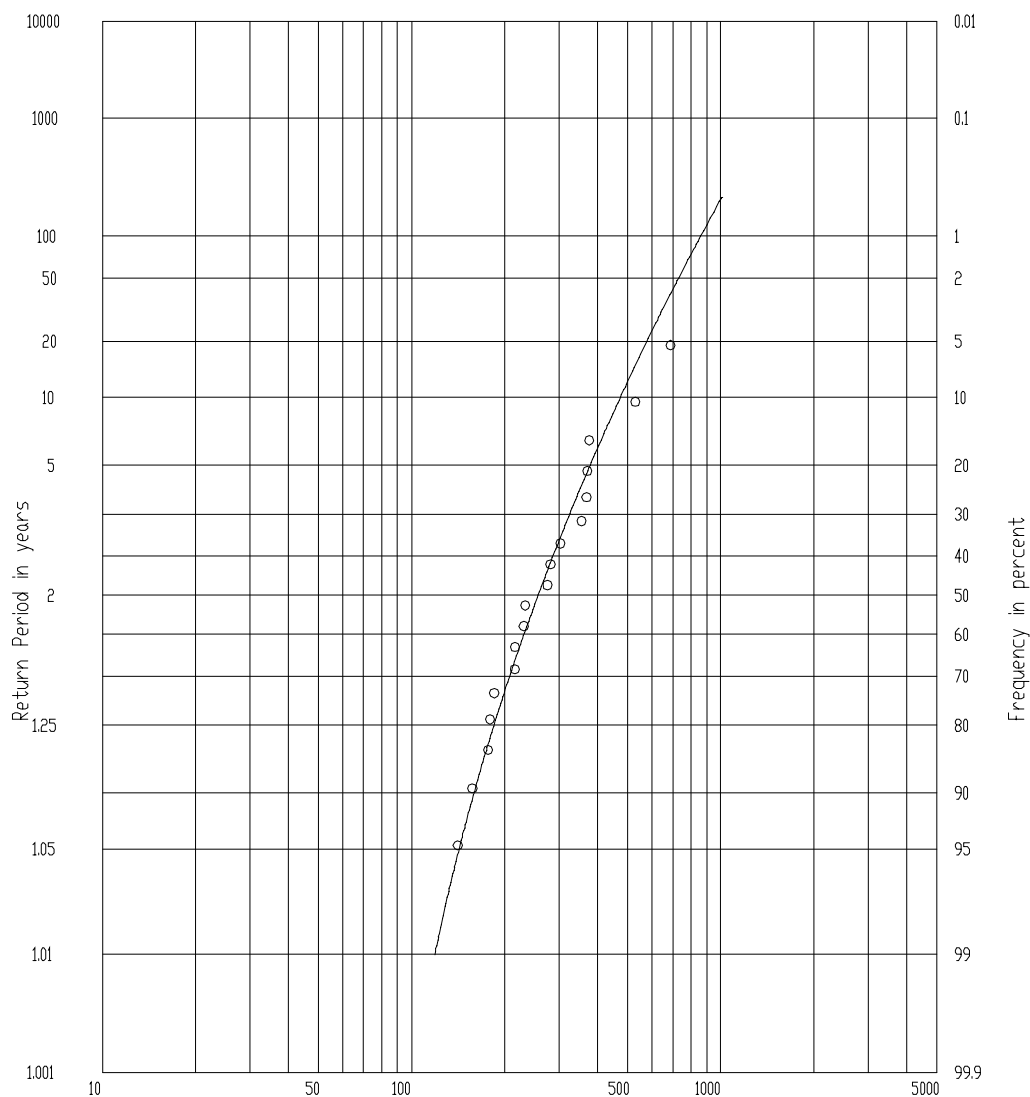


Stream ; Bucao River Drainage Area ; 6 55 Sq. km

Kind of Record ; Rainfall

Period of Record ; 1976-1995



