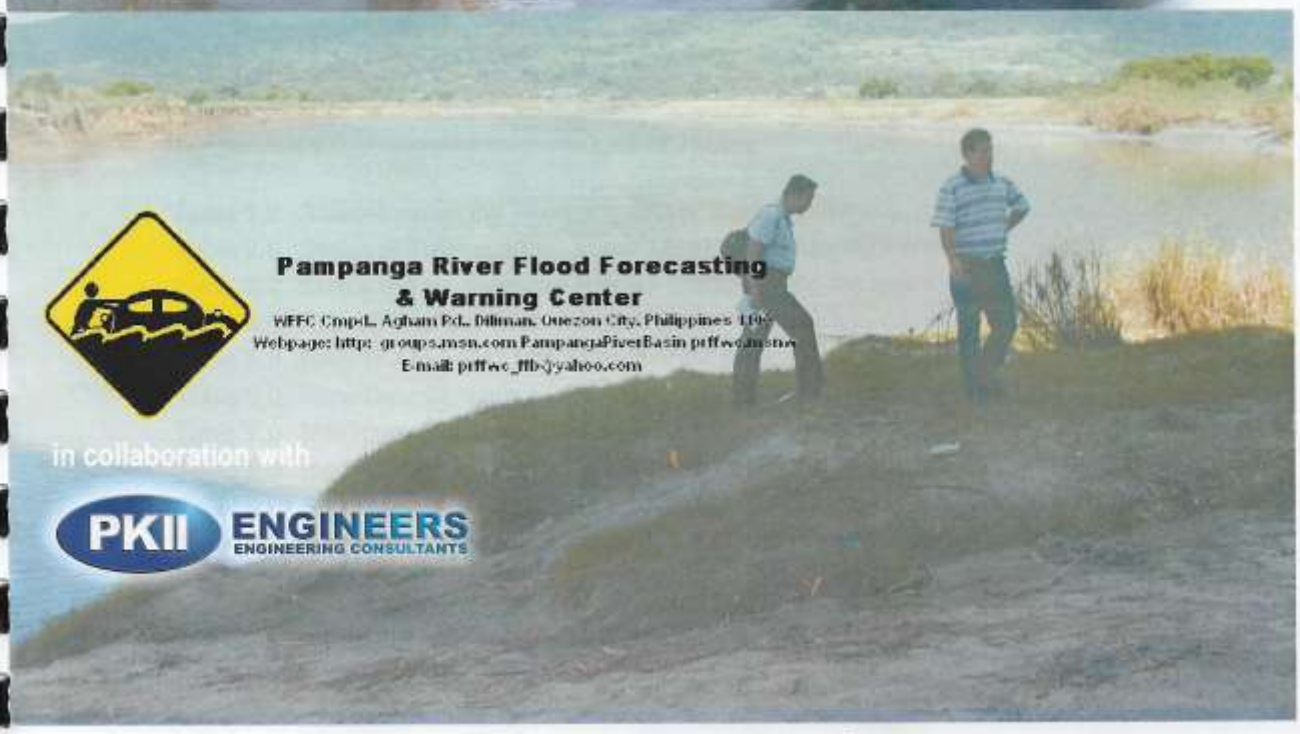
Republic of the Philippines
Department of Science and Technology
PHILIPPINE ATMOSPHERIC GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION
Flood Forecasting Branch
WFFC, BIR Road, Quezon City 1100

Post-Flood Investigation Report
Area: The Pampanga River Basin System
Event: Southwest Monsoon
August 2004



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(Southwest Monsoon as enhanced by Typhoon Marce)

Summary

Typhoon Marce (August 20-24, 2004) became the first destructive tropical cyclone to affect the Pampanga River Basin for the year 2004 and will probably be the only one for the said year. Widespread rains for more than 3 days spawned by the intensified southwest monsoon as enhanced by Typhoon Marce inundated extensive areas of the western and central sections of Luzon, including Metro Manila. As a result, 64 persons died, more than 2.1 million people affected, and an estimated damage cost of P 2.3 Billion in both agriculture and infrastructure were incurred.

An investigative survey team of the Pampanga River Flood Forecasting and Warning Center (PRFFWC) composed of Messrs. Armando P. Taruc (Senior Weather. Specialist), Hilton T. Hernando (Weather Facilities Specialist II) and Pablito E. Villablanca (Weather Observer III), was dispatched to the Pampanga River Basin to take on the following tasks:

1. Conduct a post-flood survey from September 7 to 12, 2004, to assess and make scientific evaluation of the flooding in the area;
2. Coordinate with other concerned agencies (LGU's and NGO's) and entities on the conduct of the study in connection with the flooding event; and
3. To recommend measures focusing on the non-structural means to minimize and mitigate flood losses in both life and property.

This disastrous flood is considered the major flood of 2004. A record high of river stage for Pampanga River at Arayat station and, likewise, a record water level for the Candaba Swamp area were attained during this event.

Inundation within the Pampanga River Basin area can be attributed to several interrelated factors:

1. Widespread precipitation over the basin area for more than 3 days (August 23 to 26, 2004); intermittent moderate to occasionally heavy rains prevailed in at least 2 days over the whole catchment.
2. Silted river channels particularly at the middle and lower sections of main Pampanga River.
3. The overflowing of Candaba swamp towards the confluence of Pampanga and Angat Rivers in the Apalit-Calumpit area.

On the other hand, flooding within the Guagua River Basin was mainly due to its silted waterways and flat terrain other than the widespread rains over the area.

Quite unusual about this flood event, though, was the immediate recession of floodwaters. Previous inundations within the basin took weeks to subside. However, during this episode, floodwaters lasted only for days in many of the areas affected.

1.0 Background

Pampanga River Basin, by dint of geography, is situated in the central plains of Luzon Island (Figure 1.0), which is regarded as the main rice granary of the Philippine archipelago. Climatologically, this part of Luzon falls under the First Type, this means that it experiences two pronounced seasons: dry from November to April and wet during the rest of the year especially June to September. Rains falling within the Pampanga River Basin are mainly due to the Southwest Monsoon, the seasonal air mass that originates from the Indian Ocean. There are times when this monsoon is intensified due to the influence of tropical cyclones sometimes hovering along the vicinity of northern or northeastern Luzon. The monsoon rains results in widespread flooding especially in the low-lying areas of the basin causing destruction and damages to properties, infrastructures, agricultural crops and livestock, and sometimes the loss of human lives.

Structural flood mitigation measures have been employed to provide protection to both lives and properties. These structural measures, however, can only withstand flooding up to the level of flood for which it was designed. Although these are very effective in arresting floods, an integrated approach to flood mitigation that combines structural measures with disaster preparedness or non-structural measures is most ideal.

In 1973, a pilot Flood Forecasting and Warning System (FFWS) for Pampanga River Basin was established and started through technical cooperation between the Philippines and Japan Governments. The main purpose of this instrumentally telemetered FFWS is to issue flood warnings and advisories to the concerned populace for them to take precautionary measures to avoid the disastrous effects of floods. Subsequently, in 1983 the Flood Forecasting and Warning System for Dam Operation (FFWSDO) was established within the basin to integrate in the basin forecast the amount of water released from dams. The Pampanga River Basin includes within its catchment area two large dams; the Angat Dam and the Pantabangan Dam. This FFWSDO scheme is being done in cooperation with other government agencies with PAGASA as the lead agency. Though, during T. Marce, a very much smaller reservoir, Ipo Dam, which is downstream of Angat Dam, released impounded water creating hearsay reports that this was the cause of flooding in the Bulacan area.

This report deals with the flood episode over the Pampanga River Basin as a result of the intensification of the southwest monsoon as enhanced by Typhoon Marce (August 2004).

2.0 Physiographical Factor[1]

2.1 The Pampanga River Basin

The Pampanga River Basin (PRB) is the 4th largest basin in the Philippines. It drains an aggregate area of 8,550 km^2 (Figure 2.0). It encompasses the provinces of Nueva Ecija (almost whole province), part of Bulacan and Pampanga, and portions of Tarlac. Main Pampanga River is about 260 kilometers in length.

The basin is drained through the Pampanga River and via the Labangan Channel into the Manila Bay. Several tributaries support the main river, the principal ones of which are the Peñaranda and the Coronel-Santor Rivers on the eastern side of the basin and the Rio Chico River from the northwest side. The Angat River joins the Pampanga River at Calumpit in Bulacan via the Bagbag River. The Labangan channel, on the other hand, acts as a cut-off channel for the Angat River into Manila Bay. Somewhere between the middle and lower portion of the basin stands the Mount Arayat, standing some 1,026 meters in elevation. Adjacent just on the eastern side, at the left bank of the Pampanga River, is the Candaba swamp, covering an area of some 300 km^2 absorbing most of the flood flows coming from the eastern sections of the basin (western slopes of the Sierra Madre mountain range) and the overflowing of the Pampanga River via the Cabiao Floodway. This area acts as a detention basin and is submerged during the rainy season but is relatively dry during summer. At the lower sections of the basin, where the Pampanga delta lies, the Pampanga River system, crisscrossed with fish farms, form a network of sluggish, tidal flats and canals, which eventually find their way to Manila Bay. The main river has a relatively low-gradient riverbed channel particularly at the middle and lower sections, other than being below the mean sea level elevation (Figure 2.1).

The basin experiences, on an average, at least one flooding in a year. The dry season generally occurs from December to May, and wet the rest of the year. The wettest months are from July to September. The frequency of tropical cyclone passage over the basin area is about 4 to 5 in a year on an average (Figure 2.2).

2.2 The Guagua River Basin

The Guagua River Basin is an allied system of rivers and creeks to the Pampanga River virtually converging down with the latter close at the outlet into the Manila Bay. The basin drains an approximate area of 1,990 km^2. It is bounded on the north partly by the Agno River Basin and on the south by the Manila Bay; on the east by the Pampanga River basin, where an earthdike (Apalit-Arayat Setback Levee) protecting the right bank of the Pampanga River separates them; and on the west by the Zambales Mountain Range, where Mt. Pinatubo is a part.

The major river systems draining the basin are the Pasig-Potrero, Porac-Gumain, Abacan and Pasac-Guagua Rivers. Other small creeks and secondary rivers that

[1] *Major parts of this section were lifted directly from the Pampanga River Basin Post-Flood Investigation reports of the SW Monsoon event of August 1999 and T.Ditang & Edeng event of July 2000.*

significantly drain and, on the other hand, flood the basin are the Sapang-Maragul, Gugu creek, etc.

The basin is quite vulnerable to flooding primarily because of its low elevation and flat terrain, its proximity to its outlet at Manila Bay where tides impede the river and creek flows several kilometers upstream, and the narrow and silted waterways brought largely by the eventful Mount Pinatubo eruption (1991). Possible contributory cause is the reported slow sinking of the delta making the area prone to instant flooding.

2.3 Flood Prone Areas

The overall flat topography and the rapidly developing and agriculturally productive flood plain of the Pampanga River Basin make it very vulnerable to floods during intense and prolonged rainfall. The land subject to flooding within the Pampanga River Basin is about 2,200 km^2, and about 225 km^2 for the allied basin of Guagua River. The latter basin's affected area, however, has expanded considerably partly due to the narrowing and clogging of river channels by "informal settlers" causing, at times, uncontrolled waterway overflows. About 45 municipalities are directly affected in the 4 major provinces encompassed by the whole basin system.

3.0 Meteorological Factor

3.1 Meteorological Summary

Typhoon Marce (Figures 3.0) happens to be the first destructive tropical cyclone to affect the Pampanga River Basin and major parts of the western sections of Luzon due to the enhanced Southwest Monsoon.

Earlier, Typhoon Igme (Mindulle, 0407), June 25 – July 02, 2004, partly affected the basin as it brought in near-moderate daily rains over the Pampanga River Basin causing the middle and lower sections of the main Pampanga River to attain alarm stage. However, Igme did not last long enough to cause inundation over the basin.

Typhoon Marce's regional precipitation impact started about 23rd of August and lasted for nearly 5 days before leaving almost half of Luzon's western sections inundated (Figures 3.1 to 3.6).

3.1.1 Typhoon Marce[2]

Typhoon Marce *(International Codename: Aere, 0417)*, August 20-24, 2004.

The origin of Marce was first detected as a broad and active tropical disturbance in the vicinity northwest of Guam on 13th August. Its formation and development was continuous and progressive while embedded in the monsoon trough. During the period

[2] *PAGASA - Weather Branch Summary on T.Marce by G.P.Nilo, Sr.Weather Specialist*

when Marce occurred within the PAR together with Typhoon east of it *(Chaba)*, the monsoon depression was likewise deepening.

Marce was already a tropical storm of 65 kph winds when it reached the 135 ^{0}E longitude and located at 13.6 ^{0}N about 1,130 kilometers east of Luzon in the morning of August 20. Marce took an unusual poleward movement by about 360 kilometers to the north for 18 hours. It changed course to the north-northwest in the next 6 hours taking an average speed of 19 kilometer per hour. It became a severe tropical storm of 95 kilometers per hour in the morning of August 21. From this time until the period it had exited the PAR in the northwestern border, Marce had taken a generally northwestward track. It gained typhoon strength of 120 kilometers per hour while it was about 610 kilometers almost east of Batanes. It underwent structural changes while on a deepening process when it approached land (nearing Taiwan). Another typhoon, T. Chaba (0416), was also intensifying and also being part of the monsoon depression had set the trough in a northwest to southwest orientation across the Northwest Pacific Ocean. As Marce moved through the southern islands of Japan (Okinawa), just about 220 kilometers east of Taiwan, the southern and eastern periphery of Marce had established a monsoon surge, which encompassed most of Northern and Central Luzon including Metro Manila and surrounding areas. These areas experienced heavy rains that its volume ultimately resulted to flooding.

The aftermath of flooding due to Marce continued even when rains no longer occurred. Extensive areas in Central Luzon were flooded as a result of river overflowing. There was suspension of work and classes in some parts of Luzon particularly in Metro Manila that were affected with floods especially on August 25 and 26, 2004. The occurrence of heavy downpour in Metro Manila was on August 24, 2004.

Although Typhoon Marce did not directly hit the country, it did induced and enhanced the Southwest Monsoon "Habagat" which brought heavy rains over northern, central and southern Luzon including the Metro Manila area.

3.1.2 Southwest Monsoon (Habagat)[3]

A great portion of our rainfall may be ascribed to the Southwest (SW) monsoon weather. The SW monsoon is caused by the thermal variations of the Asiatic mainland. During summer in the Northern Hemisphere, the Asiatic continent becomes warmer than the surrounding seas and a low-pressure cell develops over the continent. This causes a flow of moist SW winds over the Philippine area. At times when this SW flow becomes thick in depth, it persists for a long period causing continuous rains that may last for weeks during the months of June to September. Thus aside from typhoons, the SW is responsible for the great portion of the rainfall during the wet season.

At times, however, a SW flow of wind is also induced by the presence of a huge typhoon over the Taiwan-Okinawa area. When this is observed, the weather

[3] *Public Information Series 4, Weather Causing Phenomena, produced by Public Information & International Affairs Staff, PAGASA, DOST / Post-Flood Investigation Report for Pampanga River Basin, Southwest Monsoon August 1999.*

characteristic of the SW monsoon prevails in the Philippines as what was experienced in most of the western and central Luzon area last August of 1999 and lately last July 2000.

During Marce, the torrential southwest monsoon rains triggered massive flooding in low-lying areas and flashfloods on relatively high-elevated areas; landslides and drowning incidents in various parts of Regions I, III, IV, and CAR; the spillage of Ambuklao, Binga and San Roque Dams in Pangasinan; the overflowing of Magliman Creek in San Fernando; the collapse of Amburayan Dike in Bangar, La Union and Mandasig Flood Control in Candaba, Pampanga; and the breaching of Colibangbang Dike in Paniqui and Malayap Dike in Gerona, Tarlac.[4]

4.0 Hydrometeorological Factor

4.1 The Pampanga River Basin Flood Forecasting & Warning System[5]

The Pampanga River Basin Flood Forecasting and Warning System at present have a total of 14 rainfall (RR) stations, one is in Guagua River Basin, 7 water level (WL) stations, and 7 streamgaging sites (refer back to Figure 2.0). Within the two basin systems (Pampanga and Guagua) are 2 synoptic stations. An agrometeorological station also exists in PRB. A standard rain gage in the Municipality of Guagua was set-up just recently, through a community-based flood management program of the office, and manual observation is undertaken during times of inclement weather.

Table 1.0 Stations within the Pampanga River Basin System.

Station	Station Type	Location	Frequency of reports
Gabaldon	Telemeterized RR	15°29'55" N 121°21'20"E	Hourly
Sapang Buho	Telemeterized RR & WL (sensing pole)	15°35'39" N 121°07'09"E	Hourly
Mayapyap	Telemeterized RR & WL (sensing pole)	15°30'52"N 120°57'20"E	Hourly
Munoz	Telemeterized RR	15°44'17"N 120°57'37"E	Hourly
San Isidro	Telemeterized RR & WL (sensing pole)	15°8'49"N 120°54'37"E	Hourly
Arayat	Telemeterized RR & WL (stilling well)	15°10'06"N 120°46'56"E	Hourly
Candaba	Telemeterized RR & WL (stilling well)	15°06'59"N 120°51'01"E	Hourly
Zaragoza	Telemeterized RR & WL (stilling well)	15°26'36"N 120°45'03"E	Hourly
Sulipan	Telemeterized RR & WL (stilling well)	14°56'22"N 120°45'31"E	Hourly
Papaya	Telemeterized RR	15°21'17"N 121°03'56"E	Hourly

[4] *Final Report on the After-Effects of Southwest Monsoon Rains Induced by Tropical Storm "Marce", Administrator, OCD and Executive Officer, NDCC, September 14, 2004.*
[5] *Post-Flood Investigation Report for Pampanga River Basin, Southwest Monsoon August 1999*

Station	Station Type	Location	Frequency of reports
Sibul Spring	Telemeterized RR	15°10'04"N 121°03'27"E	Hourly
San Rafael	Telemeterized RR	14°58'48"N 120°55'36"E	Hourly
Sasmuan	Telemeterized RR	14°56'14"N 120°37'23"E	Hourly
Ipo Dam	Telemeterized RR	14°52'30"N 121°03'44"E	Hourly
Clark	Synoptic	15°10'N 120°34'E	3-Hourly
Cabanatuan	Synoptic	15°44'N 120°56'E	3-Hourly
CLSU, Munoz	Agrometeorological	15°43'N 120°54'E	6-Hourly
Guagua	Std. Non-recording Rainfall gage	14°58'N (est.) 120°37'E (est.)	As requested, by cellphone

4.2 Status of Stations during the Event (August 23-30, 2004)

Table 2.0 Status of Telemeterized Water Level Station during the event

WL Stations	Status / Remarks
Sapang Buho	Was not transmitting correct data during the event; "0" value almost whole event
Mayapyap	Worked properly during the event with minimal data errors and transmission breaks
Zaragoza	Worked generally fine during the event with minimal transmission breaks
San Isidro	"0" data reading during the whole event (erroneous)
Arayat	Worked properly during the event with fairly irregular transmission breaks
Candaba	Worked generally fine during the event with minimal transmission breaks
Sulipan	Worked properly during the event with minimal data transmission breaks

Note: 5 out of 7 Telemeterized WL stations reported a fairly valid data during the said event.

Table 3.0 Status of Telemeterized Rainfall Station during the event

RR Station	Status / Remarks
Munoz	Worked properly during the event with minimal data transmission breaks
Sapang Buho	Worked properly during the event with minimal data transmission breaks
Mayapyap	Worked properly during the event with minimal data transmission breaks
Gabaldon	Worked properly during the event with minimal data transmission breaks
Zaragoza	Worked properly during the event with minimal data transmission breaks
Papaya	Worked properly during the event with minimal data transmission breaks; possible deficient RR values due to tree obstructions
San Isidro	Worked properly during the event with minimal data transmission breaks; possible deficient RR values due to tree obstructions
Arayat	Worked OK during the event with intermittent data transmission breaks
Candaba	Worked properly during the event with minimal data transmission breaks
Sibul Spring	Worked properly during the event with minimal data transmission breaks

RR Station	Status / Remarks
Sasmuan	Worked properly during the event with minimal data transmission breaks
Sulipan	Obvious error data transmitted during the event; possibly a clogged funnel
Ipo	RR values may be deficient due to tree obstructions. Likewise chart values are similarly deficient.
San Rafael	Worked properly during the event with minimal data transmission breaks

4.3 Rainfall Aspect

Table 4.0 Rainfall Intensity Classification Table (mm)

Category	1 hour	3 hours	6 hours	12 hours	24 hours
Light	< 2.5	< 7.5	< 15	< 30	< 60
Moderate	2.5 – 7.5	7.5 – 22.5	15 – 45	30 - 90	60 – 180
Heavy	> 7.5	> 22.5	> 45	> 90	> 180

Table 5.0 Daily (8 AM-8AM / Met. Day) Rainfall patterns during the Event

August 23	Isolated light to occasionally moderate rains prevailed over the Pampanga River Basin and the allied basin of Guagua River. Significant moderate rainfall totals in some stations starting in the evening of the day.
August 24	Generally light to occasionally moderate rains was recorded over the Pampanga River Basin for the day signifying the start of the rainfall regime for the event. A relatively much more intense rainfall, however, was observed over the Guagua River sub-basin for the same day. Rains were concentrated more on the southwest region of the two basins. (Figure 4.0)
August 25	Continuous light rains becoming moderate towards the evening were being registered for both of the basins. Heavy rains for the past 24-hours have been recorded over the western sections and southeast section, particularly over the Angat-Ipo watershed (Figure 4.1).
August 26	Maximum rainfall patterns were generally observed over the western sections of both basins. Heavy rains were concentrated at the Candaba swamp area and over the Angat watershed (Figure 4.2).
August 27	Light rains still prevailed within the basin with isolated moderate rainfall breaks. Rains have almost ceased by early morning of the following day (Figure 4.3).
August 28	Isolated brief light rains throughout the day with some isolated brief heavy burst in one station – Munoz. Rains have completely ceased by evening signifying the end of the event's rainfall regime.

Hyetographs and hydrographs for each station are presented in Figures 5.0 to 5.12.Temporal patterns indicated in the accumulated basin rainfall curves (Figure 6.0) for the event shows that the most intense rainfall period for the allied basin of Guagua River started late of the 23rd until the 25th of August. On the other hand, intense rainfall period for the basin of Pampanga was between the 24th till the 26th of August. Based on available data, intense rainfall for both basins started late night of the 23rd of August. The most steep slope line manifests the intense period of rainfall for the event. A plot of

the basin's average rainfall and corresponding hydrographs for each gauging station is shown in Figure 7.0.

Rainfall records for Cabanatuan synoptic station during the event registered a maximum rainfall total of 150.6 mm for 24-hours on August 26. This amount falls within a 2 to 5 year return period (from HISSS [FFB] RIDF values). Smaller periods for the event daily totals were not available to determine other frequency periods.

Table 5.0 shows the daily (8 AM to 8 AM - meteorological day) RR values observed at stations within and around the basin system.

5.0 Basin Hydrological Factor

5.1 River Heights and Basin Situation during the Event

Generally, river water level readings (based on staff gage) of reporting stations and based on telemetered data prior to the event were all way below their respective alert status except for Zaragoza and Arayat stations. Arayat station had already reached alert status even before the 23rd of August. Likewise, river stage at Zaragoza station was already way above its alert and alarm status prior to the flooding event.

All readings basically refer to or close to the actual river stages at the station points. River stage readings for San Isidro station were taken from the DPWH gagekeeper's report for the month. Although there were some doubtful data recorded for the month, specifically before the flooding event and at the start of the month, it is believed that the gagekeeper may have conscientiously recorded close to the actual river stage reading from the DPWH staff gage during the flood episode. Flood marks at the stream gauging station, particularly at the San Isidro-Jaen Bridge, closely relates to the maximum stage recorded during the event.

Table 6.0 Time/Date Station's Flood Assessment Gage Heights were attained

Station Point	(Alert Level) Time & Day attained	(Alarm Level) Time & Day attained	(Critical Level) Time & Day attained	Remarks
Sapang Buho	(3.7 m) attained	(4.5 m) attained	(6.5 m) not attained	Peak WL at about 5.45 m (55.644 m. AMSL) based on flood marks. (Pic 12.0)
Mayapyap	(3.0 m) attained at around 1700H of the 26th	(3.5 m) attained at around 2200H of the 26th	(4.5 m) attained at about 0500H of the 27th	Peak WL recorded was at 5.06 m (30.416 m. AMSL) attained at around 1100H, 27 August.
San Isidro	(3.2 m) estimated time attained was around 0900H, of the 26th	(4.5 m) estimated time attained – before noon of the 26th	(6.0 m) estimated time attained – early morning of the 27th	Water Level recorder not transmitting correct data that time. Est. peak water level of 6.70 m. (15.933 m. AMSL) attained at around 12 noon of 27 August.

Station Point	(Alert Level) Time & Day attained	(Alarm Level) Time & Day attained	(Critical Level) Time & Day attained	Remarks
Zaragoza	(11.0 m) already attained prior to the event	(12.5 m) already attained prior to the event	(14.5 m) attained around 1500H of the 26th	Recorded peak gage height of 15.39 m (15.725 m. AMSL) attained at about 2100H, 27 August
Arayat	(5.0 m) 2100H, 24 August	(6.0 m) past 0200H, 25 August	(8.5m) past 2000H, 26 August	Peak of 10.03 m (10.112 m AMSL) based on flood marks attained after 1700H, 28 August (Pic 4.1)
Candaba		(4.5 m) 0100H, 26 August	(5.0 m) past 1400H, 26 August	Recorded Peak of 7.38 m (7.223 m AMSL) attained at around 0100H, 29 August.
Sulipan	(3.6 m) past 1600H, 28 August	(4.2 m) past 0400H, 29 August	(5.0 m) not attained	Peak gage height at 4.39 m (4.328 m AMSL) attained 1800H, 29 August.
Sasmuan				Est. peak floodwaters of 2.065 m. (AMSL) at the station; attained sometime between 25 – 28 of August
Norzagaray				No record of water level data during the event. No reported flooding at this section during the event.

Note: Elevation of gage heights (in MSL) were based on survey of elevation of zero "0" of gage at various streamgaging stations undertaken on November 1996.

Based on the preceding table, river stages at Mayapyap, San Isidro, Arayat and Zaragoza water level gauging stations overtopped their respective established assessment critical levels – level 10, bank-full stage. Surveyed section of Zaragoza station undertaken after the event showed flood marks exceeding the natural banks of the river. Likewise, similar situations at Arayat station were observed based on flood marks on the station's housing. This was the highest, so far, for the gauging station in more than 30 years of record. At Sulipan station, river stage overtopped its natural banks at the station's section. Overflowing, however, was controlled at the section due to dike structures at both banks. The Candaba swamp area was practically submerged during the event with a record high swamp water level.

Tides may have somehow caused a slow recession of floodwaters from the Pampanga River, particularly at the Sulipan station. Based on predicted tides (NAMRIA) during the event, high tides were not relatively high. There was no report of a storm surge either at that time (Figure 8.0). Nonetheless, this flood event has a relatively shorter flooding duration as compared with other flooding in the area in the last 10 years. Flooding was in the order of hours to a day, particularly at the upper main Pampanga River portion; 2 to 3 days at middle main Pampanga River portion; to less than a week at the Candba swamp area.

5.2 Streamflow

There were no river velocity measurements undertaken at the height of the flooding. The closest measurement activity performed was on the 31st of August and undertaken at 2 stream gauging sites only, Arayat and at Apalit Bridge. For Arayat, discharge was around 1,880 m^3/sec corresponding to a gage height of 8.63 m at the station. Similar undertaking at Apalit Bridge resulted to a discharge of 1,784 m^3/sec corresponding to a gage height of 3.84 m at the gauging station.

An updated rating curve for Arayat station that includes the latest measurements (consolidated discharges for the station disregarding dates of measurements) was made to determine the peak discharge attained during the event. For a 10.03 m maximum river stage attained at Arayat for the event, the corresponding discharge result is 2,955 m^3/sec.[6] Rating Curve for Apalit has yet to be made considering the tidal effects experienced at the site.

On the other hand, an estimate of discharge, using Manning's Formula, at Sapang Buho, Mayapyap and San Isidro based on the recorded gage height attained at each station during the event is presented in Table 7.0. Rating curves for the said stations, including that for Zaragoza station, have yet to be updated based on actual field-measured discharge data. It should be noted, though, that the estimated discharge are highly dependent and quite sensitive on the assigned values of Manning's roughness coefficient "n".

Table 7.0 Maximum Discharge (SW as enhanced by T.Marce, August 2004)

Station	n	I (average riverbed slope)	Computed Area A (m^2)	HWL in meters (AMSL) during the event	Computed Discharge Q (m^3/sec)
Sapang Buho	0.040	1/1000	506.9	55.6	2,160
Mayapyap	0.040	1/2000	795.2	30.4	2,887
San Isidro	0.035	1/3000	1496.6	15.9	3,481

Manning's Formula: $\mathbf{Q = VA = (1/n)\ (R^{2/3})\ (I^{1/2})\ (A)}$

Where: A = cross-sectional area of flow; R = hydraulic radius; I = river bed gradient

V = average velocity; n = Manning's roughness coefficient; Q = discharge

Note: Values for n and I were taken from the Design Report – Hydrological & Hydraulic Calculation for FFWSDO Project by NK, CTIE & BASIC Team, June 1987.

5.3 Major Hydraulic Structures and Dam Releases

Pantabangan and Angat Dams are the two main hydraulic structures within Pampanga River Basin. Pantabangan Dam, located upstream of the upper main Pampanga River operates as a hydropower and an irrigation dam. The Angat Dam, on the other hand, is located on the eastern portion of the lower main Pampanga River and drains through the Angat River via the Ipo Dam and operates as a hydropower plant. Ipo Dam, which supports and partly regulates releases coming from the Angat Dam, is

[6] *Based on a rating equation, $Q=0.365\ [H - (-3.06)]^{3.499}$*

situated about to 7 kilometers downstream of the latter. Ipo serves as an active reservoir for water supply requirement of Metro Manila. It is not purely an impounding reservoir owing to its small retention capacity but primarily as a diversion dam only. It is relatively a lot smaller than the other two dam structures with an impounding reservoir of around 7.5 million m^3 compared to Angat Dam, which has a reservoir capacity of 850 million m^3. If the impounded water exceeds this volume, water starts to overflow the radial gates.

Ipo Dam mainly diverts water from the Angat and Ipo Rivers into tunnels that lead to La Mesa reservoir and Balara filtration plant. During the flooding event, it was the only reservoir that released water.

Standard operating procedures for flood operations of Ipo Dam are as follows:

Preparatory Measures -

- Reduce NPC-Angat potable water supply releases to Ipo to maintain elevation at only 100.0m to 100.5m;
- If water elevation starts rising due to heavy rainfall, Ipo ask for further reduction from NPC-Angat releases to Ipo;
- In case of continuous heavy rains, ask NPC-Angat to maintain only minimum release to Ipo.

Flood Operations -

- If water level is rising such that Ipo Dam will overflow within one hour, Ipo operator calls CPF-Angat operator of imminent opening of Ipo gates;
- Angat operator phones Bgy. San Lorenzo's officer-on-duty, who then calls Norzagaray, and in turn relays the message to Malolos;
- Just before opening the gates, a siren is sounded to warn the most immediate downstream residents along the river;
- When Ipo elevation reaches 101.1m and over, one gate is opened at 30cm only.
- If elevation still continues to rise, open another gate.
- Add or reduce gate openings, depending on inflows and the Ipo reservoir elevations.
- Fully close all gates when Ipo elevation goes below critical levels.
- Inform Angat operator that Ipo releases have ceased.

Considering a smaller watershed area of about 6 km^2, Ipo Dam opened partly its gates and released water from its reservoir during the event. Dam releases started at about 1815H of August 25 at a reservoir elevation of 100.95 m. Releases continued for the next 2 days until it shut-off completely at 1945H, 27 August at reservoir elevation of 100.82 m. The total spilled water for the whole duration was 18,537,684 m^3. Peak release discharge of about 564.9 m^3/sec was attained at 0825H of August 26 for about 35 minutes. According to Ipo Dam authorities, the flood operation procedures were initiated, as explained above, during the T.Marce event. There were no reports of river overflowing along the Angat River during the event except at its confluence with the Pampanga River.

Table 8.0 Ipo Dam Daily Releases and Maximum Discharge

Day (Year 2004)	Total Spilled Water (m^3) at Ipo Dam*	Maximum Recorded Discharge for the day (m^3/s)
August 25	1,087,212	175.2
August 26	11,468,952	564.9
August 27	5,981,520	175.8

** Dam release data from Ipo Dam Reservoir Plant*

Angat River channel at Bgy. Matictic, Norzagaray, Bulacan can handle a discharge capacity rate of 770 m^3/s as per hydrographic survey (1997) and by hydraulic calculation at that section. The total cross-sectional area at this part is 683 m^2 with a river width of 172 meters.

Ipo Dam releases during the event have little effect on the river stage along the main Angat River as release of water was regulated. Nonetheless, the released water volume, in a way, may have partly contributed to the already worsening situation at the confluence between Pampanga and Angat Rivers. Ipo Dam has yet to be a part and a coordinating member of the FFWSDO for the Angat Dam System.

