

Fig. 2.3.1 Type of Climate

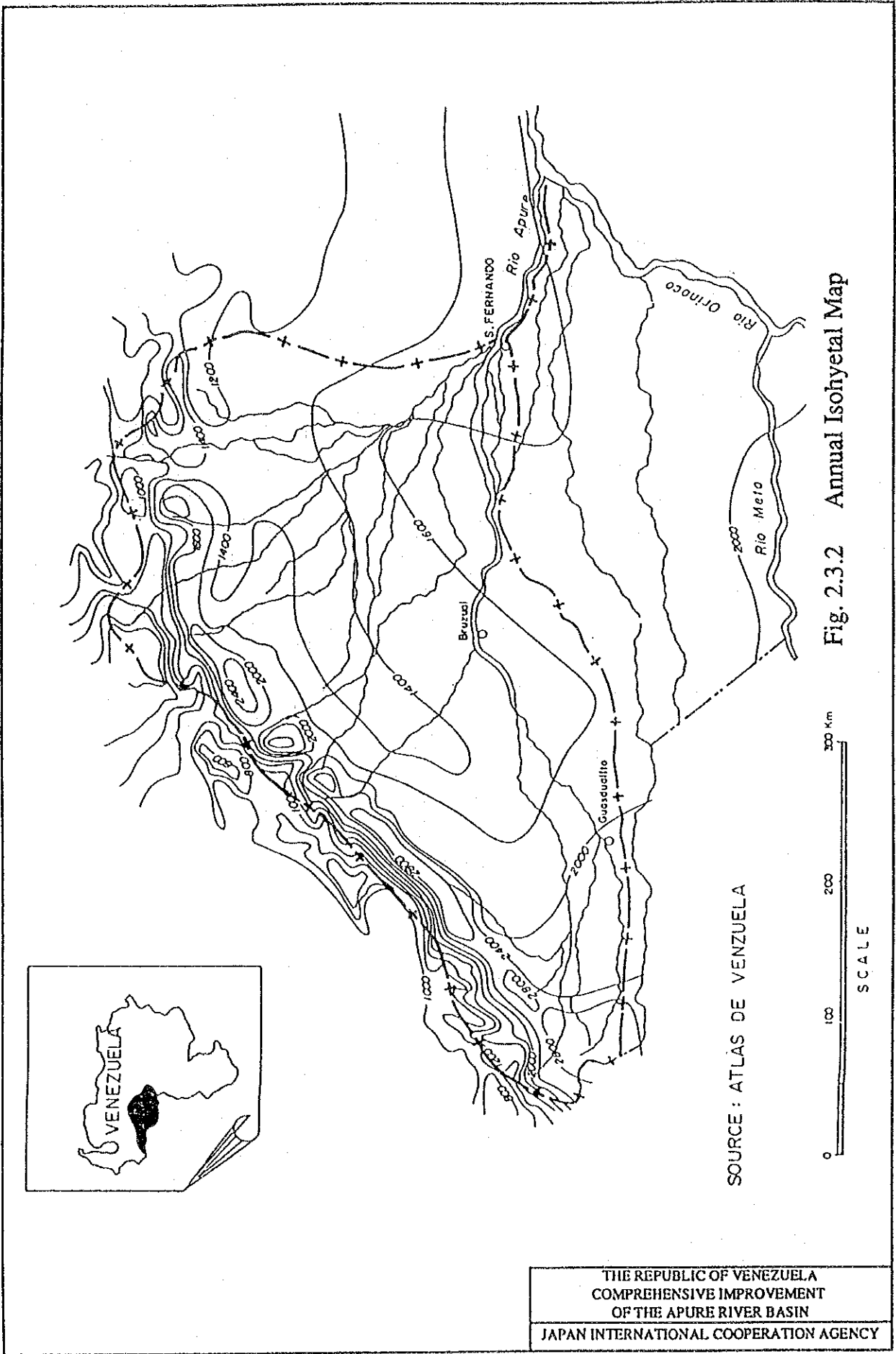


Fig. 2.3.2 Annual Isohyetal Map

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 COMPREHENSIVE IMPROVEMENT  
 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY



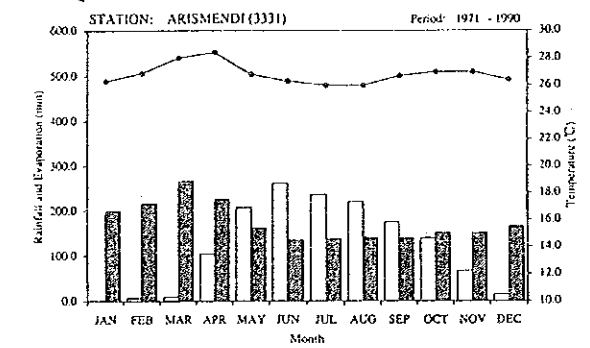
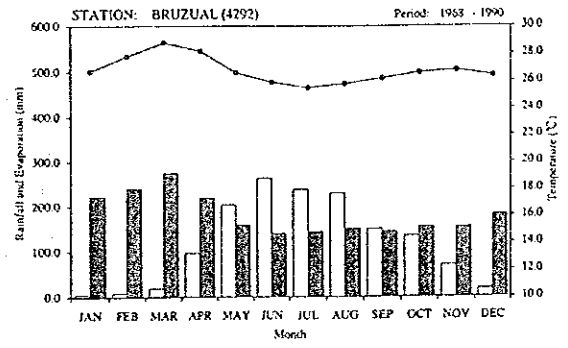
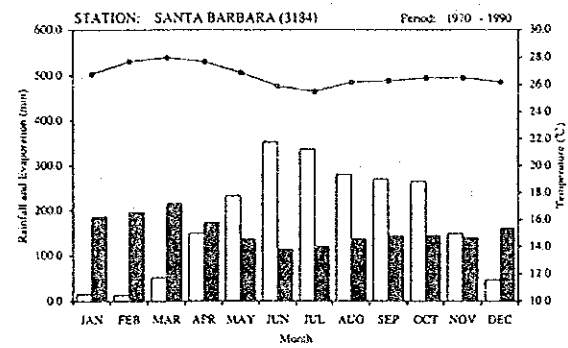
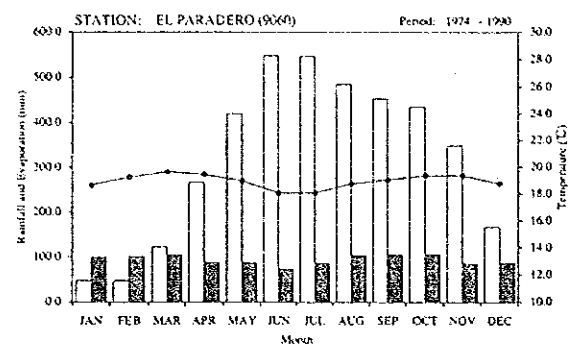
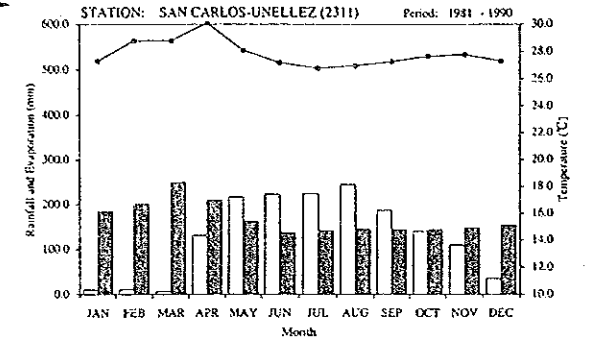
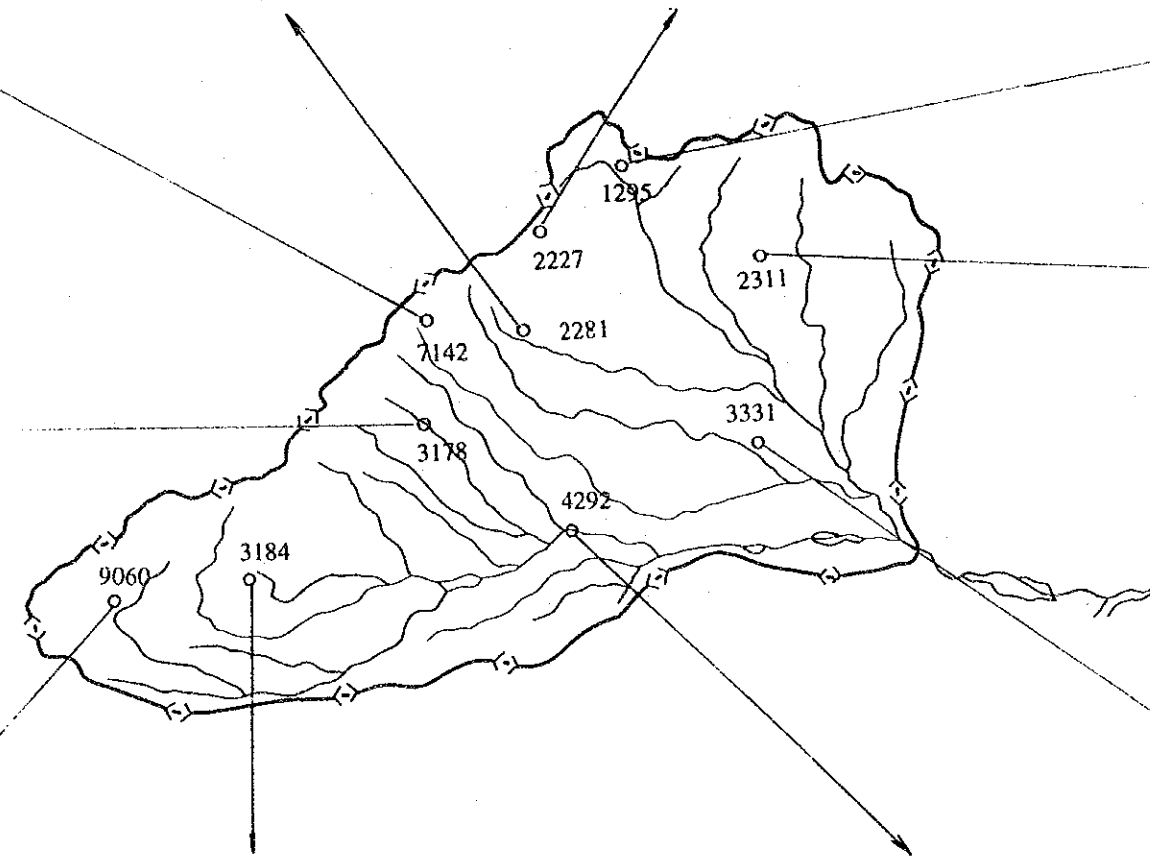
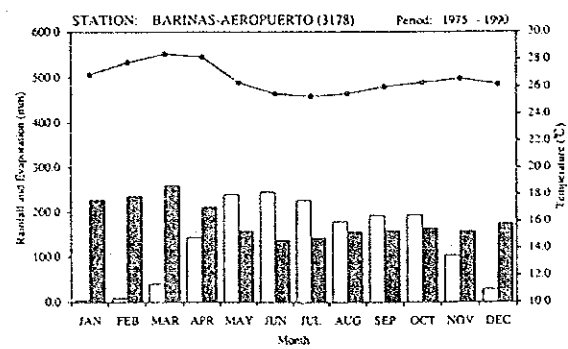
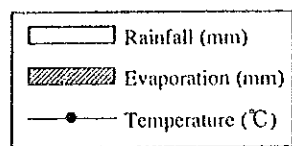
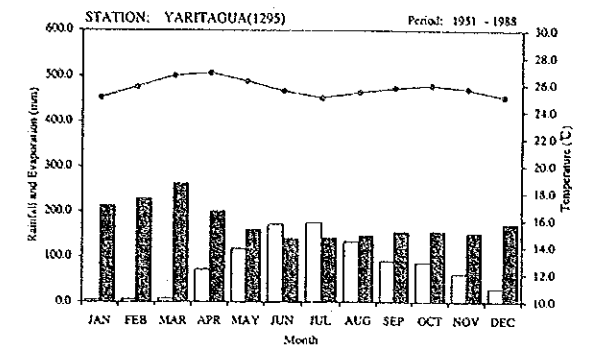
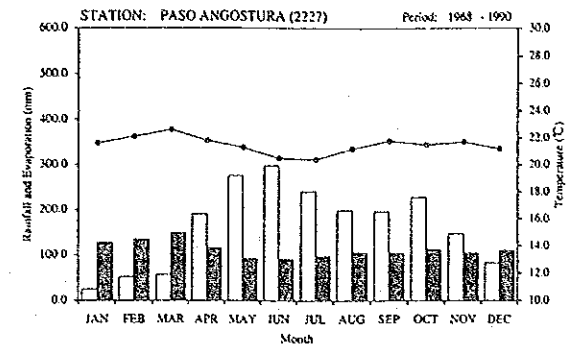
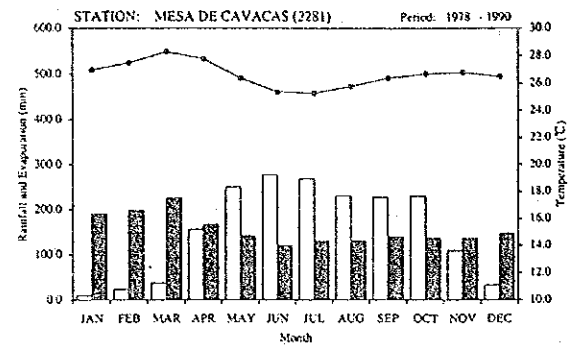
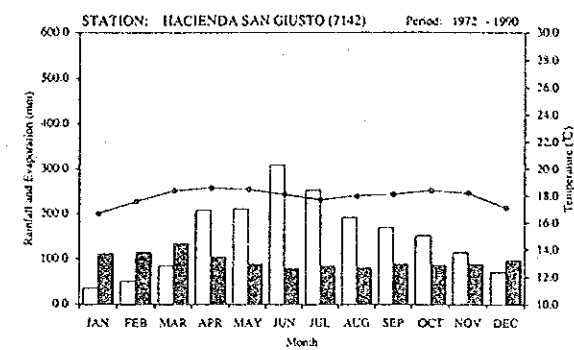