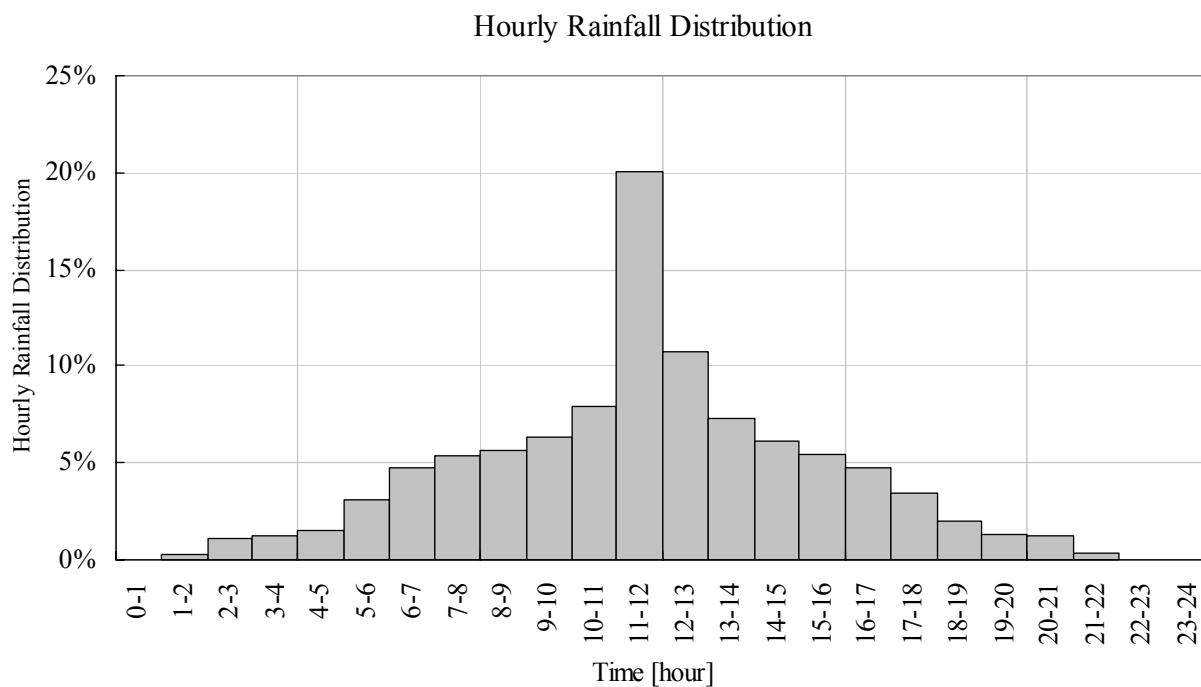
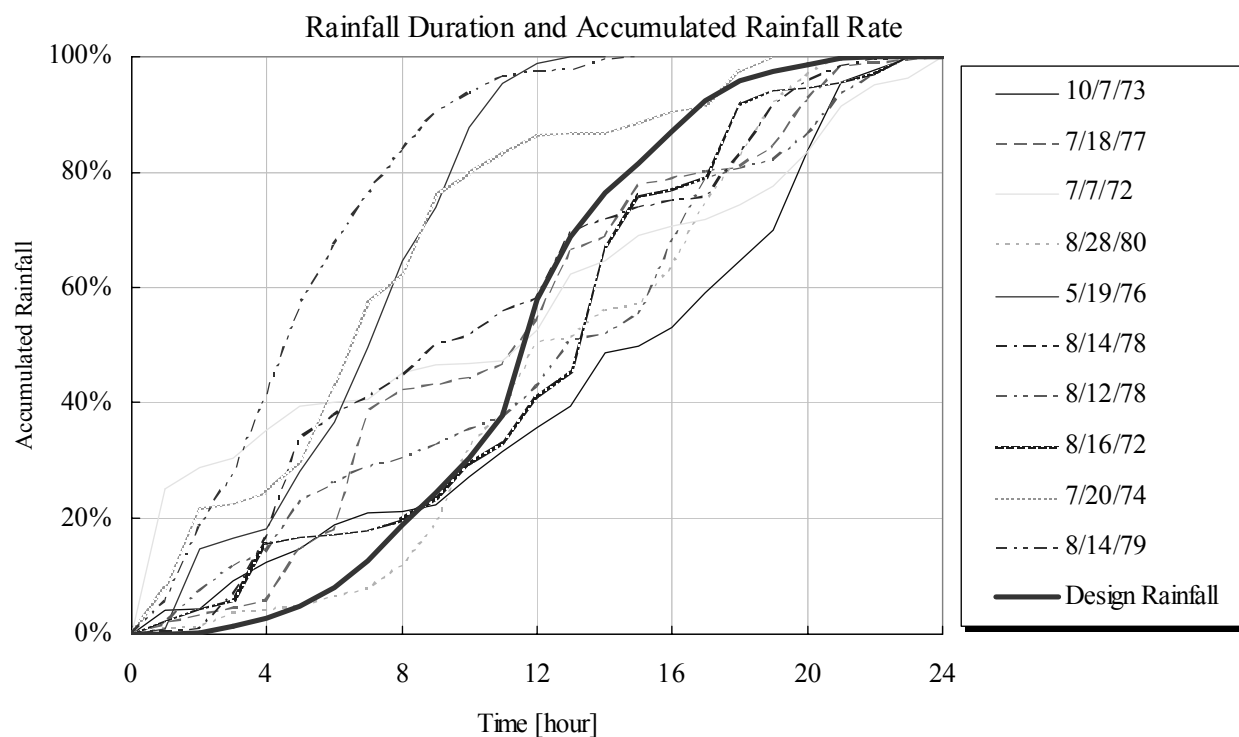
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Figure 5.1.3