Figure 9.0 shows the Ipo Dam releases and the corresponding reservoir elevation during the event. This shows that the amounts of releases from the Dam were clearly in relation to the prevailing reservoir stage.

5.4 Areas Flooded

A list of areas inundated within the two basin systems during the event is presented in Table 9.0. Flood depths of areas inundated from previous events are also presented for general comparison.

Table 9.0 Southwest Monsoon

PAMPANGA RIVER BASIN	2004						2001	2000	1999	1998	
	Height of Floodwater in Meter										
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
PROVINCE OF PAMPANGA											
GUAGUA, PAMPANGA											
1 San Matias	0.6			1.4		0.3		1.7	1.6	1.2	
2 Plaza Burgos	0.8			0.3		0.6		0.8	0.7	0.5	
3 San Agustin	0.9			0.5		0.6		1.4	1.2	1.1	
4 Sta. Ines	0.9			0.5		0.6		1.3	1.2	0.8	
5 Sta. Ursula	0.9			0.5		0.6		1.0	1.3	0.8	
6 San Isidro	0.9			0.5		0.6		1.0	1.0	0.5	
7 San Juan Nepomuceno	0.9			0.6		0.6		0.5	0.7	0.6	
8 San Roque	0.9			1.1		0.6		1.4	1.3	0.8	
9 San Nicolas 1st	0.9			1.1		-		1.2	1.6	1.0	
10 San Miguel	1.1			0.6		0.9	0.3	0.6	1.0	0.9	
11 San Juan Bautista	1.1			0.6		0.9		0.8	0.7	0.5	
12 San Nicolas 2nd	1.1			0.6		0.9		1.4	1.0	0.9	
13 Bancal	1.2			0.8		0.9		2.0	1.6	1.2	
14 Sta. Felomina	1.4			0.5		1.2		1.1	1.2		

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98	
15 San Antonio(Purol Dayat)	1.4			0.9		1.2		1.5	0.7	-		
16 San Juan 1st	1.4			1.1		1.2		1.2	1.3	0.5		
17 Sto. Cristo	1.7			1.2		1.5		1.2	1.8	1.1		
18 Sto. Nino	1.7			1.2		1.5		1.4	1.6	1.2		
19 San Rafael	1.7			1.2		1.5	0.5	1.2	1.0	0.3		
20 San Pablo	1.8			1.2		1.5		1.2	1.8	1.5		
21 San Pedro	1.8			1.2		1.5		1.4	1.6	1.8		
22 San Jose	2.0			1.2		0.2		1.2	1.3	0.5		
23 Natividad								0.8	1.0	-		
24 Jose Abad Santos								0.5	1.0			
25 Lambac								0.8				
26 Guagua Public Market								0.8				
27 Magsaysay								0.3				
28 Rizal								0.3				
29 Pulungmasle								0.4				
30 San Matias Proper										1.2		
31 San Antonio(Dayat Punta)										1.2		
32 Guagua Town Proper	1.2	1.2	1.2	1.2								
MACABEBE												
1 San Roque				0.6		0.3	0.6	1.0	1.3	0.3	0.9	
2 San Rafael				0.6		0.3	1.2	1.0	1.0	0.3	0.9	
3 San Gabriel				0.6		0.3		1.0	1.0	-	1.2	
4 Saplan David				0.6		0.3	0.6	0.8	1.2	-	0.9	
5 Sta. Maria				0.6		0.3	1.2	1.2	1.5	0.3	1.2	
6 Sta. Lutgarda				0.6		0.3	1.2	1.0	1.5	0.3	0.9	
7 Caduan Tete				0.6		0.3		1.0	0.7	-	0.9	
8 San Jose				0.6		-	1.2	1.0	1.2	0.3	0.8	
9 Mataguiti				0.6		-	0.6	1.5	1.2	-	0.9	
10 Sto. Rosario				0.6		-	0.6	1.0	1.0	0.3	0.6	
11 Tecasan				0.6		-	0.6	0.8	1.2	0.3	1.2	
12 Sta. Rita				0.6		-	0.6	1.0	1.0	-	0.3	
13 Sto. Nino				0.6		-	1.2	1.0	1.5	0.3	1.2	
14 Sta. Cruz				0.9		0.3	1.2	1.0	1.2	0.3	0.9	
15 San Isidro				0.9		0.3	0.6	0.8	0.7	0.3	0.3	
16 Castuli				0.9		0.3	1.2	1.7	1.8	0.3	1.2	
17 San Juan				0.9		-	1.2	1.0	1.3	0.3	1.2	
18 Telacsan				0.9		-		0.6	1.2	-	0.9	
19 Batasan				0.9		-	0.6	0.8	0.7	-	-	
20 San Vicente									0.6	-	0.9	
21 Batasan 1									1.0	-	0.3	
22 San Francisco								1.0	0.7	-		
23 San Esteban								0.5	1.0	-		
24 Dalayap								0.8	1.0	-		
MASANTOL												
1 San Nicolas 2				0.9		0.5	0.3	1.5		-		
2 San Isidro Anac				0.9		0.5		2.0		-	1.2	
3 San Isidro Matua				0.9		0.5		1.5	1.2	0.8	-	
4 Sta. Lucia Wakas				0.9		0.5		1.5	1.2	-	-	
5 San Nicolas				0.9		0.5			1.2	0.6	0.9	
6 Sasgrada				0.9		0.5		1.0		0.6	1.2	
7 Sto. Nino				0.9		0.5		1.5	1.2	0.8	0.6	
8 Sua				0.9		0.5			1.2	0.9	1.2	
9 Nigul				0.9		0.5			1.2	-	1.2	
10 San Isidro				0.9		0.5		1.5	1.2	-	-	
11 Pagyaba				0.9		0.5				1.1	0.9	
12 Bebe Matua				0.9		0.5		1.0		0.6	-	
13 Bebe Anac				0.9		0.5			1.2	0.6	1.2	
14 Alauli				0.9		0.5			1.2	0.6	1.2	
15 Puti				0.9		0.5			1.3	0.8	1.2	
16 Bagang				0.9		0.5			1.2	0.8	-	
17 Balibago				0.9		0.5		1.5		0.8	1.2	
18 Sta Lucia Matua								1.5	1.2	0.6	0.6	

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)		07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
19 Sta. Lucia Anak								0.3	1.5	1.2	0.6	0.9
20 Palimpe										1.2	0.9	1.2
21 Sapang Kawayan										1.2	0.6	0.9
22 Metro Plaza										1.2	-	-
23 Sta Lucia Pagyabang										1.2	-	-
24 Bulacos										1.2	0.6	-
25 Caingin										1.2	0.8	-
26 Malauli										1.2	0.6	1.2
27 San Pedro									1.5	1.2	0.6	0.9
28 Poblacion											0.5	-
29 San Isidro I											-	1.2
30 San Isidro II											-	1.2
31 Caingin San Agustin											-	1.2
32 Caingin Sta. Monica											-	1.2
33 Sta Cruz											0.8	1.2
34 Bangang											-	1.2
35 Cambasi											0.8	1.2
36 Sta. Lucio											-	1.2
37 Bualcus											-	1.2
38 San Matias											-	0.5
39 Sto. Nino Sapa											-	0.5
40 San Vicente											-	0.8
41 San Bartolome											-	0.8
42 Sto Rosario											-	0.8
43 Moras Dela Paz											-	0.5
44 Niqui											0.6	-
45 San Isidro Mambang											0.9	-
46 San Agustin											0.9	-
47 Sta. Monica											0.9	-
MINALIN												
1 Sto. Rosario				0.6		0.6	0.8	1.2	1.5	0.8		
2 Sta. Maria				0.6		0.5		1.0	1.8			
3 Sta. Rita				0.6		0.5	0.8	1.7	1.8	0.8		
4 San Isidro				0.6		0.8		1.4	1.5			
5 Sta. Catalina				0.6		0.3		1.0	1.5	1.0		
6 San Isidro				0.6		0.8				0.8		
7 San Pedro				0.8		0.6	0.8	1.4	1.2	0.8		
8 San Nicolas				0.9		0.3	0.3	1.7	1.6	0.8		
9 San Francisco 1				0.9		0.3		0.7		1.0		
10 San Francisco 2				0.9		0.3		1.0		2.0		
11 Sto. Domingo				0.9		0.3		0.8	0.4			
12 Sto Rosario 4,5 & 6									1.5			
13 Saplad								1.2	1.5	0.3		
14 San Francisco 2 Purok 3,4									1.0			
15 San Francisco 2 Purok 1,2									1.8			
16 Bulak Prk 1 to 6								1.6	1.5			
17 Dawe Prk 1,2,3,4,5 &6								1.2	1.5			
18 Lourdes Prk 2,3								1.0	1.2			
19 Maniango								2.0	2.0	0.3		
20 Lourdes										0.6		
21 Sto. Domingo (purok 3 & 4)										0.6		
22 Bulac										0.3		
23 Dawe										0.3		
City of SAN FERNANDO												
1 Sta. Lucia Purok 5	-			0.6		-						
2 Sta. Teresita	-			0.6		-		1.2				
3 Sto. Rosario	-			0.6		-		1.2	1.2			
4 Lourdes	-			0.6		-		0.5	1.2			
5 San Juan	-			0.6		-		1.0				
6 San Jose(portion)	-			0.9		0.5		1.5	1.2			
7 St. Jude Phase 2,3,4	-			0.9		-						
8 San Pedro	-			0.9		-		1.8	1.2			

PAMPANGA RIVER BASIN	2004						2001	2000	1999	1998	
	Height of Floodwater in Meter										
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9 Magliman	-			0.9		-		0.5	1.2		
10 Sto. Nino	-			0.9		-		0.6	1.0		
11 Del Pilar	-			0.9		-		1.5	1.5		
12 San Felipe	-			0.9		-		1.8	1.5		
13 San Nicolas	-			0.9		0.3		1.2	1.5		
14 NHA Centro	-			-		0.3					
15 Pandaras(portion)	-			-		0.3		2.5	1.2		
16 Greenville	-			-		0.3					
17 Dolores Sampaloc								0.5	1.0		
18 Sta. Lucia Prk 1 -15								1.0	1.0		
19 Del Pilar 1st. Avenue									1.2		
20 Villa Barosa									1.0		
21 Camp Olivas									1.2		
22 San Juan Juliana								1.2	1.2		
23 San Agustin								0.5			
ARAYAT											
1 Camba				0.6		-					
2 Batasan				0.9		0.9					
3 Gumasan				0.9		-					
4 San Nicolas				0.9		-					
5 Cupang				0.9		-			1.5		
6 Suclayin				0.9		-			0.6		
7 Cacutud				0.9		0.3					0.9
8 Plaza Luma				0.9		-					-
9 Matamo				0.9		-					-
10 Tabuan				0.9		-					-
11 San Mateo				1.8		0.3		0.3	0.6		1.8
12 Candating				1.8		0.5		1.0			1.8
13 Palinlang									0.6		-
14 Mapalad									0.6		-
15 Baliti									0.6		-
16 Bitas									0.6		-
17 Telapayong									0.6		-
18 Sto. Nino Tabon											1.5
19 Poblacion											0.9
20 Guimaran											0.9
APALIT											
1 Tabuyok				0.2		-		1.5			0.6
2 Cansinala				0.5		0.3		1.5			0.9
3 Colgante				0.9		0.6		1.0	1.5		1.2
4 Sampaloc				0.9		0.6		1.2	1.2		0.9
5 San Vicente				0.9		0.6		1.0			-
6 San Juan				0.9		0.3		1.0			0.6
7 Paligui				0.9		-		1.8	1.5		1.2
8 Patigui				-		0.3					-
9 Sulipan				-		0.3		1.8			0.6
10 San Vicente Bagong Pagasa									1.5		-
11 Villena Subdivision									1.2		-
12 Sitio Paligui									1.2		-
13 Capalangan riverside								0.6	0.6		-
14 San Vicente Sitio Sampaloc									0.3		-
15 Sitio Sampaga									1.2		-
16 Stio Centro									1.2		-
17 Sulipan Sitio Control									0.6		-
18 Sucad								0.6			1.5
19 Balucuc								1.0			0.6
20 San Vicente/ S. Sampaga											1.2
21 Capalongan											0.6
STO. TOMAS											
1 Pao				1.2		0.3					
2 San Bartolome				1.2		0.9	0.4	1.2	1.2	0.3	

PAMPANGA RIVER BASIN	2004						2001	2000	1999	1998	
	Height of Floodwater in Meter										
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
3 San Vicente				1.2		0.5	0.4	1.2	1.0	0.3	
4 Moras				1.2		0.6		1.2		-	
5 San Matias				1.2		0.3		1.2	1.0	0.3	
6 Sapa				1.2		0.5		1.0		-	
7 Poblacion				1.2		0.3	0.4	1.2	1.2	0.3	
8 Sta Rosario Pau									1.0	0.3	
9 Moras Dela Paz									1.0	0.3	
10 Sto Nino Sapa									0.6	0.3	
STA. ANA											
1 Sta. Lucia				0.5		0.3		0.3	1.2		
2 San Pedro				0.6		0.3		0.5	1.0	0.3	
3 San Jose				0.6		0.6			1.0		
4 San Roque				0.6		0.6			1.2		
5 San Bartolome				0.6		0.9		0.6	1.2		
6 San Juan				0.6		0.6		0.3	1.0		
7 Sta. Maria				0.6		0.3		0.3	1.2		
8 San Nicolas				0.6		0.3			1.2		
9 Poblacion				0.6		-					
10 San Agustin				0.9		0.3		1.0	1.2		
11 San Isidro				0.9		0.6		0.6	1.8		
12 Santiago				0.9		0.6		1.0	1.2		
13 Sta. Ana Mexico Boundary				0.9		-					
14 San Joaquin				1.2		0.6		1.0	1.2		
15 Sto. Rosario				-		0.6		0.6	1.2		
16 San Pablo									1.0		
CANDABA											
1 Bahay Pare				-		0.3		1.2	1.0	0.3	
2 Tinejero				-		0.3			0.7	-	
3 Mangga				-		0.3			0.7	-	
4 Cauyan Bugtong				-		0.3		1.4	1.0	-	
5 Lourdes				-		0.3		1.2	1.0	-	1.5
6 Mapaniqui				-		0.3		1.2	1.3	-	1.5
7 Barit				-		0.3			1.0	-	-
8 Talang				-		0.3			0.7	-	-
9 Dalayap				-		0.3			0.7	-	-
10 Pulong Plaza				-		0.3		1.5		-	1.2
11 Tagud				-		0.3				-	-
12 Mandili				-		0.3		1.2	1.0	-	1.5
13 Salapungan				-		0.3		1.0	1.0	-	-
14 Buas				0.6		0.6			1.5	-	1.5
15 Patigue				-		0.9				-	-
16 Pangclara				-		0.9			1.0	-	-
17 Vizal Sto. Nino				-		0.9		1.5	1.8	-	1.2
18 Vizal Sto. Cristo				-		0.9			1.0	-	-
19 Paralaya				1.2		0.9	1.0	1.5	1.2	0.3	1.5
20 Pulong Gubat				-		0.9		1.0	1.0	-	1.2
21 Vizal San Pablo				-		0.9		1.5	0.7	-	-
22 Vizal Pangclara				-		0.9				-	-
23 Barangca				-		0.9		1.2	1.3	-	-
24 Gulap				0.9		1.2		1.2	1.0	-	-
25 Bambang				0.6		1.2			1.3	0.2	-
26 Sto. Rosario				-		1.2			1.3	-	1.8
27 Pansinao				0.6		1.2			1.0	-	1.5
28 Mangumbali				-		1.2			1.3	0.9	1.5
29 Pescadores				0.6		1.2		1.2	1.2	-	1.2
30 Lanang				0.9		1.2			1.0	-	-
31 San Agustin				1.8		2.4	0.3	2.2	3.0	-	2.1
32 Mandasig				0.6		-			1.3	-	1.5
33 Tagulod								1.4	1.0	-	-
34 Dulong Ilog								1.2	1.3	1.2	1.5
35 Pulong Palazan									0.7	-	-
36 Paligui								1.0	1.0	-	1.2

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
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37 Poblacion	0.6								0.4	-	-	
38 Pasig								1.0	1.2	-	1.8	
39 Sitio Pansul								1.2		-	-	
40 Tulap										-	1.5	
41 Bamban										-	1.5	
42 Sto. Cristo										-	1.2	
43 San Pablo										-	1.2	
44 Pulong Ilog										-	1.2	
45 Salupungan										-	1.5	
46 Sto. Nino										0.9	-	
47 Pasig	1.3											
SAN LUIS												
1 Sta. Cruz Pambilog						0.5		1.2	1.0			
2 San Sebastian						0.5		1.0	1.2			
3 San Agustin						0.6		1.2	0.6			
4 Sta. Catalina						0.6		1.0				
5 Sto. Tomas				1.3		0.6		1.2	1.0			
6 Sto. Rosario						0.6		0.5	1.0			
7 Sta. Rita						0.6		1.5	1.2			
8 San Nicolas						0.9		1.5	1.2			
9 Sta. Catalina						0.9			1.0			
10 San Juan						0.9	0.2	1.5	1.5			
11 Sta. Cruz Poblacion						0.9		0.3				
12 Sto. Niño									1.0			
13 San Roque									1.0			
14 San Jose									1.0			
15 San Isidro								1.2	1.0			
16 Sta. Monica				1.3				1.2	1.2			
17 San Carlos								0.6	1.0			
18 Sta. Lucia								0.5				
SAN SIMON												
1 San Agustin				0.3		0.6		1.2	1.2	0.6	0.9	
2 San Pablo				0.3		0.6		1.2		-	1.2	
3 Dela Paz				0.9		0.6		1.2	1.0	0.3	0.9	
4 Sta. Monica				0.3		0.6		0.3		-	-	
5 San Nicolas				0.3		1.8		1.2			1.5	
6 San Miguel				0.5		1.8		1.0			1.5	
7 San Juan				0.3		1.8		1.0	1.2		1.2	
8 Sto. Nino				0.3		1.8		1.2	1.2		0.9	
9 Sta. Cruz				0.5		1.8		1.2	1.2		1.5	
10 San Pedro				0.3		1.8		1.2			1.5	
11 San Isidro				0.3		-		0.6			-	
12 Tulaok (LTO off)							1.0	1.2				
13 San Pablo Libutad								1.2	1.0			
14 San Pablo Propio									1.0			
15 Concepcion								0.3				
16 San Jose								0.6				
LUBAO												
1 San Juan						0.3		0.6	1.0	0.5		
2 Sta. Cruz						0.3		0.9	1.0	-		
3 Sta. Maria						0.3		1.0	1.0	1.2		
4 Bancal Sinubli						0.3				-		
5 San Jose Gubat						0.3				-		
6 Sta. Rita						0.3		0.6		-		
7 Baruya						0.3				0.6	0.5	
8 Bancal Pugad						0.3				-	-	
9 Sta. Teresa						0.3				-	-	
10 Balantaca						0.3		1.2		-	-	
11 Calangain						0.3		0.9		-	-	
12 San Agustin						0.6		1.0		-	-	
13 Sta. Catalina						0.6		1.2	1.0	1.2	0.5	

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98	
14 Sta. Barbara						0.6			1.2	1.2	0.5	
15 Remedios						0.6		0.9		2.1	0.5	
16 Sta. Monica							0.6	1.5	1.5	1.2	0.2	
17 Sta. Lucia							0.6	1.2	1.2	0.9	0.2	
18 Balantacan Prk 1 to 6									1.0	-	-	
19 San Roque Arbol Prk 1-4								1.0	0.6	-	-	
20 San Roque Arbol Prk 5 & 6									0.6	-	-	
21 San Nicolas 1st	0.9							1.5	1.0	0.9	0.5	
22 Sta Cruz St Dominic									1.0	-	-	
23 Sto. Tomas								1.0	1.0	0.9	0.5	
24 Remedios Sitio Centro									1.0	-		
25 San Agustin Prk 1-4									1.2	-		
26 San Agustin Prk 5-7									1.2	-		
27 Baruya Prk 2&3								1.2	1.5	-		
28 Baruya Prk 5-7									1.5	-		
29 Sta Barbara Prk 1								1.2	1.0	-		
30 San Pablo 2nd								1.0	1.0	-		
31 Dampulit								0.9		-		
32 Sapang Pari								0.9		-		
33 Cutud								0.6		-		
34 Lourdes								1.0		-		
35 St. Nino								0.6		-		
36 Pigufut								0.9		-		
37 Paralaya								1.0		-		
38 Centro								0.6		-		
39 Sto. Tomas bdry with Sta. Monica								1.0		-		
40 San Nicolas 2nd										0.9	0.5	
41 Del Carmen										-	0.5	
42 Sto. Cristo										1.2	0.5	
43 Sta. Cruz Bridge										1.2		
44 San Agustin Sapang Bayu										1.8		
45 Concepcion										0.6		
SASMUAN												
1 Sta. Monica				0.6				1.4	1.5	1.8	0.8	
2 San Pedro				0.6				0.6	1.2	1.5	-	
3 Sasn Nicolas 1				0.6				1.2	1.5	1.8	0.9	
4 Sto. Tomas				0.6				0.8	0.6	1.2	0.9	
5 Malusac				0.6					1.0	-	-	
6 Batang 1				0.6				1.0	1.5	-	0.5	
7 San Antonio				0.6				1.2	1.5	1.8	0.8	
8 Sta. Lucia	0.5			0.6				1.0	1.5	1.5	0.9	
9 San Nicolas 2				0.6				1.2	1.8	2.1	1.2	
10 Serbitanan				0.6				1.0	1.5		-	
11 Mabuan				0.6					1.5		-	
12 Batang 2				0.6				1.0	1.5		0.5	
13 Poblacion									1.0		-	
14 San Pedro									1.2		-	
14 Pedro											0.6	
14 Malasac											0.5	
14 Sebastian											0.5	
14 Mabuanbuan											0.5	
STA. RITA												
1 San Matias				0.3				0.6	0.6	0.3		
2 San Jose				0.6				1.0	0.6	0.3		
3 San Basilio				0.6						-		
4 San Isidro				0.6						-		
5 Sta. Rita Plaza				0.6				1.2		-		
6 San Agustin				0.6					0.6	0.3		
7 San Juan				0.6				0.6	0.6	-		
8 San Basilio Sitio Manauli									0.6	-		
9 San Vicente								0.6	0.6	0.3		
10 Sta. Monica								1.0	0.6	0.3		

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98	
11 San Bartolome									1.2			
MEXICO												
1 Savanlila				0.5								
2 Masangsang				0.6				0.6	0.6	1.2		
3 Laput				0.6						-		
4 San Carlos				0.9					1.0	1.1		
5 San Antonio				0.9				0.5	1.0	0.9		
6 Sto. Cristo				0.9						-		
7 Parian				1.2				0.6	1.2	1.4		
8 Sto. Rosario				1.2				0.6	1.0	1.1		
9 Lagundi				1.2				0.5	0.6	1.2		
10 Anao				1.2						-		
11 San Nicolas									0.6	1.4		
12 Patricio								0.6	0.6	-		
13 San Jose Matulid								0.6	0.6	1.1		
14 Sto. Domingo								0.6	0.3	1.1		
15 Dolores								0.6	0.3	-		
16 Masamat									0.3	0.3		
17 San Lorenzo								0.6	1.0	1.2		
18 Balas								0.3	0.6	0.9		
19 Sabanilia									0.3	-		
20 Laug								0.3	0.3	1.4		
21 Piring									0.3	-		
22 Sta. Cruz								0.6		-		
23 San Pablo										1.1		
24 San Roque										0.9		
25 Dolores Pring										0.6		
26 Anao (Bana & Sulbang)										0.9		
BACOLOR												
1 Sta. Inez				0.3				0.6	0.3	0.3		
2 San Vicente				0.3				0.6	0.6	0.3		
3 Parulog				0.3				0.6				
4 Cabalantian				0.3				1.0	0.3			
5 San Antonio				0.3								
6 Maliwalu				0.3								
7 Macabacle				0.3								
8 Cabambangan				0.3				0.6	0.6	0.3		
9 Tinajero				0.3						-		
10 Cabetican				0.3				0.3	1.2	0.3		
11 Dolores				0.3								
12 Sta. Barbara				0.3								
13 Ssan Isidro				0.3								
14 Magliman				0.3								
15 Talba				0.6								
16 Town Proper									0.6			
MAGALANG												
1 San Ildeponso				0.3				1.5	1.5			
2 Bukasan				0.3								
3 Sta. Maria				0.3					1.2	0.6		
4 Escaler								1.0	1.5	0.6		
5 San Agustin Sitio Dapa								0.6	1.2	-		
6 Balitucan										0.6		
7 San Pedro										0.6		
8 San Nicolas										0.6		
9 Sta. Cruz										0.6		
10 Dolores										0.6		
11 San Roque										0.6		
12 Turo										0.6		
13 Sto. Nino										0.6		
14 San Jose										0.6		
15 Bucaran										0.6		

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98	
16 Camias 1										0.3		
17 Sitio Patibakan								1.2		-		
18 Sentro Mapinya								1.2				
FLORIDABLANCA												
1 Maligaya				0.3				0.6		0.9		
2 San Antonio				0.3						0.9		
3 Fortuna				0.3						-		
4 Poblacion				0.3						-		
5 Sta. Lucia				0.3						-		
6 San Nicolas				0.3						-		
7 Sto. Tomas				0.3						-		
8 Anon				0.3						-		
9 Cabangcalan				0.6				0.6		0.9		
10 Mabical				0.6						-		
11 Sto. Rosario										0.9		
12 San Pedro										0.9		
SAN LUIS												
1 Sta. Lucia				0.6								
2 San Carlos				1.2								
3 San Sebastian				1.5								
4 Sta. Catalina				1.5								
5 Sto. Tomas				1.5								
6 San Juan				1.5								
7 Sto. Rosario				1.5								
8 San Isidro				1.5								
9 Cruz Pambilog				1.8								
10 San Agustin				1.8								
11 Sta.Monica				1.8								
12 Sta. Rita				1.8								
13 San Nicolas				2.1								
14 Sta. Cruz Poblacion				3.0								
MABALACAT												
1 Dolores				0.3					0.3			
2 San Joaquin				0.3					0.3			
3 Dau Portion									1.0			
4 Mangaliit									1.5			
PROVINCE OF BULACAN												
SAN MIGUEL												
1 San Juan		0.3										
2 Camias		0.3										
3 San Jose		0.3										
4 San Agustin		0.3										
5 Balite		0.3										
6 Paliwasan		0.3							1.0			
7 Sta. Rita Bata		0.3										
8 Sacdalan		0.3							1.0			
9 Magmarale		0.3										
10 Tibagan		0.3										
11 Bardias		0.3										
12 Sta. Lucia		0.3										
13 Malibay		0.3										
14 Pulong Bayabas		0.3										
15 Cambio		0.3										
16 Pinambaran		0.3										
17 King Kabayo		0.3										
18 Biak-na-Bato		0.3										
19 Sapang		0.3										
20 Maligaya		0.3										
21 Mandile		0.6							0.6			
22 Biclat		0.6										

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)		07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
23 Ilog-Bulo		0.6								0.6		
24 Tigpalas		0.6										
25 Salangan		0.6										
26 Batasan Bata		0.6										
27 Batasan Matanda		0.6										
28 Salacot		0.6										
29 Buga		0.6										
30 San Vicente		0.6										
31 Sta. Rita Matanda		0.6										
32 Bulualto		0.6										
33 Bagong Pag-Asa		0.6								0.6		
34 Calumpang		0.6										
35 Buliran		0.6								0.6		
36 Sibul		0.6								0.3		
37 Bantog		0.6										
38 Labne		0.6										
39 baritan		0.6										
40 Lambakin		0.6										
41 Pacalag		0.6										
42 Tartaro		0.6										
43 Sta. Ines		0.6										
44 Partida		0.6										
45 Pulong Duhat		0.9										
46 Bagong Silang		1.2								0.6		
47 Poblacion		-								0.6		
SAN ILDEFONSO												
1 Antayam		0.3								1.2		
2 Nabaong Garlang		0.3								1.0		
3 Telepatio		0.3								1.0		
4 San Juan		0.3										
5 Bubulong Malki		0.3										
6 Bubulong Munti		0.3										
7 Calawitan		0.3								0.6		
8 Pulong Tamo		0.3								0.6		
9 Ssan Juan		0.3										
10 sta. Catalina Matanda		0.3										
11 Lapnit		0.3										
12 Makapilapil		0.2										
13 Matimbubong		0.3										
14 Calasag										0.6		
15 Maasim										0.6		
BALIUAG												
1 Pagala										1.0		
2 Tibag									0.3	1.0		
3 Matang Tubig									0.3	1.0		
4 Telepayong									0.3	1.0		
5 Sto. Nino										1.0		
6 Birhen delas Flores										1.0		
7 Poblacion									0.3	1.0		
8 Sto. Cristo										1.0		
9 Concepcion										0.6		
10 San Jose									0.3	1.0		
11 Tiaong									0.3	1.0		
12 Piel										0.6		
13 Calantipay									0.3	0.6		
14 San Roque									0.3	0.6		
15 Sabang									0.3			
16 Hinukay									0.3			
17 Tarkan									0.3			
18 Tangos									0.3			
19 Bagong Nayon									0.3			
20 Paitan									0.3			

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98	
21 Sta. Barbara								0.3				
22 Makinabang								0.3				
CALUMPIT												
1 San Miguel									1.0		1.2	
2 Meysulao								1.2	1.0		0.6	
3 Bulusan								0.6	0.6		0.6	
4 Calizon					0.3			0.3	1.2		0.6	
5 Caniogan								0.6	1.0		0.2	
6 Calumpang								0.3	0.6		0.3	
7 Corazon								0.3	1.0		0.3	
8 Frances								0.3	1.0		0.2	
9 Gatbuca								0.3	1.0		0.9	
10 Gugo								0.6	0.6		0.2	
11 Iba Este								0.3	1.0		-	
12 Iba O'este								0.6	1.0		0.2	
13 Longos								0.3	1.0		0.3	
14 Meyto								0.3	0.6		0.6	
15 Palimbang								0.3	0.3		-	
16 Pio Cruzcosa								0.3	0.6		0.3	
17 Poblacion								0.3	0.3		0.3	
18 San Jose								0.6	0.6		0.6	
19 San Marcos								0.3	1.0		-	
20 San Miguel					0.3			1	1.5		-	
21 Sapang Bayan					0.6			1.2	1.5		0.6	
22 Sto. Nino								0.6	1.0		0.2	
23 Sucol								0.3	1.0		0.3	
24 Baguion								0.3	0.6		-	
25 Sergio Bayan								0.3	0.3		-	
26 Sta. Lucia								0.3	1.5		0.6	
27 Pungo								0.6	1.2		0.2	
28 Pandukot								0.3	1.2		0.3	
29 Balungao								0.6			-	
30 Balite								0.3			-	
SAN RAFAEL												
1 Pansumalok								0.2	1.0			
2 Pulong Bayabas								0.2	1.0			
3 Maasim									0.6			
4 Diliman II								0.3	0.6			
5 San Agustin									0.6			
6 Banca-Banca									0.6			
7 Dagat-dagatan									0.6			
8 San Roquie									0.6			
9 Pinac-Pinacan									0.6			
PAOMBONG												
1 Kapitangan								0.6	0.6		0.3	
2 Sto. Rosario								0.6	0.6		0.3	
3 Sto. Nino								0.6	0.3		0.3	
4 San Jose								0.6	0.3		-	
5 San Isidro I								0.6	0.6		-	
6 San Isidro								0.6	0.6		0.6	
7 San Roque								0.6	0.6			
8 Pinalagdan								0.6	0.3			
9 Poblacion								0.6	0.2			
10 San Vicente								0.6	0.6			
11 Malumot								0.6	0.6			
12 Sta. Cruz								0.6	0.3			
13 Binakod								0.6	0.6			
14 Masukol								0.6	0.6			
HAGONOY												
1 Palapat								0.5	1.0		0.9	
2 San Juan								0.3	1.0		0.9	