Fig. 2.3.3 Climatological Conditions (1/2)

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 OF THE APURE RIVER BASIN  
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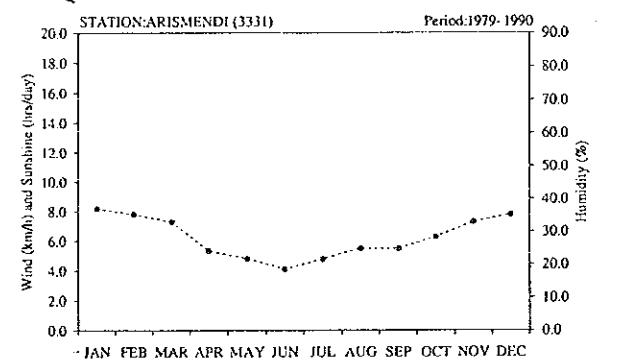
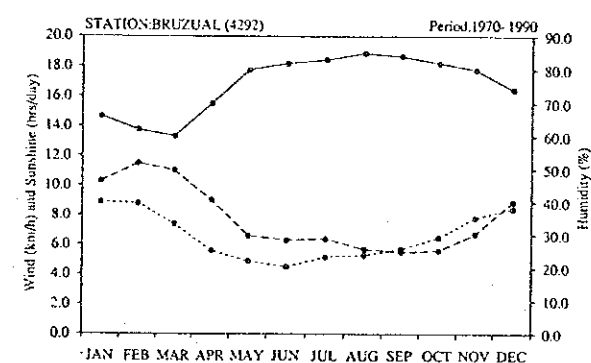
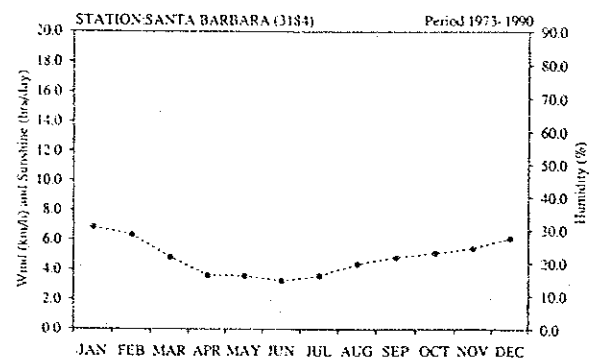
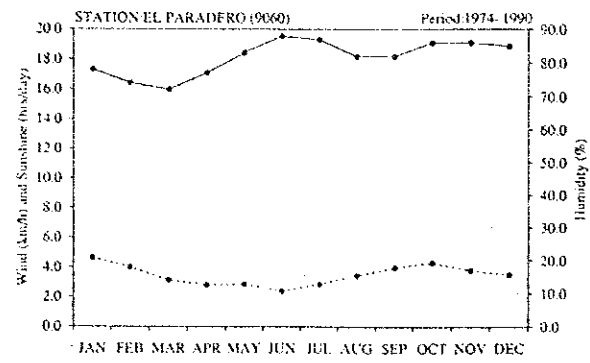
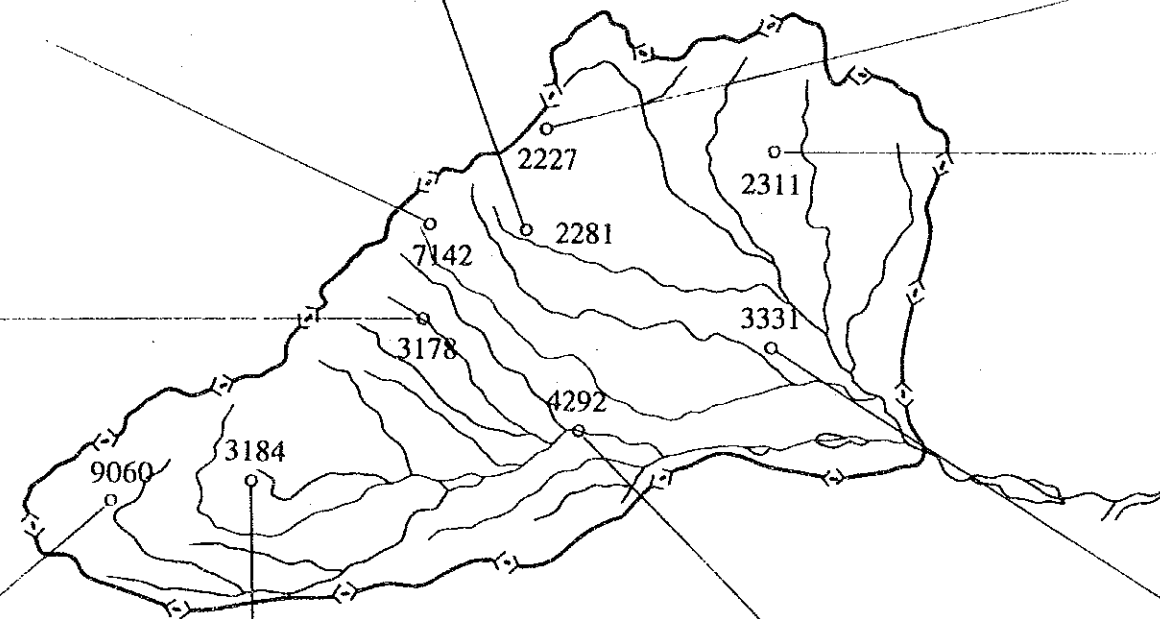
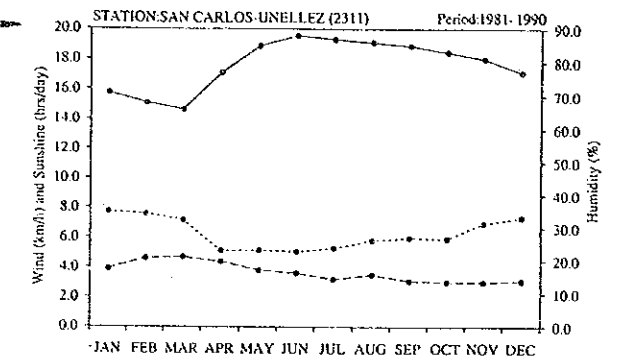
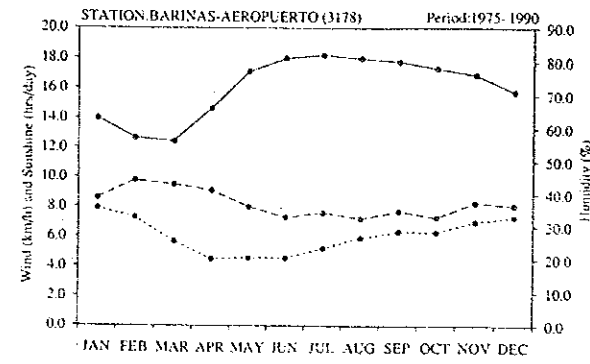
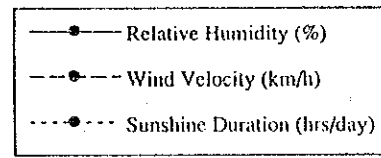
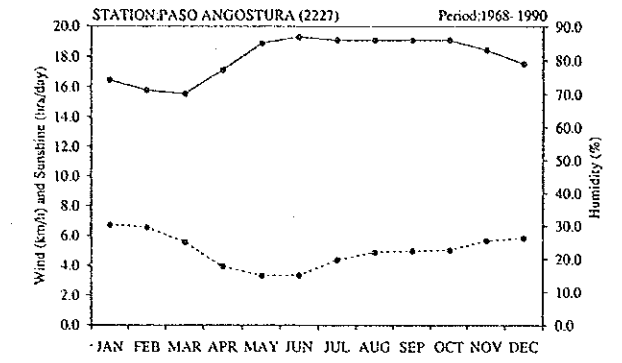
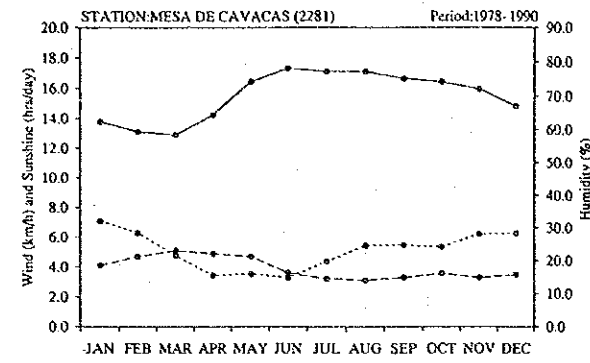
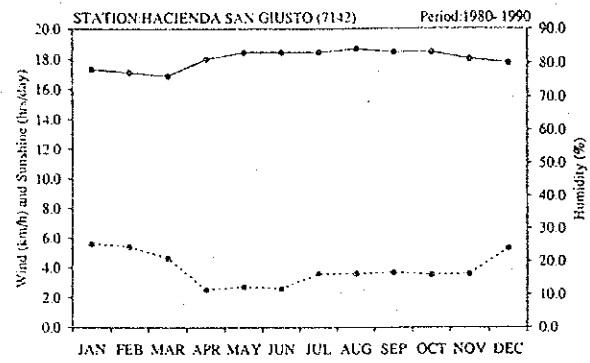


Fig. 2.3.3 Climatological Conditions (2/2)

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 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY

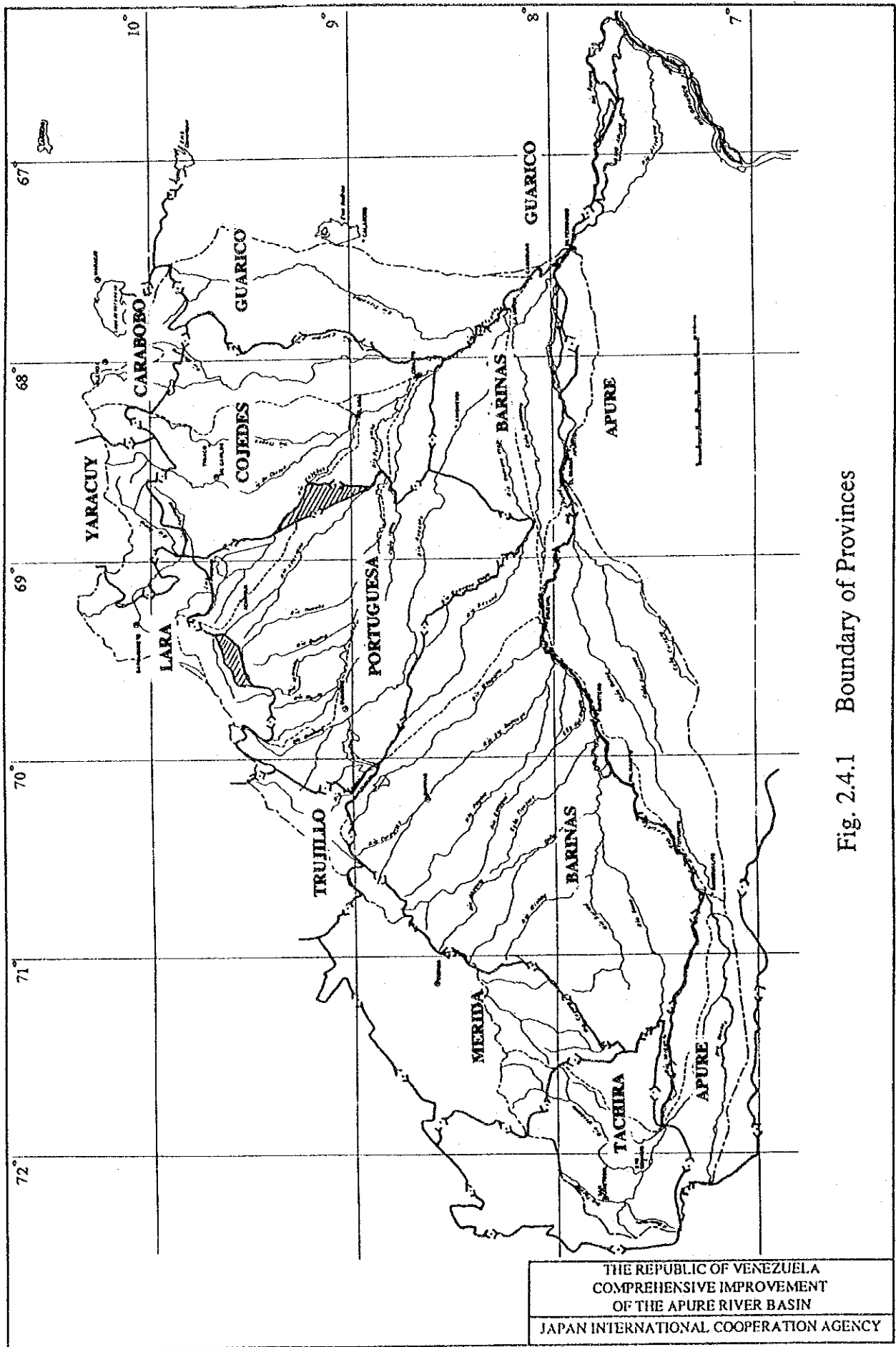


Fig. 2.4.1 Boundary of Provinces



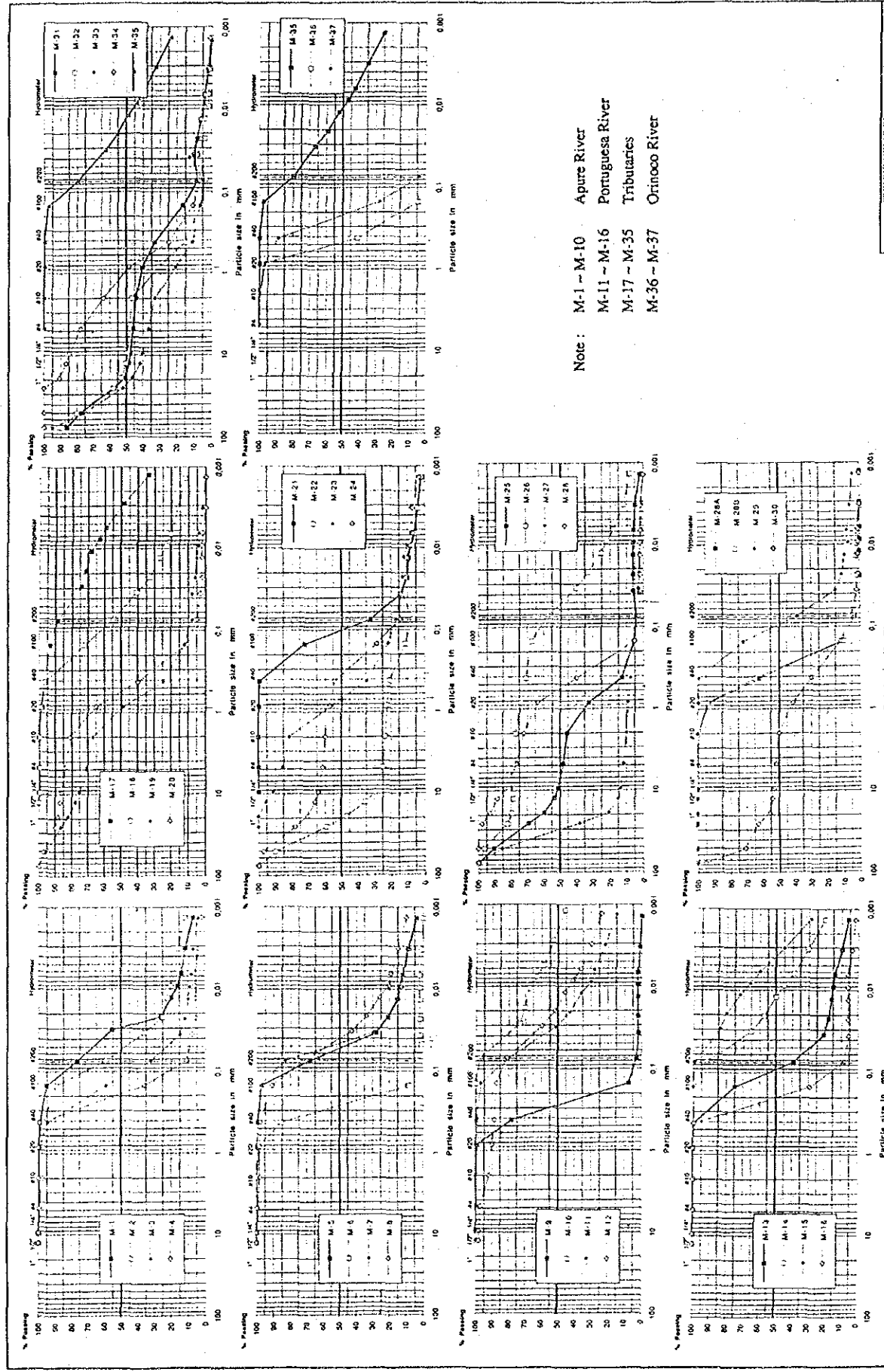










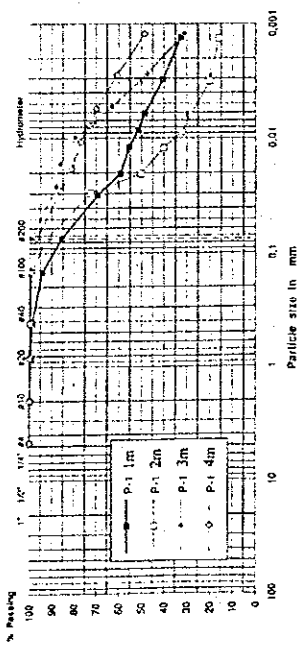


Note : M-1 - M-10 Apure River  
 M-11 - M-16 Portuguesa River  
 M-17 - M-35 Tributaries  
 M-36 - M-37 Orinoco River

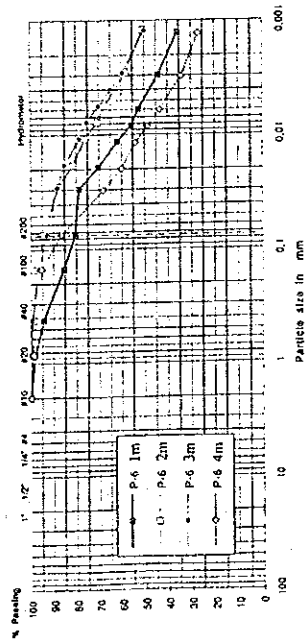
Fig. 3.2.3 Grain Size Distribution Curves of River Bed Material

(a) Apure River

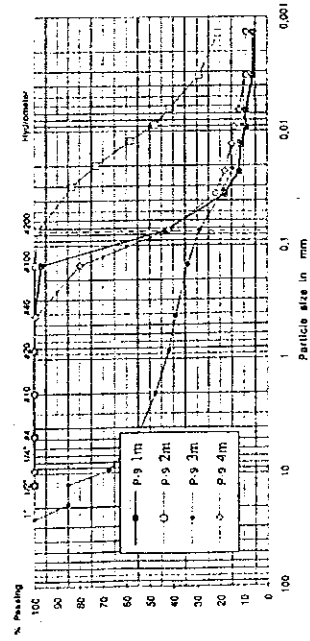
P-1 Puente Remolino



P-6 Bruzual

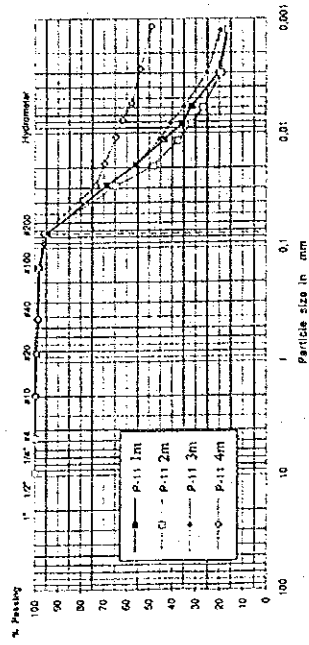


P-9 San Fernando

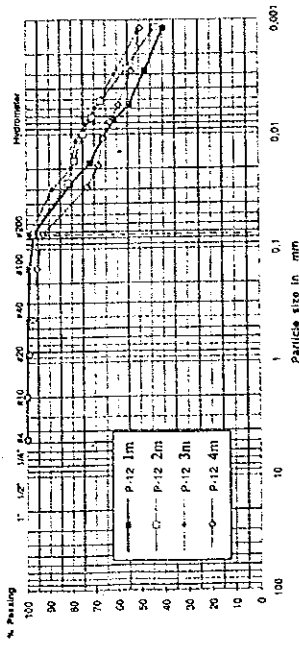


(b) Portuguesa River

P-11 El Baul



P-12 Socoro



P-13 Camaguan

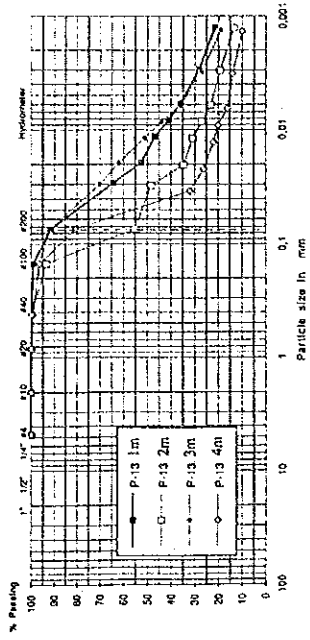
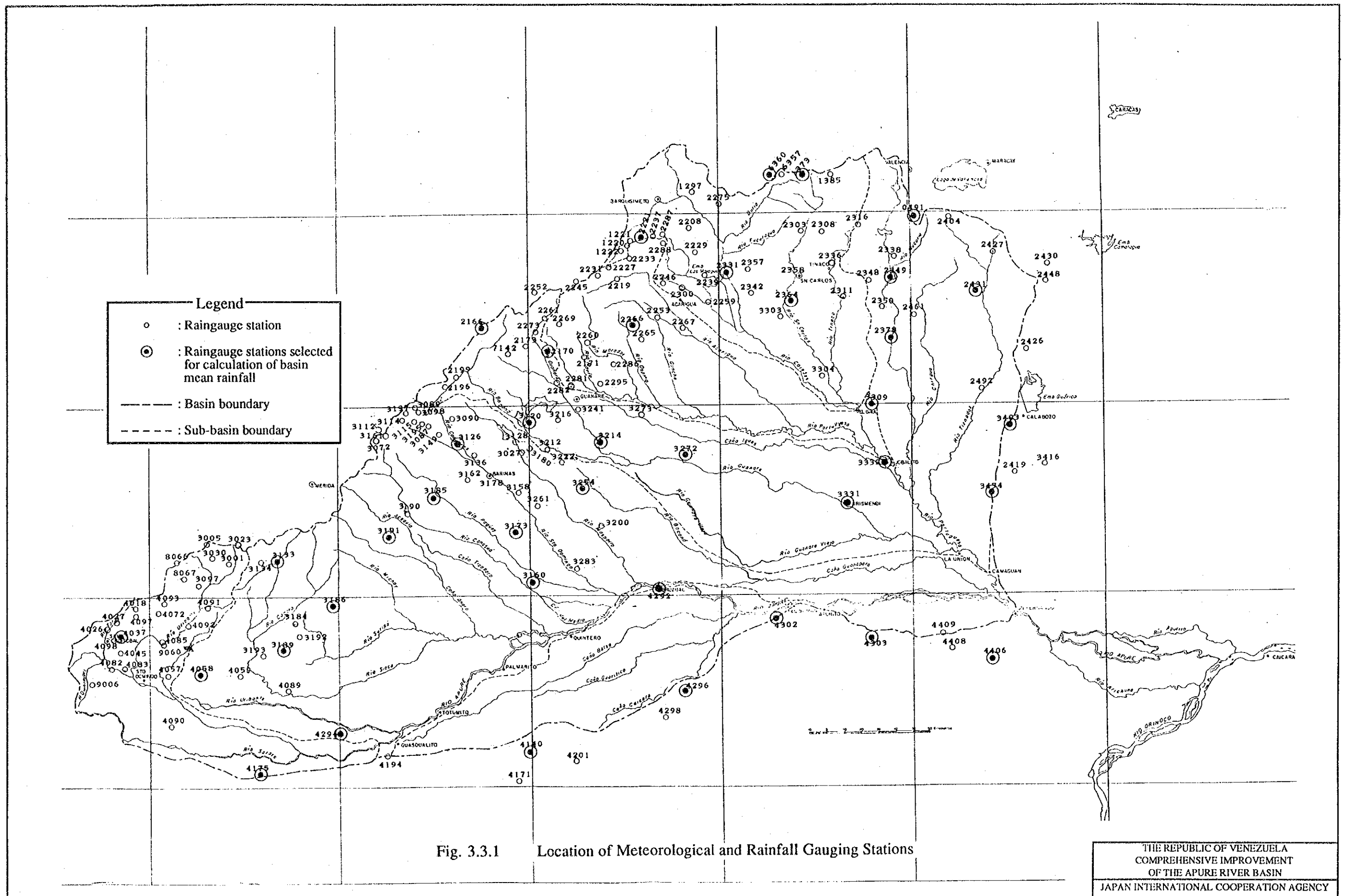