**Probable Rainfall Distributions
(Log-Pearson III)**

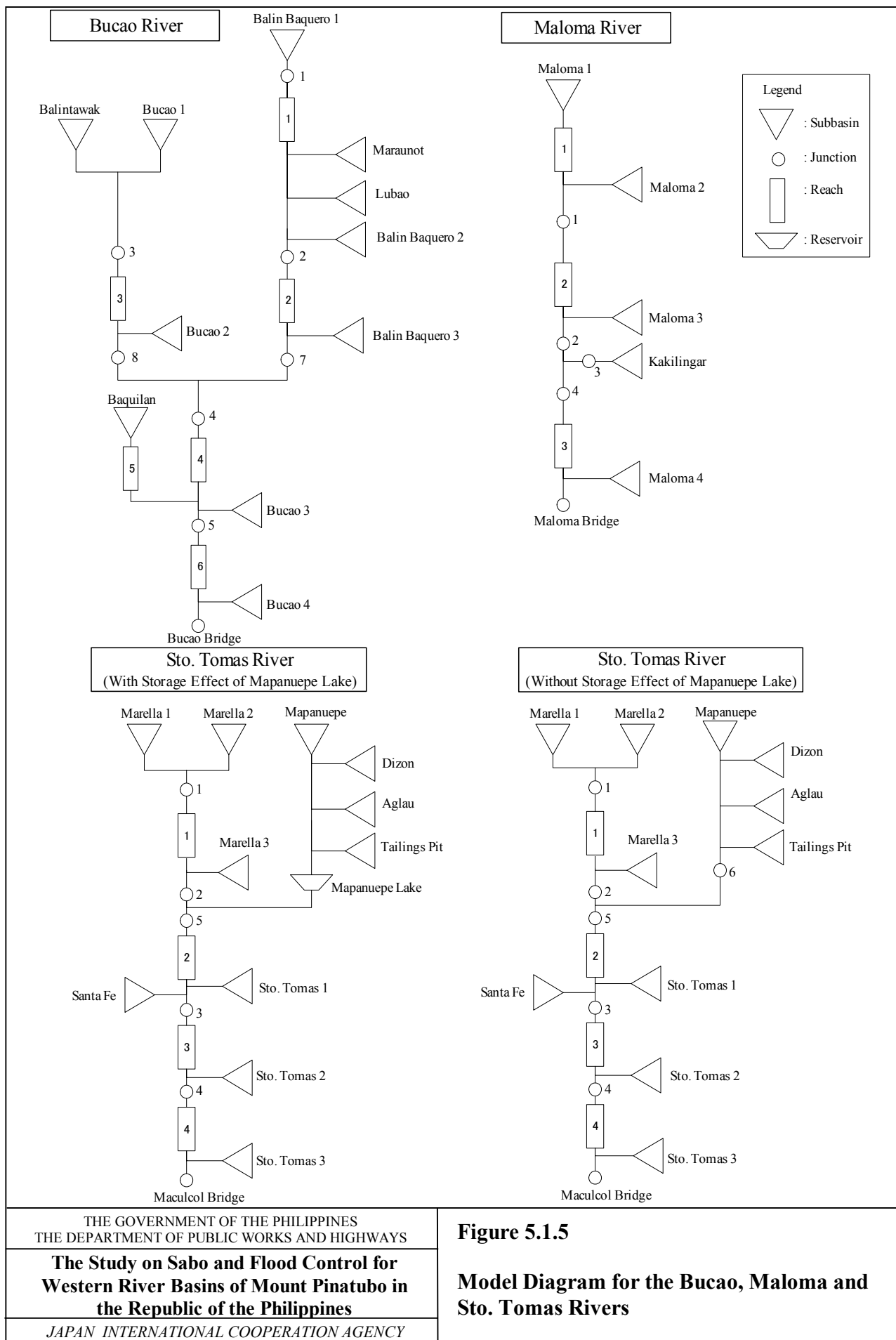


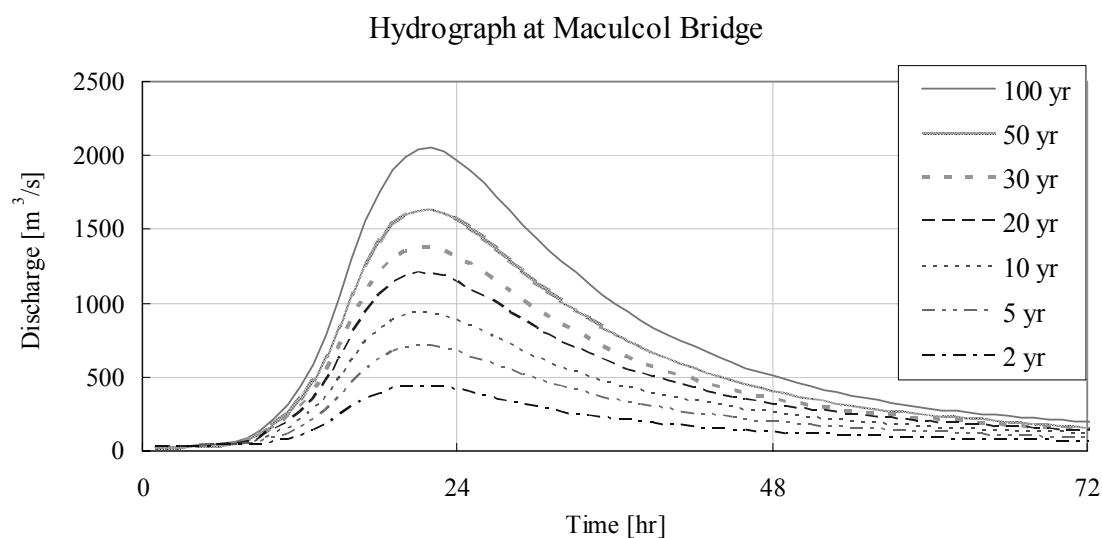
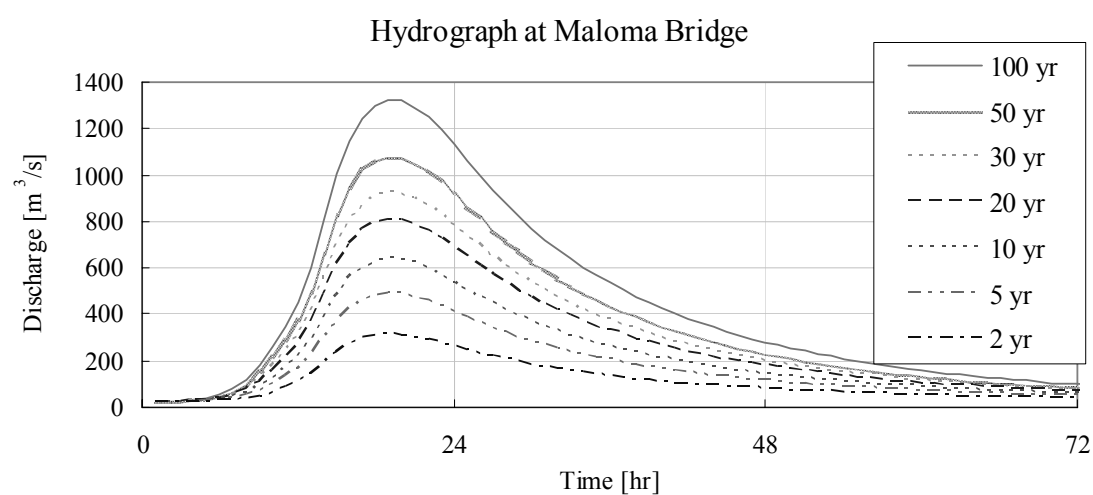
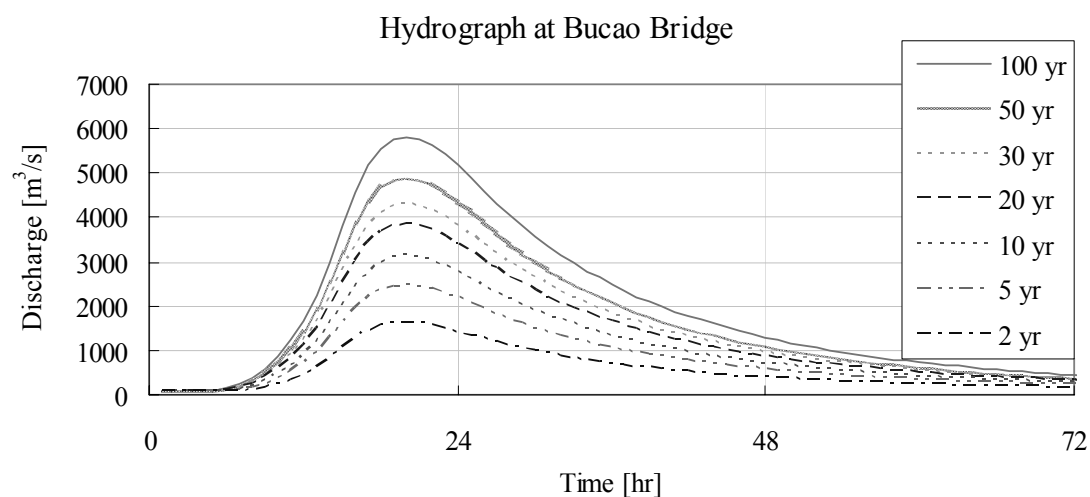
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Figure 5.1.4
Model Hyetograph