PAMPANGA RIVER BASIN	2004						2001	2000	1999	1998	
	Height of Floodwater in Meter										
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
3 San Roque		0.3						0.3	1.0		-
4 San Agustin		0.3						0.6	0.6		0.3
5 San Pablo		0.3						0.6	0.6		-
6 Abulalas								0.6	0.6		0.3
7 San Pedro								0.6	0.6		-
8 San Nicolas		0.3					0.3	0.1	0.6		-
9 San Pascual							0.4	0.3	1.2		-
10 Sagrada Familia		0.3						0.5	0.6		-
11 Mercado		0.3						0.5	0.6		-
12 Sto. Rosario		0.3						0.5	0.6		-
13 Sta. Cruz		0.3						0.3	0.6		-
14 Sta. Monica								0.3	0.6		0.3
15 Tampok								0.3	1.0		0.9
16 San Isidro								0.5	1.2		0.9
17 Pugad								0.6	0.6		-
18 San Jose		0.3						0.5	0.6		-
19 Tibaguin								1.5	0.3		-
20 San Sebastian		0.3						0.3	0.6		-
21 Sto. Nino		0.3						0.6	0.6		-
22 Carillo								0.6	0.6		0.9
23 Iba									0.6		0.6
24 San Miguel								0.6	1.2		0.3
25 Sta. Elena		0.3						0.3	0.6		-
26 Iba-Ibayo									0.6		-
BUSTOS											
1 Maharlika Vilalge								0.6			
2 Riverside								0.6			
3 Yabut Compound								0.6			
4 San Pedro								0.3			
5 Bonga Menor								0.3			
PULILAN											
1 Dampol B								1.0		0.3	
2 Inaon								0.5		0.3	
3 Penabatan								0.3		0.6	
4 Lumbac								0.6		-	
5 Dulong Malabon								1.0		0.6	
6 Sto. Cristo								0.3		-	
7 Dampol A								0.3		0.6	
8 Paltao								0.3		-	
9 Taal								0.6		-	
10 Sta. Peregrina										2.0	
PROVINCE OF NUEVA ECIJA											
CABIAO											
1 Bagong Sikat	0.5								0.6		
2 Sta. Isabel	0.5								0.6		
3 Polillio	0.5								0.6		
4 Concepcion	0.5								1.2		
5 Sta. Rita	0.5								0.6		
6 San Vicente	0.5								0.6		
7 San Roque	0.5								0.6		
8 San Gregorio	0.5								0.6		
9 San Fernando Sur	1.3								0.6		
10 San Juan South	0.5								0.6		
11 Natividad South	0.5								0.6		
12 San Carlos	0.5								0.6		
13 Bagong Silang	0.5								0.6		
14 Palasinan	0.5								0.6		
15 Sta. Ines	0.5								0.6		
16 Entablado	0.5								0.6		
17 Natividad Norte	0.5								0.6		

PAMPANGA RIVER BASIN

Flood Affected Areas Municipality (Baranggay, etc)	2004						2001	2000	1999	1998	
	Height of Floodwater in Meter										
	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
ALIAGA											
1 Bibiclat	0.5						1.2	0.3			
2 Bucot	0.5						1.2	0.3			
3 San Emiliano	0.5										
4 San Juan								0.3			
5 San Pablo (Old)											
6 San Pablo (young)											
7 Pantoc											
8 San Eustacio											
9 San Carlos							1.2				
10 La Purisima											
11 Santiago											
12 Sta. Monica	0.5										
13 Sto. Rosario (old)											
14 Poblacion East I							1.2				
15 Poblacion East II							1.2				
16 Magsaysay											
17 Sto. Rosario (young)											
18 Poblacion Centro											
19 San Juan	0.5										
TALAVERA											
1 Pag-asa District							3.0				
2 Matias District							1.2				
3 Pulong San Miguel							3.0				
4 Calipahan							3.0				
5 San Pascual							1.5				
QUEZON											
1 San Andres I								2		4.3	
2 San Andres II	0.5							2		1.8	
3 Pulong Bahay	0.5							2		4.9	
4 Sto. Cristo	0.5							2			
5 Bgy. Uno								2			
6 San Alejandro	0.5							0.5		4.9	
7 Osmena								0.5			
8 Dulong Bayan								0.5			
9 Sto. Tomas Feria	0.5							0.5			
10 Ilog Baliwag								0.5			
11 Barangay I										1.8	
STO. DOMINGO											
1 Dolores	0.5						1.5				
2 Concepcion	0.5						1.2				
3 San Agustin	0.5						1.0				
4 Mabini Gen. Luna	0.5						2.0				
5 San Agustin	0.5						3.0				
6 Gen. Luna	0.5										
7 Baloe	0.5										
8 Casulucan	0.5										
9 Comitang	0.5										
10 Malasin	0.5										
11 San Francisco	0.5										
SAN JOSE											
1 Sto. Nino							1.5	0.3			
2 Abar 1st							1.5				
3 Sibut							1.5				
4 Sto. Nino II							1.5				
5 Calaocan							1.5				
6 San Mauricio											
7 Palestina								0.3			
8 Tondod											
9 FE Marcos											

PAMPANGA RIVER BASIN	2004						2001	2000	1999	1998	
	Height of Floodwater in Meter										
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
10 Sto. Tomas											
11 Dizol											
12 Malasin											
13 Kita-kita											
CABANATUAN CITY											
1 Valdefuente	1										
2 Cabu Bana	0.5										
3 San Isidro	0.5										
4 Sto. Nino	0.5										
5 Caudillo	0.5										
6 Imelda	1										
7 MS Garcia	0.6										
8 Matadero	0.5										
9 Pagas	0.5										
10 Aduas Sur	0.6										
11 Isla	0.5										
12 Aduas Norte	0.5										
13 Rizdela	0.5										
14 Communal	0.6										
15 San Juan Acefa	0.5										
16 San Roque Sur	0.5										
17 Sumacab Norte	1										
18 Bonifacio	0.5										
19 Sta. Arcadia	0.6										
20 D.S. Garcia	1										
21 Dicarma	0.5										
22 Calawagan	0.6										
23 Daan Sarile	0.5										
24 Aduas Centro	0.5										
25 Sumacab Sur	0.5										
26 Samon	0.5										
27 Magsaysay Sur	0.5										
28 Balite	0.5										
29 Palagay	0.5										
30 Polillio	0.5										
31 Talipapa	0.5										
32 Cinco-cinco	0.5										
33 Ibabao Bana	0.5										
34 Caalibangbangan	0.5										
35 Bantug Norte	0.6										
36 Pangaban	0.5										
37 Dimasalang	0.5										
38 Sumacab Este	0.5										
39 San Josef Sur	0.5										
40 San Josef Norte	0.5										
41 Mabini Homesite	0.5										
42 Villa Ofelia	0.5										
43 Barrera	0.5										
44 Caridad	0.5										
45 P Crisostomo	0.5										
46 Sapang	0.5										
47 Pula	0.5										
48 Mayapyap Norte	0.5										
49 Magsaysay Norte	0.6										
50 Bangaad(Univille Subdivision)	0.6										
51 Sto. Rosario Young	0.9										
SAN ISIDRO											
1 Pulo	0.5							0.9			
2 Sto. Cristo								0.9			
3 Mangga	0.5							0.9			
4 Tabon	0.5										
5 Pulo	0.5										

PAMPANGA RIVER BASIN

Flood Affected Areas Municipality (Baranggay, etc)	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)		07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
PALAYAN CITY												
1 Popolan	0.5								0.3			
SAN ANTONIO												
1 Papaya	0.5								0.3		1.5	
2 Hulo	0.5								0.3		1.5	
3 San Jose	0.5								0.3		1.5	
4 San Francisco	0.5								0.3		1.5	
5 Sta. Barbara	0.5								0.3		1.5	
6 Cama-Juan	0.5								0.3		1.5	
7 Panabigan	0.5								0.3		1.5	
8 Tikiw	0.5										1.5	
9 San Mariano	x										1.5	
10 Maugat	x										1.5	
11 Sto. Cristo	0.5										1.5	
12 Luyos	0.5										1.5	
13 Buliran	0.5										2.5	
GEN. TINIO												
1 Sawmill									0.5			
2 Poblacion									0.5			
3 Central									0.5			
4 Bago (Libis)									0.5			
5 Concepcion									0.5			
6 Pias									0.5			
LAUR												
1 Betania	0.5										1.8	
2 San Antonio	0.5										2.8	
SAN LEONARDO												
1 Castellano	0.5										1.2	
2 Nieves											0.6	
3 Mambangnan											0.6	
4 Mallorca											0.9	
5 Poblacion											0.9	
6 San Anton	0.4										1.5	
7 Tabuating	0.5										1.2	
8 San Roque	0.5										1.5	
9 Magpapalayok	1.9										1.5	
10 Tagumpay	0.5										1.2	
11 Adorable	0.5										1.2	
RIZAL												
1 Bicos											0.9	
2 Agbanawag											0.9	
PENARANDA												
1 Las Pinas											0.9	
2 Carlos											0.9	
3 San Josef											0.9	
4 San Mariano											0.9	
5 Barangay I											0.9	
6 Barangay II											0.9	
7 Barangay III											0.9	
8 Barangay IV											0.9	
9 Sinansajan											0.9	
10 Sto. Tomas											0.9	
STA. ROSA												
1 Zamora	0.5										1.2	
2 Rizal											1.2	
3 Tramo											1.2	
4 La Fuente	1.2										1.2	

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98	
5 Sapsap										1.2		
6 San Jose										1.2		
7 Maliolio										1.2		
8 Cojuangco										1.2		
9 Lourdes										1.2		
10 Sta. Teresita										1.2		
11 Sto. Rosario										1.2		
12 Inpector										1.2		
13 Mabini										1.2		
14 San Pedro										1.2		
15 Isla	0.5									1.2		
16 Luna	0.5									1.2		
17 Valenzuela										1.2		
18 Rizal Sur										1.2		
19 Rizal Norte										1.2		
20 Rizal Centro										1.2		
21 San Mariano	0.5									1.2		
22 San Isidro										1.2		
23 Aguinaldo										1.2		
24 San Gregorio										1.2		
25 Tagpus										1.2		
26 Del Pilar	0.5											
SAN JOSE CITY												
1 Brgy. Sto. Nino	0.5											
2 Abar 1st	0.5											
ZARAGOSA												
1 Brgy. San Miguel	0.5											
2 Partidal	0.5											
3 San Agustin	0.5											
4 Macamias	0.5											
5 Tampac	0.5											
6 San Andres	0.5											
7 Triala	0.5											
8 Galvan	0.5											
9 Valeriana	0.5											
10 Mayamot	0.5											
11 San Rafael	0.5											
12 Del Pilar	0.5											
13 Macarse	0.5											
14 Sto. Rosario (old)	0.9											
15 Balitang	0.5											
CARANLAN												
1 Gen. Luna	0.5											
2 Burgos	0.5											
3 San Agustin	0.5											
4 Bunga	0.5											
5 Bunga	0.5											
CUYAPO												
1 Dist. IV	0.5											
2 Dist. V	0.5											
3 Dist. VI	0.5											
4 Dist. VII	0.5											
5 Dist. VIII	0.5											
6 Benugan	0.5											
7 San Jose	0.5											
8 Bulala	0.5											
9 Malbeg	0.5											
10 San Antonio	0.5											
11 Sta. Clara	0.5											
12 Calancuasan Sur	0.5											

PAMPANGA RIVER BASIN	2004						2001	2000	1999	1998	
	Height of Floodwater in Meter										
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
13 Ungab	0.5										
14 Villaflores	0.5										
15 Burgos	0.5										
16 Bibiclat	0.5										
17 Nagmisahan	0.5										
18 Paglisan	0.5										
19 Loob	0.5										
20 Sitio Lawak	0.5										
21 Tutuloy	0.5										
22 Tagtagumbao	0.5										
23 Maycaban	0.5										
24 Landig	0.5										
25 Pugo	0.5										
JAEN											
1 Pamacpacan	0.5										
2 Niyugan	0.5										
3 Sapang	0.5										
4 Langla	0.5										
5 Sta. Rita	0.5										
6 San Jose	0.5										
7 Sto. Tomas N.	0.5										
8 Sto. Tomas S.	0.5										
9 Dampulan	0.5										
10 San Pablo	0.5										
11 Malabon K	0.5										
BONGABON											
1 Palomaria	0.5										
2 Kaingin	0.5										
3 Mantile	0.5										
4 Sisilang	0.5										
5 San Roque	0.5										
6 Sinipit	0.5										
7 Magtanggol	0.5										
8 Social	0.5										
9 Commercial	0.5										
10 Sampalukan	0.5										
11 Ariendo	0.5										
12 Rizal	0.5										
13 Tulay na Bato	0.5										
14 Labi	0.5										
15 Digmala	0.5										
16 Calasnan	0.5										
17 Larcon	0.5										
18 Lusok	0.5										
MUNOS											
1 Balante	0.5										
2 Bagong Sikat	0.5										
3 Bical	0.5										
4 Cabisuculan	0.5										
5 Catalanacan	0.5										
6 Gabaldon	0.5										
7 Maragol	0.5										
8 Palosapis	0.5										
9 Pandella	0.5										
10 Rizal	0.5										
11 Rang-ayan	0.5										
12 San Felipe	0.5										
13 Sapang Cawayan	0.5										
14 Villa Santos	0.5										
15 Calisitan	0.5										

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)	07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98	
GUIMBA												
1 San Manuel	0.5											
2 Partida	0.5											
3 San Agustin	0.5											
4 Macamias	0.5											
5 Tampac	0.5											
6 San Andres	0.5											
7 Triala	0.5											
8 Galvan	0.5											
9 Sta. Lucia	0.5											
10 Maturanoc	0.5											
11 Cavite	0.5											
12 St. John	0.5											
13 Saranay	0.5											
14 Macatemi	0.5											
15 C. Bugtong	0.5											
16 Bacayao	0.5											
17 Guimba West C. School	0.5											
18 Regina Rice Mill	0.5											
19 Latter Day Saints	0.5											
20 Bubal	0.5											
21 Sta. Veronica	0.5											
22 Pob. West	0.5											
23 Pacac	0.5											
24 Simulatan	0.5											
25 San Rafael	0.5											
26 Nagpandayan	0.5											
27 Caballero	0.5											
28 Macapahellag	0.5											
29 Narvacan I	0.5											
30 Ayos Lomboy	0.5											
31 Camiling	0.5											
PROVINCE OF TARLAC												
CAPAS												
1 Municipal Hall									0.2			
2 Sitio Pies									0.6			
3 Capas ES									0.2			
4 Dolores ES									0.1			
5 Gabaldon ES									0.1			
6 Capas Junction									0.2			
7 Cutcut 1 ES									0.1			
8 Buca Approach									0.6			
9 Susuba									0.3			
BAMBAN												
1 San Nicolas									0.6			
2 San Roque									0.6			
3 Anupul								0.5	0.6			
4 Bangcul									0.9			
5 Dapdap Resettlement									0.3			
6 Culubasa									0.9			
7 San Vicente									0.3			
8 Sto. Nino									0.9			
9 Poblacion								0.5				
CONCEPCION												
1 Café									0.9			
2 Castillo									0.9			
3 San Jose								0.5	1.2			
4 Sta. Monica								1.2	1.2			
5 San Francisco									0.6			
6 Minane									0.6			
7 San Nicolas Poblacion									0.6			

PAMPANGA RIVER BASIN	2004							2001	2000	1999	1998	
	Height of Floodwater in Meter											
Flood Affected Areas Municipality (Baranggay, etc)	08/27/2004 (Friday)	08/28/2004 (Saturday)	08/29/2004 (Sunday)	08/30/2004 (Monday)	09/03/2004 (Fridayday)	09/04/2004 (Saturday)		07/01/2001 (Thursday)	01-Jul-00	01-Aug-99	01-Sep-98	01-Oct-98
8 Green Village										0.6		
9 Culatingan										0.9		
10 Santiago										0.6		
11 Sitio Yanca										0.6		
LA PAZ												
1 Rio Chico Bridge										1.0		
2 San Roque		0.9								0.7		
3 San Isidro										0.6		
4 Rizal										0.3		
5 Balanoy										0.6		
6 Paludpud										0.6		
7 Caut										0.9		
8 Bantog									1.2	0.6		
9 Sierra										0.5		
10 Dumarais										0.3		
11 Lara										0.6		
12 Macalong										0.7		
13 Guevarra										0.5		
14 La Purisima										0.5		
15 Lomboy										0.5		
16 Kapanikian										0.6		
17 Matayum-tayum										0.6		
18 Mayang										0.6		
VICTORIA												
1 Bantog, Sitio Pasubaan										0.6		
2 Canarem, Sitio Namitinan									0.6	0.9		
3 Sta. Barbara, Sitio Gripo										0.6		
4 San Jacinto										0.9		
5 Cabuluan										0.6		
6 Balayang										0.6		
7 Cruz										0.3		
8 Batang-Batang										0.3		
PURA												
1 Balite									0.6			
2 Buenavista									0.6			
3 Cadanglaan									0.6			
4 Estipna									0.6			
5 Linao									0.6			
6 Maasin									0.6			
7 Matindeg									0.6			
8 Maungib									0.6			
9 Naya									0.6			
10 Nilasin 1st									0.6			
11 Nilasin 2nd									0.6			
12 Poblacion 1									0.6			
13 Poblacion 2									0.6			
14 Poblacion 3									0.6			

The approximate point flood depth map (Figure 10.0) of the basin shows maximum estimated floodwater heights observed and/or reported at various places during the event. Likewise, a map showing the flow of floodwaters during the event is presented in Figure 10.1.

6.0 Flood Forecasting and Warning activities

Flood monitoring operations for the Pampanga River were initiated on 24 August 2004 and shift work, under Flood watch conditions, begun on the 25th August 2004. Most of the rainfall gauges were observed as functional during the event but there were WL gauges that were not reporting correct readings, particularly Sapang Buho and San Isidro gaging stations.

Flood Bulletin No. 1 was issued on 0900H, 26 August 2004 after significant rainfall (moderate to heavy) was recorded over at the upper sections of Pampanga River. Arayat WL during this time was showing a slow increase in the river stage and was, obviously, expected to reach ALARM level. WL level readings for Mayapyap was also rising from alarm to critical levels and a forecast of light to moderate rainfall would result to a slow rise for the Rio Chico and Talavera rivers in view of accumulated rainfall with light to moderate intensity since 24 August. Flood advisory No. 1 was issued for the Guagua River one day ahead of the issuance for the Pampanga River. This was in view of the forecast of moderate to heavy rainfall. Flood bulletins for the two basins were regularly issued thereafter.

Final General Flood Advisory for the Guagua sub-basin was issued on 1600H, 28 August 2004, following forecast of light rainfall. The final bulletin for the Pampanga River was issued on 1600H, 29 August 2004, following recession of river stages at Mayapyap and Arayat and no observed significant rainfall.

The issuance of flood bulletins for Pampanga River was somehow perceived to be on time (some 18 hours ahead before a reported flooding within the basin). Although by river basin forecasting standards this could be regarded as a bit short.

Post-flood investigation noted flooding in the upper Pampanga River, especially in low-lying areas and areas near river embankments, the flooding lasting for short-duration (less than 48hours) from 26-27 August 2004. It was also noted that record high flood marks were indicated in river sections within the upper Pampanga River, indicating the large volume of rainwater that overtopped narrow and shallow embankments, eventually being concentrated at the middle-Pampanga river.

A very slow recession of flood due to the volume of accumulated rainwater was observed at the Candaba swamp and the lower Pampanga River causing several days of inundation.

Table 10.0 Issuance of Flood Bulletins (FB) & General Flood Advisory (GFA)

Date (2004)	Time	Pampanga	Guagua
25 August	0900H		GFA 1
26 August	0900H	FB 1	GFA 2
26 August	1600H	FB 2	
27 August	0400H	FB 3	GFA 3
27 August	1600H	FB 4	GFA 4
28 August	0400H	FB 5	GFA 5
28 August	1600H	FB 6	GFA 6 (Final)
29 August	0400H	FB 7	
29 August	1600H	FB 8 (Final)	

A total of 8 Flood Bulletins (FB) and 6 General Flood Advisories (GFA) was issued for the whole flood watch duration during the SW Monsoon-T.Marce event for Pampanga River and Guagua River Basins, respectively.

Figure 11.0 presents the relations between flood bulletins issued for the Pampanga River Basin and observed water levels for each stream gauging station during the flood event. The Final Flood Bulletin issued on 1600H August 29 was based primarily on the rainfall records observed. As no rainfall was observed, it was expected that river stage would decrease in the basin, therefore the final bulletin. However, it was observed that at the downstream area of Sulipan gauging station, water level continued to rise even after the issuance of the final bulletin. Peak gage height at the Sulipan was registered 2 to 3 hours after the final flood bulletin for Pampanga River was issued.

The final bulletin forecasted that flooding in the lower Pampanga River shall persist for a few days and in the Candaba swamp shall remain for a few weeks. Nevertheless, future forecast should be based on observed water level data even at the downstream area.

Contents of the Flood Bulletins:

From the flood bulletins issued can be gleaned clearly that the rainfall conditions were being monitored. The PRFFWC have summarized the rainfall data for the basin, but station data should also be emphasized, to show the extent of coverage of the flood-causing phenomenon. In the basis for forecast, the observations on the progression of the river stages should also be mentioned. The August 2004 Monsoon showed observed record high water level and which should be communicated to the target recipient.

The General Flood Advisory for the Guagua River was noted to be similar throughout despite the changes in the rainfall and at times the affected river system.

The PRFFWC have made efforts to communicate other data by establishing a local website, other than the agency's main homepage, *http://www.dost.gov.ph*, which carried information of isohyetal maps and hydrographs during the event. Their site, *http://groups.msn.com/PampangaRiverBasin/prffwc.msnw*, which has been in operation

for about 2 years now, happens to be the only existing information site for any of the river basins being monitored by the FFB. Such effort should be encouraged.

7.0 Flood Damages (Region III)[7]

Local declaration of areas under State of Calamity through their respective Sangguniang Panlalawigan / Bayan / Panglungsod in Region III, where the Pampanga River Basin system is situated as follows: Province of Pampanga and Tarlac; Municipalities of Calumpit and San Miguel both in Bulacan; and Mexico, Pampanga.

As per joint report of OCD and NDCC, "the massive flooding in the low-lying areas of Region III was due to the silted rivers and waterways in the provinces of Tarlac, Pampanga and Bulacan, aggravated by the breaching of Colibangbang Earthdike in Paniqui and Malayep Dike in Gerona, Tarlac". Furthermore, it reports that "Based on the findings of aerial survey conducted by LGUs on August 31, 2004, heavily silted rivers and waterways caused the widespread flooding in Pampanga and that water was relatively stagnant due to lahar sediments that accumulated at the channel of the following rivers: Gumain-Porac River (4 kms), Upper Dalan Bapor River (4.35 kms) and Lower Dalan Bapor River (3.65 kms) all in Lubao, Pampanga; and Guagua-Porac River, Malusac Section (5 kms.)".

Damage assessments for the region are as follows:

- Estimate of Area and Population affected – 6 Provinces; 8 Cities; 76 Municipalities; 974 Barangays; 261,040 Families; 1,198,131 Persons.
- Casualties – 31 Dead and 2 Missing
- Damaged Houses – 216 Totally; 1,254 Partially
- Damaged Agriculture (₱ Millions): 597.325 for Crops; 5.204 for Livestock; 846.788 for Fisheries.
- Damaged Infrastructure (₱ Millions): 289.670 for Infrastructure

Roads / Bridges

- Viga Bridge in Bongabon-Rizal Road
- Paniqui-Camiling-Wawa Road
- Tarlac, Sta. Rosa Road, La Paz section Bgy. San Roque
- San Fernando-Gapan Road Magliman section
- Norzagaray-Bigte Road, Bgy. Minuyan section

8.0 Highlights during the event and other significant findings

- The Guagua River Basin was one of the most severely flooded areas within the region (Region III), particularly the towns of Guagua, Lubao, San Fernando, Macabebe, and Masantol during the event; the western sections of the Pampanga River Basin, particularly the upper western portions of sub-basin of Rio Chico River,

[7] *Final Report on the After-Effects of Southwest Monsoon Rains Induced by Tropical Storm "Marce", Administrator, OCD and Executive Officer, NDCC, September 14, 2004.*

particularly Quezon, Aliaga, Zaragoza and Licab in Nueva Ecija and La Paz in Tarlac. The Candaba swamp area, and the Pampanga delta area were similarly heavily inundated.

- Widespread flooding in these areas could be attributed to several factors; one is the intensification of the SW Monsoon, which was enhanced by Typhoon Marce. Another thing is the decrease of conveyance capacity of river channels for both basins due to siltation aside from its low-gradient channel at downstream sections. Survey of cross-sections of Pampanga River at Arayat shows a decrease in river section (Figure 12.0). It is believed that similar situations exists at other sections except those where dredging works are being undertaken.

- The Arnedo Dike at Mandasig section in Candaba was overtopped by floodwaters (between August 26-27) during the event and was nearly breached if not for the army and residents who protected the dike with sandbags. Arnedo dike was named after the first elected provincial governor of Pampanga (1904) – Macario Arnedo. He accomplished many projects including construction of railroads, concrete and asphalt roads, government buildings, schools, irrigation systems and flood-control works particularly the "human-made" Arnedo Dike which extends from northeastern towns of Arayat and Candaba passing through the municipalities of San Luis, San Simon, Apalit, Macabebe and Masantol.

- Flooding of Candaba area – floodwaters reached the second step of the municipal building; Bgy. San Agustin was the worst-flooded area within the town; this event was ranked as the worst for the town according to the municipal secretary; flooding within the town proper lasted from 7 to 8 days before normal traffic flow resumed.

- The peak river height attained at Arayat gauging station, which is estimated at 10.03 m, and the maximum water level attained at Candaba swamp area, around 7.38 m, are record highs based on available record, since the start of the FFWS operation (late 1973) for the Pampanga River Basin.

- The 1st General Flood Advisory for Guagua River Basin was issued on the morning of August 25 (0900H) following significant rainfall amounts recorded (Sasmuan & Clark stations) over the area. By nighttime, there were already reports of minor flooding within the Guagua River Basin area. On the morning of the following day, August 26, Flood Bulletin No.1 for Pampanga River Basin was issued as widespread moderate to occasionally heavy rainfall was monitored over the basin. Likewise, minor floods were already being reported at relatively low-lying areas within the basin, particularly in the Candaba swamp area. Succeeding flood advisories and bulletins for Guagua and Pampanga River Basins were regularly issued following the prescribed issuance time of 0400H and 1600H daily. There were no intermediate bulletins issued throughout the whole flood-warning phase for said event.

- Final General Flood Advisory (No. 6) for Guagua River Basin was issued at 1600H of August 28. On the other hand, Final Flood Bulletin (No. 8) for Pampanga River Basin

was issued on the afternoon of August 29 (1600H). No intermediate bulletins or advisories were issued throughout the flood watch operation activities.

- The termination of Flood watch activities for the Pampanga River Basin was decided even before the peak at Sulipan has not yet been attained. This is in view of the widespread flooding already persisting in the lower main Pampanga River area. Though, this could be seen as a basic fault on the part of the center's duty hydrologists. The center's personnel status at that time was short and basing on the judgment that the area (lower main Pampanga River) had already been forewarned 2 days earlier for disaster entities to conduct necessary evacuation procedures. Also, portions of the downstream areas particularly Apalit, Calumpit, Hagonoy and Paombong are already inundated. Peak stage at the gauging station (Sulipan) was attained 2 hours after the issuance of final Flood Bulletin.

- The lack of rainfall stations and not a single water level station within the Guagua River Basin stand to be a setback in the timely issuance of flood advisories over the said area. Considering this handicap, the center (PRBFFWC) was judiciously able to prepare, issue and furnish the flood bulletins to its intended recipients for both basins.

- Although a record high of river stage at Arayat and Candaba swamp was observed during the event, it is quite enlightening to note that flooding within the Pampanga and Guagua River basins did not last long – at most 2 to 3 days (except those areas that have relatively low elevation, ponding / pooling of rainwater), thus having less disastrous impact to most of the affected areas within the basin. Dredging of the Pampanga River along the Pampanga Delta Development Project (PDDP) stretch could have been one of the reasons for the immediate recession of floodwaters.

9.0 Recommendations

The following recommendations are offered as a result of the hydrological analyses, post-flood survey and investigations undertaken within the Pampanga-Guagua River Basins, operational activities during the SW Monsoon-T.Marce event. Some of the items have already been recommended in previous post-flood reports.

A. Short Term:

(1) Continuous and extensive public information drive (PID) to step-up level of awareness by the concerned populace on flood hazards, disaster preparedness, environmental protection awareness, weather and flood information interpretation, etc. in direct coordination with various regional and local Disaster Coordinating Councils (PDCC/RDCC) and other concerned agencies and Non-Governmental Organizations (NGOs) within the area. Solicit and tap the help of mass media and school systems to educate the public especially on the dangers of floods and the need for proper, life-preserving measures.

(2) Establishment of rainfall and water level gages at strategic points especially within the Guagua River Basin systems. These instruments should be provided to LGU's and responsibilities be given to them to facilitate prompt observations and reporting of rainfall intensities through special or dedicated communication link. This could possibly pave the way for the establishment of a community-based flood management network within the area.

The installation of flood markers in strategic areas within the river basin would provide data to PAGASA on the extent of inundation. This can be a part of the proposed community-based flood management network as mentioned above. Mobile communication such as cell phones can be the network's system of reporting.

(3) Continuous physical re-survey of target basin areas, especially Guagua River Basin, to familiarize basin forecasters of the ever-changing basin features particularly its river system and present structural works.

(4) Regular maintenance of all telemetering stations, their equipment, and the stations' housing. Physical maintenance of station condition, particularly cleaning of water level intake pipes (declogging and desilting works) and wells during low river level status.

(5) Memorandum of Agreement / Manual on Ipo Dam Operations regarding Dam Discharge Activities. The lack of pre-release information for the Ipo dam discharge, called attention to the absence of a clear procedure for Dam Discharge Warning between the FFWSDO and the Ipo Dam operations. This should be addressed through a joint Memorandum of Agreement and a manual of operation between PAGASA and Ipo Dam authorities so as to establish exchange of information on the status of the Dam and basin and detail the responsibilities for future discharge and warning operations.

(6) Joint Monitoring of Status on Dam Discharge Warning Systems. While there were no reported discharges from the Pantabangan and Angat Dams, it is important for future flooding that coordination on the monitoring of the status of the dam catchment be maintained. In this regard, there should be a continued joint-agency monitoring activity focused on updating the status of FFWSDO Warning Equipment for said dams, including monitoring if the dam discharge warning communications system/equipment is still functional.

(7) Improved systems for information exchanges (inter-agency). Information on the actual conditions of flooding was not available to the FFWS and PRFFWC personnel during the flooding event. Actual conditions are also factual basis for continuing forecast; therefore it will be significant to establish information links during the flood event. It would be beneficial to pursue activities aimed at an inter-agency Flood Watch Hotline during major flood events among the agencies

of the LGU's, OCD, PDCC, DSWD, DPWH, NPC, and NIA. The hotline or dedicated communication link could be a venue for exchanging information on forecast, actual flooding conditions during flood events aimed at better disaster responses.

(8) On-line Communications and Data-entry. On-line information through the Internet should be upgraded and sustained among the disaster-related agencies. This facilitates the exchange of forecast and flood conditions, other than Flood Bulletins which are exchanged through faxed communications or those exchange by phone. This requires the upgrading of computers at the Field Centers and linkages with computer systems of the Dam Operations within the PABC. An on-line telemetered data for easier computation and analysis and possible reduction of data gaps due to interferences or malfunction.

Efforts should also be undertaken to link the system to the Short Messaging Services. Since this would require support from service providers, efforts should be directed to engage them for the project.

(9) Repairs and Maintenance of Telemetered stations. Immediate repairs are required from the TSSS on the WL gauges for Sapang Buho and San Isidro. Maintenance of telemetering stations is necessary to include clearing of foliage overgrowth for stations partially obscured for rainfall data (Mayapyap, Papaya, Ipo Dam, San Isidro and Arayat), the clearing of flood debris on staff gages and cleaning of water level intake pipes.

(10) There is a need to augment personnel of the PRFFWC for floodwatch operations. At present, the office has 2 hydrologist and 3 hydrological aides. During the 10-day floodwatch, the shift rotation would be exhausting for the limited staff. On the immediate, staff from the FFWS could be detailed to the PRFFWC during floodwatch operations.

B. Medium / Long Term:

(1) Development of simple hydrologic models that may incorporate advanced mapping methods such as Geographic Information System (GIS) and others. Emphasis should be placed on antecedent meteorological and hydrological conditions, flash-flood guidance indices, and instantaneous rainfall rates as determined from satellites or radar images.

(2) Establishment of a telemeterized rainfall and water level monitoring system for enhanced flood forecasting and warning operations particularly for Guagua River basin.

(3) There is a need to rehabilitate the telemetering system of the Pampanga River Basin in order to get reliable real-time data on the rainfall and water level readings at each station. Rehabilitation should include the installation of

additional telemetered stations in strategic locations, particularly in the Guagua River system whose catchment, at the moment, has only one telemetered RR station.

On the immediate, the WL telemetering stations should be installed with staff gage for manual water level reading. Local observers who can be engaged on short-term contracts during the flood season can undertake manual reading. These observers can provide data through Short Messaging Services (SMS) of cellular phones.

Staff gages should be installed in strategic points (especially Rio Chico and Talavera rivers) to complement readings from telemetered stations. Local observers should also be engaged on a contractual basis or acceptable arrangements with the local government through community-based flood management networking.

(4) Appropriations should be provided for equipment with the aim of improving the present FFW system, enhancing the mobility of flood forecasting personnel during flood events, facilitating post-flood field investigation surveys and for supplemental data on rivers not covered by the present system. There is a need for the following items:

- Vehicle w/ boom & tackle - for mobility during floodwatch operations; for the conduct of post-flood investigation; Boom and tackle attachment for use in discharge measurements at relatively high flows.
- Staff gages – for installation in Rio Chico and Talavera rivers, initially, and at other significant river systems within the basin.
- Flood marker gages - For installation of flood markers in specific points in flood prone areas, based on list of perennially flooded barangays.
- River floats made of young bamboos ("buho") to support river velocity measurements at relatively high flow periods.