Fig. 3.2.4 Grain Size Distribution Curves of River Bank Material













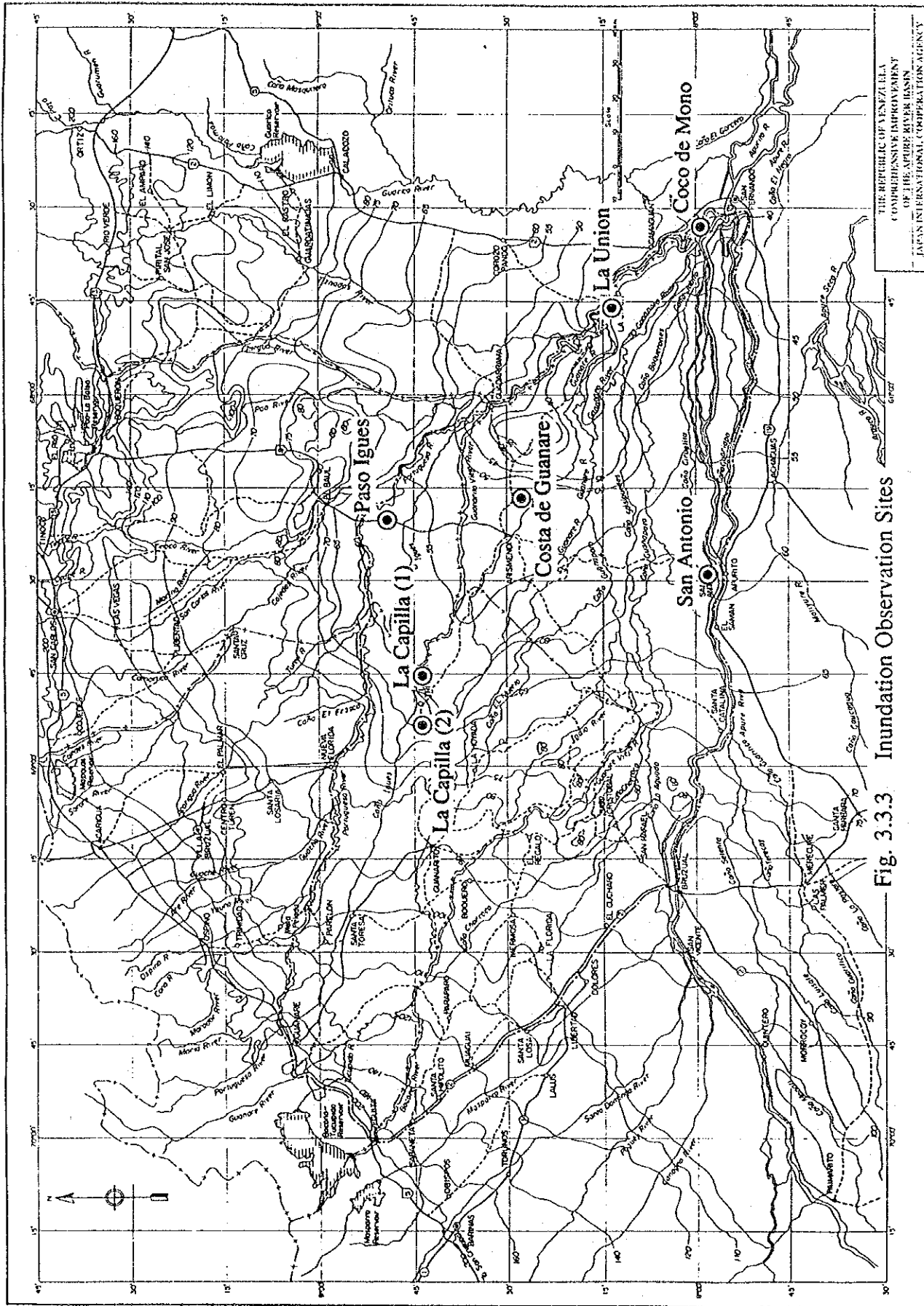
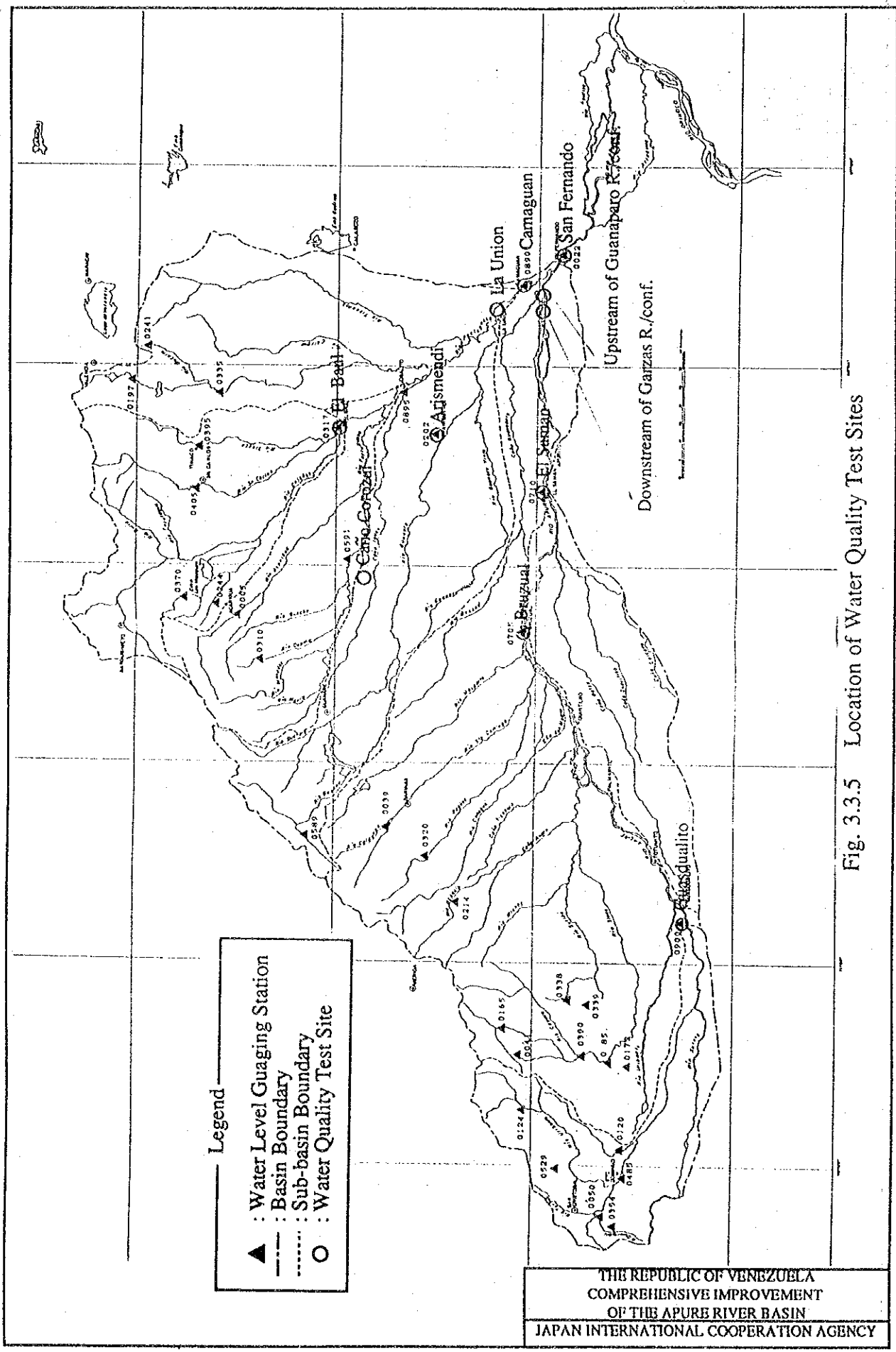