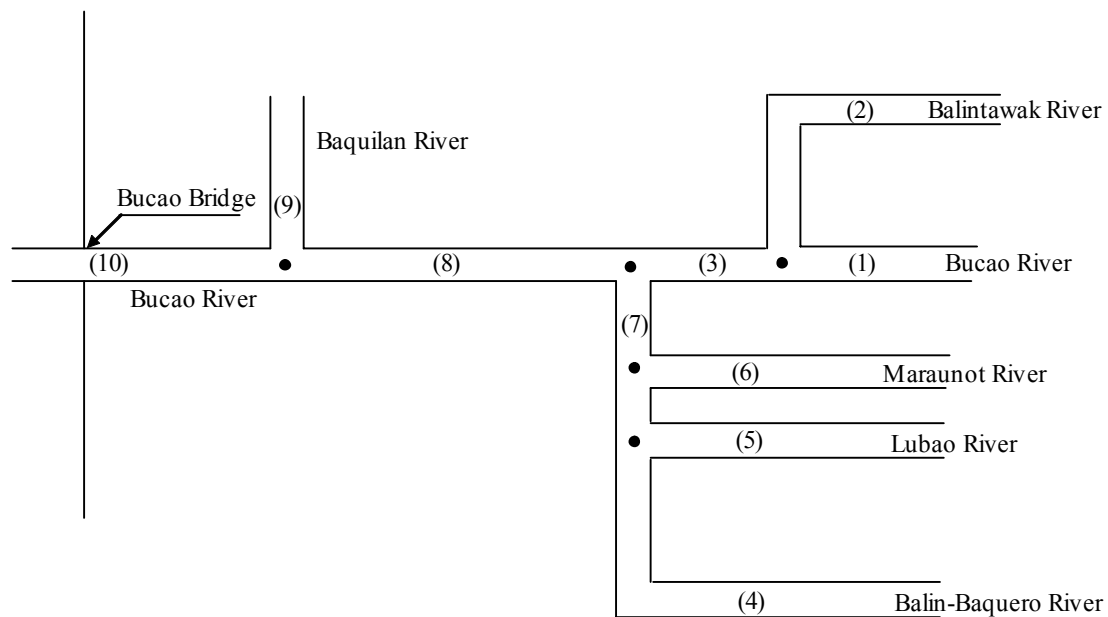
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Figure 5.1.6

**Flood Hydrographs for the Bucao, Maloma
and Sto. Tomas Rivers**



Probable Peak Discharge (m^3/s)

Reach	Return Period (year)						
	2	5	10	20	30	50	100
(1)	210	310	400	490	540	620	740
(2)	350	520	660	820	910	1,000	1,200
(3)	550	830	1,100	1,300	1,400	1,700	2,000
(4)	190	290	370	250	510	580	690
(5)	160	240	310	380	420	480	570
(6)	40	60	80	100	110	130	150
(7)	660	1,000	1,300	1,500	1,700	2,000	2,300
(8)	1,300	1,900	2,400	2,900	3,300	3,800	4,400
(9)	180	290	350	440	490	560	660
(10)	1,600	2,500	3,100	3,800	4,300	4,900	5,800