10.0 References

A. Reports:

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2. Design Report – Hydrological & Hydraulic Calculation for FFWSDO Project. NK, CTIE & BASIC Team. June 1987.
3. Water and Floods: A Look at Philippine Rivers and Flood Mitigation Efforts. DPWH-JICA-PKII. March 2004.
4. Encarrnacion, R. P. and Hernando, H. T., "Post-Flood Investigation Report – Widespread Flooding in Pampanga River Basin due to the Influence of Typhoons Ditang and Edeng (July 2000)". PRFFWC, Flood Forecasting Branch, PAGASA, DOST. September 2000.
5. Resurreccion, M., Presentation on Ipo Dam: An Overview. Bulacan Province. Oct – Nov 2004.

B. Resource Persons:

1. Personnel and Staff of the Pampanga Provincial Disaster Coordinating Center, San Fernando, Pampanga.
2. Mr. Rodolfo Santos, Provincial Disaster Coordinating Officer, Bulacan Provincial Disaster Coordinating Office, Malolos, Bulacan
3. Lorenzo W. Burgos, Executive Officer, PDCC; Chief, Provincial Disaster Management Center, Office of Civil Defense, Province of Nueva Ecija.
4. Raul Agustin, Bulacan Provincial Disaster Coordinating Office, Bulacan
5. Elsa P. Pantino, Municipal Planning & Development Coordinator, Municipality of Guagua, Pampanga
6. Leny Manalo, Secretary to the Mayor, Candaba, Pampanga
7. Carmelito P. Calimbas, Chief, GMS-PAGASA
8. Geraldine P. Nilo, Sr. Weather Specialist, WB, PAGASA
9. Personnel and Staff of PAGASA Cabanatuan Synoptic Station, Cabanatuan City, Nueva Ecija
10. Herminigildo M. Medrano, Head, Ipo Headwork's and Conveyances, Ipo Dam, MWCI
11. Mario C. N. Resurreccion, Manager, Common Purpose Facilities, Manila Water
12. Leonida S. Santos, Weather Specialist II, FFB, PAGASA
13. Lourdes Elipane, DPWH gagekeeper, San Isidro, Nueva Ecija
14. Personnel & Staff of Pampanga River Basin Flood Forecasting & Warning Center (PRFFWC), PAGASA

FIGURES

Figure 1.0 Pampanga River Basin Location Map

FFB, PRFFC - hdh - May2000

Figure 2.0 The Pampanga River Basin including the allied basin of Guagua River.

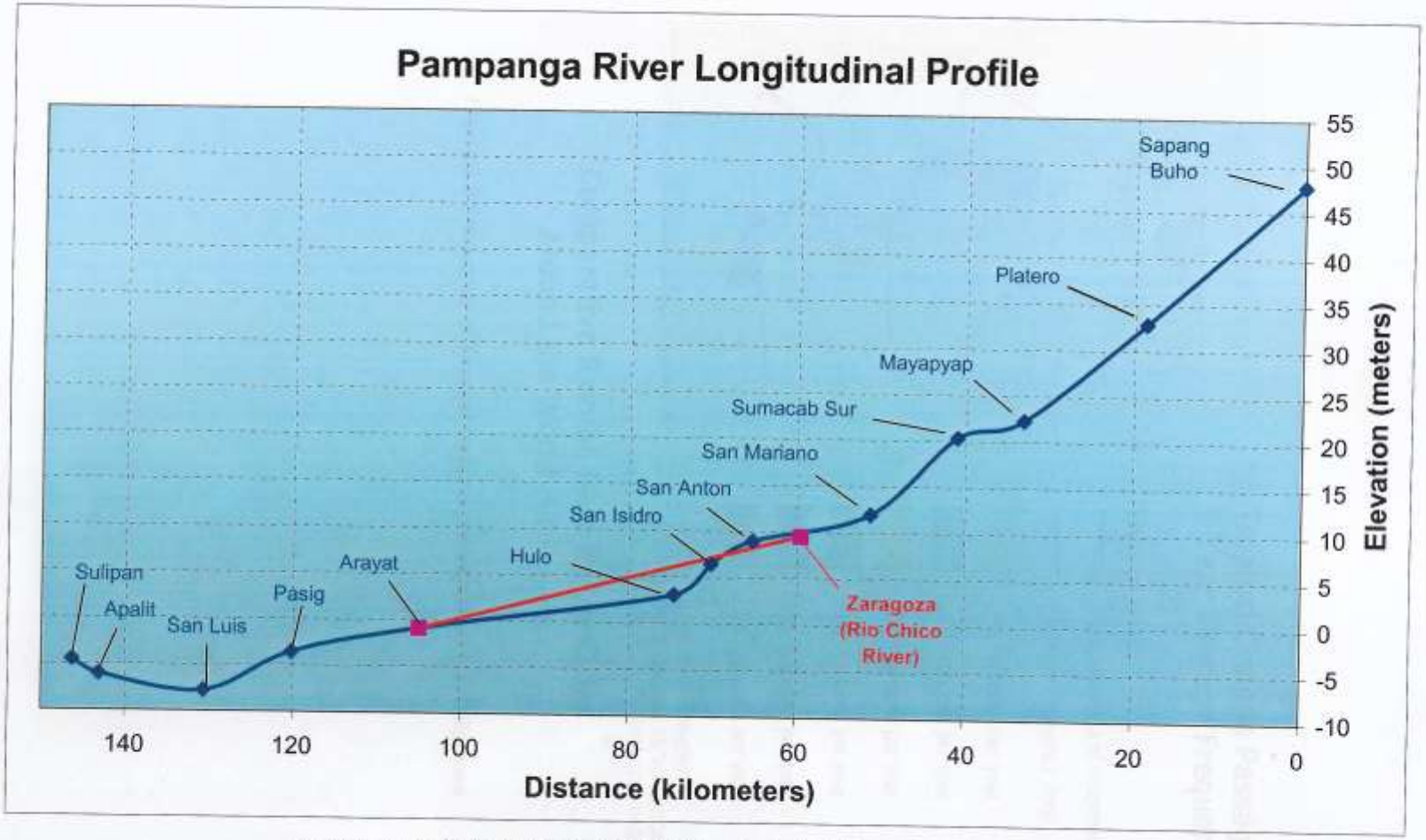


Figure 2.1 Longitudinal Profile of Pampanga River Basin (including portions of Rio Chico River)

Tropical Cyclone Passage
5-Year Average Frequency

Legend:

- Philippine Area of Responsibility
- Typhoon Frequency Zone
- 0-1 Typhoons per year
- 1-2 Typhoons per year
- 2-3 Typhoons per year
- 3-4 Typhoons per year
- 4-5 Typhoons per year
- 5-6 Typhoons per year

SOURCE: PHILIPPINE ATMOSPHERICAL GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION (PAGASA)

Comparative Rainfall Data in Key Cities Around the World (5-Year Average)

Figure 2.2 Frequency of Tropical Cyclone passage over the Philippines

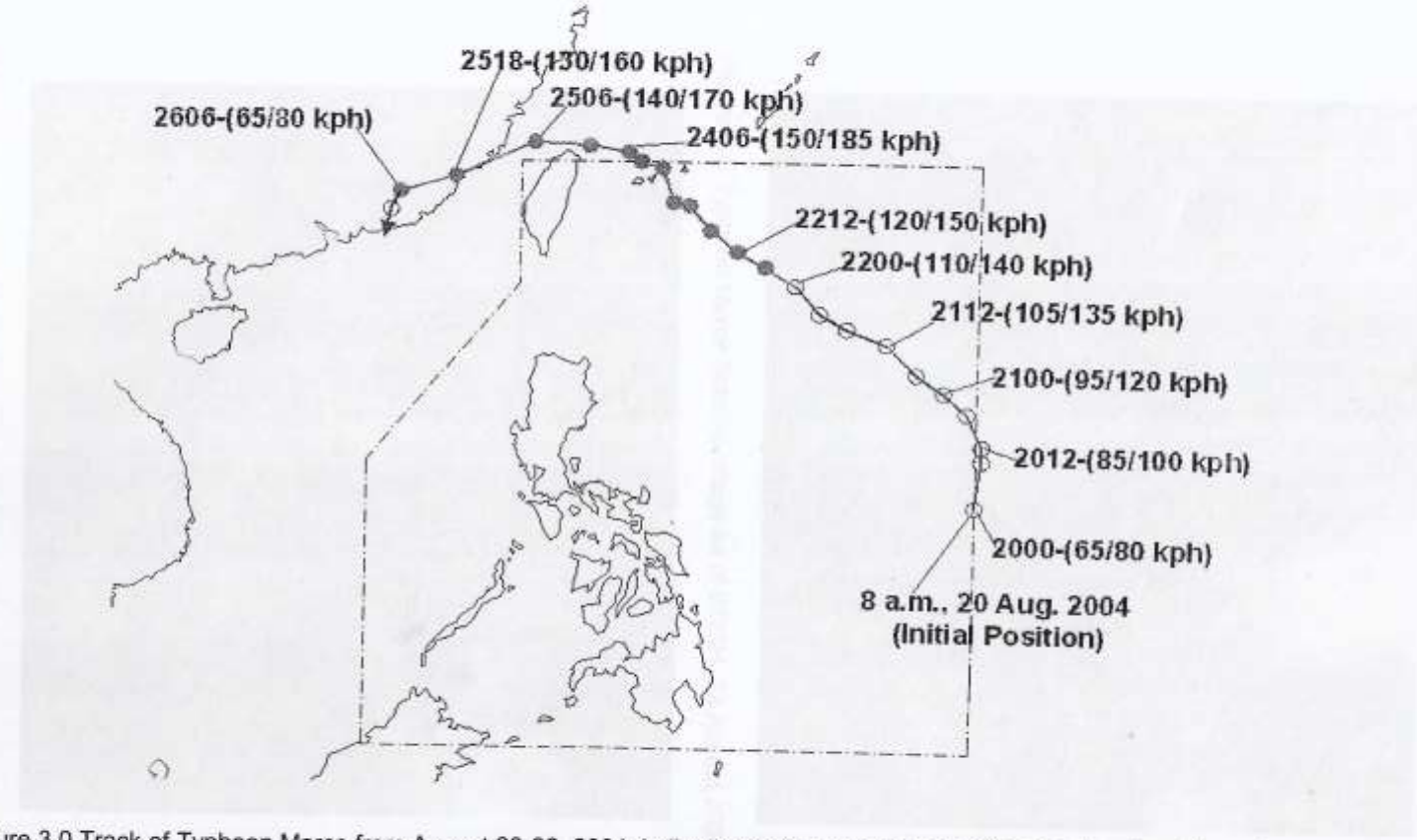


Figure 3.0 Track of Typhoon Marce from August 20-26, 2004, indicating date, time and with wind speed and gustiness (xxx/xxx kph).

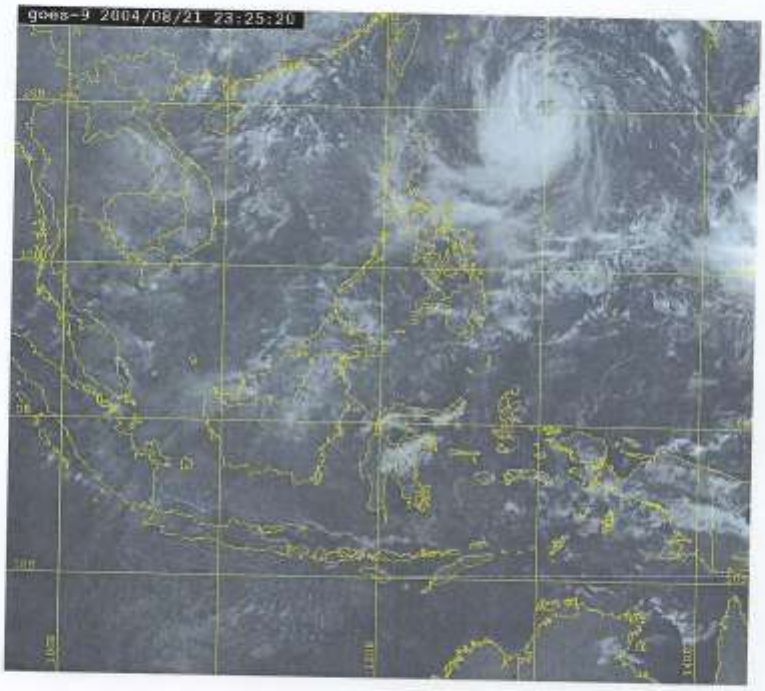


Figure 3.1. Typhoon Marce Satellite Image as of 0725H, 23 August 2004.

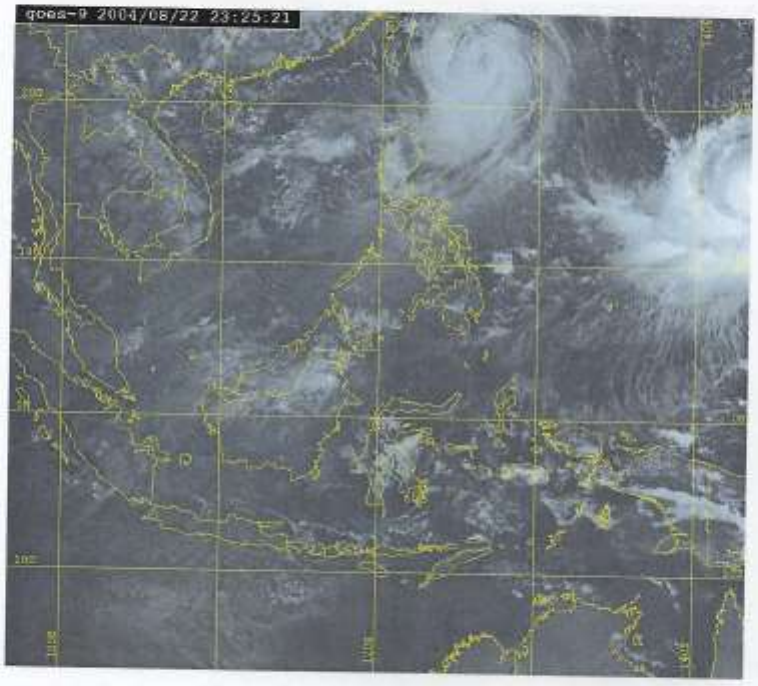


Figure 3.2. Typhoon Marce Satellite Image as of 0725H, 24 August 2004.

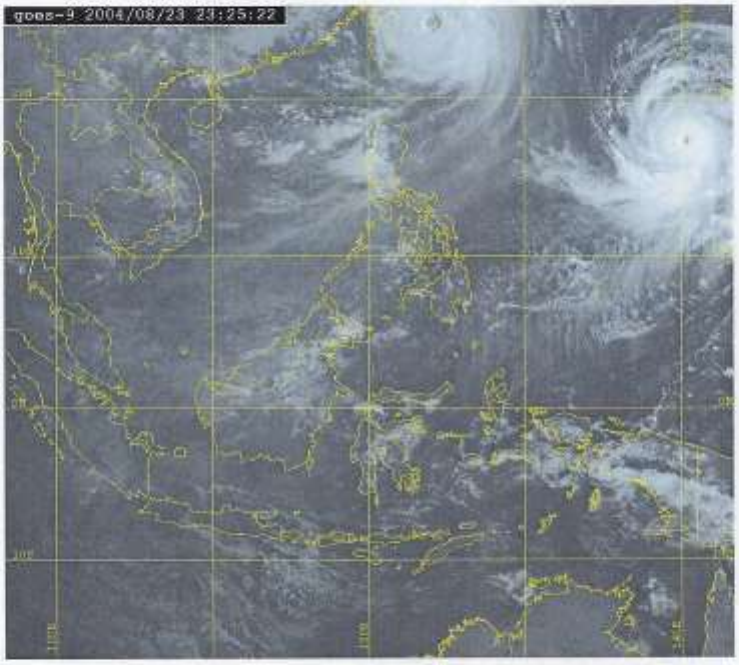


Figure 3.3. Typhoon Marce Satellite Image as of 0725H, 25 August 2004.

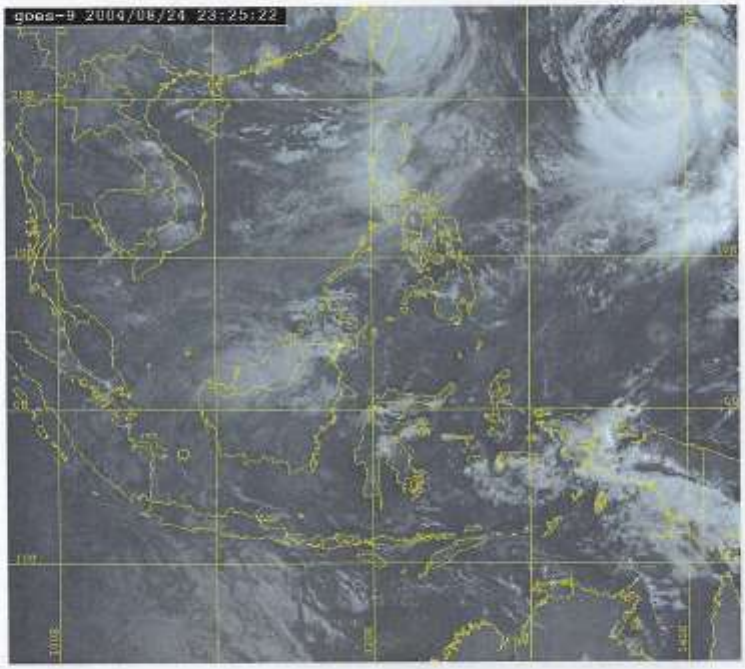


Figure 3.4. Typhoon Marce Satellite Image as of 0725H, 26 August 2004.

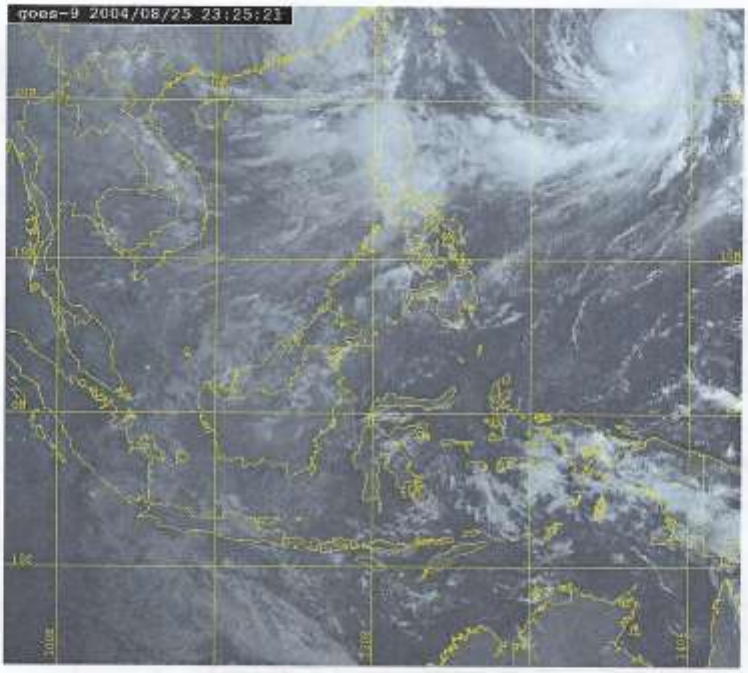


Figure 3.5. Typhoon Marce Satellite Image as of 0725H, 27 August 2004.

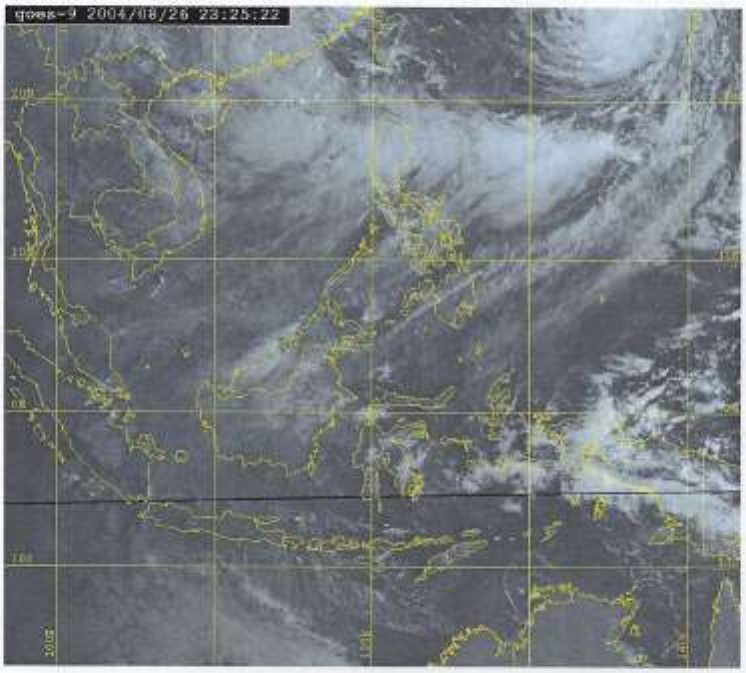


Figure 3.6. Typhoon Marce Satellite Image as of 0725H, 28 August 2004.