Fig. 3.3.3 Inundation Observation Sites





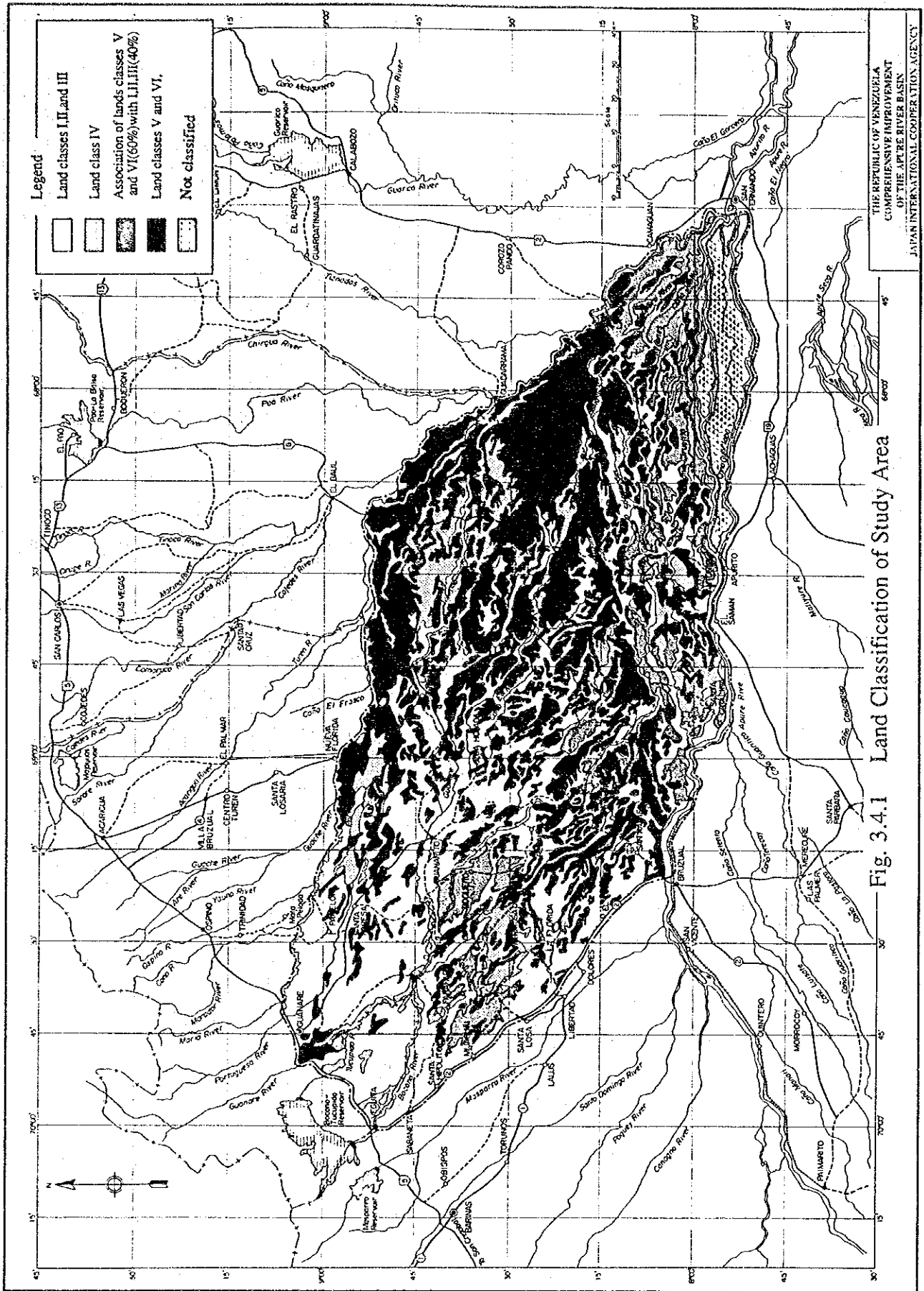


Fig. 3.4.1 Land Classification of Study Area

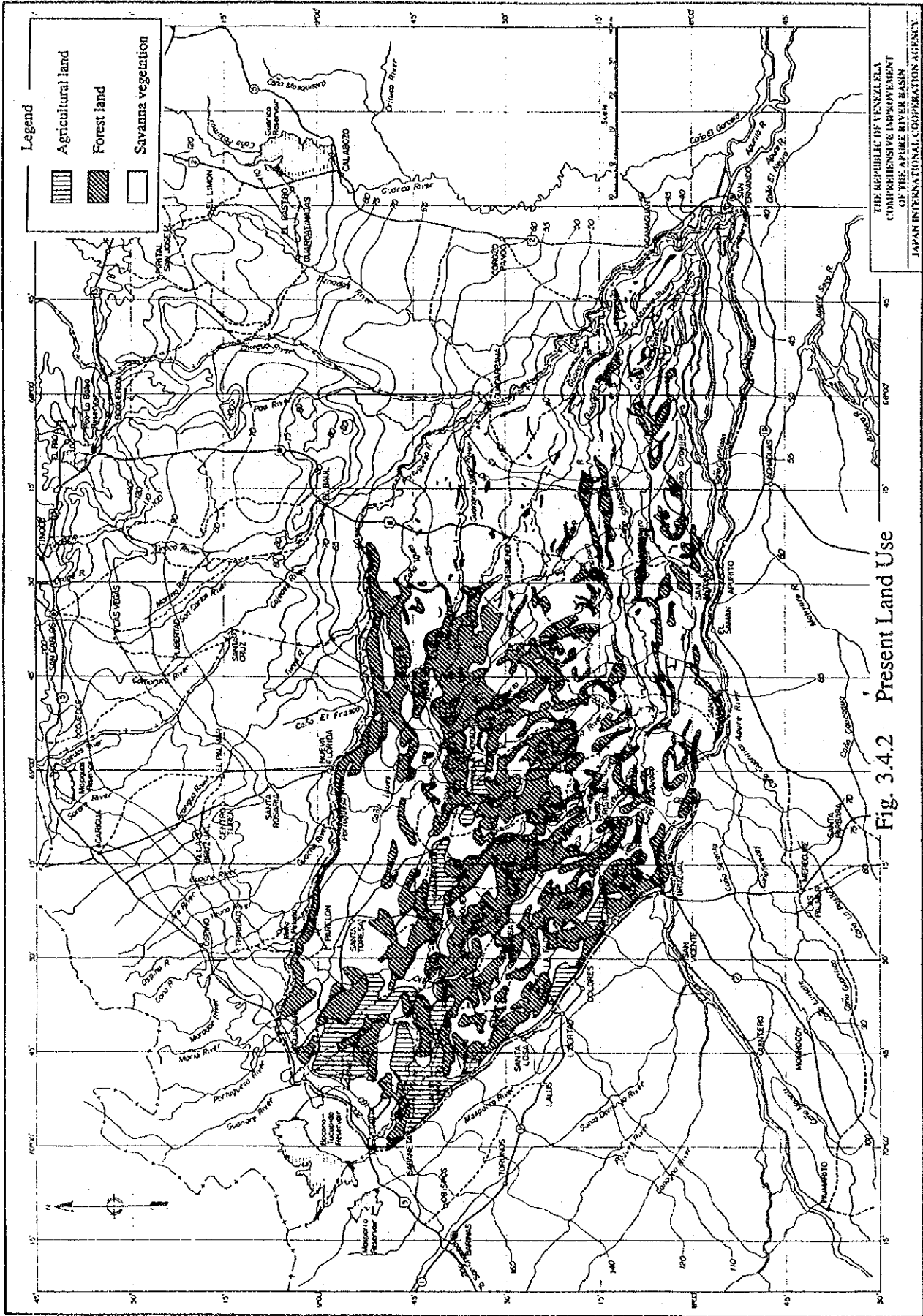


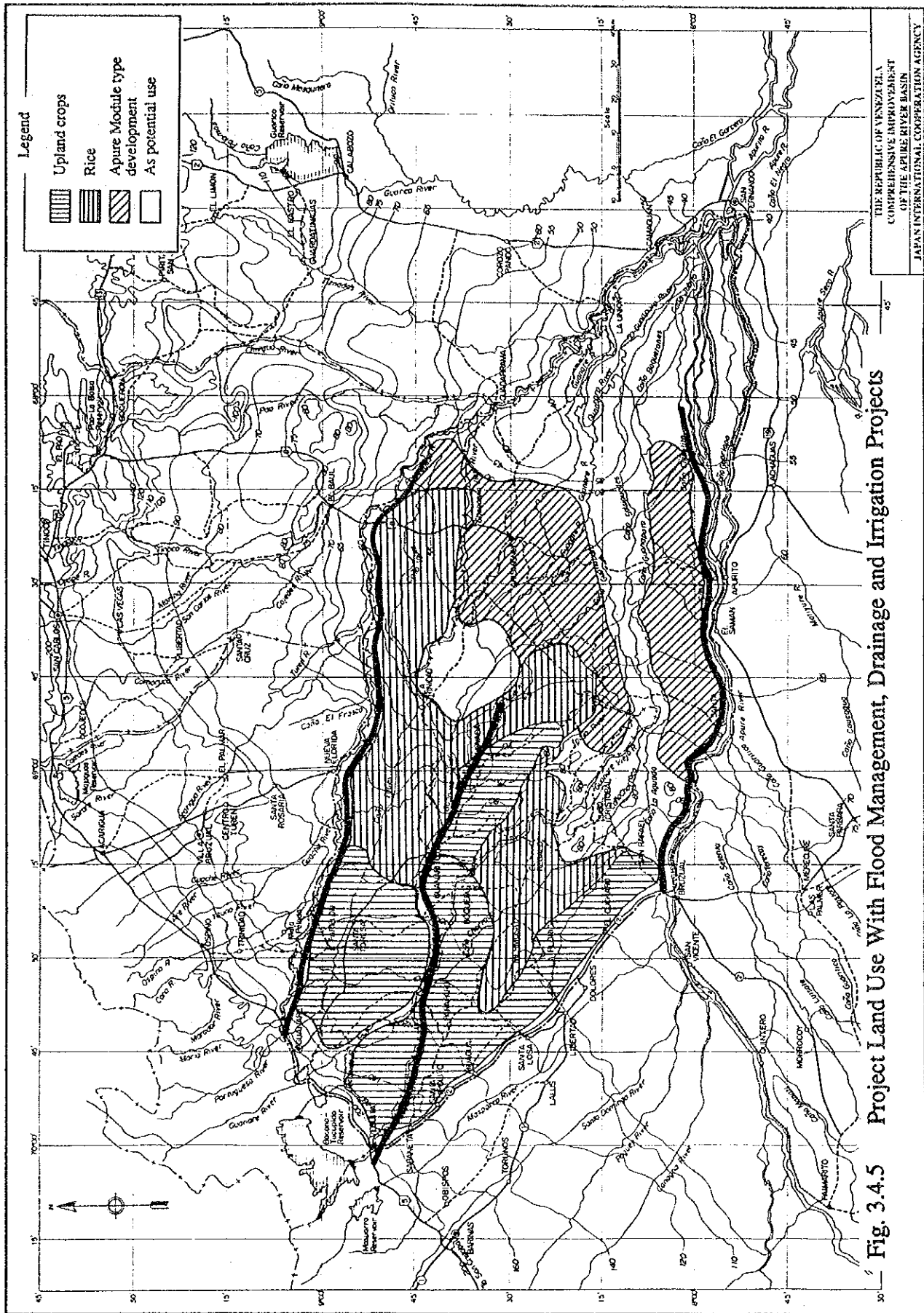
Fig. 3.4.2 Present Land Use

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 COMPREHENSIVE IMPROVEMENT  
 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY