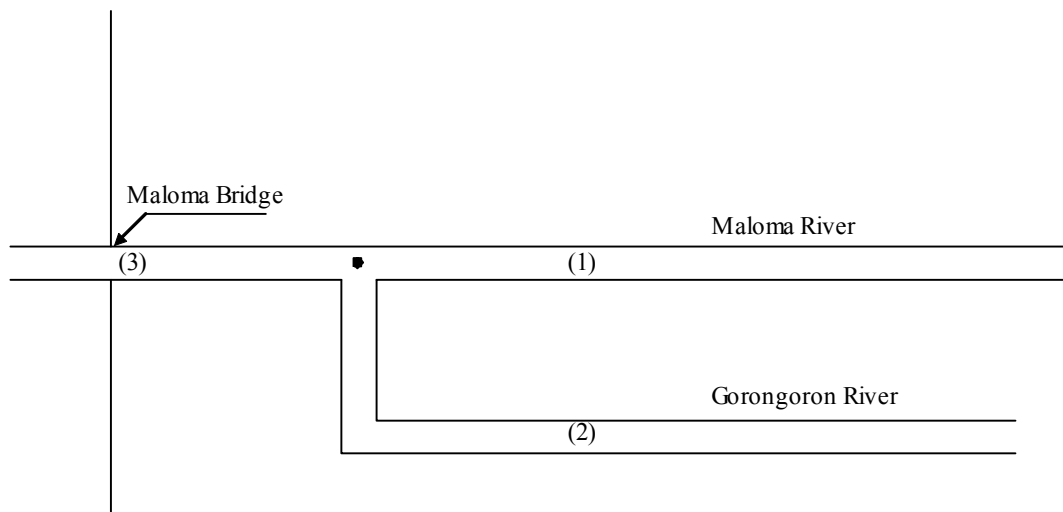
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Figure 5.1.7

**Flow Distribution Diagram for the Bucao
River**



Probable Peak Discharge (m ³ /s)							
Reach	Return Period (year)						
	2	5	10	20	30	50	100
(1)	220	350	450	570	650	770	940
(2)	60	100	130	160	190	220	270
(3)	310	490	640	810	920	1,100	1,300

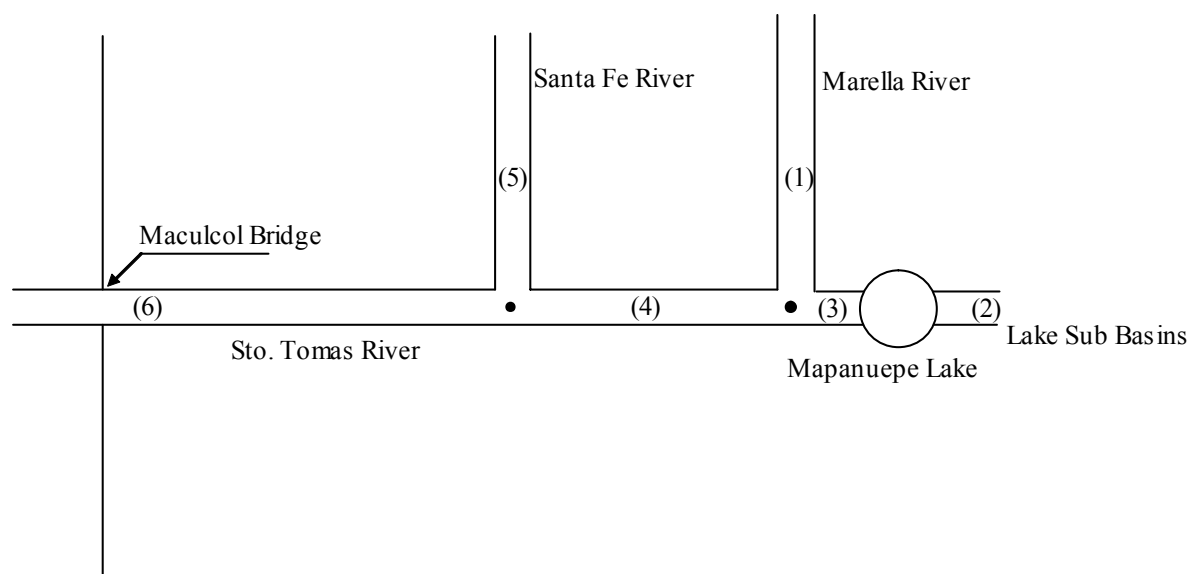
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Figure 5.1.8

**Flow Distribution Diagram for the Maloma
River**



Probable Peak Discharge (m^3/s)

a. With Retarding Effect of Mapanuepe Lake

Reach	Return Period (year)						
	2	5	10	20	30	50	100
(1)	260	400	530	680	780	900	1,100
(2)	390	610	800	1,000	1,200	1,400	1,700
(3)	80	140	180	250	300	370	480
(4)	310	500	670	860	990	1,200	1,500
(5)	60	100	130	160	190	220	270
(6)	440	710	940	1,200	1,400	1,600	2,000

b. Without Retarding Effect of Mapanuepe Lake

Reach	Return Period (year)						
	2	5	10	20	30	50	100
(1)	260	400	530	680	780	900	1,100
(2)	390	610	800	1,000	1,200	1,400	1,700
(3)	390	610	800	1,000	1,200	1,400	1,700
(4)	620	980	1,300	1,600	1,900	2,200	2,700
(5)	60	100	130	160	190	220	270
(6)	730	1,200	1,500	1,900	2,200	2,600	3,200