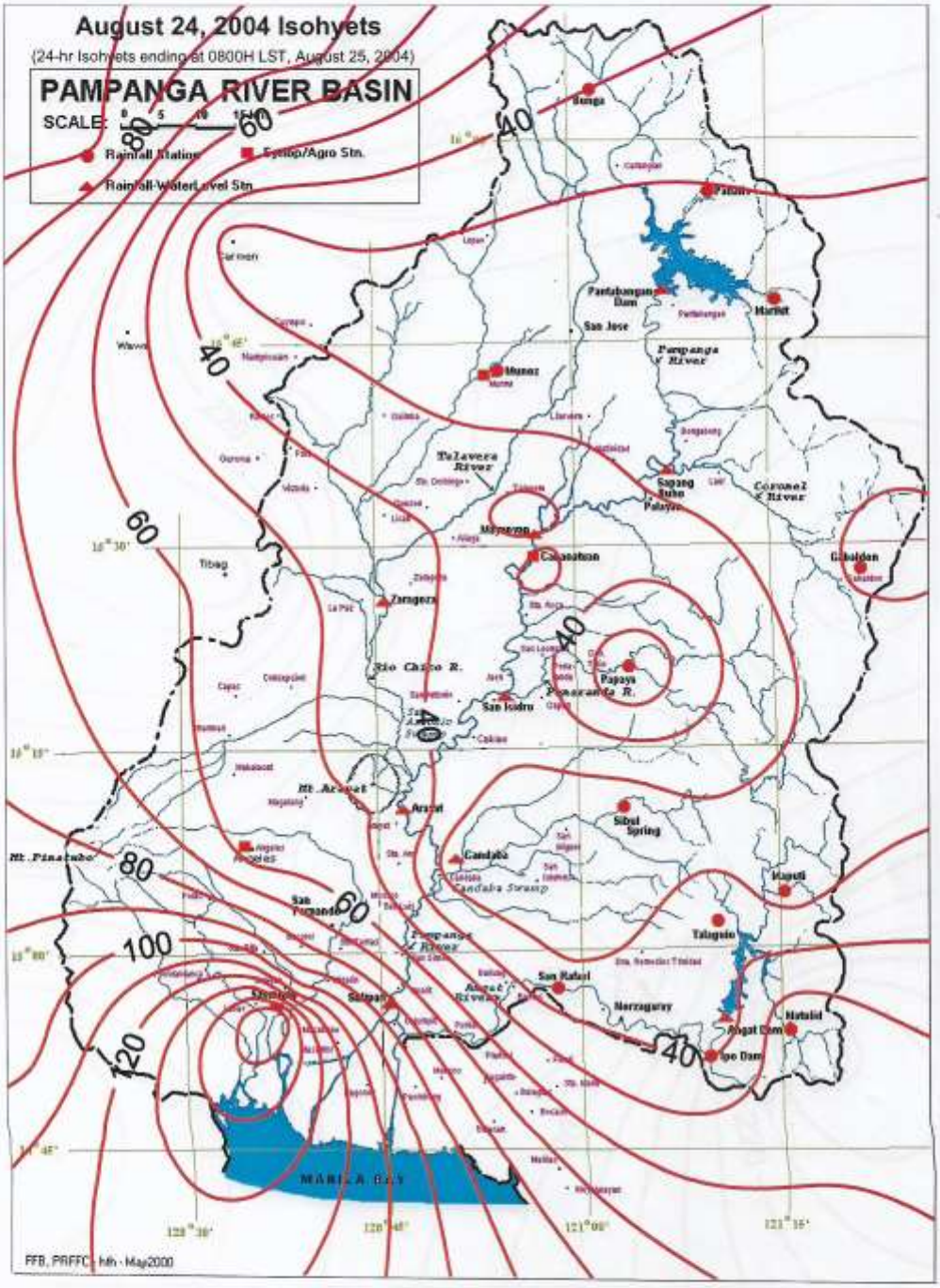


Figure 4.0 24-hour Isohyets ending at 0800H, August 25,2004

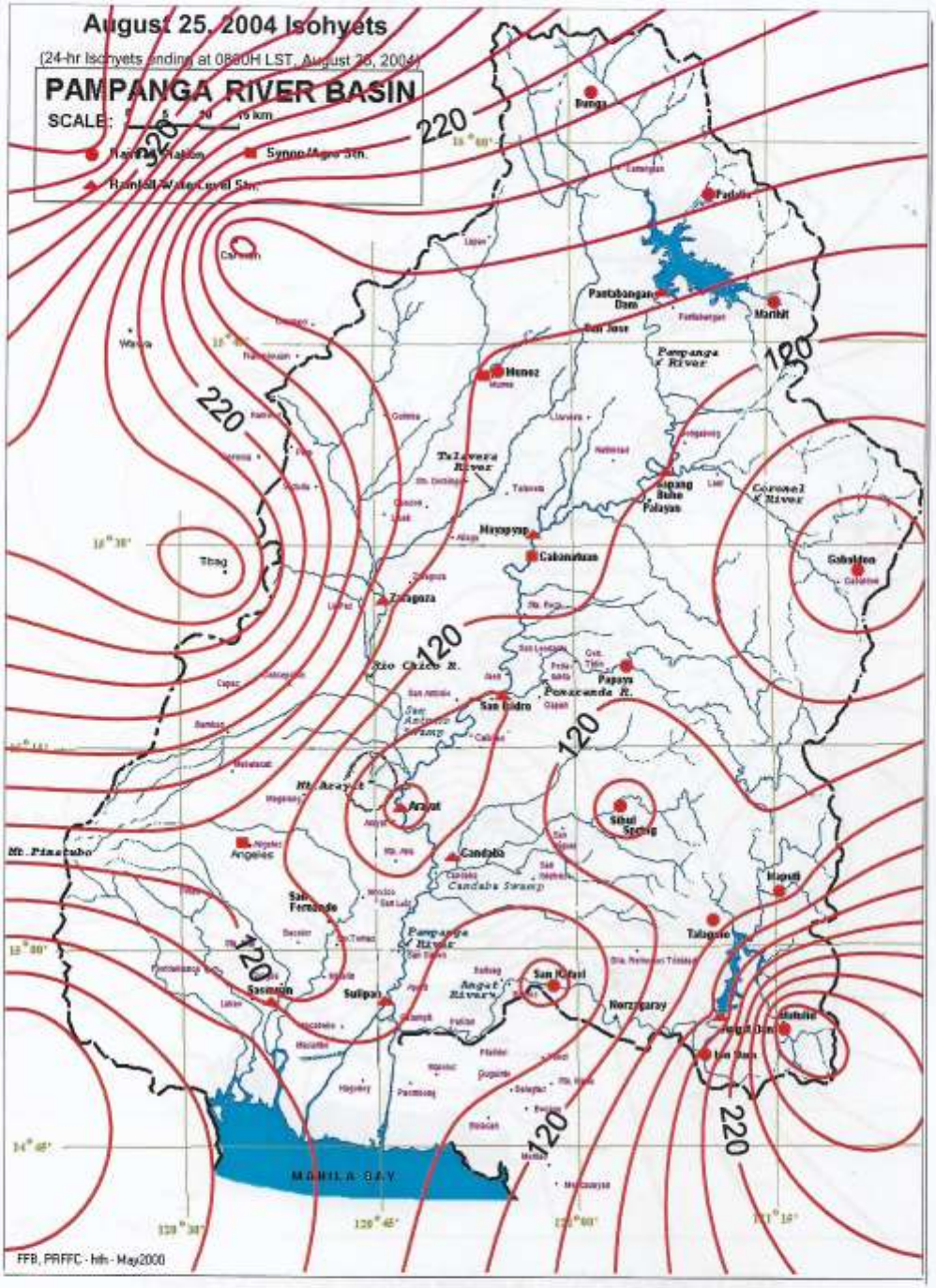


Figure 4.1 24-hour Isohyets ending at 0800H, August 26,2004

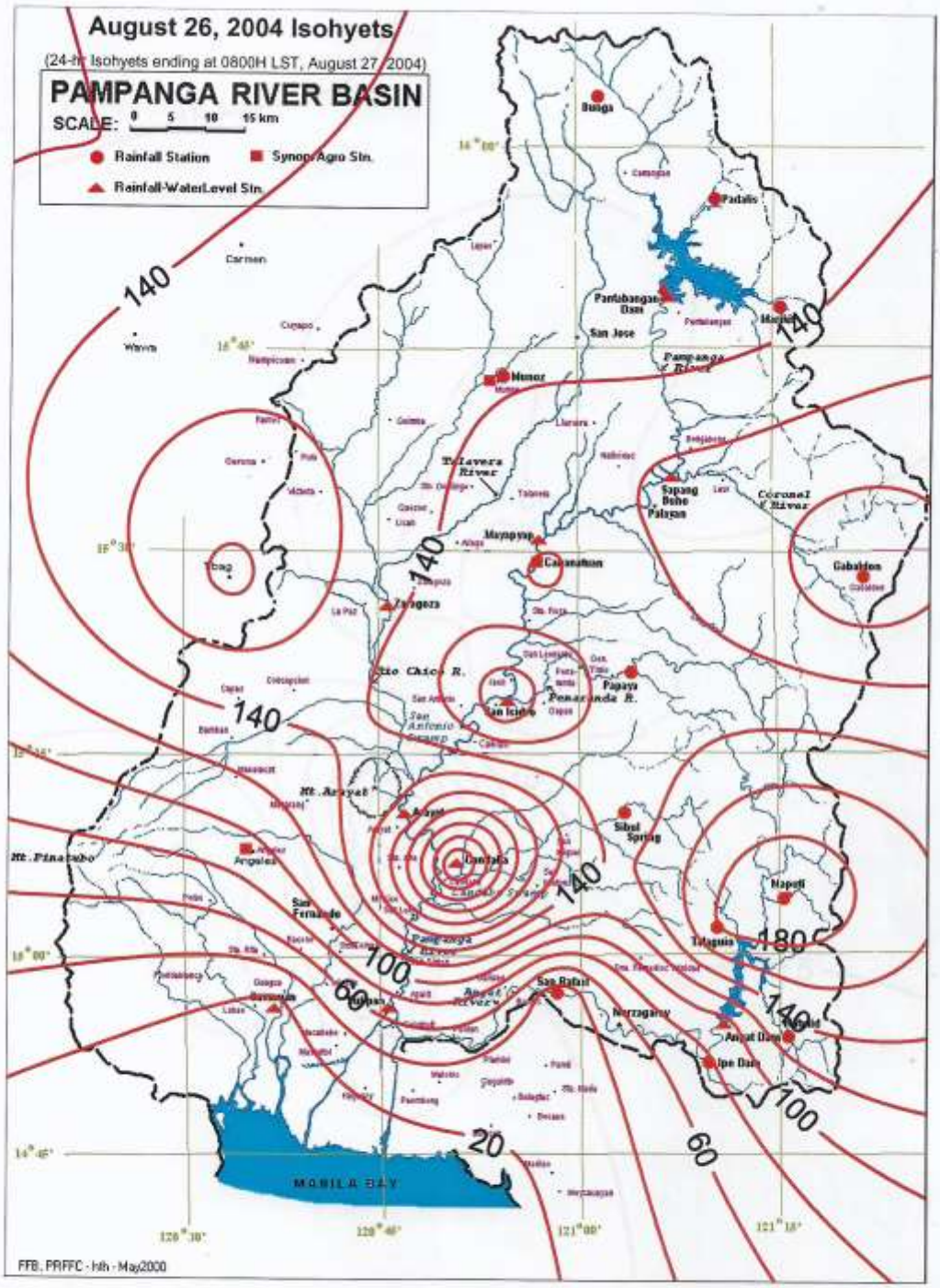


Figure 4.2 24-hour Isohyets ending at 0800H, August 27,2004

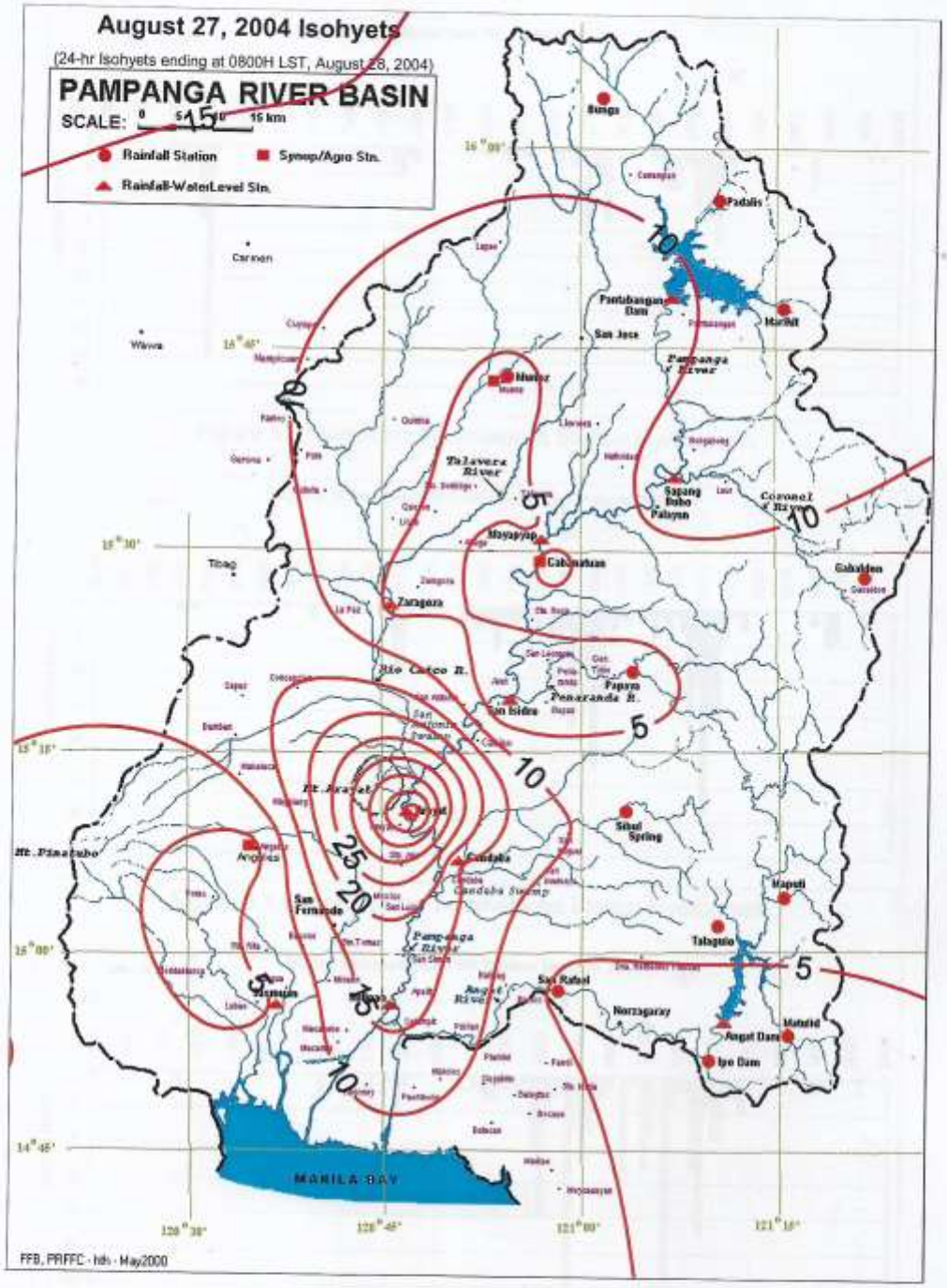


Figure 4.3 24-hour Isohyets ending at 0800H, August 28,2004

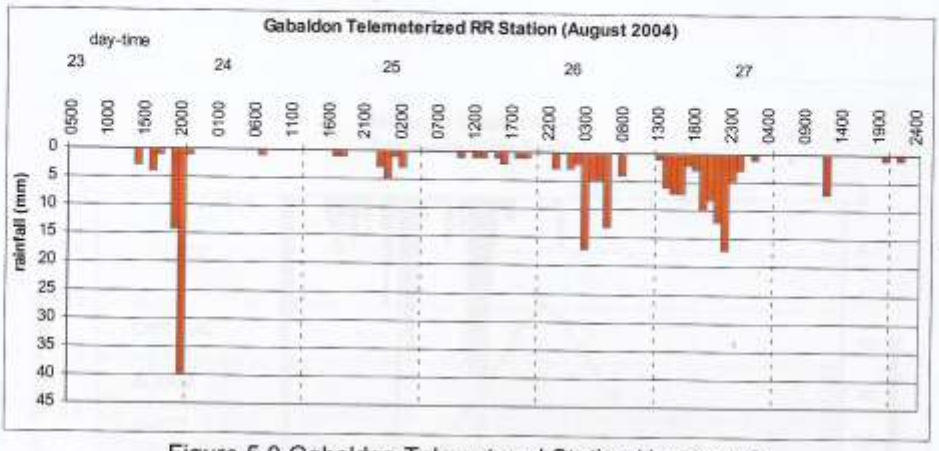


Figure 5.0 Gabaldon Telemetered Station Hyetograph

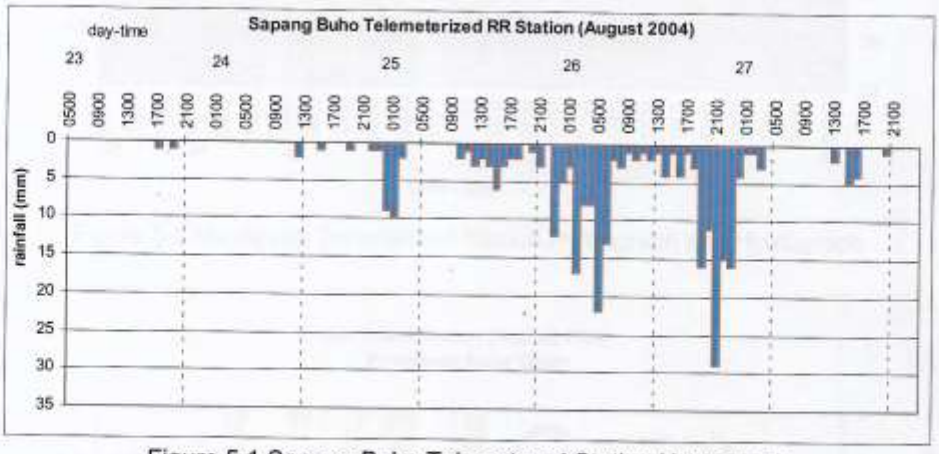


Figure 5.1 Sapang Buho Telemetered Station Hyetograph

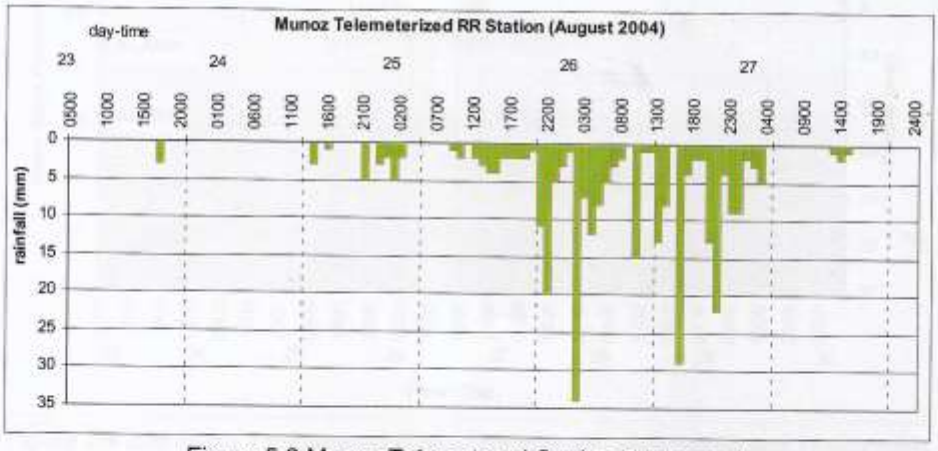


Figure 5.2 Munoz Telemetered Station Hyetograph

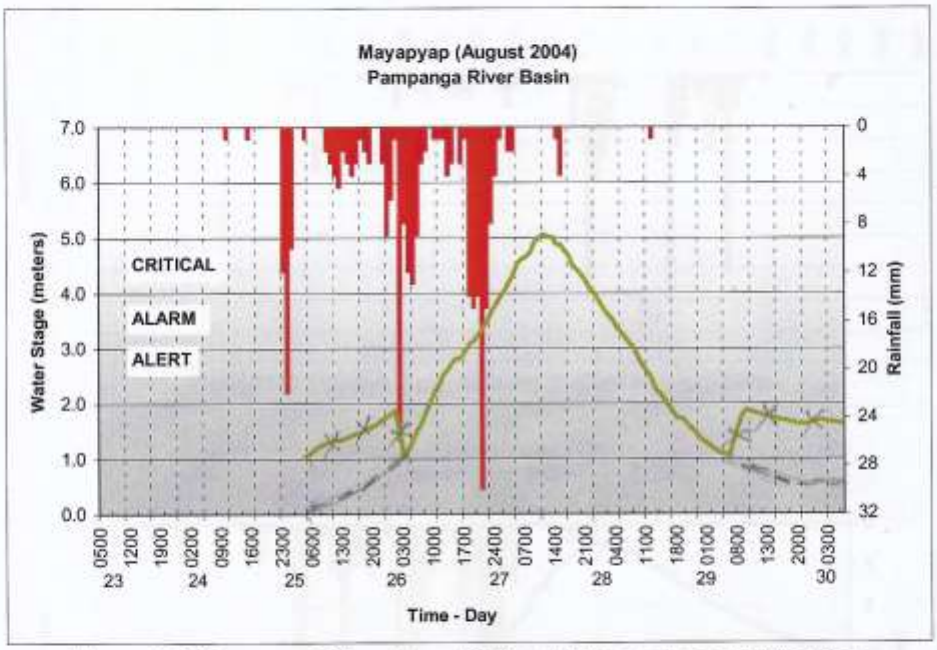


Figure 5.3 Mayapyap Telemetered Station Hydrograph and Hyetograph

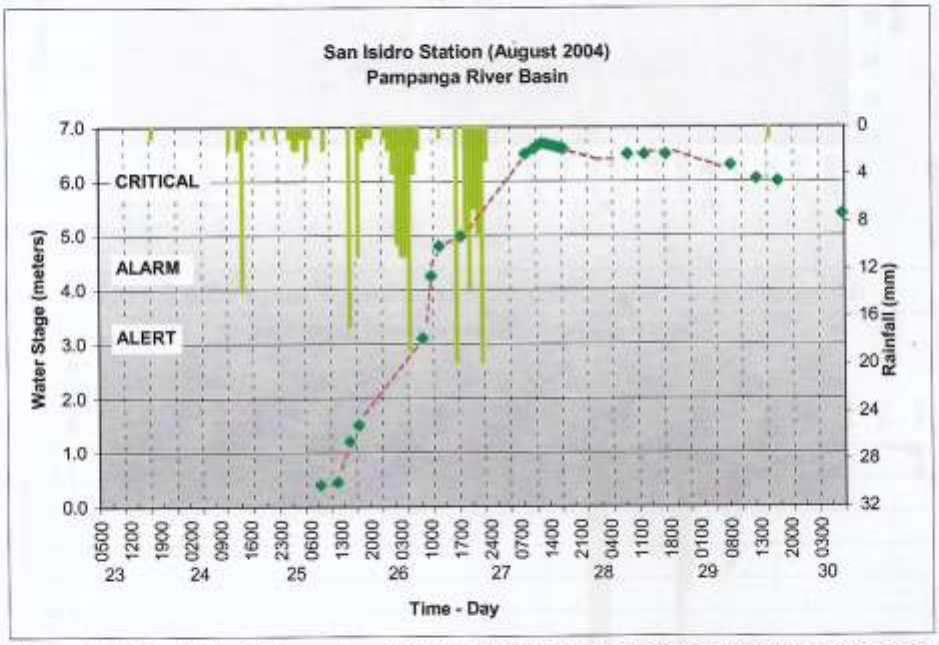


Figure 5.4 San Isidro Telemetered Station Hydrograph (estimated) and Hyetograph

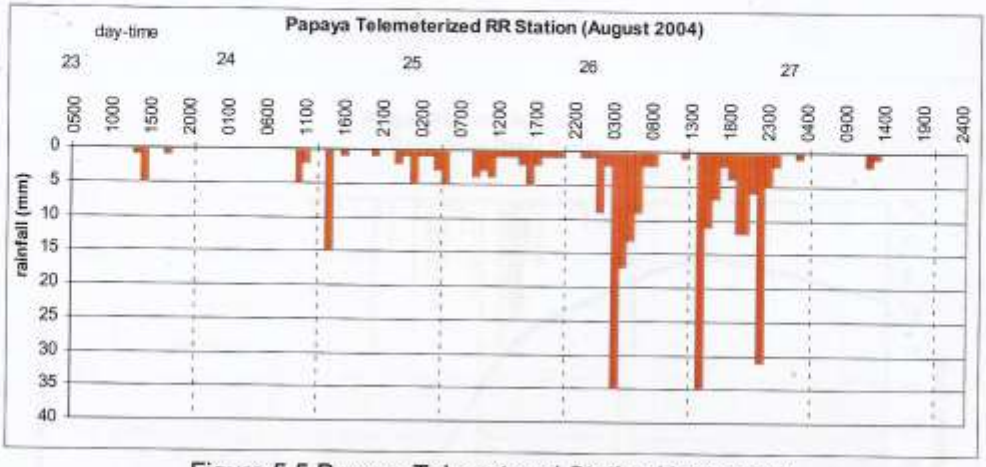


Figure 5.5 Papaya Telemetered Station Hyetograph

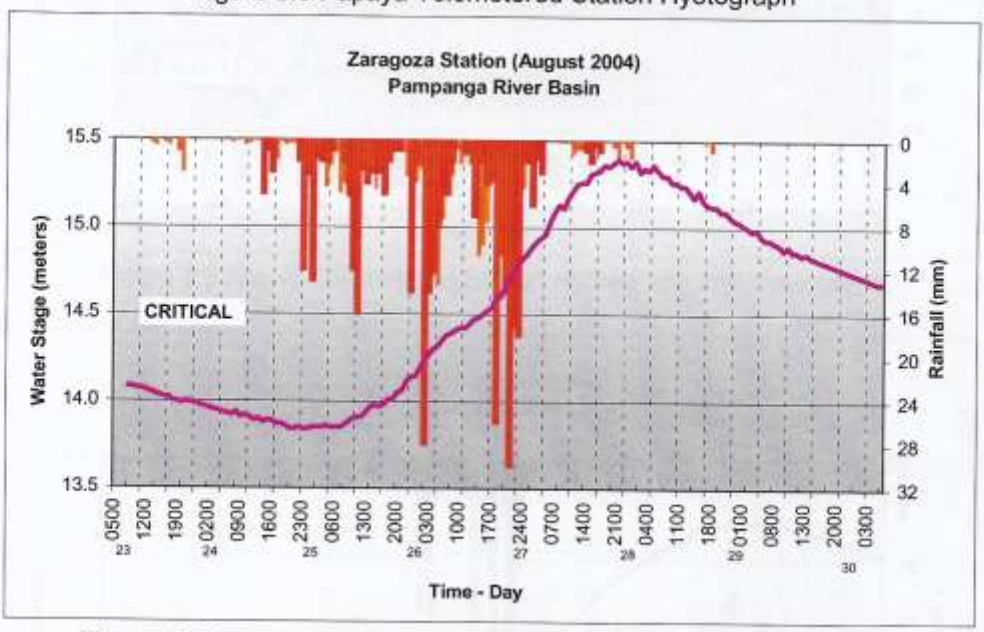


Figure 5.6 Zaragoza Telemetered Station Hydrograph and Hyetograph

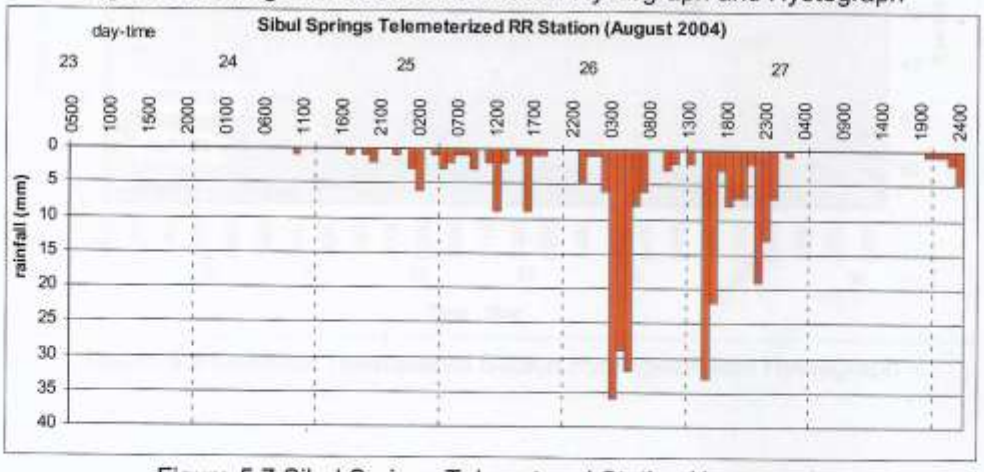


Figure 5.7 Sibul Springs Telemetered Station Hyetograph

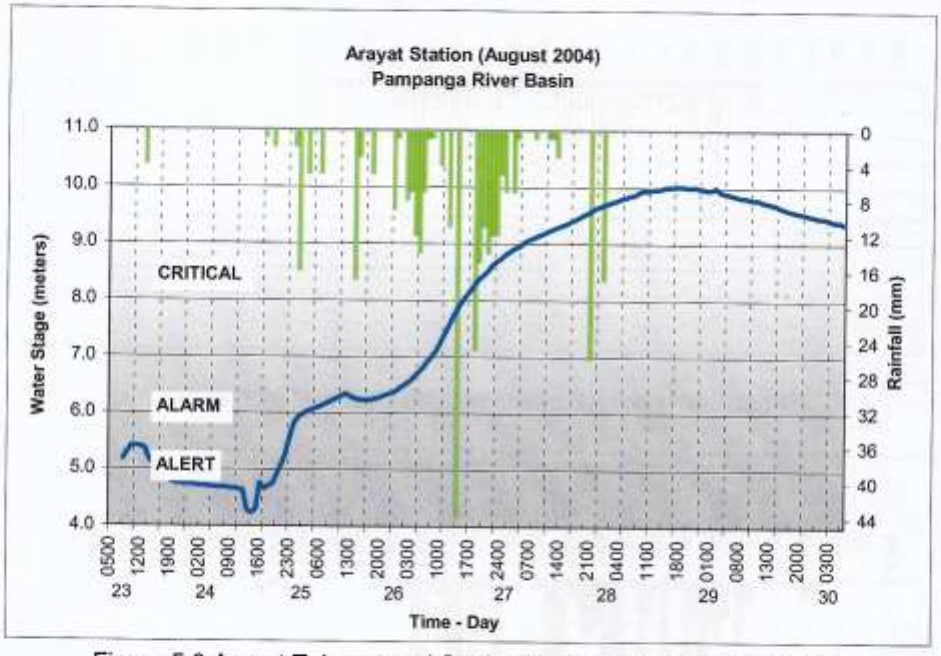


Figure 5.8 Arayat Telemetered Station Hydrograph and Hyetograph

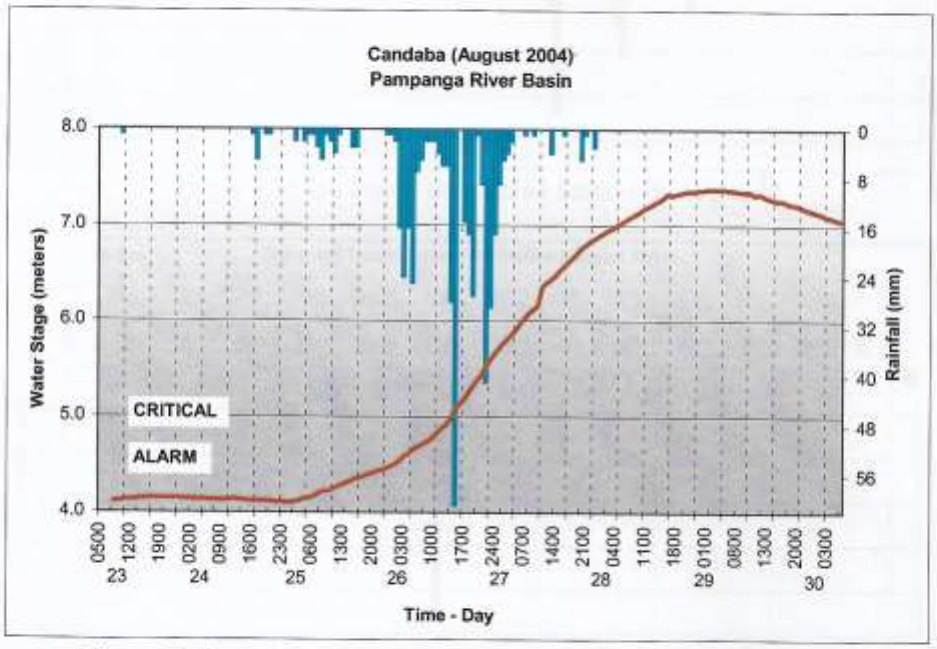


Figure 5.9 Candaba Telemetered Station Hydrograph and Hyetograph

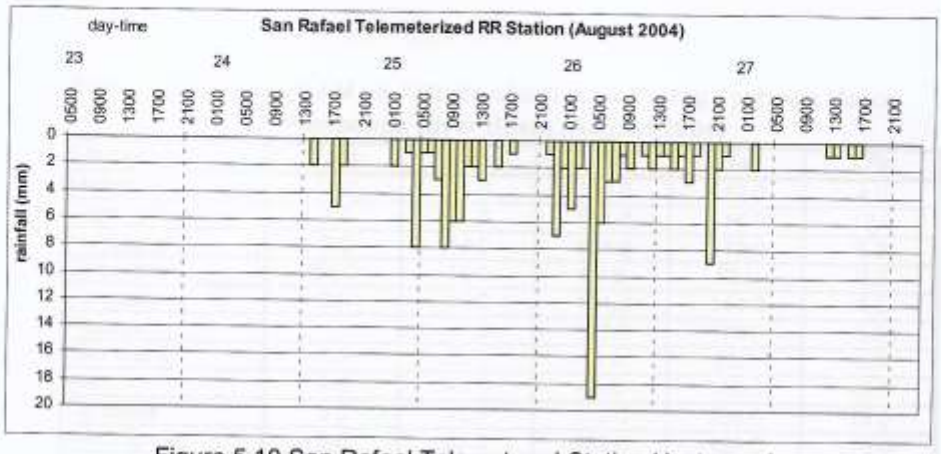


Figure 5.10 San Rafael Telemetered Station Hyetograph

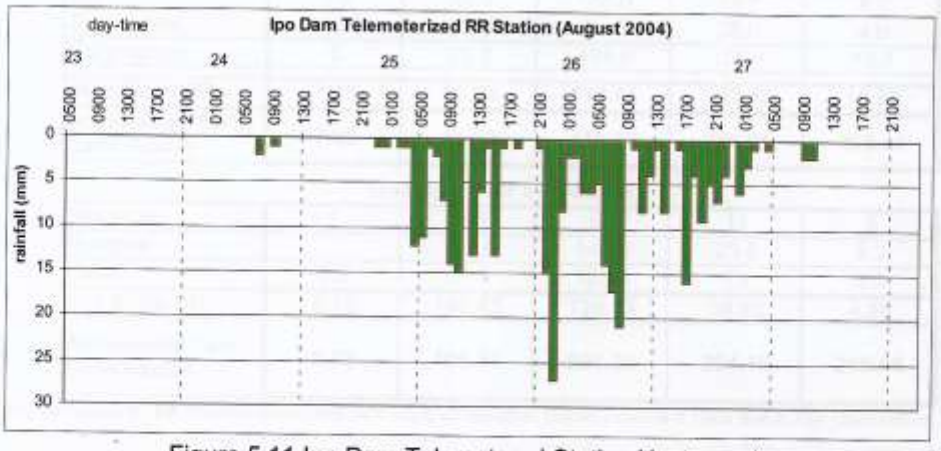


Figure 5.11 Ipo Dam Telemetered Station Hyetograph

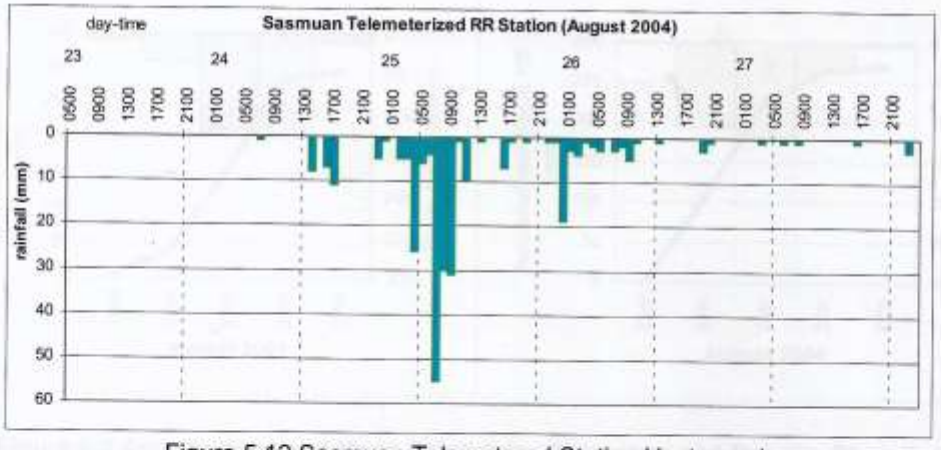


Figure 5.12 Sasmuan Telemetered Station Hyetograph

Table 5.0 24-Hour (8 AM - 8 AM) Rainfall Totals during Typhoon Marce
Pampanga River Basin (August 2004)

Stations	23rd	24th	25th	26th	27th
Munoz	13.0	21.0	136.0	142.0	4.0
Sapang Buho	3.0	27.0	121.0	116.0	12.0
Mayapyap	0.0	47.0	124.0	119.0	5.0
Gabaldon	64.0	18.0	60.0	82.0	9.0
Zaragoza	0.0	46.0	144.0	144.0	4.0
Papaya		61.0	117.0	129.0	3.0
San Isidro	1.0	32.0	98.0	83.0	0.0
Arayat	4.0	49.0	68.0	169.0	48.0
Candaba	0.0	22.0	113.0	286.0	15.0
Sibul Spring	0.0	23.0	152.0	129.0	10.0
Sulipan					18.0
Ipo	2.0	39.0	188.0	79.0	4.0
San Rafael	0.0	33.0	71.0	28.0	4.0
Cabanatuan	0	23.2	134.6	150.6	12.6
Ave.Basin RR	**7.25**	**33.94**	**117.43**	**127.43**	**10.61**
Accumulated Daily Basin Rainfall	**7.25**	**41.19**	**158.62**	**286.05**	**296.66**

Guagua River Sub-Basin

Sasmuan	1	163	91	14	5
Guagua		101.8	143.6	23.8	6.2
Clark	0.5	54.5	125.5	73	3.5
Ave.Basin RR	**0.75**	**106.43**	**120.03**	**36.93**	**4.90**
Accumulated Daily Basin Rainfall	**0.75**	**107.18**	**227.22**	**264.15**	**269.05**

Note : Rainfall values in red indicates incomplete data count observation; possible deficient value due to tree obstructions.

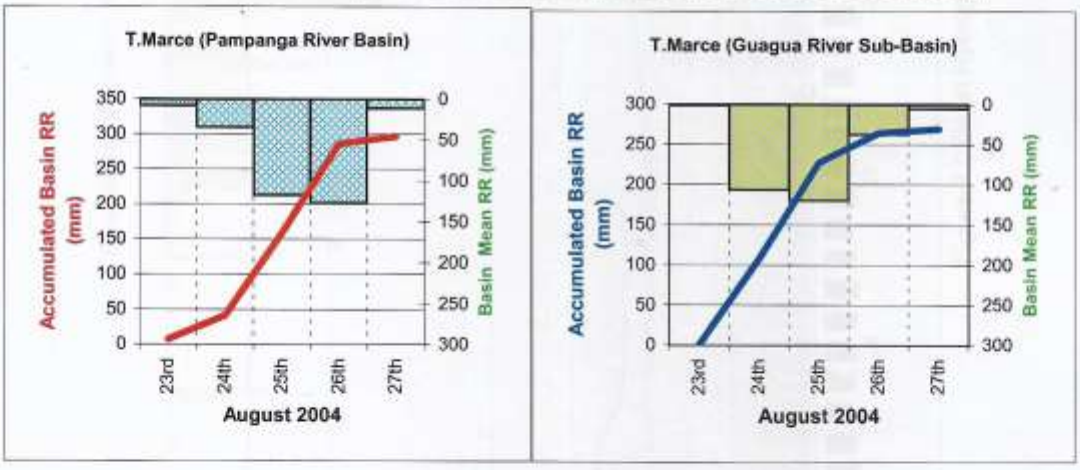


Figure 6.0 Accumulated and Mean Rainfall for Pampanga and Guagua River Basins

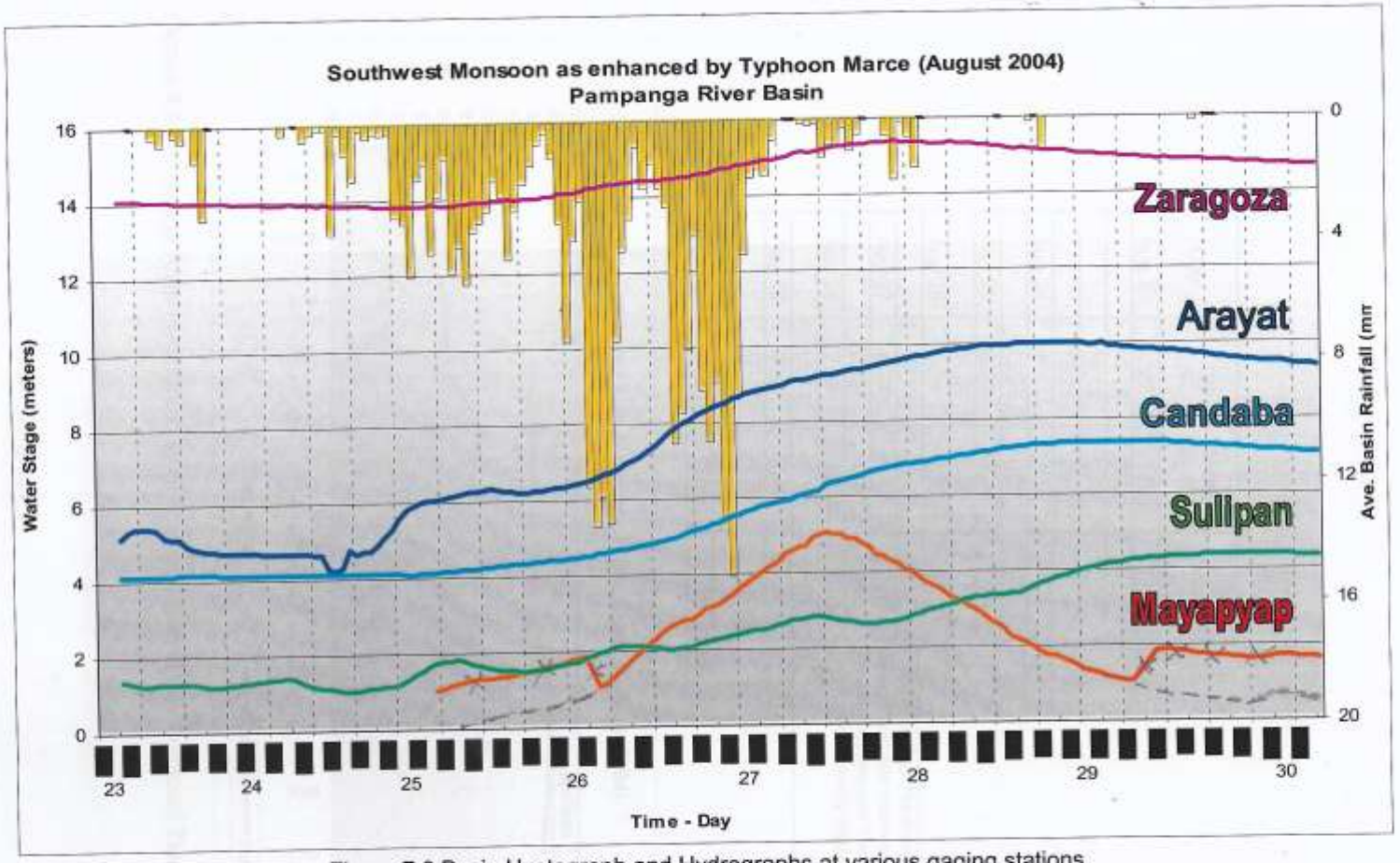


Figure 7.0 Basin Hyetograph and Hydrographs at various gaging stations

Day	Time (LST)	Manila Bay Tide*	Sulipan Water Level
Aug 23	2:27	1.02	1.49
	10:18	0.34	1.26
	16:19	0.55	1.28
	19:25	0.51	1.24
Aug 24	6:37	1.14	1.38
	15:25	0.23	1.04
Aug 25	4:03	1.24	1.74
	14:06	0.09	1.53
Aug 26	5:14	1.32	2.09
	15:13	-0.03	2.07
Aug 27	6:27	1.39	2.76
	16:01	-0.10	2.65
Aug 28	7:36	1.44	3.26
	16:41	-0.11	3.63
Aug 29	8:41	1.45	4.32
	17:17	-0.05	4.38
Aug 30	9:44	1.43	4.32
	17:49	0.03	4.23

** Based on Tidal Predictions along Manila Bay courtesy of the National Mapping and Resource Information Authority (NAMRIA), 2004.*

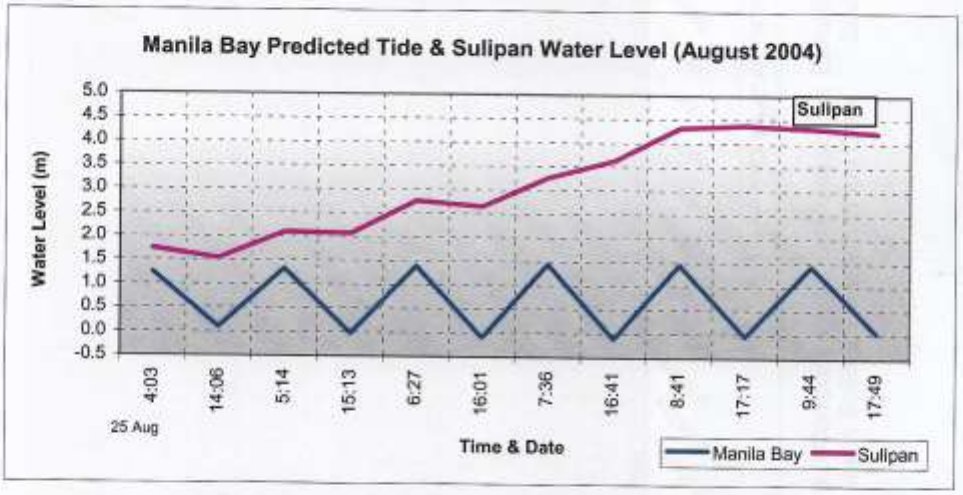


Figure 8.0 Pampanga River Hydrograph @ Sulipan and Manila Bay Predicted Tide Levels.

