pertaining to maritime safety is to be carried out by MARINA.

For MARINA to be technically capable in performing its task, a loan was secured and granted by the World Bank in 1975. The loan included financial assistance for the training of 20 engineers and surveyors in the field of maritime safety inspection. Various other local and foreign training and seminars were availed by the MARINA personnel. To date, some 25 engineers/technical personnel and about 50 other were sent for training abroad on different aspects of Marine Technology.

Table 6.3
Mandates of Functions

Functions	A G E N C Y					
	MARINA	PAGASA	PCG	POEA	PPA	NAMRIA
Mandate	PD747 EO125 EO125A	PD78	RA5173	EO247	PD857 EO513	EO192 s4
Planning/Coordination						
Transport Devmt.	PDs5					
Communication Devmt.	EOs14					
Overseas Shipping						
Policies/Guidelines	EOs14					
Interisland Shipping						
Policies/Guidelines	EOs14					
Regulatory (Fare/Route)	EOs14					
Vessel Registry	EOs14		RAs3			
Voyage Clearance			RAs3			
Seafarers Administration						
Employment & Welfare	EOs14		RAs3	EOs4		
Education/Training			RAs3			
Licensing	EOs14		RAs3	EOs4		
Service Record Book	EOs14					
Ship Technology						
Regulations/Guidelines	EOs14		RAs3			
Technical Evaluation	EOs14		RAs3			
Cert./License	EOs14		RAs3			
Surveyor/Enterprise Accreditation	EOs14					
Port						
Port Planning					PDs2	
Port Design/Construction					PDs2	
Port Management						
Port Devmt./Maint.						
Pollution Control			RAs3		PDs37	
Security						
Patrol			RAs3			
Search & Rescue			RAs3			
Communication						
Regulatory			RAs3			
License			RAs3			
Maritime Information						
Nautical Charts						CGSD
Surveys						CGSD
Navigation Aid						
Planning			RAs3			
Design/Construction			RAs3			
Operation			RAs3			
Maintenance			RAs3			
Climatology						
Weather Monitoring		PDs3				
Weather Advisories		PDs3				
Accident Reporting/Inv.			RAs3			

Abbreviations:

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PROFESSIONAL REGULATORY COMMISSION (PRC)
- LEO - Licensure and Exams Office.

MARINA was at the peak of its massive building-up and strengthening process of its branches and personnel when the PCG re-took over the safety regulatory function, specifically the registration and licensing in the middle part of 1977 by virtue of Presidential Decree 1064 for reasons of national security.

The PCG although traditionally has performed these functions has inherent limitation to do so. It is a military unit and thus virtually impossible to professionalize its personnel inasmuch as the officers and men are subject to periodic assignments in the AFP. Most of the PCG personnel granted technical studies abroad are from the military and hardly is there a civilian employee of the PCG who has availed or enjoyed technical assistance for foreign training. The grantees are given new prejudicing the intents and purposes of the training program.

It is the PCG civilian staff that almost always perform the function relevant to safety (i.e., vessel inspection prior to issuance of Certificates of Inspection, calculation and vessel plan approval, etc.).

The PCG, which has approximately 2,800 officers and men distributed in 8 Coast Guard Districts of the country, has been assisting about 21 agencies in the implementation of their functions, hence a divided concentration/attention of its functions at any given time.

6.6 Identified Problems and Issues

a) The full and complete implementation of the new missions under EO125/EO125A have yet to be effected by the MARINA. The functions which ought to be transferred to the MARINA by virtue of these Orders are still being performed by PCG relative to safety regulatory function, registration and licensing and issuance of the continuous discharge book or the seaman's book, and the Professional Regulation Commission (PRC) relative to the licensure and examination of seamen. To date, however, the MARINA is only discharging the function relative to the issuance of certificates of competency to seamen.

   It is the opinion of both PRC and PCG that those functions are still within their jurisdiction, inasmuch as EO125/125A did not expressly repeal their basic enabling laws. More specifically, although section 23 of EO125/125A repeals Presidential Decree NO.890, Letters of Instruction Nos. 263 and 371, Executive Order No. 1011 and all other laws, ordinances, etc. inconsistent with it, the Order did not expressly repeal certain laws that would enable the unhampered transfer of functions. For instance, the PCG contends that Republic Act 5173, which is the

Philippine Coast Guard Law, was not expressly repealed by EO125, but only divested them with authority over some of its maritime functions. In addition, EO125/125A were never implemented for want of the required implementing rules and regulations mandated to be promulgated by the Secretary of DOTC.

b) Presently, PCG has eight district offices, 42 stations and 145 detachments manned by a total of 2,800 combined military and civilian personnel. The MARINA, on the other hand, has six regional offices with a personnel complement of 439 (as of May 1992). The geographical presence of the PCG in outlying areas, coupled with its human resource complement and watercraft facilities underscores the PCG's potential advantage vis-a-vis the MARINA's present network and personnel complement, to efficiently and continually discharge the functions of EO125/125A.

c) As the Philippine National Police has already been established with explicit provision for a Maritime Unit, PCG was divested of maritime police functions. But transfer of existing PCG resources may be difficult to undertake. Hence, another overlap of functions may occur.

6.7 IMPROVEMENT DIRECTIONS AND PLANS

6.7.1 Short Term Plans (1992 - 1995)

Immediate action shall have to be implemented within this time frame to address problems which should not be ignored much longer. These are:

a) Implementation of EO 125/125A

Functions/responsibilities should be defined and set. This would only mean that EO 125 and 125A shall have to take full effect.

For this, a 12-month transitory program shall be drawn by and between MARINA and PRC. The activities to be undertaken shall include, but not limited to:

(1) Reorganization of MARINA in preparation to absorbing the personnel from PCG and PRC offices carrying out maritime safety functions.

(2) Drawing up of programs for the education, training and retraining of personnel.

(3) Setting up of offices in strategic areas. The possibility of arranging tie-ups with already existing line offices of DOTC shall be considered. As MARINA and PPA are attached agencies of DOTC, a link up of these two offices, in terms of

providing MARINA a wide reach, shall be explored.

(4) Acquisition of required hardware support and defining budgetary requirements.

b) Maritime Accident/Vessel Information System

The existing vessel and accident reporting system shall be systematized, with the end view of establishing a centralized and comprehensive databank. This databank shall form part of the total databank for the entire maritime industry. Processing and control of these particular data shall be accessible to the private sector and to all government agencies concerned. The baseline data, for maritime accidents, shall be evolved with information of accidents over the last 10 years. Thereafter, it shall be updated regularly.

Since MARINA is basically responsible for the control and supervision of all maritime enterprises (directly or indirectly engaged in maritime activities), this larger database shall play an important role in establishing the appropriate safety criteria to regulate the various maritime sectors under its umbrella.

6.7.2 Long Term Plan (1996 - 2000)

An all encompassing organization on maritime safety shall be carefully considered. This shall involve the active participation of relevant agencies as have been identified in the preceding sections and the private sector.

A quasi-judicial body, which would objectively look into incidents relating to maritime safety, this body shall resemble the Admiralty Courts of more advanced countries. The objective of the organization shall be to insure that it is responsive to the needs of the maritime sector, as a whole.