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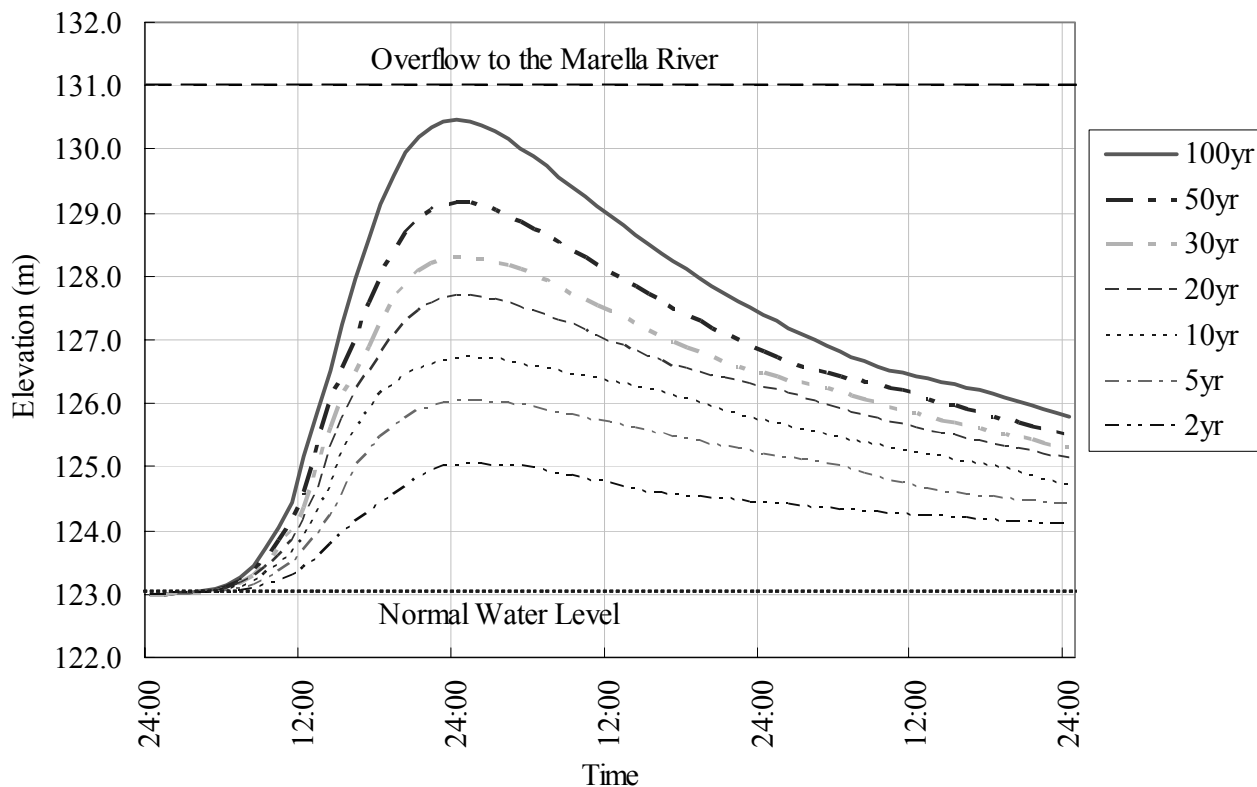
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Figure 5.1.9

**Flow Distribution Diagram for the Sto. Tomas
River**

Water Level of Mapanuepe Lake during Probable Flood



	Unit (m)						
	Return Period						
	2yr	5yr	10yr	20yr	30yr	50yr	100yr
Normal (El.)	123.0						
Highest (El.)	125.0	126.0	126.7	127.7	128.3	129.2	130.5
Water Rise	2.0	3.0	3.7	4.7	5.3	6.2	7.5

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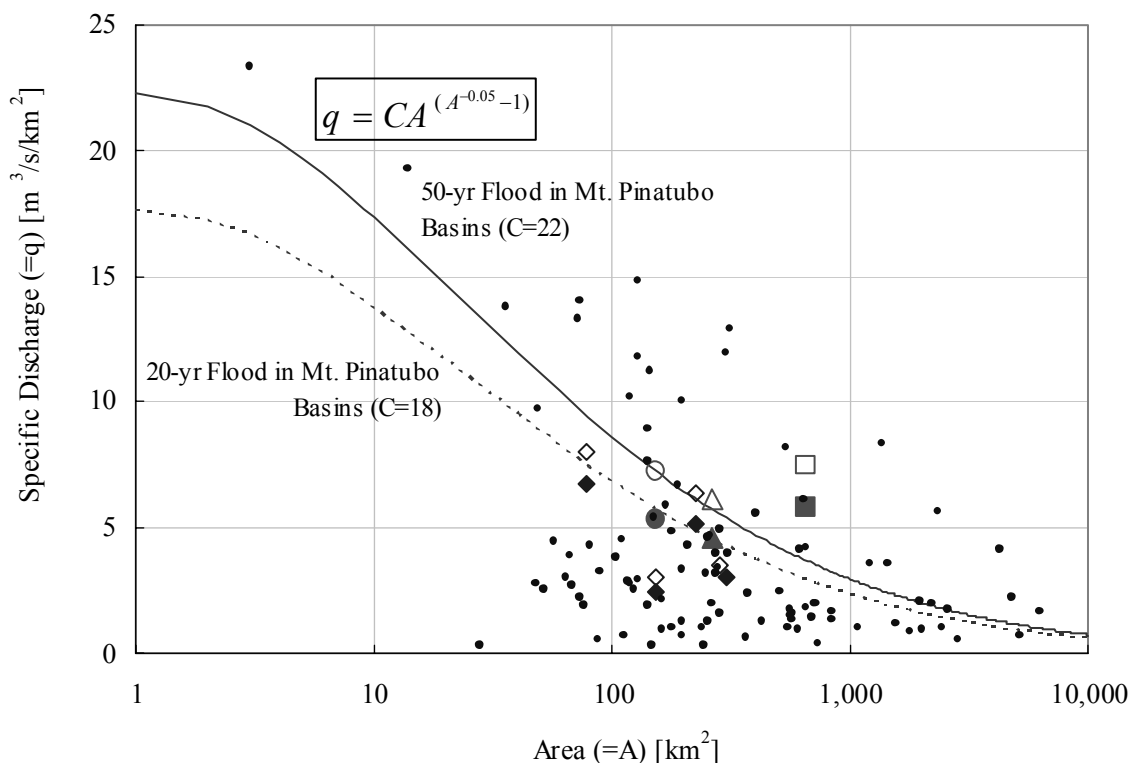
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Figure 5.1.10