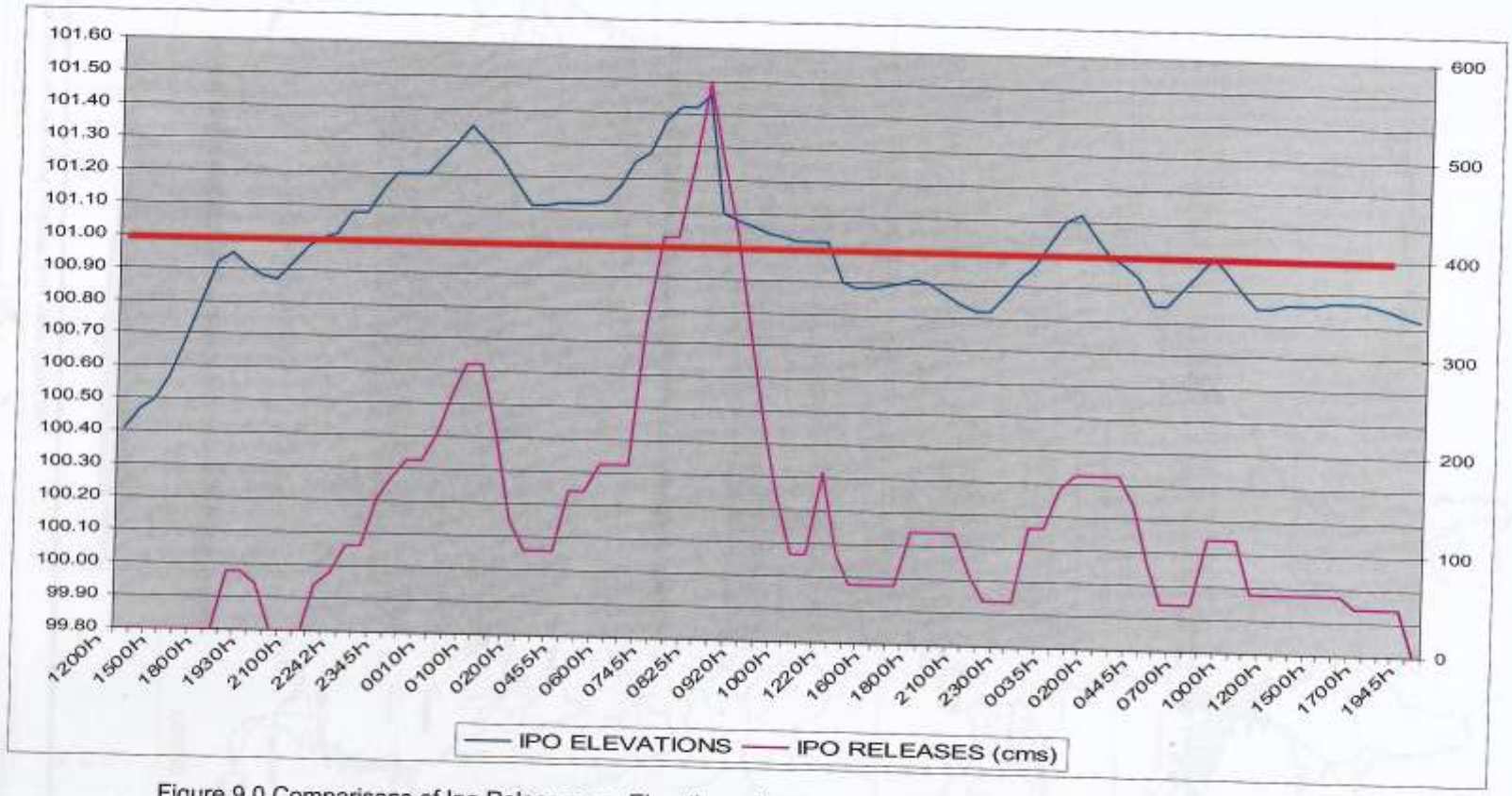
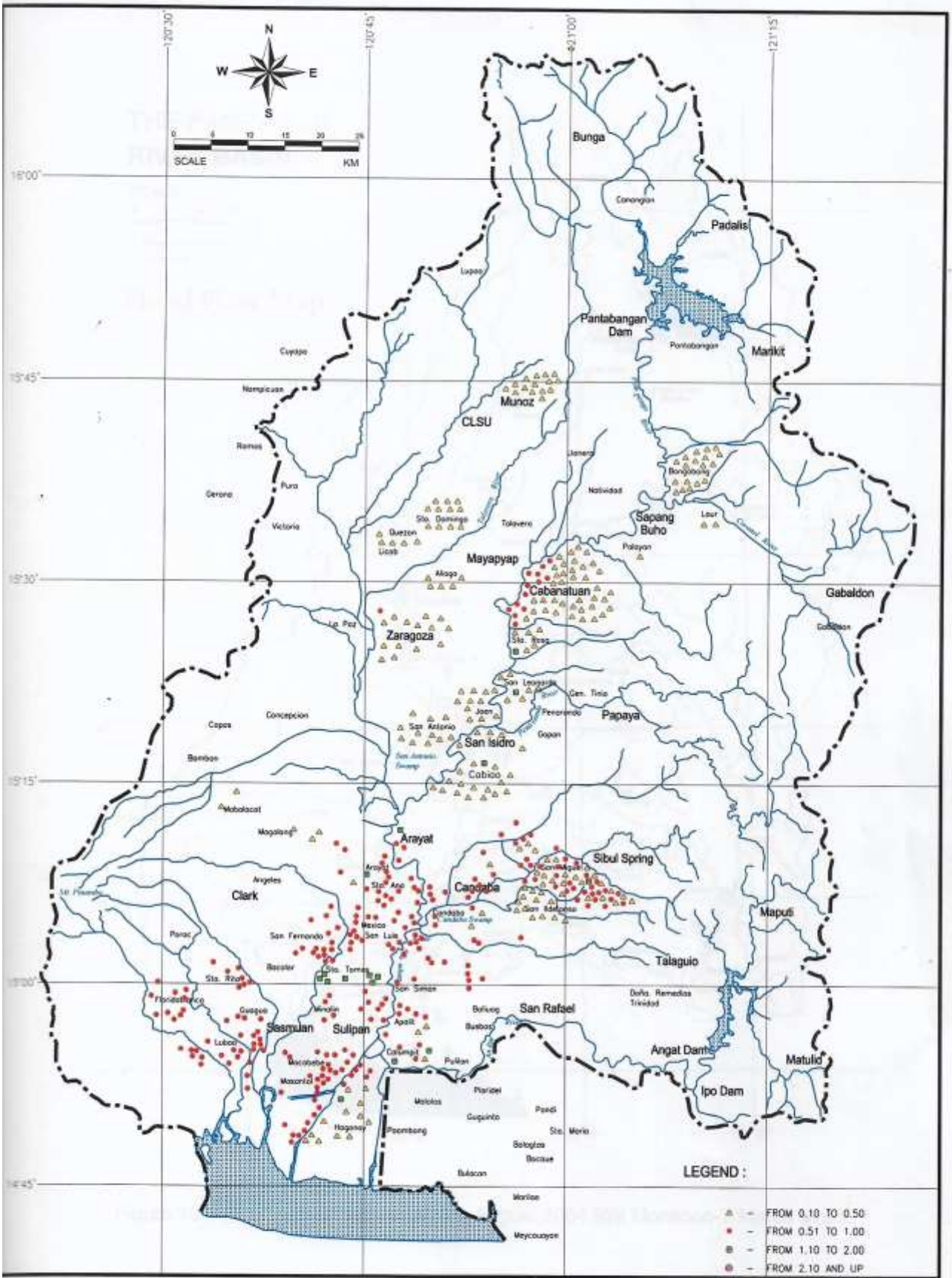


Figure 9.0 Comparisons of Ipo Releases vs. Elevations, August 25 - 27, 2004 (SW Monsoon due to T.Marce)
Note: Red line is Spilling Elevation of Ipo Dam Source: Ipo Dam Presentation by M. Resurreccion, Oct-Nov2004



CONTENT: Spot Flood Level Map Along Pampanga River Basin, August 2004

CONSULTANT		PROJECT TITLE :	FIGURE NO :
PKII ENGINEERS ENGINEERING CONSULTANT	JICA JAPAN INTERNATIONAL COOPERATION AGENCY PHILIPPINE ATMOSPHERIC, GEOPHYSICAL & ASTRONOMICAL SERVICES ADMINISTRATION	POST-FLOOD STUDY IN PAMPANGA AND AGNO RIVER BASINS FOR FLOOD FORECASTING AND WARNING OPERATION IMPROVEMENT	10.0

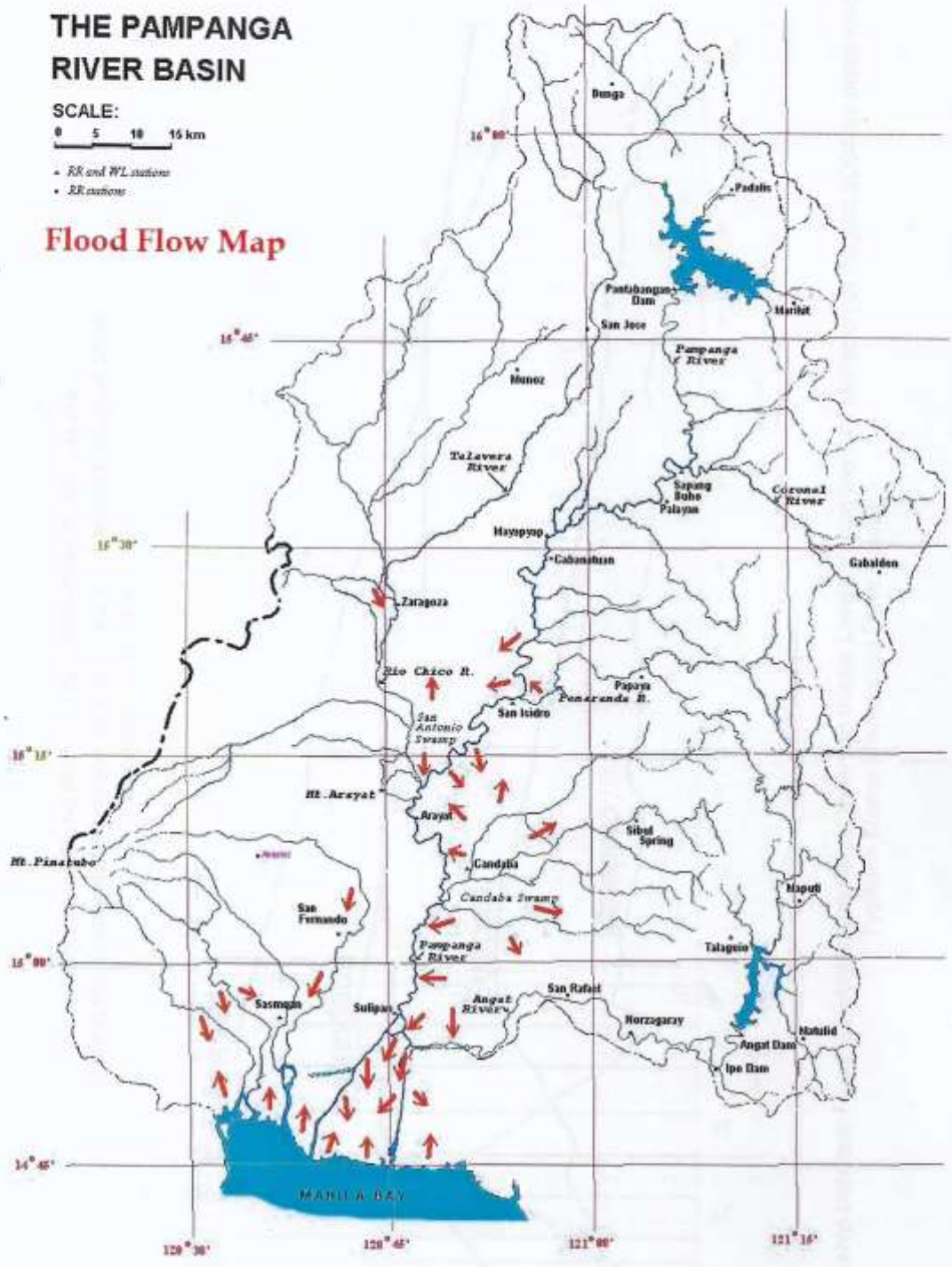


Figure 10.1 Floodwater flows during the August 2004 SW Monsoon-T.Marce event.

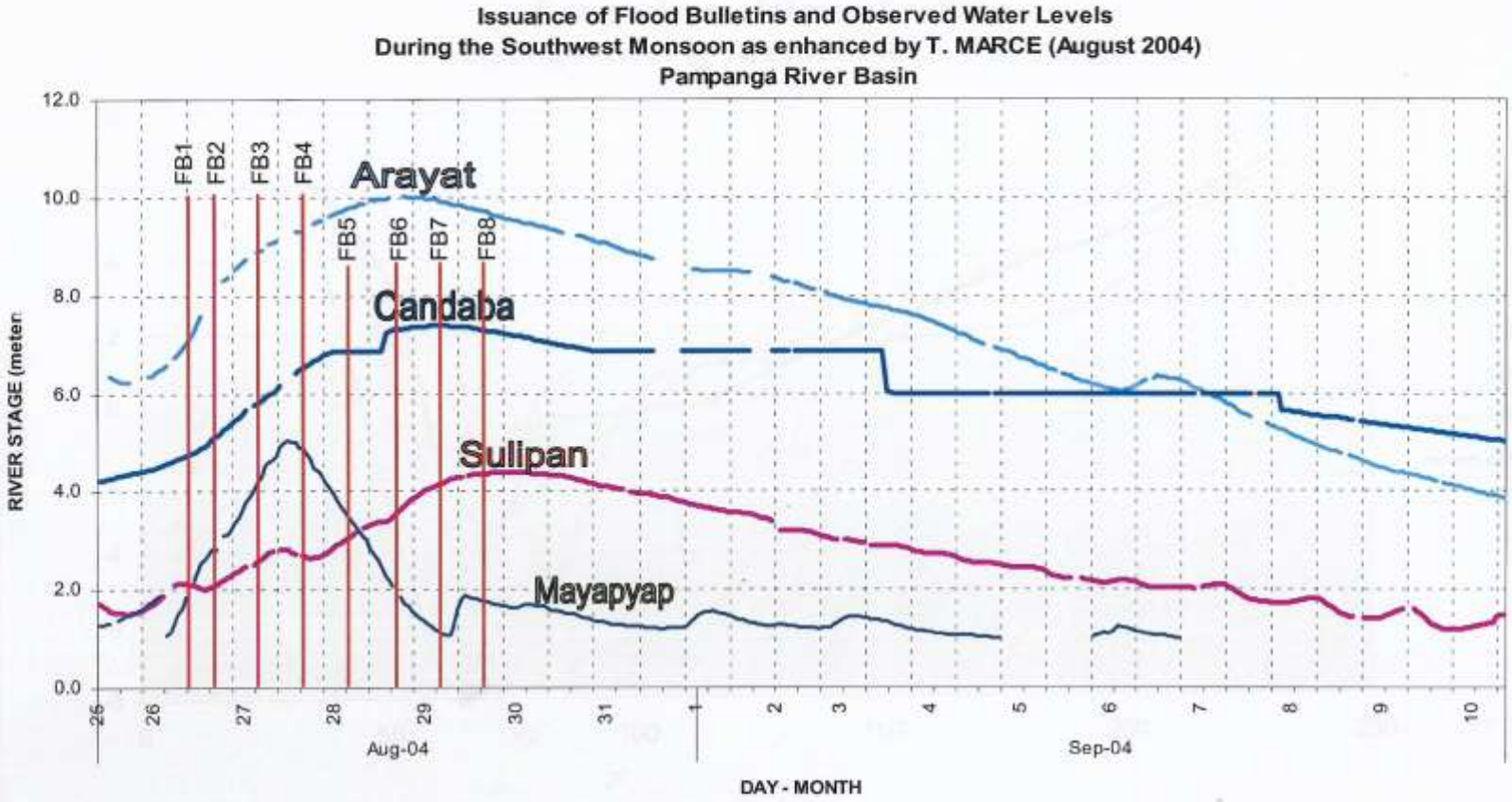


Figure 11.0 Relationship between Flood Bulletins Issued and Observed Water Levels during the SW Monsoon of August 2004 as enhanced by Typhoon Marce (Pampanga River Basin)

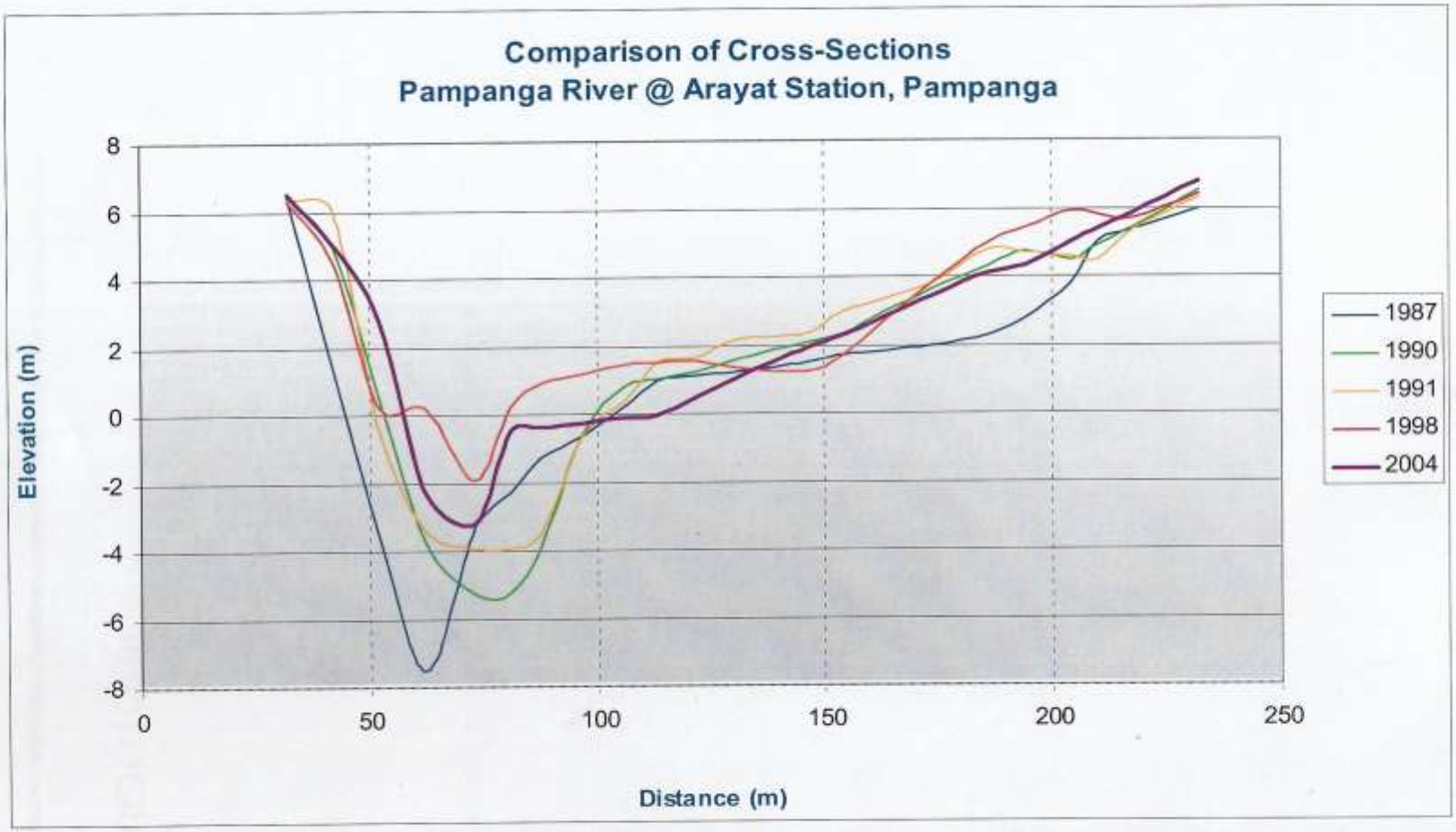


Figure 12.0 Comparison of surveyed cross-sections of Pampanga River at Arayat gaging station, Pampanga from 1987 to 2004.

PHOTOGRAPHS

Pic. 1.0 Almost whole stretch of the San-Simon-Mexico road underwater.

Pic 1.1 Knee-deep of floodwaters along the San Simon-Mexico road.

Pic 2.0 Around 0.3 m floodwaters in Bgy. Sta. Maria, Town of Sta. Ana, Pampanga.

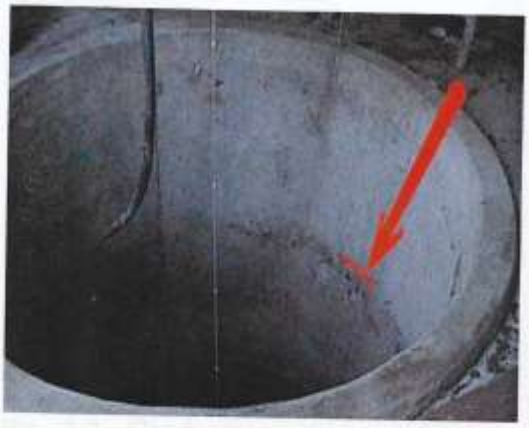
Pic 2.1 Portions of Bgy. Sta. Maria, Sta. Ana, Pampanga have 0.5 meters of floodwaters

Pic 3.0 Streamgaging section in Apalit Bridge along NLEX. (August 31, 2004).

Pic3.1 Ankle to knee-deep floodwaters in Poblacion, Apalit (August 31, 2004).

Pic. 4.0 Arayat telemetering station at stage 8.65 m., 4 days after its recorded peak stage of 10.03 m.

Pic 4.1 Record high of 10.03 m. registered by a flood mark attained at Arayat telemetering station.



Pic 4.2 Inside view of the Stilling well of Arayat tel. station, about half meter more before reaching station's flooring.

Pic 4.3 Sandbags protecting the Arayat-Cabiao Ring Levee at Bgy. Sta. Cruz, Arayat, Pampanga during the event.

Pic 4.4 Approximately 1.3 m. above the flood marker area in Bgy. Candating, Arayat, Pampanga.

Pic 4.5 Affected "informal settlers" within the dike in Bgy. San Agustin, Arayat, Pampanga.

Pic. 5.0 Flooded streets – T.Joson Ave., Dulong Bayan, Quezon, Nueva Ecija..

Pic 5.1 Ankle-deep of floodwaters along T.Joson Ave., Poblacion, Quezon, Nueva Ecija.

Pic 5.2 Floodwaters at knee-deep in Poblacion, town of Quezon, Nueva Ecija.

Pic 5.3 Knee-deep of Swirling floodwaters along the Quezon-Guimba Road, Quezon, Nueva Ecija.

Pic 5.4 Knee deep of floodwaters along the Quezon-Aliaga Road in Polong Bahay, Town of Quezon, Nueva Ecija.

Pic 5.5 Almost waist-deep of floodwaters along the T. Joson Ave., Town of Quezon, Nueva Ecija.

Pic. 6.0 Bgy. D.S.Garcia in Cabanatuan City underwater (August 26-27, 2004) by almost a meter of floodwaters.

Pic 6.1 "Informal settlers" affected in Bgy. Valdefuente, Cabanatuan (inside the dike) showing flood depth of about 1.5 m.

Pic 6.2 Maximum flood level attained in Bgy. Sumacab Norte, Cabanatuan, N.E.

Pic 6.3 Breached road dike going to Sitio Kaingin in Bgy. Sumacab Norte, Cabanatuan, N.E.

Pic 7.0 Flood depths ranging from 0.5 to 1.0 m. in Bgy. Hulo, San Antonio, N.E. (Flood peaked on August 27, 2004).

Pic 8.0 No overflowing of Minatula River (Cabanatuan) during the event but flood flows scoured portions of the river dike.

Pic. 9.0 Maximum flood height as reflected by flood marks in Zaragoza gaging stn. (16.8 meters based on the DPWH gage)

Pic 9.1 Debris strewn overflow bridge at Zaragoza streamgaging station after the flood event (September 7, 2004).

Pic 9.2 Dried branches and debris clinging to the foundation of Zaragoza telemetering station after the flood event.

Pic 9.3 Zaragoza-La Paz Road went underwater from August 26-29, 2004 and was not passable on 27 to 28.

Pic 10.0 About a meter of floodwaters at Bgy. San Roque, La Paz, Tarlac; peaked on the afternoon of August 28, 2004.

Pic 11.0 No overflowing of Cabu River in Cabanatuan during the event, but showed relatively high river marks.

Pic. 12.0 Flood level mark at Sapang Buho gaging station reaching 5.4 m as referred to station's staff gage.

Pic 12.1 Lowest sensing pole of Sapang Buho telemetering station almost covered by debris after the flood event.

Pic 13.0 Peak of floodwaters in Bgy. Magpapalayok, Town of San Leonardo, Nueva Ecija attained on August 27, 2004.

Pic 13.1 A still flooded area in Bgy. Magpapalayok, San Leonardo, Nueva Ecija one week after the event.

Pic 14.0 Maximum flood height at Bgy. San Fernando Sur, Cabiao, Nueva Ecija.

Pic 14.1 Cabiao floodway after the event. Overflow road on the floodway was impassable from Aug. 26 to 27, 2004.

Pic. 15.0 Portions of the Sta.Ana-Mexico (GSO) road remained underwater for more than 2 weeks after the passage of T.Marce.

Pic 16.0 The maximum observed gage height at San Isidro - Jaen bridge was around 6.7 meters.

Pic 17.0 Pampanga River at San Leonardo with 2 to 3 meters flood marks at its left bank (brown foliage).

Pic 18.0 Penaranda River (N.E.) partly overflowed its right bank during the flood event at Penaranda Bridge, N.E.

Pic 19.0 Right bank of Pampanga River at San Antonio, N.E. littered with debris and garbage after the flood event.

Pic 20.0 High water marks at the bridge's post of San Agustin Bridge in Arayat, Pampanga.

Pic. 21.0 Maximum flood height reached 1.3 m in Bgy. Sta. Monica, San Luis, Pampanga. (peaked on August 29, 2004)

Pic 22.0 Flood marks reached 0.7 m at Bgy. San Jose, Calumpit, Bulacan.

Pic 22.1 Around 0.8 m of floodwaters registered in front of the San Jose elementary school, Calumpit, Bulacan.

Pic 22.2 Floodwaters reached 1.4 m at Bgy. Bagbag, Calumpit, Bulacan. Peak of flooding was August 29, 2004.

Pic 22.3 Partly flooded streets in Bgy. Balungao, Calumpit, Bulacan due to rainwater.

Pic 22.4 Ankle to knee-deep of floodwaters in Poblacion, Calumpit, Bulacan (August 31, 2004).

Pic. 22.5 Residents crossing almost waist-deep of flowing floodwaters in Bgy. Calizon, Calumpit, Bulacan (taken August 31, 2004).

Pic 22.6 Bgy. Calizon, Calumpit, Bulacan was one of the hardest hit area during the flood event (taken August 31, 2004).

Pic 22.7 The same area above this photo (Pic 22.5) a week after the event (taken September 9, 2004).

Pic 22.8 The same house / area above this photo (Pic 22.6) a week after the event (taken September 9, 2004).

Pic 23.0 San Fernando City, Pampanga at the height of flooding in the area. (taken August 27, 2004)

Pic 24.0 Downtown of San Fernando City, Pampanga during the flood event. (taken August 27, 2004)

Pic. 25.0 Flooded area in front of HVCAT in Bacolor, Pampanga

Pic 26.0 Road leading to the town of Candaba, Pampanga remains flooded even after the event (September 09,2004).

Pic 26.1 Only the roof of the schoolhouse shed in Bgy. Pasig, Candaba, Pampanga remains at the height of flooding in the area.

Pic 26.2 The same area on the left (Pic 26.1) one week after the flood event in the area. (taken September 9, 2004).

Pic 26.3 Flooded road along Bgy. Pasig, Candaba, Pampanga due to overflowing of Pampanga River.

Pic 26.4 The same road stretch on the left (Pic 26.3) after the flooding (taken September 9, 2004)

Pic. 26.5 Residents and Army personnel protecting the Mandasig portion of Arnedo Dike in Candaba, Pampanga.

Pic 26.6 The Mandasig portion of Arnedo Dike after the flood event. (taken September 9, 2004)

Pic 26.7 Strong floodwater current from overflowing of Pampanga River in Candaba, Pampanga.

Pic 26.8 Kilometer posts are the only remaining signs along a municipal road in Candaba, Pampanga during the flood event.

Pic 26.9 Still flooded portions in Candaba about 2 weeks after the main flood event (taken September 9, 2004).

Pic 26.10 A section along the municipal road in Bgy. Pasig, Candaba where Pampanga River overflowed.

Pic. 27.0 Flooded G. Puyat st. right in the center of the town of Guagua, Pampanga at the height of flooding in the area.

Pic 27.1 The same area on the left (Pic 27.0) about 2 weeks after the main flood event (taken September 9, 2004).

Pic 27.2 Almost a meter of floodwaters in front of the Municipal Hall and the Police Station in Guagua, Pampanga.

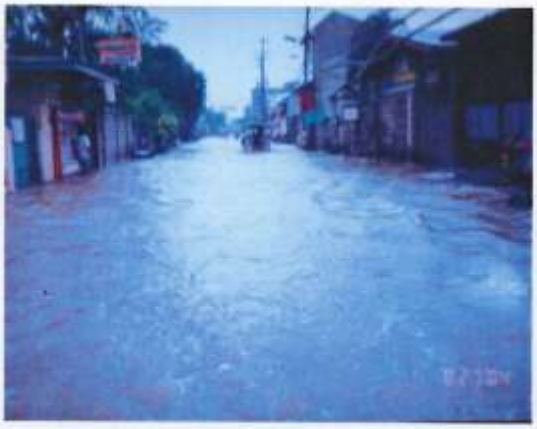
Pic 27.3 The same area on the left (Pic 27.2) 2 weeks after the main flood event (taken September 9, 2004).

Pic 27.4 Plaza Burgos in the heart of the town of Guagua, Pampanga during the flood event.

Pic 27.5 The same area on the left (Pic 27.4) 2 weeks after the main flood event. (taken September 9, 2004).

Pic. 27.6 Plaza Burgos in the town of Guagua, Pampanga went underwater by almost a meter during T. Marce.

Pic 27.7 Bgy. San Juan Bautista, Guagua, Pampanga at the height of the flood event.



Pic 27.8 Bgy. San Nicolas 1st (along McArthur Hi-way), Guagua, Pampanga during the flood event.

Pic 27.9 Bgy. San Nicolas 2nd (in front of San James Parish), town of Guagua, Pampanga with floodwaters.