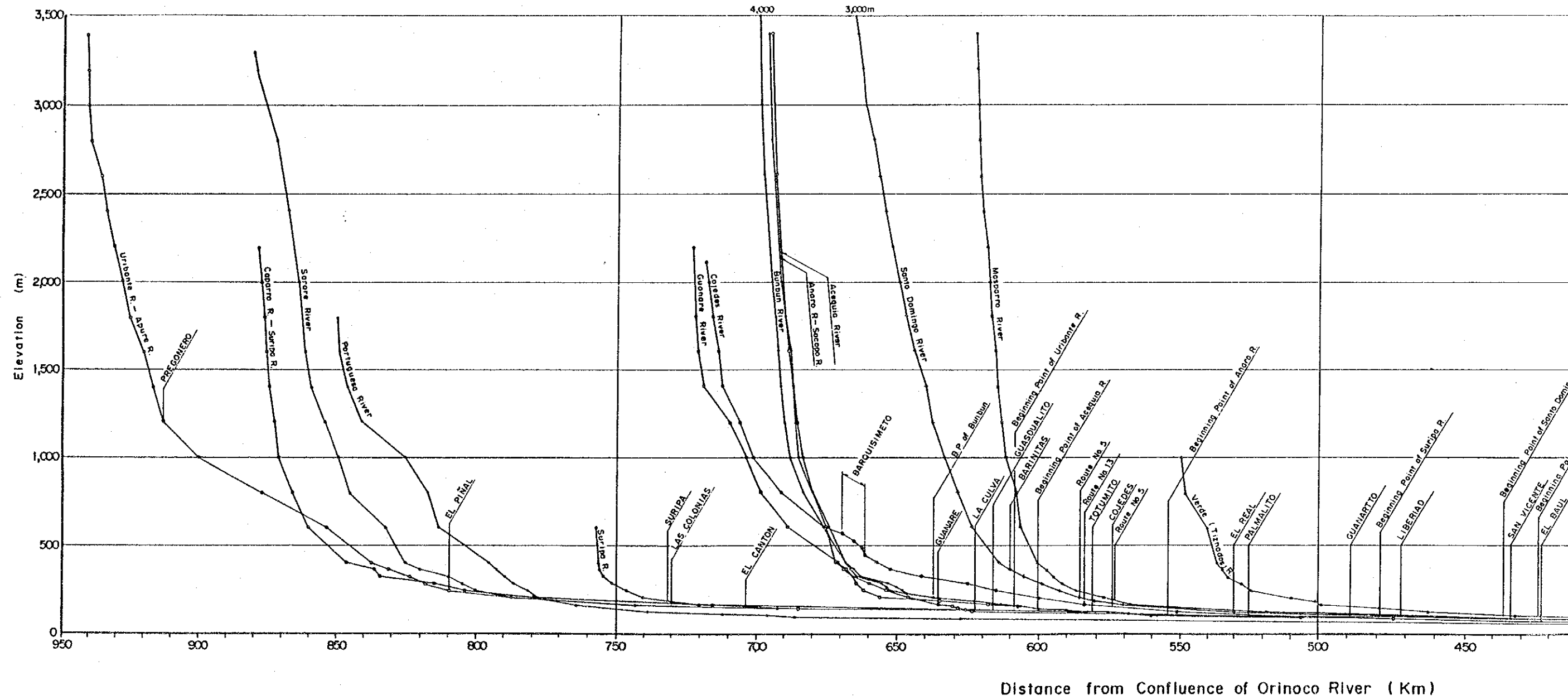


Fig. 4.1.1 Profiles of Rivers in Apure River Basin

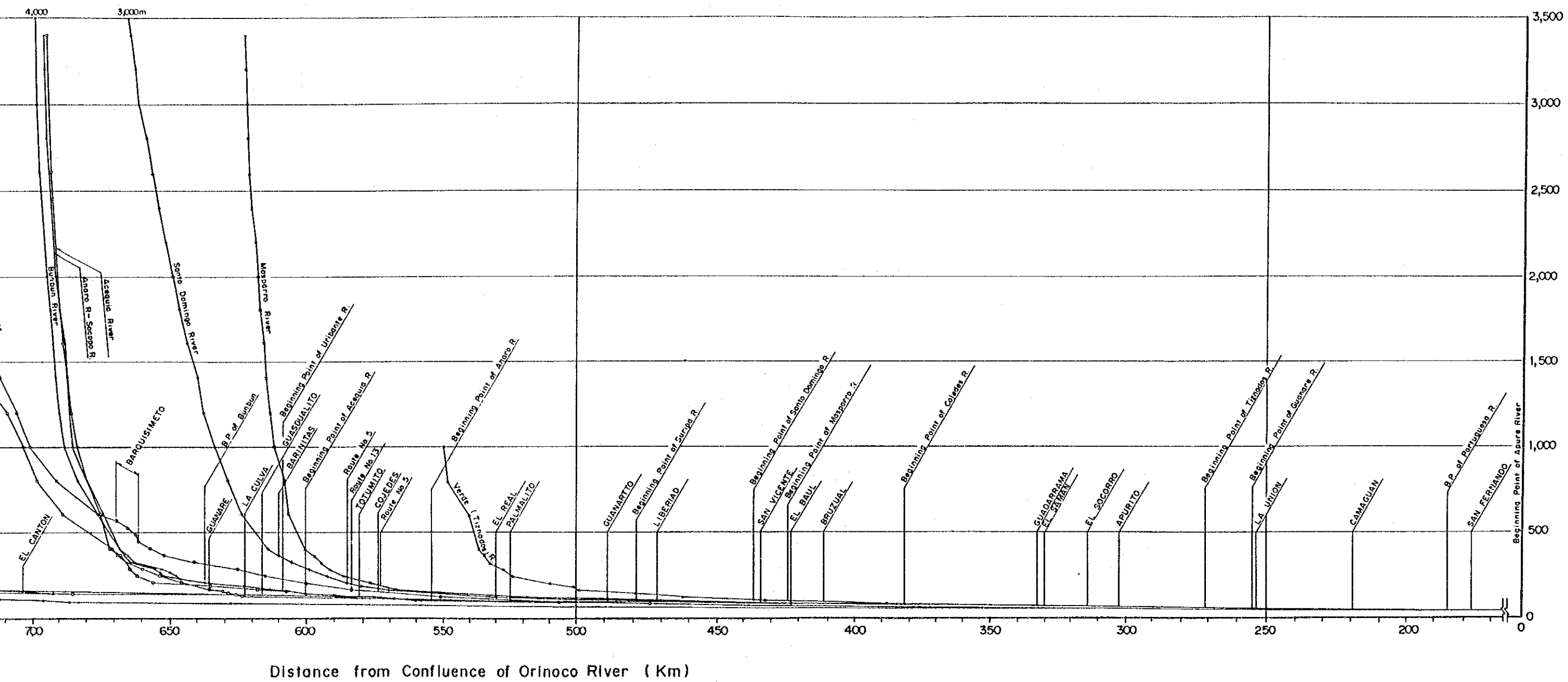
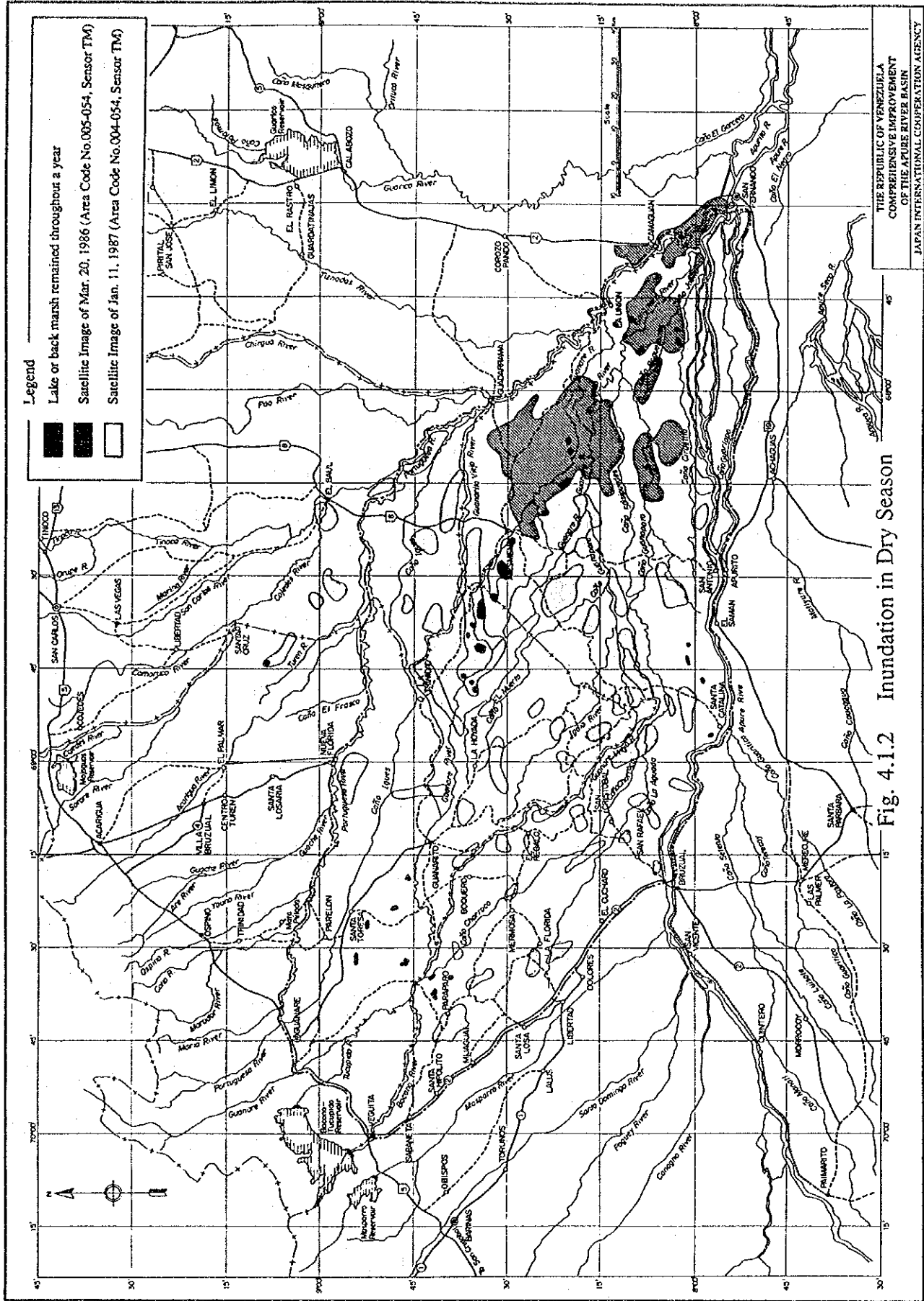


Fig. 4.1.1 Profiles of Rivers in Apure River Basin

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 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY





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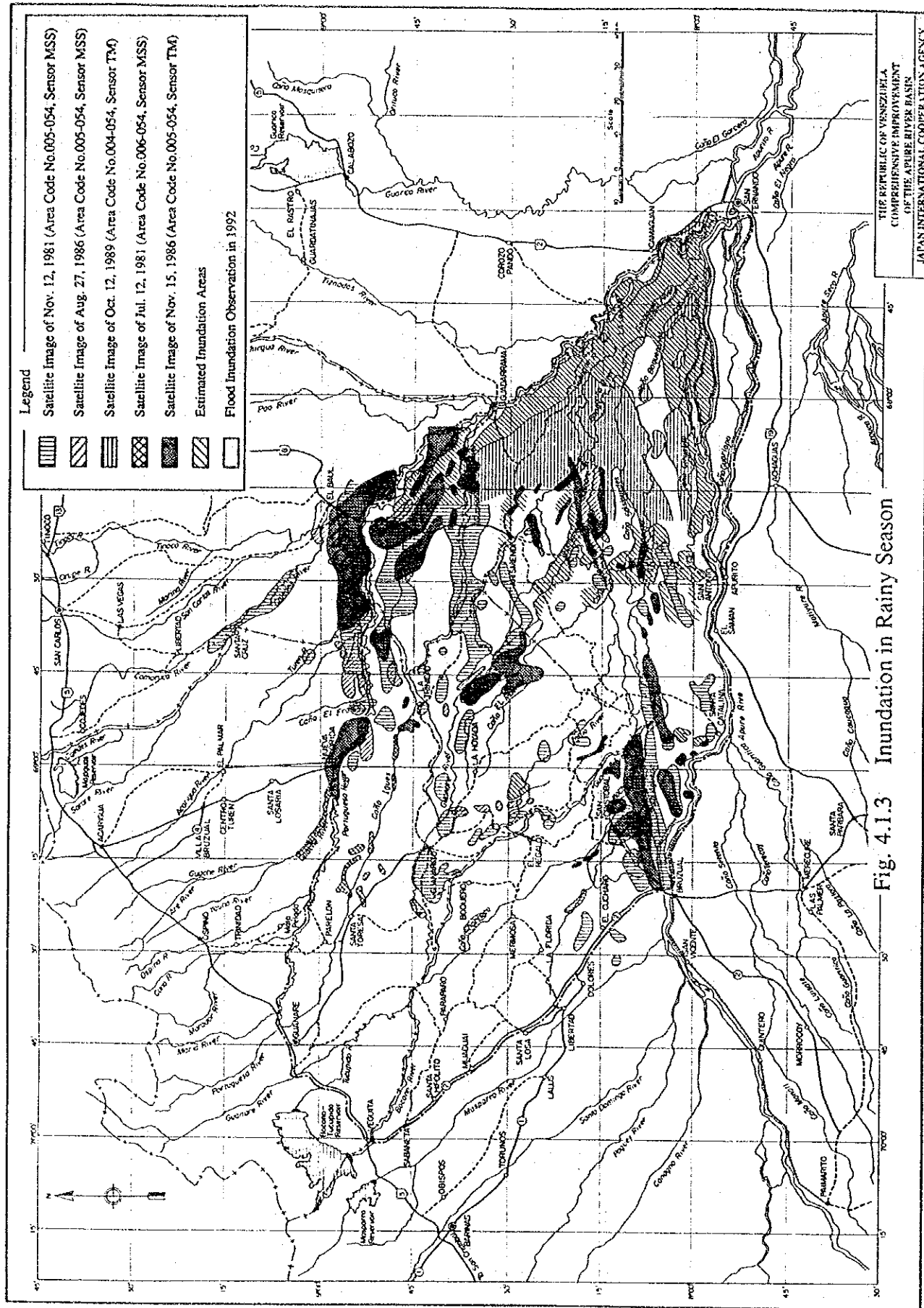
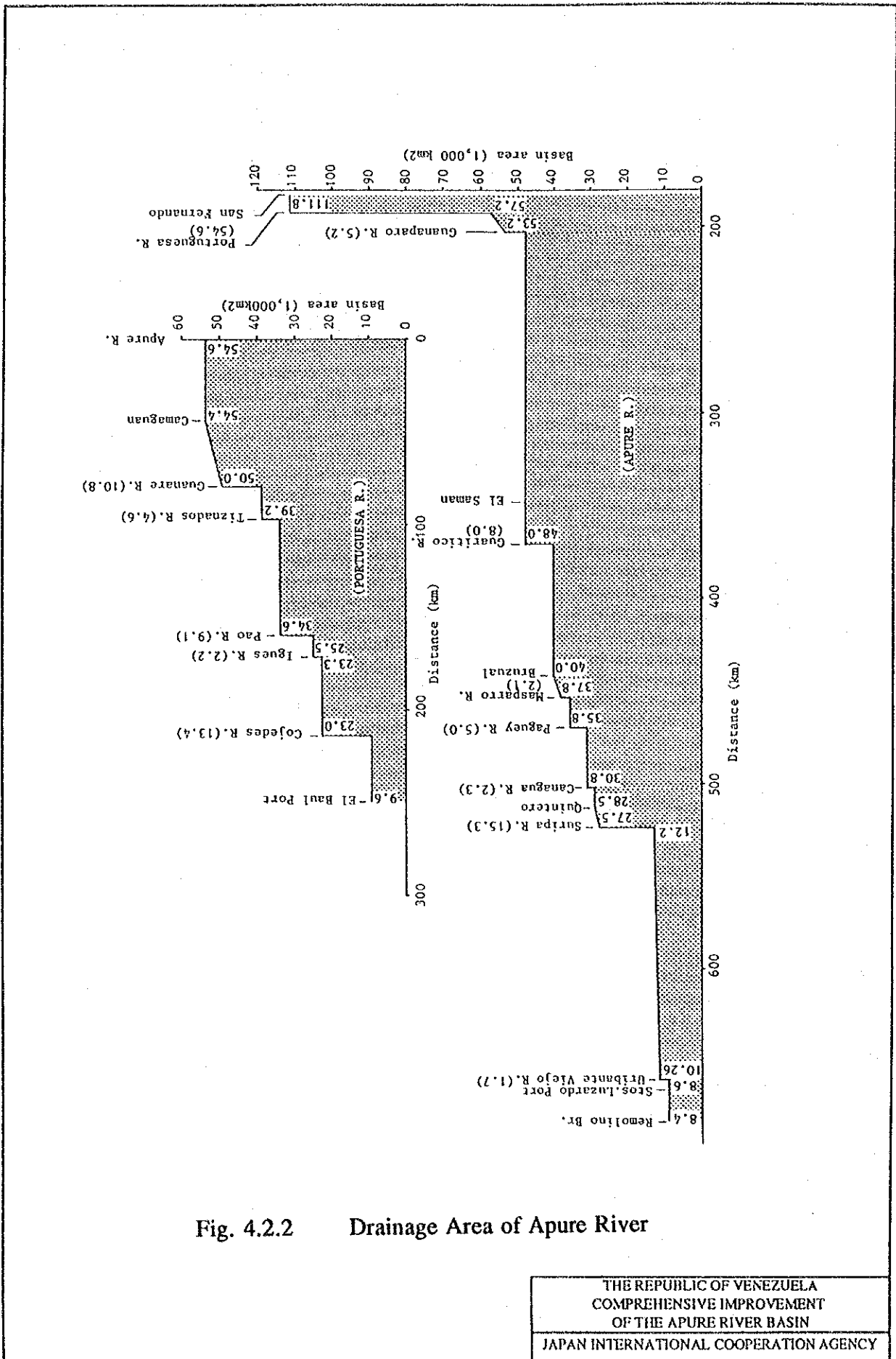


Fig. 4.1.3 Inundation in Rainy Season

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 COMPREHENSIVE IMPROVEMENT  
 OF THE ATURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY





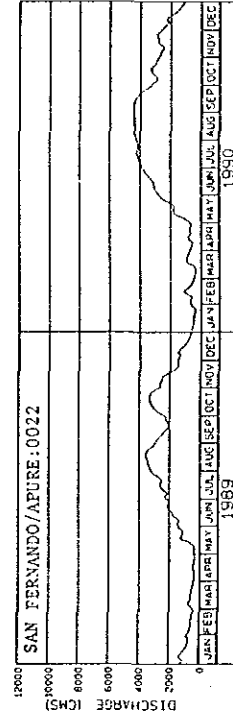
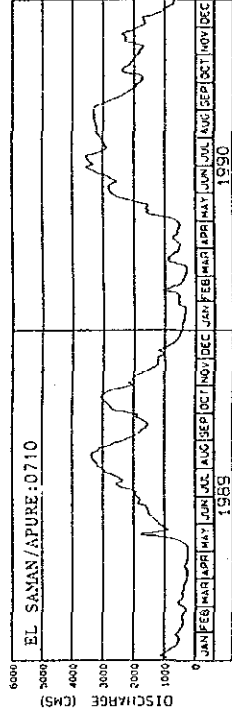
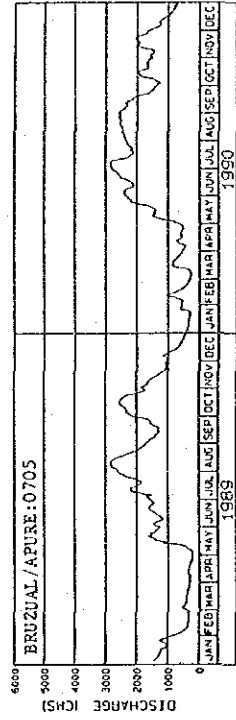
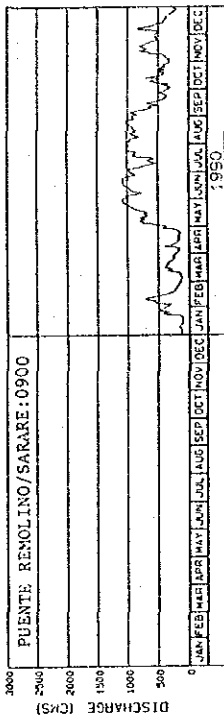
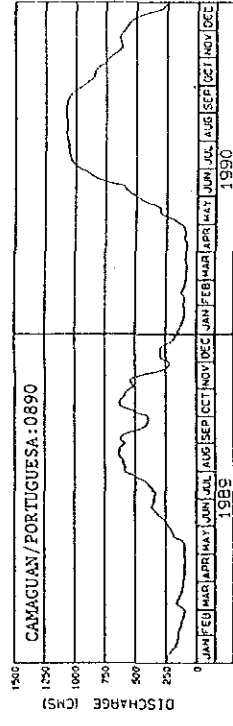
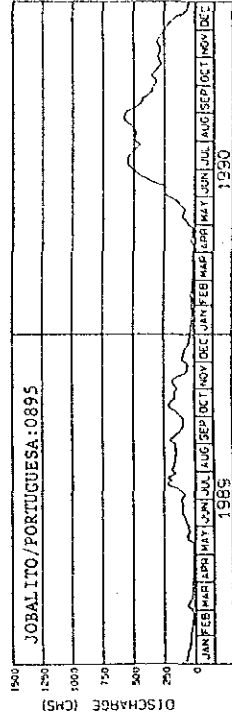
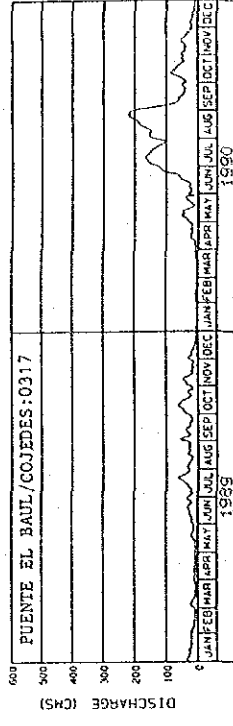
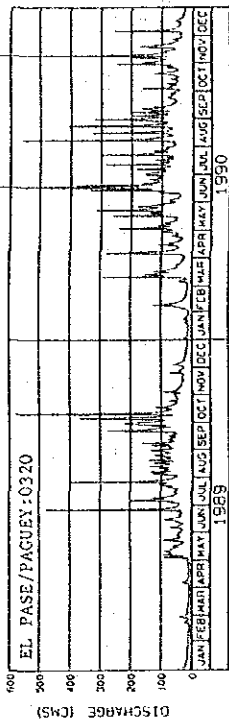
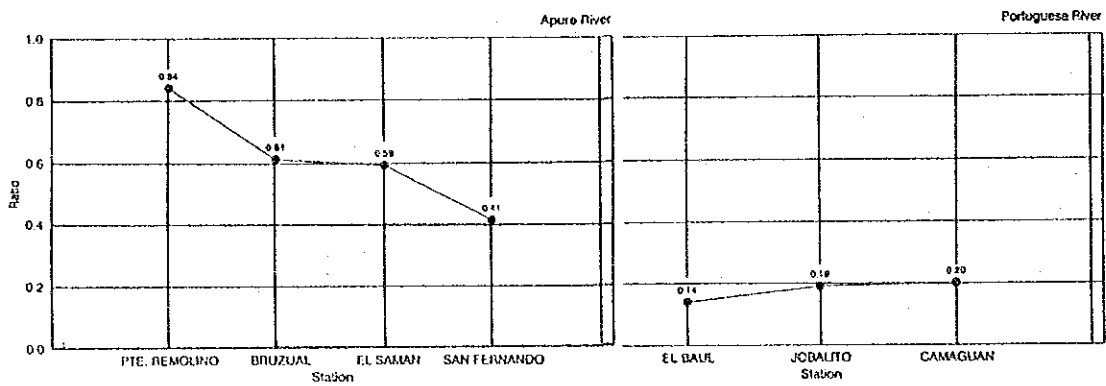
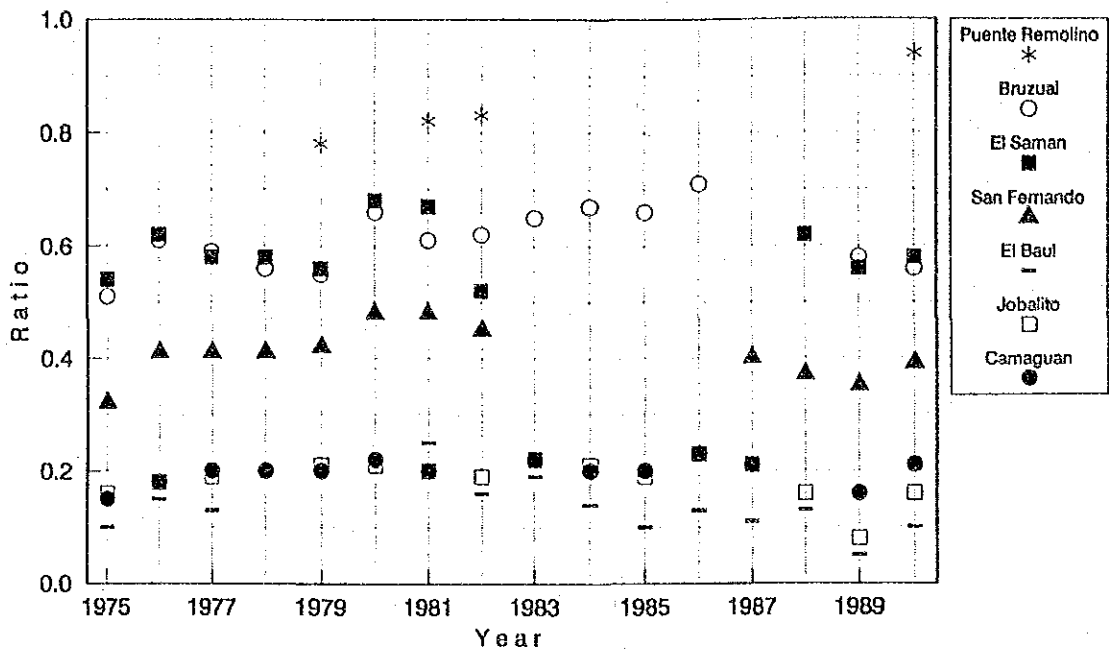


Fig. 4.2.3 Daily Discharge in 1989/1990

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 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY



YEAR	REMOLINO (900)	BRUZUAL (705)	EL SAMAN (710)	S. FERNANDO (022)	EL BAUL (317)	JOBALITO (895)	CAMAGUAN (890)
1975	-	0.51	0.54	0.32	0.10	0.16	0.15
1976	-	0.61	0.62	0.41	0.15	0.18	0.18
1977	-	0.59	0.58	0.41	0.13	0.19	0.20
1978	-	0.56	0.58	0.41	-	-	0.20
1979	0.78	0.55	0.56	0.42	-	0.21	0.21
1980	-	0.66	0.68	0.48	0.22	0.21	0.22
1981	0.82	0.61	0.67	0.48	0.25	0.20	0.20
1982	0.83	0.62	0.52	0.45	0.16	0.19	-
1983	-	0.65	-	-	0.19	0.22	0.22
1984	-	0.67	-	-	0.14	0.21	0.20
1985	-	0.66	-	-	0.10	0.19	0.20
1986	-	0.71	-	-	0.13	0.23	0.23
1987	-	-	-	0.40	0.11	0.21	0.21
1988	-	-	0.62	0.37	0.13	0.16	-
1989	-	0.58	0.56	0.35	0.05	0.08	0.16
1990	0.94	0.56	0.58	0.39	0.10	0.16	0.21
AVERAGE	0.84	0.61	0.59	0.41	0.14	0.19	0.20

Fig. 4.2.4 Annual Runoff Ratio

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 OF THE APURE RIVER BASIN  
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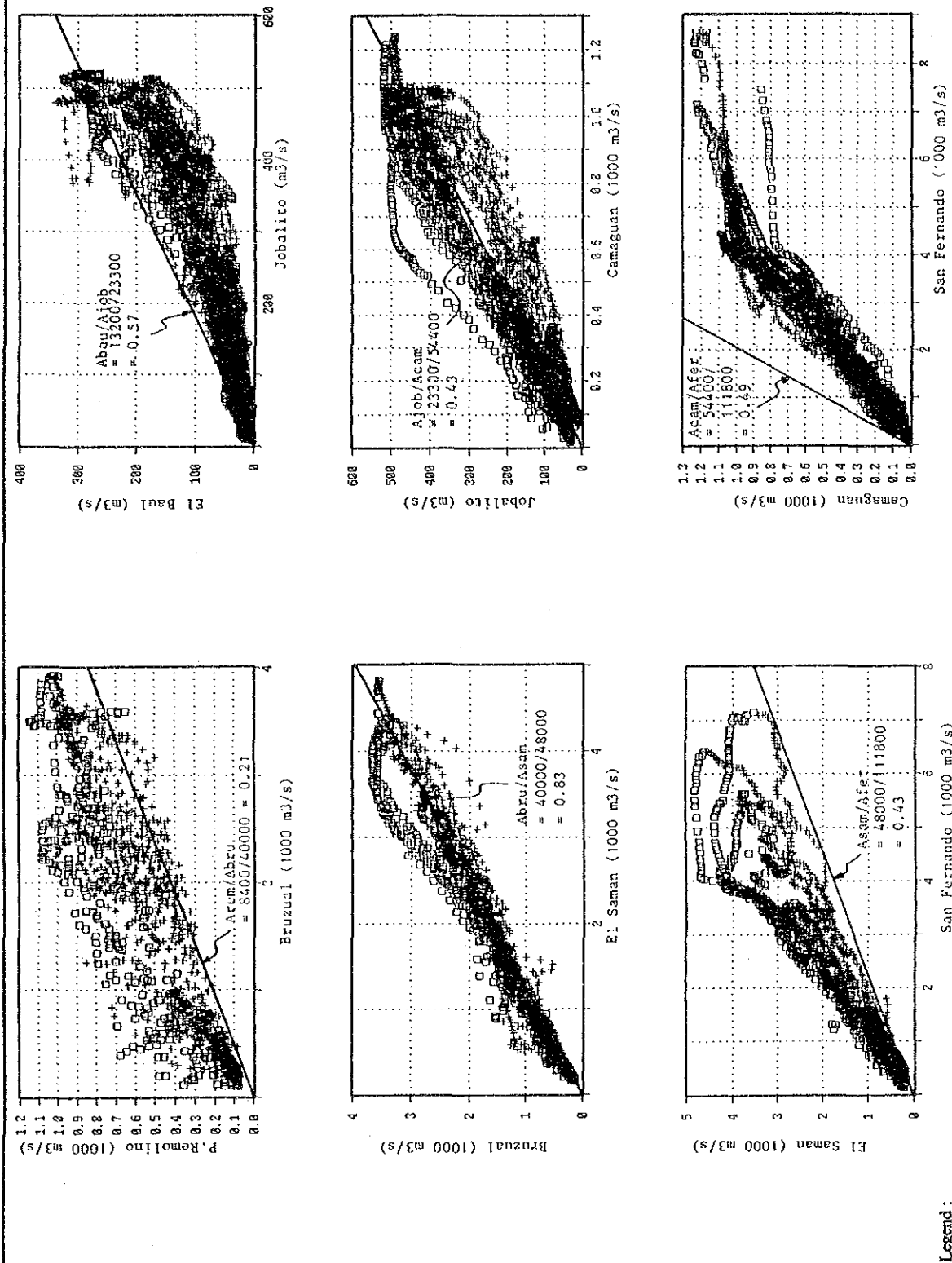