**Simulated Maximum Water Level of
Mapanuepe Lake**

Catchment Area and Specific Discharge



■ Bucao 20yr	● Maloma 20yr	▲ Sto. Tomas 20yr
□ Bucao 50yr	○ Maloma 50yr	△ Sto. Tomas 50yr
◆ Other Mt.Pina Basins 20yr	◇ Other Mt.Pina Basins 50yr	• Rivers in the Philippines

Basin	Area (km ²)	Specific Discharge		Creager's C-Value	
		20-yr	50-yr	20-yr	50-yr
Sacobia-Bamban	225	5.2	6.3	19	23
Abacan	77	6.7	8.0	16	19
Porac-Gumain	302	3.0	-	12	-
Pasig-Potrero	154	2.5	3.0	8	9
O'Donnell	283	-	3.5	-	14
Bucao	655	5.8	7.5	35	45
Maloma	152	5.3	7.2	16	22
Sto. Tomas	262	4.6	6.1	18	24
Average (around Mt. Pinatubo)	264	4.7	6.0	18	22

Source: The Study on Flood and Mudflow Control for Sacobia-Bamban/Abacan River Draining from Mt. Pinatubo, 1996
 Monitoring and Planning of Flood Control Works on the Pasac Delta (including Porac-Gumain River) and Third River Channel, 2002
 Pinatubo Hazard Urgent Mitigation Project Part III monitoring and Planning on Lahar/Mudflow Control Works in Pasig-Potrero River Basin, 1998
 The Detailed Engineering Design of the Urgent Rehabilitation and Improvement Works for Agno River Flood Control Project, 1994

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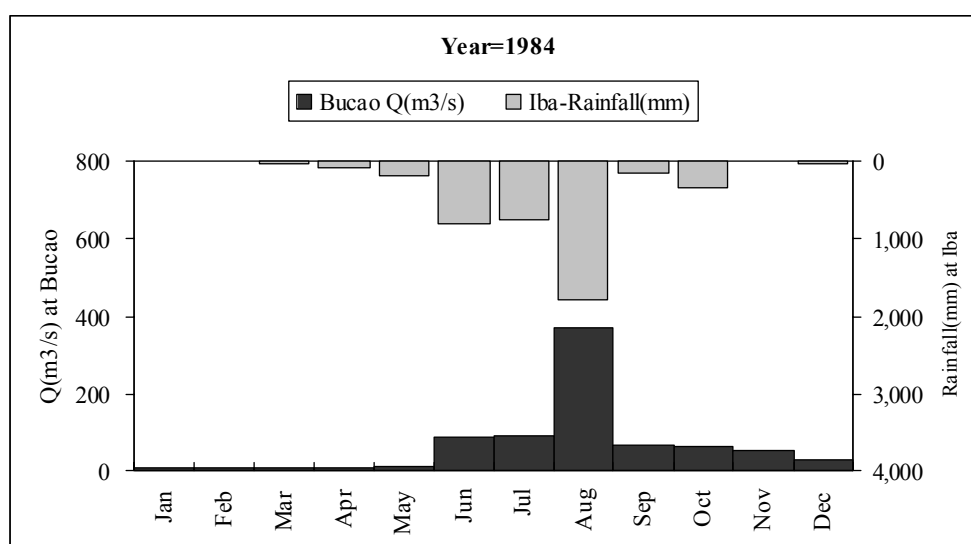
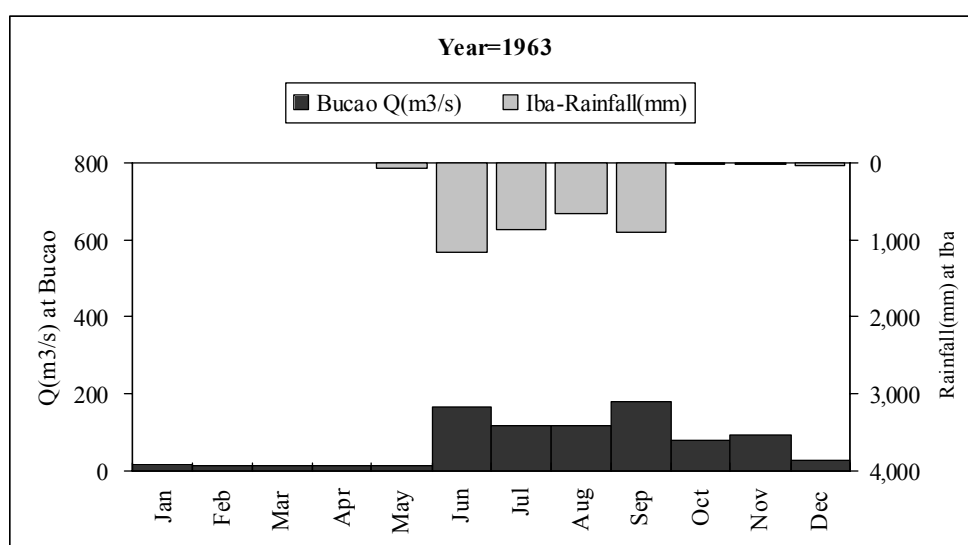
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Figure 5.1.11