Pic 28.0 About 1.5 m of floodwaters at this part of Bgy. Sulipan in Apalit, Pampanga. Sulipan telemetering station in background.

Pic 29.0 River velocity measurements undertaken at Arayat gaging station 2 days after the flood event (Aug. 31, 2004).

Flood Bulletins

FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 1
(Issued at 9:00 AM, 26 August 2004)
(Valid until the next issuance at 4:00 PM today)

AVERAGE BASIN RAINFALL:

PAST 32-HR AVERAGE BASIN RAINFALL ENDING AT 3:00 PM TODAY = 118 mm

FORECAST 12-HR BASIN RAINFALL BEGINNING AT 8:00 AM TODAY = MORE THAN 50 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO INCREASE SLOWLY.

2. SLOW INCREASE OF THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER.
FLOODING IS TPOSSIBLE: IN THE LOW LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, ALL IN NUEVA ECIJA, AND ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO SLOWLY INCREASE.
FLOODING IS POSSIBLE: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT TO THE LOWER MAIN PAMPANGA RIVER.

4. THE SLOW FILLING-UP OF THE CANDABA SWAMP.
FLOODING IS THREATENING: IN THE LOW-LYING AREAS WITHIN THE CANDABA SWAMP.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE NOW ADVISED TO TAKE THE APPROPRIATE ACTIONS.

PRFFWC / HTH / LSF

** For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin*

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 2
(Issued at 4:00 PM, 26 August 2004)
(Valid until the next issuance at 4:00 AM tomorrow)

AVERAGE BASIN RAINFALL:

PAST 32-HR AVERAGE BASIN RAINFALL ENDING AT 3:00 PM TODAY = 147 mm

FORECAST 12-HR BASIN RAINFALL BEGINNING AT 8:00 AM TODAY = MORE THAN 50 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO CONTINUE ITS SLOW RISE.

2. CONTINUED SLOW INCREASE OF THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER.
FLOODING IS THREATENING: IN THE LOW LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, SAN ISIDRO, JAEN ALL IN NUEVA ECIJA, AND RIVERBANK AREAS OF ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO MAINTAIN ITS SLOW RISE.
FLOODING IS THREATENING: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT TO THE LOWER MAIN PAMPANGA RIVER.

4. FURTHER INCREASE OF THE CANDABA SWAMP.
FLOODING TO OCCUR: IN THE LOW-LYING AREAS WITHIN AND AROUND THE CANDABA SWAMP AREA.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE ADVISED TO TAKE CONTINUE TO TAKE APPROPRIATE ACTIONS.

PRFFWC / HTH / ACA

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 3
(Issued at 4:00 AM, 27 August 2004)
(Valid until the next issuance at 4:00 PM today)

AVERAGE BASIN RAINFALL:

PAST 24-HR AVERAGE BASIN RAINFALL ENDING AT 4:00 AM TODAY = 156 mm

FORECAST 12-HR BASIN RAINFALL BEGINNING AT 4:00 AM TODAY = MORE THAN 50 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO CONTINUE ITS SLOW RISE.
FLOODING IS THREATENING: IN THE LOW LYING AREAS OF PALAYAN, CABANATUAN, STA. ROSA AND SAN LEONARDO ALL IN NUEVA ECIJA.

2. FURTHER INCREASE OF THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER.
FLOODING TO OCCUR: IN THE LOW LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, SAN ISIDRO, JAEN ALL IN NUEVA ECIJA, AND RIVERBANK AREAS OF ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO MAINTAIN ITS CONTINUED SLOW RISE.
FLOODING IS THREATENING: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT TO THE LOWER MAIN PAMPANGA RIVER.

4. FURTHER SLOW INCREASE OF THE CANDABA SWAMP.
FLOODING TO PERSIST: IN THE LOW-LYING AREAS WITHIN AND AROUND THE CANDABA SWAMP AREA.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE ADVISED TO CONTINUE TO TAKE APPROPRIATE ACTIONS.

PRFFWC / HTH / FLM

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http://groups.msn.com/PampangaRiverBasin/prffwc.msnw

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 4
(Issued at 4:00 PM, 27 August 2004)
(Valid until the next issuance at 4:00 AM tomorrow)
AVERAGE BASIN RAINFALL:

PAST 24-HR AVERAGE BASIN RAINFALL ENDING AT 4:00 PM TODAY = 85 mm

FORECAST 12-HR BASIN RAINFALL BEGINNING AT 4:00 PM TODAY = MORE THAN 20 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO PEAK AND TO RECEDE SLOWLY LATE TODAY.
FLOODING TO OCCUR: IN THE LOW LYING AREAS OF PALAYAN, CABANATUAN, STA. ROSA AND SAN LEONARDO ALL IN NUEVA ECIJA.

2. THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER EXPECTED TO PEAK TOMORROW MORNING.
FLOODING TO PERSIST: IN THE LOW LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, SAN ISIDRO, JAEN, GAPAN ALL IN NUEVA ECIJA, AND RIVERBANK AREAS OF ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO MAINTAIN ITS CONTINUED SLOW RISE.
FLOODING TO OCCUR: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT TO THE LOWER MAIN PAMPANGA RIVER.

4. CANDABA SWAMP EXPECTED TO LEVEL-OFF TONIGHT.
FLOODING TO PERSIST: IN THE LOW-LYING AREAS WITHIN AND AROUND THE CANDABA SWAMP AREA.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE ADVISED TO CONTINUE TO TAKE APPROPRIATE ACTIONS.

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http://groups.msn.com/PampangaRiverBasin/prffwc.msnw

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 5
(Issued at 4:00 AM, 28 August 2004)
(Valid until the next issuance at 4:00 PM today)

AVERAGE BASIN RAINFALL:

PAST 24-HR AVERAGE BASIN RAINFALL ENDING AT 4:00 AM TODAY = 10 mm

FORECAST 12-HR BASIN RAINFALL BEGINNING AT 4:00 AM TODAY = MORE THAN 5 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO CONTINUE ITS SLOW RECESSION TODAY.
FLOODING TO SLOWLY SUBSIDE BY LATE AFTERNOON : IN THE LOW LYING RIVERBANK AREAS OF PALAYAN, CABANATUAN, STA. ROSA AND SAN LEONARDO ALL IN NUEVA ECIJA.

2. THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER EXPECTED TO PEAK AND TO RECEDE SLOWLY TODAY.
FLOODING TO PERSIST: IN THE LOW LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, SAN ISIDRO, JAEN, GAPAN ALL IN NUEVA ECIJA, AND RIVERBANK AREAS OF ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO MAINTAIN ITS CONTINUED SLOW RISE.
FLOODING TO PERSIST: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT TO THE LOWER MAIN PAMPANGA RIVER.

4. CANDABA SWAMP EXPECTED TO REMAIN AT ITS PEAK LEVEL BUT TO RECEDE VERY SLOWLY LATE TODAY.
FLOODING TO PERSIST: IN THE LOW-LYING AREAS WITHIN AND AROUND THE CANDABA SWAMP AREA.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE ADVISED TO CONTINUE TO TAKE APPROPRIATE ACTIONS.

PRFFWC / HTH / FLM

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 6
(Issued at 4:00 PM, 28 August 2004)
(Valid for the next 24-hours)

AVERAGE BASIN RAINFALL:

PAST 24-HR AVERAGE BASIN RAINFALL ENDING AT 4:00 PM TODAY = LESS THAN 10 mm

FORECAST 12-HR BASIN RAINFALL BEGINNING AT 4:00 PM TODAY = MORE THAN 2 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO CONTINUE ITS GRADUAL FALL.
FLOODING IS STILL POSSIBLE: IN THE LOW LYING RIVERBANK AREAS OF PALAYAN, CABANATUAN, STA. ROSA AND SAN LEONARDO ALL IN NUEVA ECIJA.

2. THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER TO PEAK LATE TODAY.
FLOODING TO REMAIN: IN THE LOW LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, SAN ISIDRO, JAEN, GAPAN ALL IN NUEVA ECIJA, AND RIVERBANK AREAS OF ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO MAINTAIN ITS CONTINUED SLOW RISE.
FLOODING TO PERSIST: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT FURTHER TO THE LOWER MAIN PAMPANGA RIVER.

4. CANDABA SWAMP EXPECTED TO REMAIN AT ITS PEAK LEVEL BUT TO RECEDE VERY SLOWLY LATE TODAY.
FLOODING TO REMAIN FOR WEEKS: IN THE LOW-LYING AREAS WITHIN AND AROUND THE CANDABA SWAMP AREA.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE STILL ADVISED TO CONTINUE TO TAKE APPROPRIATE ACTIONS.

PRFFWC - HTH / ACA / LSF

** For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin http://groups.msn.com/PampangaRiverBasin/prffwc.msnw*

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 7
(Issued at 4:00 AM, 29 August 2004)
(Valid until the next issuance at 4:00 PM, Today)

AVERAGE BASIN RAINFALL:

PAST 24-HR AVERAGE BASIN RAINFALL ENDING AT 4:00 PM TODAY = LESS THAN 5 mm

FORECAST 12-HR BASIN RAINFALL BEGINNING AT 4:00 PM TODAY = LESS THAN 5 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO CONTINUE ITS GRADUAL FALL.
FLOODING IS NO LONGER POSSIBLE IN THE NEXT 24-HOURS: IN THE LOW LYING RIVERBANK AREAS OF PALAYAN, CABANATUAN, STA. ROSA AND SAN LEONARDO ALL IN NUEVA ECIJA.

2. THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER TO RECEDE SLOWLY.
FLOODING TO REMAIN: IN THE LOW LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, SAN ISIDRO, JAEN, GAPAN ALL IN NUEVA ECIJA, AND RIVERBANK AREAS OF ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO MAINTAIN ITS CONTINUED SLOW RISE.
FLOODING TO PERSIST: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT FURTHER TO THE LOWER MAIN PAMPANGA RIVER.

4. CANDABA SWAMP EXPECTED TO REMAIN AT ITS PEAK LEVEL BUT TO RECEDE VERY SLOWLY.
FLOODING TO REMAIN FOR WEEKS: IN THE LOW-LYING AREAS WITHIN AND AROUND THE CANDABA SWAMP AREA.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE STILL ADVISED TO CONTINUE TO TAKE APPROPRIATE ACTIONS.

PRFFWC - HTH / FLM

** For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin http://groups.msn.com/PampangaRiverBasin/prffwc.msnw*

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

PAMPANGA RIVER BASIN
FLOOD BULLETIN NO. 8 (FINAL)
(Issued at 4:00 PM, 29 August 2004)
(Valid for the next 24-hour period)

AVERAGE BASIN RAINFALL:

PAST 24-HR AVERAGE BASIN RAINFALL ENDING AT 4:00 PM TODAY = LESS THAN 5 mm

FORECAST 24-HR BASIN RAINFALL BEGINNING AT 4:00 PM TODAY = LESS THAN 5 mm

EXPECTED HYDROLOGICAL RESPONSE:
1. UPPER MAIN PAMPANGA RIVER TO CONTINUE ITS GRADUAL FALL.
FLOODWATERS HAVE SUBSIDED. RIVER FLOODING IS NO LONGER POSSIBLE IN THE NEXT 24-HOURS: IN THE LOW-LYING RIVERBANK AREAS OF PALAYAN, CABANATUAN, STA. ROSA AND SAN LEONARDO ALL IN NUEVA ECIJA.

2. CONTINUED SLOW RECESSION OT THE MIDDLE MAIN PAMPANGA RIVER AND TRIBUTARY RIO CHICO RIVER BELOW FLOODING STAGE WITHIN 24 HOURS.
FLOODING STILL TO REMAIN FOR A FEW DAYS: IN THE LOW-LYING AREAS OF CABIAO, ZARAGOZA, SAN ANTONIO, SAN ISIDRO, JAEN, GAPAN ALL IN NUEVA ECIJA, AND RIVERBANK AREAS OF ARAYAT IN PAMPANGA.

3. THE LOWER MAIN PAMPANGA RIVER TO EFFECT A SLOW RECESSION WITHIN 24HOURS.
FLOODING TO PERSIST FOR A FEW DAYS: IN THE LOW-LYING AREAS OF SAN SIMON, SAN LUIS, AND APALIT IN PAMPANGA; CALUMPIT, HAGONOY AND PAOMBONG IN BULACAN AND THOSE WITHIN THE DELTA AREAS ADJACENT FURTHER TO THE LOWER MAIN PAMPANGA RIVER.

4. WATER LEVEL OF THE CANDABA SWAMP EXPECTED TO SUBSIDE SLOWLY BUT TO REMAIN AT FLOODING STAGE FOR SEVERAL DAYS.
FLOODING TO REMAIN FOR WEEKS: IN THE LOW-LYING AREAS WITHIN AND AROUND THE CANDABA SWAMP AREA.

THE RESIDENTS AND THE DISASTER COORDINATING COUNCILS CONCERNED ARE STILL ADVISED TO CONTINUE TO TAKE NECESSARY ACTIONS.

PRFFWC - APT / HTH / ACA / LSF

** For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin http://groups.msn.com/PampangaRiverBasin/prffwc.msnw*

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General Flood Advisories Issued

FLOOD FORECASTING BRANCH
PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER
WFFC Bldg., Agham Road, Diliman, Quezon City

GUAGUA RIVER BASIN
GENERALFLOOD ADVISORY NO. 1
(Issued at 9:00 AM, Wednesday, 25 August 2004)
(Valid for the next 24-hr. period)

FORECAST 24-HR AVERAGE BASIN RAINFALL BEGINNING AT 4:00 AM TODAY = MORE THAN 20 mm.

WATERWAYS TO BE AFFECTED:
PASIG-POTRERO, PORAC-GUMAIN, PASAC-GUAGUA RIVERS AND OTHER ALLIED STREAMS AND CREEKS WITHIN THE BASIN.

PUBLIC WARNING:

PEOPLE LIVING IN LOW-LYING AREAS ADJACENT TO OR ALONG THE ABOVE MENTIONED WATERWAYS AND THE LOCAL DISASTER COORDINATING COUNCILS CONCERNED ARE ADVISED TO TAKE NECESSARY APPROPRIATE ACTIONS.

PRFFWC

** For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin*

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FLOOD FORECASTING BRANCH
PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER
WFFC Bldg., Agham Road, Diliman, Quezon City

GUAGUA RIVER BASIN
GENERALFLOOD ADVISORY NO. 2
(Issued at 9:00 AM, 26 August 2004)
(Valid for the next 24-hr. period)

FORECAST 24-HR AVERAGE BASIN RAINFALL BEGINNING AT 8:00 AM TODAY = MORE THAN 20 mm.

WATERWAYS TO BE AFFECTED:
PASIG-POTRERO, PORAC-GUMAIN, PASAC-GUAGUA, ABACAN, SAPANG MARAGUL RIVERS AND OTHER ALLIED STREAMS AND CREEKS WITHIN THE BASIN.

PUBLIC WARNING:

PEOPLE LIVING IN LOW-LYING AREAS ADJACENT TO OR ALONG THE ABOVE MENTIONED WATERWAYS AND THE LOCAL DISASTER COORDINATING COUNCILS CONCERNED ARE ADVISED TO TAKE NECESSARY APPROPRIATE ACTIONS.

PRFFWC

** For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin*

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

GUAGUA RIVER BASIN
GENERAL FLOOD ADVISORY No. 3
(Issued at 4:00 AM, 27 August 2004)
(Valid for the next 24 hours)

FORECAST 24-HR AVERAGE BASIN RAINFALL BEGINNING AT 4:00 AM TODAY = MORE THAN 15 mm.

WATERWAYS TO BE AFFECTED:
PASIG-POTRERO, PORAC-GUMAIN, PASAC-GUAGUA, ABACAN, SAPANG MARAGUL RIVERS AND ALL OTHER ALLIED STREAMS AND CREEKS WITHIN THE BASIN.

PUBLIC WARNING:

PEOPLE LIVING IN THE LOW-LYING AREAS ADJACENT TO OR ALONG THE ABOVE MENTIONED WATERWAYS AND THE LOCAL DISASTER COORDINATING COUNCILS CONCERNED ARE ADVISED TO CONTINUE TO TAKE NECESSARY ACTIONS.

PRFFWC

** For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin*

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

GUAGUA RIVER BASIN
GENERAL FLOOD ADVISORY No. 4
(Issued at 4:00 PM, 27 August 2004)
(Valid for the next 24 hours)

FORECAST 24-HR AVERAGE BASIN RAINFALL BEGINNING AT 4:00 PM TODAY = MORE THAN 10 mm.

WATERWAYS TO BE AFFECTED:
PASIG-POTRERO, PORAC-GUMAIN, PASAC-GUAGUA, ABACAN, SAPANG MARAGUL RIVERS AND ALL OTHER ALLIED STREAMS AND CREEKS WITHIN THE BASIN.

PUBLIC WARNING:

PEOPLE LIVING IN THE LOW-LYING AREAS ADJACENT TO OR ALONG THE ABOVE MENTIONED WATERWAYS AND THE LOCAL DISASTER COORDINATING COUNCILS CONCERNED ARE STILL ADVISED TO CONTINUE TO TAKE NECESSARY ACTIONS.

Prepared By:
PRFFWC

For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: *Pampanga River Basin*
http://groups.msn.com/PampangaRiverBasin/prffwc.msnw

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

GUAGUA RIVER BASIN
GENERAL FLOOD ADVISORY No. 5
(Issued at 4:00 AM, 28 August 2004)
(Valid for the next 24 hours)

FORECAST 24-HR AVERAGE BASIN RAINFALL BEGINNING AT 4:00 PM TODAY = MORE THAN 5 mm.

WATERWAYS TO BE AFFECTED:
PASIG-POTRERO, PORAC-GUMAIN, PASAC-GUAGUA, ABACAN, SAPANG MARAGUL RIVERS AND ALL OTHER ALLIED STREAMS AND CREEKS WITHIN THE BASIN.

PUBLIC WARNING:

PEOPLE LIVING IN THE LOW-LYING AREAS ADJACENT TO OR ALONG THE ABOVE MENTIONED WATERWAYS AND THE LOCAL DISASTER COORDINATING COUNCILS CONCERNED ARE STILL ADVISED TO CONTINUE TO TAKE NECESSARY ACTIONS.

Prepared By:
PRFFWC

For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: *Pampanga River Basin*
http://groups.msn.com/PampangaRiverBasin/prffwc.msnw

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FLOOD FORECASTING BRANCH

PAMPANGA RIVER FLOOD FORECASTING & WARNING CENTER

WFFC Bldg., Agham Road, Diliman, Quezon City

GUAGUA RIVER BASIN
GENERAL FLOOD ADVISORY No. 6 (FINAL)
(Issued at 4:00 PM, 28 August 2004)
(Valid for the next 24 hours)

FORECAST 24-HR AVERAGE BASIN RAINFALL BEGINNING AT 4:00 PM TODAY = MORE THAN 5 mm.

WATERWAYS TO BE AFFECTED:
PASIG-POTRERO, PORAC-GUMAIN, PASAC-GUAGUA, ABACAN, SAPANG MARAGUL RIVERS AND ALL OTHER ALLIED STREAMS AND CREEKS WITHIN THE BASIN.

PUBLIC WARNING:

PEOPLE LIVING IN THE LOW-LYING AREAS ADJACENT TO OR ALONG THE ABOVE MENTIONED WATERWAYS AND THE LOCAL DISASTER COORDINATING COUNCILS CONCERNED ARE STILL ADVISED TO CONTINUE TO EXERCISE PRECAUTIONARY MEASURES.

Prepared By:
PRFFWC

For additional information regarding Pampanga River Basin and the allied basin of Guagua River and/or updates of hydrological forecasts for said basin areas, please check the following Website: Pampanga River Basin
http://groups.msn.com/PampangaRiverBasin/prffwc.msnw

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Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
1	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.19		13.81	0.00	4.28	3.83		1.58
1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18		13.82	0.00	4.30	3.83		1.66
1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17		13.81	0.00	4.42	3.82		1.67
1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14		13.81	0.00	4.49	3.81		1.60
1	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12		13.82	0.00	4.72	3.81		1.48
1	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11		13.80	0.00	4.64	3.80		1.34
1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.10		13.81	0.00	4.61	3.80		1.19
1	16	0	0	2	0	8	0	0	0	0	0	1	0	0	0	0.18		13.81	0.00	4.62	3.79		1.03
1	17	0	0	0	0	1	20	0	0		0	1	0	0	4	0.17		13.82	0.00	4.70	3.79		0.99
1	18	0	0	0	0	0	0	5	1	6	0	0	0	41	1	0.17		13.82	0.00	4.78	3.79		0.99
1	19	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.13		13.80	0.00	4.92	3.79		0.99
1	20	0	0	0	0	0	0	2	1	0	0	0	0	0	1	0.12		13.80	0.00	5.07	3.78		0.99
1	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.82	0.00	5.10	3.77		0.99
1	22	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0.00		13.81	0.00	5.12	3.77		0.99
1	23	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.00		13.82	0.00	5.04	3.76		0.99
2	**00**	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.81	0.00	4.99	3.76		0.99
2	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.81	0.00	4.97	3.75		0.99
2	02	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0.00		13.80	0.00	4.95	3.74		0.99
2	03	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.00		13.79	0.00	4.95	3.74		0.99
2	04	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0.00		13.80	0.00	5.06	3.73		0.99
2	05	0	0	0	0	0	26	3	0	0	0	0	0	0	0	0.00		13.80	0.00	5.12	3.72		0.99
2	06	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.00		13.79	0.00	4.73	3.72		1.03
2	07	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0.00		13.78	0.00	4.59	3.71		1.16
2	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.77	0.00	4.80	3.71		1.29
2	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.79	0.00	5.07	3.70		1.47
2	10	0	0	0	0	0	0	0	0	6	0	0	0	4	0	0.00		13.76	0.00	4.88	3.70		1.65
2	11	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0.00		13.79	0.00	4.67	3.70		1.74

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
2	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.79	0.00	4.60	3.70		1.71
2	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.80	0.12	4.69	3.69		1.63
2	14	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0.00		13.79	0.16	4.80	3.69		1.52
2	15	0	1	0	0	0	0	0	4	10	0	0	0	0	0	0.00		13.78	0.10	4.97	3.69		1.37
2	16	0	1	0	0	2	1	1	0	0	3	0	0	0	0	0.00		13.78	0.16	5.11	3.69		1.22
2	17	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.00		13.79	0.16	5.19	3.69		1.10
2	18	0	9	0	0	0	0	0	0	0	0	6	0	0	0	0.00		13.78	0.19	5.24	3.69		1.00
2	19	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.77	0.13	5.27	3.69		0.99
2	20	5	16	0	0	0	0	0	0	0	0	0	0	0	0	0.12		13.78	0.00	5.35	3.69		0.99
2	21	18	4	0	0	0	2	0	0	0	1	0	0	0	0	0.17		13.77	0.00	5.37	3.69		0.99
2	22	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0.48		13.78	0.00	5.32	3.69		0.99
2	23	14	1	4	0	0	1	0	0	0	0	0	0	0	0	0.79		13.77	0.00	5.21	3.69		0.99
3	00	0	27	2	0	0	1	0	0	0	0	0	0	0	0	1.10		13.76	0.00	5.11	3.69		0.99
3	01	0	1	9	0	0	0	0	2	9	0	0	0	0	0	1.27		13.75	0.00	5.06	3.70		0.99
3	02	0	2	1	0	0	0	1	0	4	18	0	0	0	0	1.26		13.76	0.00	5.04	3.71		0.99
3	03	0	1	0	0	0	0	1	0	0	14	0	0	1	0	1.25		13.74	0.00	5.02	3.71		0.99
3	04	0	0	0	0	0	2	0	0	0	0	0	0	0	4	1.24	1.24	13.74	0.00	5.01	3.72		0.99
3	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.23	1.44	13.74	0.00	5.00	3.72		0.99
3	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.17	1.54	13.76	0.00	5.00	3.72		0.99
3	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.21	1.62	13.77	0.00	4.99	3.72		0.99
3	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.65	13.77	0.00	4.99	3.73		1.09
3	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.67	13.78	0.19	4.99	3.73		1.26
3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.69	13.78	0.29	5.00	3.73		1.44
3	11	0	5	0	0	0	0	0	0	0	0	0	0	0	0		1.72	13.78	0.00	5.02	3.74		1.56
3	12	0	0	1	0	0	0	0	0	0	0	0	0	0	0		1.79	13.80	0.00	5.27	3.75		1.6
3	13	0	0	9			0	0	9		0	9			0		1.80	13.80		5.52	3.76		1.563
3	14	0	0	0			0	0	0		0	1			0		1.81	13.80		5.76	3.77		1.527

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
3	15	0	0	0			5	0	0		3	0			1	1.17	1.81	13.80		6.01	3.78		1.49
3	16	5	0	0	0	0	0	0	0	0	0	0	0	3	0	1.18	1.82	13.80	1.10	6.26	3.79		1.43
3	17	2	3	0	0	0	0	0	0	1	0	0	0	1	0	1.17	1.83	13.80		6.20	3.81		1.35
3	18	4	4	0	0	0	0	0	0	0	0	0	0	7	0	1.17	1.86	13.81	1.16	6.13	3.83		1.28
3	19	4	3	0	0	1	0	0	0	0	0	0	0	0	0	1.17	1.81	13.81		6.20	3.84		1.21
3	20	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.10	1.75	13.82	1.16	6.26	3.85		1.16
3	21	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1.17	1.70	13.82	1.16	6.36	3.85		1.13
3	22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.20	1.67	13.82	1.16	6.40	3.85		1.12
3	23	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1.20	1.64	13.82	1.13	6.42	3.85		1.15
4	**00**	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1.17	1.65	13.82	1.10	6.45	3.85		1.18
4	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.67	13.84	1.19	6.47	3.85		1.22
4	02	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1.14	1.69	13.85	1.01	6.48	3.85		1.27
4	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.70	13.87		6.49	3.85		1.3
4	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.68	13.90		6.48	3.85		1.31
4	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.66	13.90		6.48	3.85		1.31
4	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.63	13.93		6.35	3.85		1.32
4	07	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1.14	1.60	13.95		6.33	3.85		1.35
4	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.56	13.97		6.35	3.85		1.37
4	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.53	14.00		6.11	3.85		1.42
4	10	0	0	0	0	0	0	0	0	0	0	0	0	6	7	1.14	1.50	14.01		6.19	4.05		1.53
4	11	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1.14	1.47	14.03		6.31	4.06		1.62
4	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.45	14.03		6.32	4.07		1.7
4	13	0	0	0	0		0	0	0	0	0	0	0	0	0	1.14	1.43	14.08		6.33	4.08		1.76
4	14	6	22	8	0	13	0	0	0	0	0	0	0	3	0	1.14	1.42	14.09		6.31	4.10		1.77
4	15	0	2	0	0	2	0	19	0	0	0	0	0	0	0	1.14	1.40	14.11		6.31	4.10		1.74
4	16	0	0	0	0	0	5	3	0	0	0	0	0	1	16	1.14	1.39	14.13		6.29	4.10		1.68
4	17	1	0	2	0	4	6	3	3	0	6	0	0	20	6	1.14	1.39	14.15		6.29	4.11		1.57

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
4	18	1	7	7	0	1	6				0	0	0		0	1.14	1.38	14.16		6.27	4.12		1.46
4	19	0	3	1	0	0	1	3	3	3	1	0	0	5	0	1.14	1.38	14.18		6.18	4.13		1.37
4	20	0	0	0	0	1	0	0	0	0	0	0	0	2	0	1.14	1.37	14.20		6.15	4.13		1.31
4	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.36	14.20		6.10	4.14		1.25
4	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.35	14.21		6.01	4.14		1.22
4	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.35	14.22		5.91	4.15		1.21
5	**00**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.34	14.24		5.64	4.15		1.2
5	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.35	14.24		5.59	4.15		1.21
5	02	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.14	1.36	14.24		5.61	4.16		1.23
5	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.37	14.26		6.03	4.16		1.25
5	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.39	14.25		6.12	4.17		1.26
5	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.41	14.26		6.10	4.18		1.26
5	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.44	14.27		5.50	4.18		1.25
5	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.44	14.25		5.75	4.19		1.25
5	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.43	14.27		5.99	4.20		1.22
5	**09**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.43	14.26		5.85	4.20		1.25
5	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.40	14.26		5.75	4.20		1.335
5	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.39	14.26		6.24	4.21		1.42
5	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.38	14.25		6.30	4.22		1.53
5	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.35	14.25		6.36	4.22		1.6
5	14	0	0	0	0	2	0	2	0	0	0	0	0	0	0	1.14	1.33	14.24		6.07	4.23		1.64
5	15	0	1	4	0	2	1	2	0	0	0	0	0	0	0	1.14	1.31	14.24		5.77	4.23		1.65
5	16	0	2	1	0	0	0	1	1	0	0	0	0	0	0	1.14	1.30	14.24		5.27	4.24		1.61
5	17	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1.14	1.27	14.24		5.13	4.24		1.54
5	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.28	14.24		5.23	4.25		1.44
5	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.31	14.23		5.20	4.25		1.37
5	20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.32	14.23		5.18	4.26		1.31

Year:	PAMPANGA RIVER BASIN																							
2004	Telemeterized Rainfall and Water Level Data																							
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
5	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.30	14.21		5.15	4.26		1.26
5	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.27	14.21		5.15	4.26		1.23
5	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.25	14.22		5.17	4.26		1.22
6	**00**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.22	14.19		5.16	4.26		1.22
6	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.20	14.18		5.16	4.26		1.25
6	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.17	14.18		5.14	4.26		1.3
6	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.15	14.17		5.13	4.27		1.34
6	04	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1.14	1.13	14.17		5.12	4.27		1.36
6	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.11	14.16		5.10	4.27		1.34
6	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.09	14.15		5.07	4.27		1.3
6	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.08	14.13		4.47	4.27		1.28
6	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.07	14.14		4.73	4.27		1.25
6	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.06	14.13		4.74	4.27		1.22
6	10	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1.14	1.03	14.12		4.75	4.27		1.22
6	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.00	14.11		4.75	4.26		1.24
6	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14		14.09		4.76	4.26		1.29
6	13	0	0	0	14	0	0	0	0	0	0	0	0	0	0	1.14		14.09		4.74	4.26		1.37
6	14	0	0	0	4	0	0	0	0	0	0	0	0	0	0	1.14		14.07		4.73	4.26		1.45
6	15								0		7	0			0								
6	16								0		4	0			0								
6	17								3		2	0			0								
6	18								2		0	0			0								
6	19								0		0	0			0								
6	20								0		0	0			0								
6	21								0		0	0			0								
6	22								0		0	0			0								
6	23								0		0	0			0								