Regional Specific Discharge

Month	1963		1984	
	Rainfall(Iba) (mm)	Discharge (m ³ /s)	Rainfall(Iba) (mm)	Discharge (m ³ /s)
Jan	0.0	15.2	0.0	9.3
Feb	1.1	13.4	0.0	9.1
Mar	0.0	12.4	16.7	9.1
Apr	1.5	11.3	75.7	9.0
May	69.3	13.5	195.1	11.0
Jun	1,166.0	167.7	801.8	86.2
Jul	880.3	118.4	738.4	91.2
Aug	673.2	116.8	1,787.6	369.4
Sep	891.0	180.7	135.0	67.1
Oct	30.6	77.3	326.5	62.0
Nov	20.3	93.3	10.0	53.8
Dec	50.8	23.6	20.4	28.1
Total	3,784.1		4,107.2	
Average		70.3		67.6



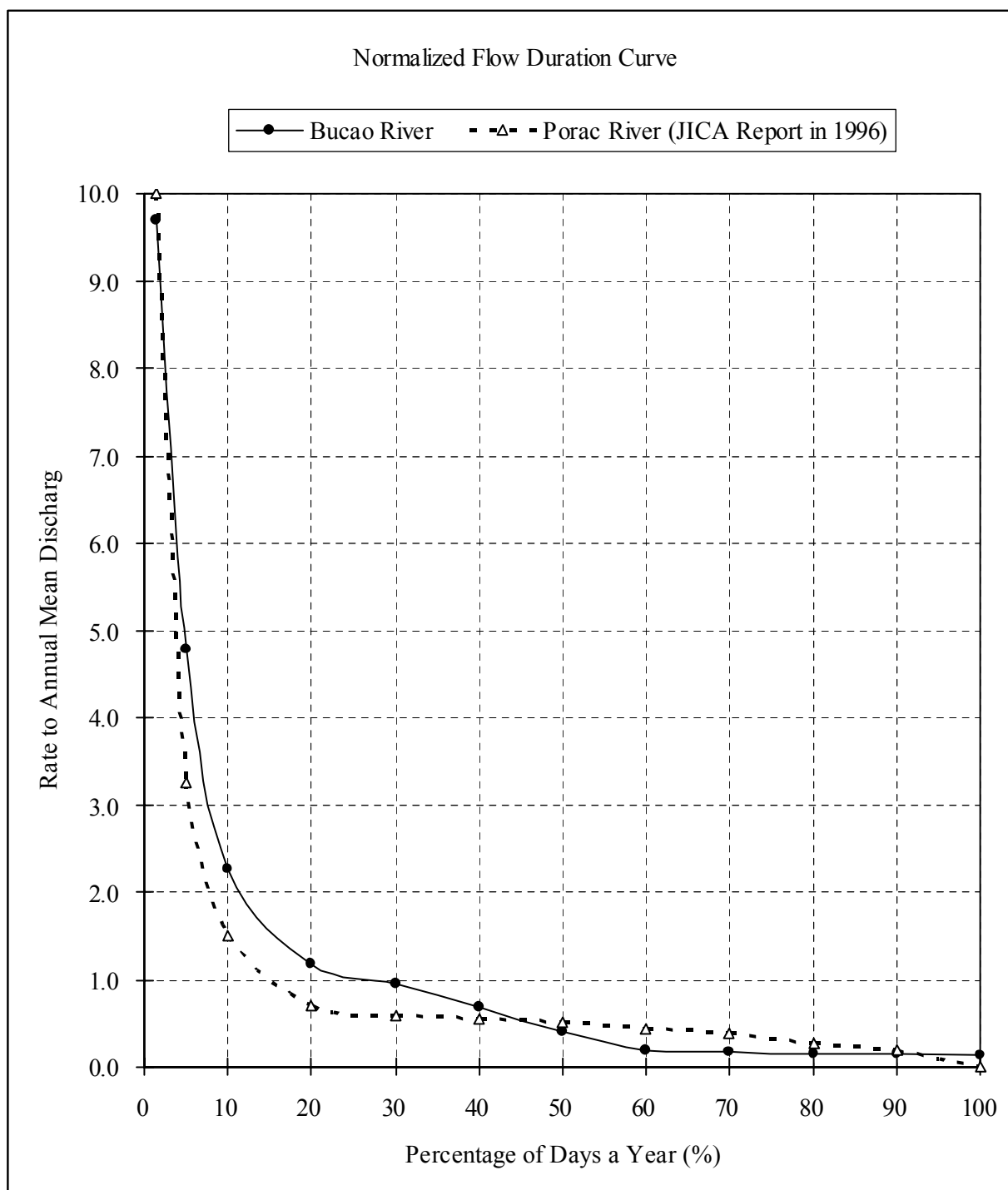
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Figure 5.2.1

**Monthly Rainfall and Discharge in the Bucao
River in 1963 and 1984**



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Figure 5.2.2

**Comparison of Normalized Flow Duration
Curves**



(1) Overflow from Maloma River
to No.7 National Highway (on Right Side)



(2) Maculcol Bridge on July 8, 2002



(3) Lahar at the Bucao Bridge (2 Hours
after Peak of Lahar Flow)



(4) Erosion of Dike at the Bucao Bridge
on July 13, 2002 (Right Bank)

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Figure 5.3.1

Pictures during Flood in July 2002