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
7	**00**								0		0	0			0								
7	01								0		0	0			0								
7	02								0		0	0			0								
7	03								0		0	0			0								
7	04								0		0	0			0								
7	05								0		0	0			0								
7	06								0		0	0			0								
7	07								0		0	0			0								
7	08								0		1	0			0								
7	**09**								0		0	0			0								
7	10								0		0	0			0								
7	11								0		0	0			0								
7	12								0		0	2			0								
7	13								0		0	0			0								
7	14								0		0	0			0								
7	15								0		0	0			0								
7	16								0		0	0			0								
7	17								0		0	0			1								
7	18								0		0	0			0								
7	19								0		0	0											
7	20								0		0	0											
7	21								0		0	0											
7	22								0		0	0											
7	23								0		0	0											
8	**00**								0		0	0											
8	01								2		0	1											
8	02								0		0	1											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
8	03								0		0	0											
8	04								0		0	0											
8	05								0		0	0											
8	06								0		0	0											
8	07								0		0	0											
8	08								0		0	0											
8	09								0		0	0											
8	10								0		0	0											
8	11								0		0	0											
8	12								0		0	0											
8	13								0		0	4											
8	14								0		0	0											
8	15								0		0	0											
8	16								0		0	0											
8	17								0		0	0											
8	18								0		0	0											
8	19								0		0	0											
8	20								0		0	0											
8	21								0		0	0											
8	22								0		0	0											
8	23								0		0	0											
9	00								0		0	0											
9	01								0		0	0											
9	02								0		0	0											
9	03								0		0	0											
9	04								0		0	0											
9	05								0		0	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations															Water Level Stations						
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
9	06								0		0	0											
9	07								0		0	0											
9	08								0		0	0											
9	**09**								0		0	0											
9	10								0		0	0											
9	11								0		0	0											
9	12								0		0	0											
9	13								0		0	0											
9	14								0		0	0											
9	15								0		0	0											
9	16	4							0		0	0											
9	17								0		0	0											
9	18								0		0	0											
9	19								0		0	0											
9	20								0		0	0											
9	21								0		0	0											
9	22								0		0	0											
9	23								0		0	0											
10	**00**								0		0	0											
10	01								0		0	0											
10	02								0		0	3											
10	03								0		0	0											
10	04								0		0	0											
10	05								0		0	0											
10	06								0		0	0											
10	07								0		0	0											
10	08								0		0	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations															Water Level Stations						
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
10	09								0		0	0											
10	10								0		0	0											
10	11								0		0	0											
10	12								0		0	0											
10	13								0		1	0											
10	14								0		15	0											
10	15								0		0	0											
10	16								0		0	0											
10	17								0		0	0											
10	18								0		0	0											
10	19								0		0	0											
10	20								0		0	0											
10	21								0		0	0											
10	22								0		0	0											
10	23								0		0	0											
11	**00**								0		0	0											
11	01								0		0	0											
11	02								0		0	0											
11	03								0		0	0											
11	04								0		0	0											
11	05								0		0	0											
11	06								0		0	0											
11	07								0		0	0											
11	08								0		0	0											
11	09								0		0	0											
11	10								0		0	0											
11	11								0		0	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
11	12								0		0	0											
11	13								0		1	0											
11	14								0		0	0											
11	15								0		0	0											
11	16								0		0	0											
11	17								0		0	0											
11	18								0		0	0											
11	19								0		0	0											
11	20								0		0	0											
11	21								0		0	0											
11	22								0		0	0											
11	23								0		0	0											
12	**00**								0		0	0											
12	01								0		0	0											
12	02								0		0	0											
12	03								0		0	0											
12	04								0		0	0											
12	05								0		0	0											
12	06								0		0	0											
12	07								0		0	0											
12	08								0		0	0											
12	**09**								0		0	0											
12	10								0		0	0											
12	11								0		0	0											
12	12								0		17	0											
12	13								0		2	0											
12	14								0		0	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
12	15								0		0	0											
12	16								0		0	0											
12	17								0		0	1											
12	18								0		0	0											
12	19								0		0	0											
12	20								0		0	0											
12	21								0		0	0											
12	22								0		0	1											
12	23								0		0	0											
13	**00**								0		0	1											
13	01								0		0	0											
13	02								0		0	1											
13	03								0		0	0											
13	04								0		0	0											
13	05								0		0	3											
13	06								0		0	0											
13	07								0		1	0											
13	08								0		0	0											
13	09								0		0	1											
13	10								1		0	0											
13	11								0		0	0											
13	12								8		0	0											
13	13								1		35	0											
13	14								3		4	2				1.14		13.30	0.19	4.37	3.98		1.10
13	15								0		1	1											
13	16								0		0	0											
13	17								0		0	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations															Water Level Stations						
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
13	18								0		0	0											
13	19								0		0	0											
13	20								0		0	0											
13	21								0		0	0											
13	22								0		0	0											
13	23								0		0	0											
14	**00**								0		0	0											
14	01								0		0	0											
14	02								0		0	0											
14	03								0		0	0											
14	04								0		0	0											
14	05								0		0	0											
14	06								0		0	0											
14	07								0		0	0											
14	08								0		0	0											
14	**09**								0		0	0											
14	10								0		0	0											
14	11								0		0	0											
14	12								0		0	0											
14	13								0		0	0											
14	14								0		0	0											
14	15								0		0	0											
14	16								0		0	0											
14	17								0		0	0											
14	18								54		0	2											
14	19								28		0	0											
14	20								3		3	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations															Water Level Stations						
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
14	21								1		1	1											
14	22								2		0	4											
14	23								0		0	3											
15	**00**								0		0	0											
15	01								0		0	0											
15	02								0		0	0											
15	03								0		0	0											
15	04								0		0	0											
15	05								0		0	0											
15	06								0		0	0											
15	07								0		0	0											
15	08								0		0	0											
15	09								0		0	0											
15	10								0		0	0											
15	11								0		0	0											
15	12								0		0	0											
15	13								0		0	0											
15	14								0		0	0											
15	15								0		0	0											
15	16								0		0	0											
15	17								0		0	0											
15	18								1		0	0											
15	19								0		1	0											
15	20								0		18	1											
15	21								1		6	0											
15	22								4		2	0											
15	23								5		1	3											

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
16	**00**								0		0	1											
16	01								0		0	0											
16	02								0		0	0											
16	03								0		0	0											
16	04								0		0	0											
16	05								0		0	0											
16	06								0		0	0											
16	07								0		0	0											
16	08								0		0	0											
16	**09**								0		0	0											
16	10								0		0	0											
16	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.14	1.19	13.84	0.00	4.66			
16	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0			13.85	0.00	4.75			
16	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12	1.13	13.86	0.00	4.84	4.03		1.63
16	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	1.08	13.88	0.00	4.89	4.04		1.56
16	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0			13.90		4.93	4.05		1.47
16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.92	0.00	4.98	4.06		1.38
16	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		13.92	0.00	5.00	4.07		1.32
16	18								0		0	0				0.00		13.94	0.00	5.00	4.09		1.24
16	19								0		0	0											
16	20								0		0	0											
16	21								0		0	0											
16	22								0		0	0											
16	23								0		0	0											
17	**00**								0		0	0											
17	01								0		0	0											
17	02								0		0	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
17	03								0		0	0											
17	04								0		0	0											
17	05								0		0	0											
17	06								0		0	0											
17	07								0		0	0											
17	08								0		0	0											
17	09								0		0	0											
17	10								0		0	0											
17	11								1		0	0											
17	12								0		0	0											
17	13								6		7	5											
17	14								0		0	0											
17	15								0		0	4											
17	16								4		0	0											
17	17								4		0	1											
17	18								0		0	0											
17	19								0		0	0											
17	20								0		0	0											
17	21								0		0	0											
17	22								0		0	0											
17	23								0		0	0											
18	00								0		0	0											
18	01								0		0	0											
18	02								0		0	0											
18	03								0		0	0											
18	04								0		1	0											
18	05								0		1	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
18	06								0		0	0											
18	07								0		0	0											
18	08								0		0	0											
18	**09**								0		0	0											
18	10								0		0	0											
18	11								0		0	1											
18	12								0		0	0											
18	13								0		0	0											
18	14								0		0	0											
18	15								0		0	0											
18	16								0		0	0											
18	17								0		0	0											
18	18								0		0	0											
18	19								0		0	0											
18	20								0		0	0											
18	21								0		0	0											
18	22								0		0	0											
18	23								0		0	0											
19	**00**								0		0	0											
19	01								0		0	0											
19	02								0		0	0											
19	03								0		0	0											
19	04								0		0	0											
19	05								0		0	0											
19	06								0		0	0											
19	07								0		0	0											
19	08								0		0	0											

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
19	09								0		0	0											
19	10								0		0	0											
19	11								0		0	0											
19	12								0		0	0											
19	13								0		0	0											
19	14								0		0	7											
19	15								1		0	0											
19	16								0		0	0											
19	17								0		0	0											
19	18								0		0	0											
19	19								0		0	0											
19	20								0		0	0											
19	21								0		0	0											
19	22								0		0	0											
19	23								0		0	0											
20	**00**								0		0	0											
20	01								0		0	0											
20	02								0		0	0											
20	03								0		0	0											
20	04								0		0	0											
20	05								0		0	0											
20	06								0		0	0											
20	07								0		0	0											
20	08								0		0	0											
20	**09**								0		0	0											
20	10								0		0	0											
20	11								0		0	0				0.00	0.00			3.72	3.91		1.10

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
20	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.26		3.63	3.90		1.22
20	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.26		3.61	3.89		1.28
20	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.25		3.58	3.89		1.30
20	15	0	0	0	1	5	0	0	0	0	0	0	0	0	0	0.00	0.00	14.26		3.71	3.88		1.26
20	16	0	0	0	0	28	0	0	3	0	0	0	0	0	0	0.00	0.00	14.27		3.84	3.88		1.19
20	17	0	0	0	0	1	0	2	26		0	0	0	0	0	0.00	0.00	14.28		3.96	3.87		1.09
20	18	0	0	0	0	0	0	0	3	4	17	0	0	0	0	0.00	0.00	14.27		3.93	3.87		1.04
20	19	0	0	0	0	0	1	0	1	3	1	0	0	27	0	0.00	0.00	14.27		3.88	3.87		0.99
20	20	5	0	0	0	0	0		0		0	0	0	0	1	0.00	0.00	14.26		3.77	3.87		0.99
20	21	1	6	0	0	0	0	1	1	1	0	0	0	0	0	0.00	0.00	14.25		3.66	3.87		0.99
20	22	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.26		3.68	3.87		0.99
20	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.26		3.71	3.87		0.99
21	**00**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.24		3.72	3.87		0.99
21	01	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.00	0.00	14.25		3.73	3.87		0.99
21	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.25		3.73	3.87		1.02
21	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.24		3.73	3.87		1.02
21	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.26		3.74	3.87		0.99
21	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.24		3.80	3.87		0.99
21	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.24		3.66	3.84		0.99
21	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.25		3.73	3.84		0.99
21	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.25		3.82	3.84		0.99
21	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.24		3.88	3.84		0.99
21	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.23		3.94	3.84		0.99
21	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.23		3.92	3.84		0.99
21	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.22		3.97	3.84		1.06
21	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.22		4.00	3.85		1.15
21	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.22		4.05	3.85		1.18

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
21	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	14.22		3.96	3.85		1.19
21	16	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0.00		14.23		3.95	3.85		1.18
21	17	0	0	0	1	0	0	0	0	0	0	9	0	0	10	0.00		14.20		3.95	3.86		1.14
21	18	0	0	15	13	29	0	0	0	0	1	0	0	0	1	0.00		14.22		3.95	3.86		1.07
21	19	1	31	12	4	8	3	1	0	0	0	0	0	1	0	0.00		14.22		4.03	3.86		0.99
21	20	1	62	3	2	1	5	6	3	2	1	0	0	13	0	0.00		14.21		4.06	3.86		0.99
21	21	4	22	16	0	0		2		6	6	0	0	1	4	0.00		14.20		4.08	3.86		0.99
21	22	12	0	1	0	4	9	2	4	4	1	0	0	3	2	0.00		14.20		4.09	3.86		0.99
21	23	1	0	4	0	0	1	3	2	2	2	0	0	2	2	0.00	0	14.24		4.08	3.86		0.99
22	**00**	1	0	2	0	1	0	2	4	1	3	1	0	1	2	0.00	0.10	14.24		4.09	3.86		1.03
22	01	1	0	0	0	1	0	0	2	1	0	0	0	0	1	0.00	0.38	14.23		4.09	3.86		1.07
22	02	0	0	0	0	0	0	0	0		1	0	0	0	0	0.00	0.54	14.22		4.09	3.86		1.11
22	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.67	14.21		4.11	3.86		1.13
22	04	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.76	14.21		4.21	3.88		1.13
22	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.81	14.22		4.26	3.88		1.10
22	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.84	14.19		4.30	3.88		1.06
22	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.84	14.19		4.58	3.88		1.01
22	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.81	14.19		5.05	3.88		0.99
22	**09**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.74	14.18		5.19	3.88		0.99
22	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.67	14.19		5.18	3.89		1.00
22	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.60	14.17		5.16	3.89		1.04
22	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.55	14.17		5.43	3.90		1.11
22	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.51	14.17		5.53	3.90		1.18
22	14	0	0	0	0	0	0	0	0	0	0	0	0	6	9	0.00	0.47	14.15		5.62	3.91		1.26
22	15	0	0	0	1	0	0	0	0	0	0	0	0	17	1	0.00	0.43	14.16		5.64	3.92		1.32
22	16	0	0	0	0	2	0			6	0	0	0	0	0	0.00	0.40	14.16		5.65	3.94		1.36
22	17	0	0	0	1	0	3	12	8	3	4	0	0	0	0	0.00	0.36	14.15		5.66	3.95		1.36

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
22	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.33	14.15		5.69	3.96		1.35
22	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.30	14.16		5.72	3.98		1.33
22	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.21	0.26	14.15		5.70	3.99		1.30
22	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.22	0.22	14.14		5.70	4.00		1.30
22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0.20	14.15		5.70	4.01		1.31
22	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.18	0.16	14.12		5.70	4.02		1.34
23	**00**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.14	14.13		5.70	4.03		1.39
23	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.13	14.12		5.69	4.04		1.45
23	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.10	14.12		5.69	4.05		1.50
23	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12	0.09	14.13		5.68	4.06		1.54
23	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0.07	14.11		5.60	4.08		1.55
23	05	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.10	0.03	14.10		5.54	4.09		1.54
23	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.19	0.01	14.11		5.52	4.09		1.50
23	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17	0	14.09		5.51	4.10		1.44
23	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17		14.08		5.17	4.11		1.38
23	**09**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17		14.08		5.31	4.12		1.31
23	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.13		14.07		5.41	4.12		1.26
23	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12		14.07		5.41	4.13		1.24
23	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11		14.06		5.40	4.13		1.24
23	13	0	0	0	0	0	1	0	4	0	0	0	0	0	0	0.00		14.05		5.37	4.13		1.26
23	14	0	0	0	3	0	5	0	0	0	0	0	0	0	0	0.00		14.04		5.16	4.14		1.28
23	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		14.03		5.11	4.14		1.28
23	16	0	0	0	4	0	0		0	0	0	0	0	0	0	0.00		14.02		5.09	4.15		1.28
23	17	3	1	0	1	0	1	1	0	0	0	0	0	0	0	0.00		14.02		4.94	4.15		1.28
23	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00		14.00		4.84	4.15		1.28
23	19	0	1	0	14	0	0	0	0	0	0	0	0	0	0	0.00		14.00		4.80	4.15		1.24
23	20	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0.00	0	13.99		4.76	4.15		1.21

Year:	PAMPANGA RIVER BASIN																					
2004	Telemeterized Rainfall and Water Level Data																					
Mo.: Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
23	21	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.00	0	14.00		4.75	4.15		1.18
23	22								0		0	0											
23	23								0		0	0											
24	**00**								0		0	0											
24	01								0		0	0											
24	02								0		0	0											
24	03								0		0	0											
24	04								0		0	1											
24	05								0		0	0											
24	06								0		0	0											
24	07								0		0	0				0.10	0	13.92		4.68	4.13		1.39
24	08	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0.19		13.94		4.68	4.13		1.35
24	**09**	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.17		13.91		4.66	4.13		1.27
24	10	0	0	1	0	0	5	0	0	0	1	0	0	1	0	0.17		13.92		4.66	4.13		1.21
24	11	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0.17		13.91		4.64	4.13		1.14
24	12	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.16		13.89		4.63	4.14		1.11
24	13	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.14		13.90		4.27	4.13		1.09
24	14	3	0	0	0	5	15	14	0	0	0	5	0	0	1	0.13		13.88		4.23	4.13		1.07
24	15	0	1	1	0	1	0	1	0	0	0	3	0	0	1	0.13		13.89		4.29	4.12		1.04
24	16	1	0	0	0	3	1	0	0	1	0	7	0	0	0	0.12		13.89		4.76	4.12		1.02
24	17	0	0	0	1	0	0	0	1	5	1	11	0	0	5	0.11		13.87		4.65	4.12		1.04
24	18	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0.11		13.87		4.71	4.12		1.06
24	19	0	1	0	0	0	0	1	2	1	1	0	0	0	0	0.14		13.86		4.74	4.12		1.09
24	20	0	0	0	0	0	1	0	0	1	2	0	0	0	0	0.14		13.84		4.75	4.12		1.12
24	21	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.17		13.84		5.01	4.11		1.13
24	22	0	1	0	0	2	0	1	0	0	0	0	0	0	0	0.17		13.85		5.26	4.11		1.15
24	23	3	1	12	3	12	2	0	0	0	2	5	0	1	0	0.11	0	13.84		5.57	4.11		1.21

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
25	**00**	2	9	22	5	0	1	0	2	0	0	1	0	1	0	0.19	0	13.84		5.83	4.10		1.30
25	01	5	10	10	1	13	5	1	16	0	3	0	0	0	2	0.29	0	13.85		5.93	4.10		1.43
25	02	2	2	0	3	0	1	2	1	2	1	5	0	1	0		0	13.85		5.98	4.11		1.55
25	03	0	0	0	0	2	1	2	5	0	0	5	0	1	1		0	13.85		6.03	4.12		1.65
25	04	0	0	1	0	2	3	1	2	2	1	26	0	12	8		0.03	13.86		6.06	4.14		1.74
25	05	0	0	0	0	1	5	3	1	1	3	6	0	11	1		0.08	13.85		6.09	4.15		1.79
25	06	0	0	0	0	0	0	1	1	1	2	4	0	1	1		0.14	13.85		6.12	4.16		1.80
25	07	0	0	0	0	0	0	0	2	3	1	55	0	2	3		0.20	13.85		6.16	4.18		1.83
25	08	0	0	0	0	2	0	2	4	5	1	30	0	8	7		0.24	13.86		6.20	4.21		1.77
25	**09**	1	0	0	0	5	4		8	1	3	31	0		6		0.28	13.88		6.24	4.22		1.72
25	10	2	2	0	1	12	3		0	2	0	1	0	29	6		0.30	13.90		6.27	4.23		1.66
25	11	0	1	4	0	16	4		0	4	2	10	0	0	2		0.33	13.91		6.31	4.25		1.63
25	12	4	3	5	1	1	1		0	1	9	0	0	13	2		0.33	13.91		6.35	4.27		1.58
25	13	3	2	2	2	5	1		2	0	2	1	0	6	3		0.36	13.94		6.30	4.29		1.55
25	14		3	3	0	3	1		3	0	0	0	0	1	0		0.38	13.97		6.26	4.31		1.53
25	15	12	6	4	1	3	2		3	3	1	0	0	13	2		0.42	13.98		6.24	4.33		1.52
25	16	2	3	3	2	3	5		2	3	9	7	0	1	0		0.46	13.97		6.23	4.36		1.51
25	17	2	2	1	0	5	2	11	0	0	1	1	0	0	1		0.48	13.98		6.23	4.36		1.50
25	18	2	2	2	1	2	1	2	0	0	1	0	0	11	0		0.51	14.01		6.25	4.38		1.53
25	19	2	0	3	1	1	1	1	0	0	0	1	0	0	0		0.56	14.01		6.26	4.40		1.54
25	20	1	1	0	0	1	1	1	0	0	0	0	0	0	0		0.60	14.05		6.29	4.41		1.57
25	21	11	3	0	0	0	0	0	7	0	0	0	0	1	0		0.64	14.06		6.32	4.43		1.60
25	22	20		3	0		0	0	2	0	0	1	0	15	1		0.71	14.11		6.35	4.44		1.65
25	23	5	12	9	3	4	1	1	1	1	5	1	0	27	7		0.77	14.14		6.37	4.46		1.69
26	**00**	3	5	6	0	2	1	1	1	1	1	1	0	8	2		0.82	14.14		6.41	4.48		1.72
26	01	1	3	1	3	0	9	4	7	2	1	3	0	2	5		0.88	14.19		6.47	4.50		1.82
26	02	34	17	26	2	28	2	0	9	16	6	4	0	2	2		~~1.47~~	14.24		6.52	4.53		1.87

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
26	03	7	8	8	17	14	35	11	9	24	36	1	0	6	0		1.06	14.27		6.58	4.58		1.94
26	04	12	8	12	5	12	17	11	14	16	29	2	0	6	19		1.16	14.30		6.66	4.61		2.02
26	05	8	22	3	5	8	13	19	6	15	32	3	0	5	6		1.32	14.32		6.74	4.65		2.09
26	06	5	13	9	13	3	9	4	2	7	8	3	0	14	3		1.51	14.35		6.81	4.68		2.14
26	07	3	2	3		5	2	2	0	5	6	0	0	17	3		1.64	14.38		6.92	4.70		2.14
26	08	2	3	2	4	2	2	0	0	2	0	2	0	21	1		1.84	14.39		7.01	4.73		2.13
26	09		1	0	0	0	0	0	4	2	0	5	0	0	2		2.02	14.41		7.12	4.75		2.11
26	10	15	2	1	0	0	0	0	3	2	3	1	0	1	0		2.20	14.42		7.27	4.79		2.09
26	11	1	1	1	0	1	0	0	11	4	2	0	0	8	1		2.34	14.42		7.42	4.84		2.07
26	12	1	2	1	0	0	1	1	22	6	0	0	0	4	2		2.53	14.44		7.58	4.88		2.03
26	13	13	1	4	1	7	0		24	6	2	1	0	1	0		2.62	14.47		7.73	4.92		2.02
26	14	8	4	3	6	2	35		16	28	0	0	0	8	1		2.73	14.48		7.87	4.98		2.03
26	15	0	1		7	1	11		0	61	33	0	0		2		2.82	14.50		7.98	5.08		2.07
26	16	29	4	3	7	4	7		4	0	22	0	0	1	1		2.82	14.52		8.09	5.13		2.10
26	17	4	1	1	2	3	2		5	15	3	0	0	16	3		2.96	14.54		8.20	5.18		2.15
26	18	2	3	14	3	25	4	11	16	17	8	0	0	4	1		3.09	14.60		8.31	5.25		2.20
26	19	2	16	15	10	8	12	14	11	27	13	3	0	0	0		3.13	14.60		8.38	5.32		2.26
26	20	13	11	14	8	14	12	7	14	1	7	1	0	5	9		3.24	14.66		8.46	5.38		2.30
26	21	22	29	20	12	30	9	9	13	9	2	0	0	7	2		3.36	14.71		8.53	5.44		2.35
26	22	4	15	15	7	17	31	20	11	41	19	0	0	4	1		3.47	14.74		8.63	5.53		2.39
26	23	9	16	8	5	18	5	3	4	28	13	0	0	0	0		3.65	14.79		8.69	5.59		2.43
27	00	9	4	4	3	1	2	0	6	17	7	0	0	6	0		3.78	14.82		8.75	5.66		2.46
27	01	2	1	1	0	2	0	0	3	9	0	0	0	3	0		3.92	14.85		8.80	5.72		2.49
27	02	3	1	0	1	6	0	0	8	5	1	0	0	1	3		4.03	14.89		8.86	5.77		2.52
27	03	5	3	2	0	1	1	0	7	4	0	1	0	0	0		4.18	14.92		8.91	5.81		2.57
27	04	0	0	2	0	3	0	0	12	2	0	0	0	1	0		4.31	14.94		8.94	5.86		2.64
27	05	1	0	0	0	0	0	0	14	0	0	0	0	0	0		4.53	14.96		9.00	5.91		2.70

Year:	PAMPANGA RIVER BASIN																						
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Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
27	06	0	0	0	0	0	0	0	7	0	0	1	0	0	0		4.61	15.03		9.06	5.97		2.75
27	07	0	0	0	0	0	0	0	1	1	1	0	0	0	0		4.66	15.09		9.09	6.03		2.78
27	08	0	0	0	0	0	0	0	1	0	0	1	0	4	1		4.74	15.13		9.12	6.08		2.81
27	09	0	0	0	0	0	0	0	0	1	0	1	0	12	1		4.93	15.11		9.15	6.16		2.83
27	10	0	0	0	0	0	0	0	4	0	0	0	0	2	0		5.01	15.17		9.19	6.24		2.83
27	11	0	0	0	0	0	0	0	0	0	0	0	17	0	2		5.06	15.21		9.22	6.31		2.81
27	12	0	0	0	7	0	2	0	11	0	0	0	0	0	0		5.02	15.25		9.26	6.37		2.77
27	13	2	2	0	0	0	1	0	0	4	0	0	0	0	1		5.02	15.26		9.29	6.43		2.74
27	14	2	0	1	0	1	0	0	44	0	0	0	0	0	0		4.89	15.26		9.32	6.47		2.71
27	15	1	5	4	0	2	0	1	0		0	0	0	0	1		4.88	15.31		9.35	6.53		2.68
27	16	0	4	0	0	0	0	0	0	1	0	1	0	0	1		4.76	15.32		9.38	6.57		2.65
27	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4.67	15.33		9.42	6.62		2.64
27	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4.48	15.36		9.46	6.66		2.65
27	19	0	0	0	0	0	0	0	15	0	0	0	0	0	0		4.41	15.35		9.51	6.71		2.66
27	20	0	1	0	1	0	0	0	11	5	1	0	0	0	0		4.31	15.37		9.54	6.76		2.69
27	21	0	0	0	0	0	0	0	14	1	1	0	0	0	0		4.20	15.39		9.58	6.79		2.73
27	22	0	0	0	1	0	0	0	12	0	1	0	0	0	0		4.06	15.37		9.61	6.83		2.78
27	23	0	0	0	0	0	0	0	12	3	2	3	0	0	0		3.98	15.38		9.66	6.86		2.84
28	00	0	0	0	0	0	0	0	5	0	5	0	1	0	0		3.84	15.35		9.69	6.86		2.90
28	01	0	0	0	0	0	0	0	7	0	0	1	0	0	0		3.71	15.38		9.72	6.86		2.96
28	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3.60	15.32		9.75	6.86		3.01
28	03	0	0	0	0	0	0	0	7	0	0	0	0	0	0		3.52	15.34		9.77	6.86		3.05
28	04	0	0	0	0	0	0	0	1	0	0	0	0	0	0		3.38	15.33		9.81	6.86		3.10
28	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3.29	15.36		9.82	6.86		3.17
28	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3.19	15.33		9.86	6.86		3.22
28	07	0	0	0	0	0	0	0	0	0	0	0	0	1	0		3.08	15.30		9.87	6.86		3.26
28	08	0	0	0	0	0	0	0	1	0	0	0	0	0	0		3.00	15.30		9.91	6.86		3.30

Year:	PAMPANGA RIVER BASIN																						
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Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
28	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.83	15.26		9.95	6.86		3.33
28	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.70	15.26		9.94	6.86		3.36
28	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.59	15.24		9.96	6.86		3.38
28	12	4	0	1	0	0	0	0	1	0	0	0	0	0	0		2.47	15.24		9.97	6.86		3.38
28	13	0	0	0	0	0	0	0	3	0	0	0	0	0	0		2.25	15.21		9.97	7.24		3.39
28	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.19	15.17		10.00	7.26		3.42
28	15	0	0	0	0	0	0	0	0	0	0	2	0	0	0		2.07	15.21		10.01	7.29		3.48
28	16	0	0	0	2	0	0	0	0	0	0	0	0	0	0		1.96	15.15		10.01	7.33		3.57
28	17	0	0	0	1	0	0	0	0	0	0	0	0	0	0		1.85	15.13		10.02	7.31		3.64
28	18	15	0	0	0	0	0	0	0	0	0	0	0	0	0		1.73	15.12		10.02	7.33		3.71
28	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.66	15.12		10.01	7.34		3.78
28	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.56	15.09		10.00	7.35		3.84
28	21	0	0	0	0	0	0	0	26	0	0	0	0	0	0		1.50	15.09		10.01	7.36		3.89
28	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.41	15.06		9.99	7.36		3.95
28	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.38	15.04		9.98	7.37		4.00
29	**00**	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.31	15.03		9.96	7.37		4.04
29	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.26	15.01		9.96	7.38		4.08
29	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.20	15.00		10.00	7.38		4.12
29	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.15	14.98		9.93	7.38		4.15
29	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.10	14.99		9.90	7.38		4.18
29	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.08	14.95		9.89	7.38		4.21
29	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	? 1.27	1.05	14.93		9.87	7.37		4.25
29	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	? 1.27	~~1.30~~	14.93		9.85	7.37		4.27
29	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?	~~1.50~~	14.91		9.83	7.36		4.29
29	**09**	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.81	14.90		9.83	7.35		4.30
29	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.89	14.87		9.80	7.35		4.32
29	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.86	14.89		9.79	7.35		4.33

Year:	PAMPANGA RIVER BASIN																						
2004	Telemeterized Rainfall and Water Level Data																						
Mo.: Aug	Rainfall Stations															Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
29	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.83	14.86		9.79	7.32		4.34
29	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.81	14.86		9.75	7.33		4.35
29	14	0	0	0	2	0	0	0	0	0	0	0	0	0	0		6.78	14.84		9.74	7.31		4.35
29	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.76	14.85		9.71	7.29		4.36
29	16	0	0	0	1	0	0	0	0	0	0	0	0	0	0	?1.17	6.75	14.83		9.70	7.28		4.37
29	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?1.17	6.72	14.82		9.66	7.26		4.38
29	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.70	14.81		9.63	7.26		4.38
29	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.69	14.80		9.61	7.25		4.38
29	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?1.17	6.66	14.79		9.59	7.23		4.39
29	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.65	14.78		9.57	7.22		4.39
29	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.63	14.77		9.55	7.21		4.39
29	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.63	14.76		9.54	7.19		4.38
30	**00**	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.63	14.75		9.51	7.17		4.39
30	01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	?1.17	6.65	14.74		9.50	7.16		4.38
30	02	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.69	14.73		9.47	7.14		4.38
30	03	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.70	14.72		9.47	7.13		4.38
30	04	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.69	14.71		9.45	7.11		4.37
30	05	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.67	14.70		9.42	7.09		4.36
30	06	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.66	14.69		9.40	7.08		4.35
30	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.65	14.68		9.40	7.06		4.35
30	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.63	14.68		9.37	7.05		4.34
30	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.58	14.67		9.34	7.03		4.33
30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.57	14.66		9.33	7.01		4.32
30	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.56	14.64		9.32	7.00		4.32
30	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.53	14.62		9.28	6.98		4.31
30	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.51	14.63		9.27	6.97		4.29
30	14	0	0	0	0	0	0	0	0	3	0	0	0	0	0		6.51	14.64		9.25	6.96		4.28

Year:		PAMPANGA RIVER BASIN																					
2004		Telemeterized Rainfall and Water Level Data																					
Mo.:	Aug	Rainfall Stations														Water Level Stations							
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
30	15	0	0	0	0	0	0	0	0	0	1	0	0	0	0		0.50	14.60		9.24	6.94		4.26
30	16	0	0	0	0		0	0	0	0	0	0	0	0	0		0.46	14.59		9.22	6.92		4.24
30	17	0	0	0	0		0	0	0	0	0	0	0	0	0		0.45	14.59		9.20	6.91		4.22
30	18	0	0	0	0		6	2	0	0	0	0	0	0	0		0.41	14.58		9.17	6.90		4.19
30	19	0	0	0	0		0	0	0	0	0	0	0	0	0		0.41	14.57		9.15	6.88		4.18
30	20	0	0	0	0		0	0	0	0	0	0	0	0	0		0.38	14.57		9.12	6.87		4.16
30	21	0	0	0	0		1	0	0	0	0	0	0	0	0		0.36	14.56		9.10	6.87		4.14
30	22	0	0	0	0		0	0	0	0	0	0	0	0	0		0.35	14.56		9.07	6.87		4.12
30	23	0	0	0	0		1	0	0	0	0	0	0	0	0		0.34	14.55		9.08	6.87		4.11
31	**00**	0	0	0	0		0	0	0	0	0	0	0	0	0		0.32	14.54		9.04	6.87		4.09
31	01	0	0	0	0		0	0	0	0	0	0	0	0	0		0.30	14.54		9.02	6.87		4.08
31	02	0	0	0	0		0	0	0	0	0	0	0	0	0		0.30	14.53		8.98	6.87		4.06
31	03	0	0	0	0		0	0	0	0	0	0	0	0	0		0.29	14.52		8.96	6.87		4.05
31	04	0	0	0	0		0	0	0	0	0	0	0	0	0		0.27	14.52		8.94	6.87		4.03
31	05	0	0	0	0		0	0	0	0	0	0	0	0	0		0.26	14.51		8.91	6.87		4.01
31	06	0	0	0	0		0	0	0	0	0	0	0	0	0		0.26	14.51		8.88	6.87		3.99
31	07	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.25	14.50		8.87	6.87		3.98
31	08	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.24	14.49		8.84	6.87		3.96
31	09	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.24	14.49		8.81	6.87		3.95
31	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.23	14.48		8.79	6.87		3.95
31	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.23	14.48		8.76	6.87		3.94
31	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.21	14.47		8.74	6.87		3.93
31	13	0	0	0	0	0	0		0		0	0	0	0	0		0.21	14.46		8.72			3.92
31	14	0	0	0	0		0		19		0	1	1	0	0		0.20			8.70			3.90
31	15	1	0	1	0		0		3		0	2	13		5		0.19			8.68			3.89
31	16	0	13	2	1		18		1		1	1	2	13	1		0.21			8.66			3.87
31	17	0	0	2	1		8		2		6	1	1	2	2		0.21			8.64			3.85

Year:	PAMPANGA RIVER BASIN																					
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Mo.: Aug	Rainfall Stations															Water Level Stations						
Day	Time (0000)	Munoz	Sapang Buho	Mayapyap	Gabaldon	Zaragoza	Papaya	San Isidro	Arayat	Candaba	Sibul Spring	Sasmuan	Sulipan	Ipo Dam	San Rafael	Sapang Buho	Mayapyap	Zaragoza	San Isidro	Arayat	Candaba	Sexmoan	Sulipan
31	18	1	0	0	1		1		0		2	0	0	2	2		0.21			8.62	6.87		3.82
31	19	0	1	1	1		1		0		0	0	0	1	0		0.21			8.60			3.80
31	20	4	0	0	1		1	1	0	1	1	0	0	1	0		0.21			8.58	6.87		3.78
31	21	1	0	1	0		0	0	1	0	0	0	0	0	0		0.26			8.56	6.87		3.76
31	22	0	0	0	0		0		0	0	0	0	1	0	0		0.31			8.54	6.87		3.74
31	23	0	0	0	0		0		0	0	0	0	0	0	0		0.39			8.52	6.87		3.73
1	**00**								0		0	0											
1	01								0		0	0											
1	02								0		0	0											
1	03								0		0	0											
1	04								0		0	0											
1	05								0		0	0											
1	06								0		0	0											
1	07								0		0	0											
1	08								0		0	0											