Fig. 4.2.5 Discharge Correlation

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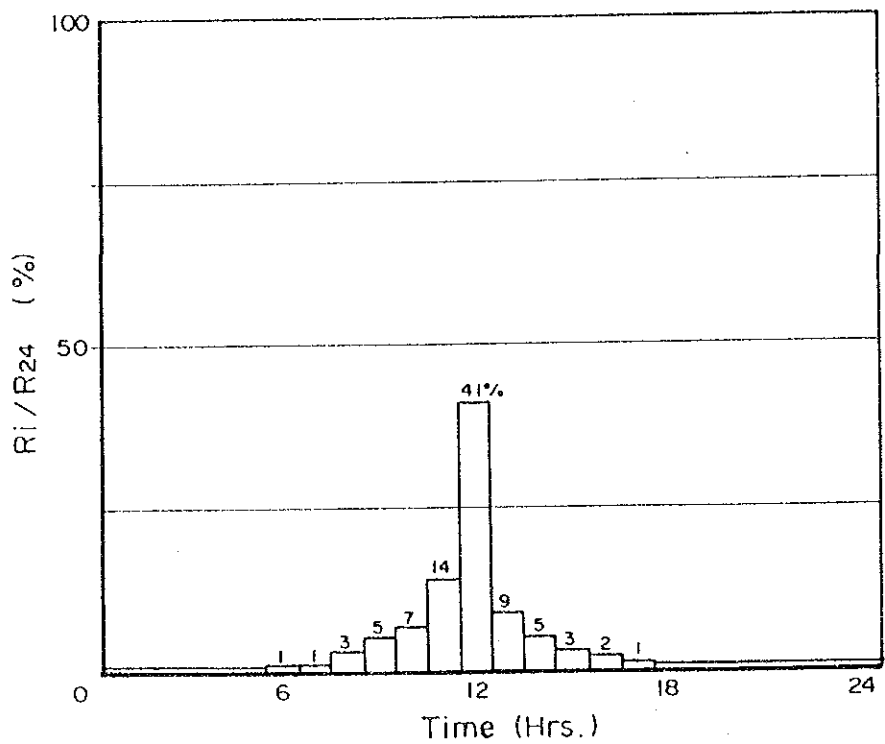
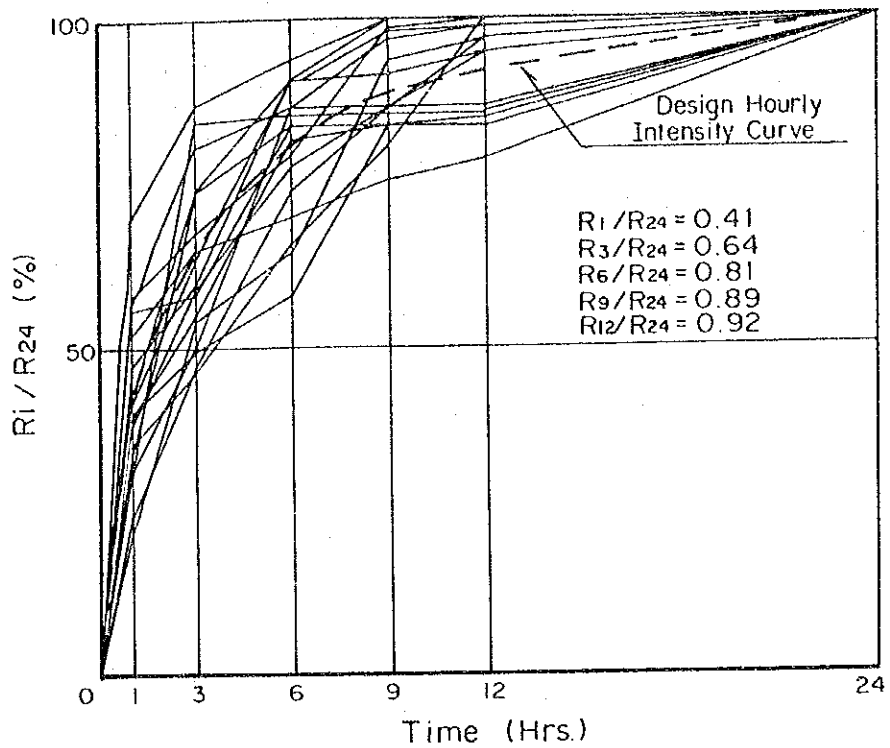


Fig. 4.3.2 Design Hourly Rainfall Intensity Curve and Distribution

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 OF THE APURE RIVER BASIN  
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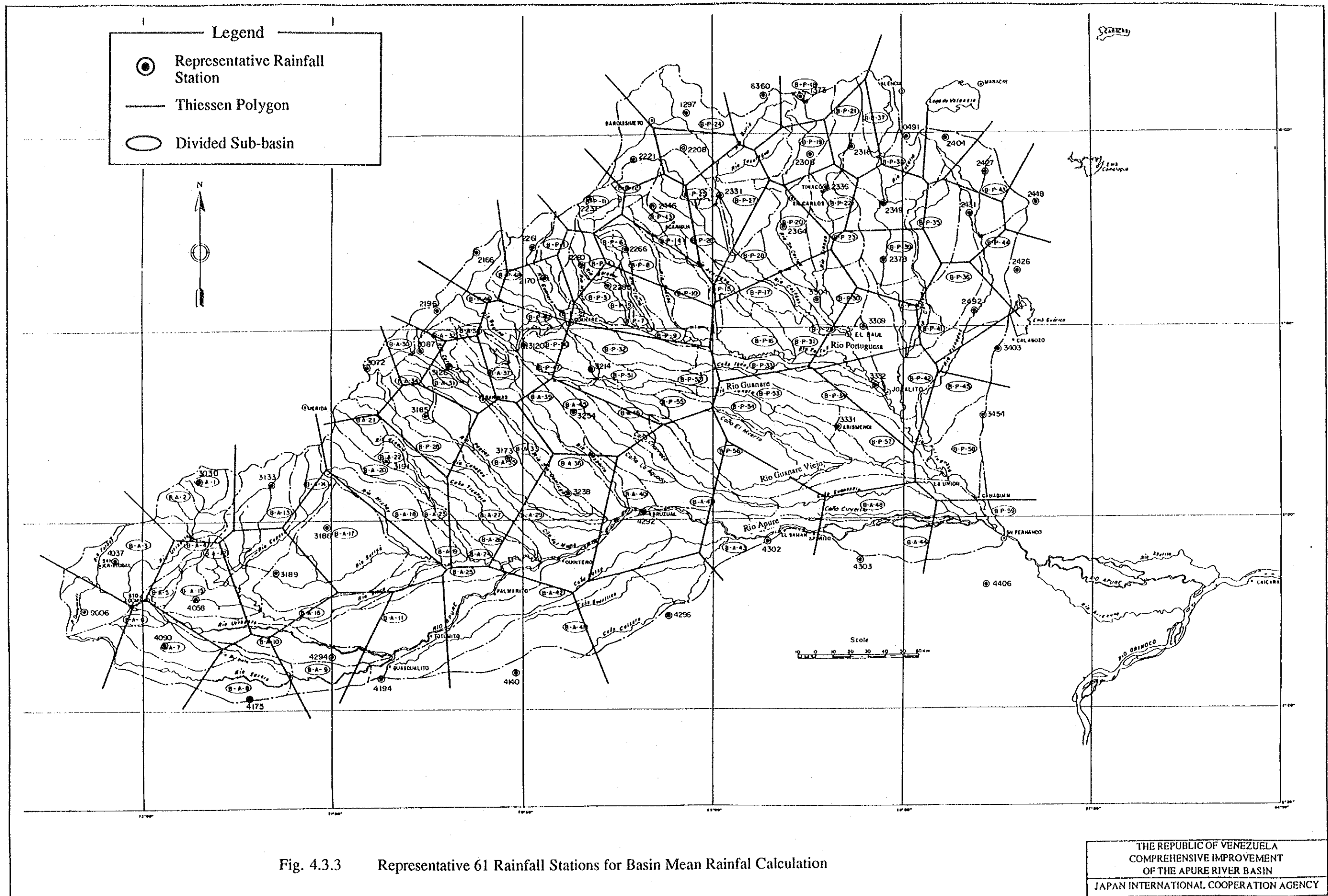


Fig. 4.3.3 Representative 61 Rainfall Stations for Basin Mean Rainfal Calculation

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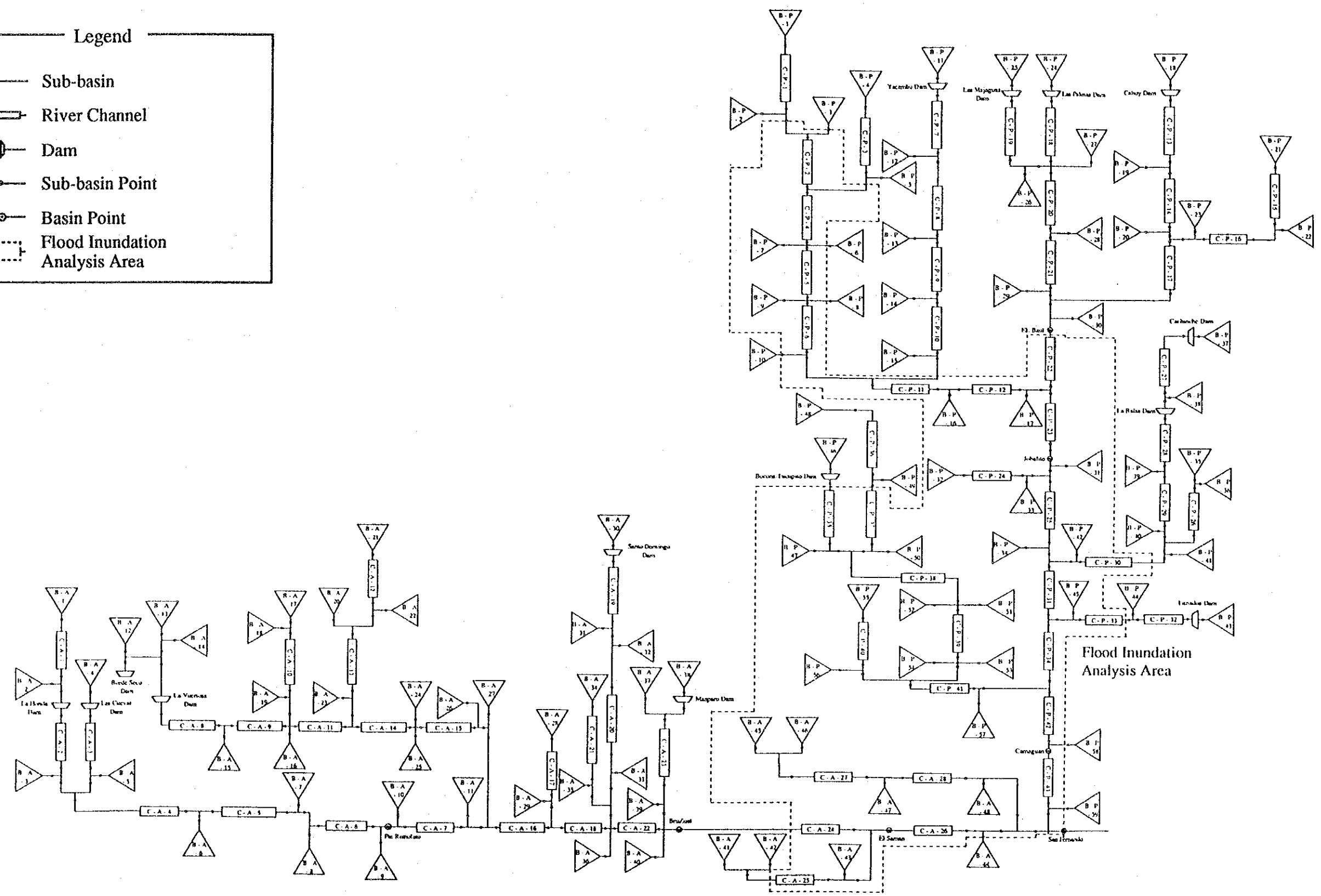
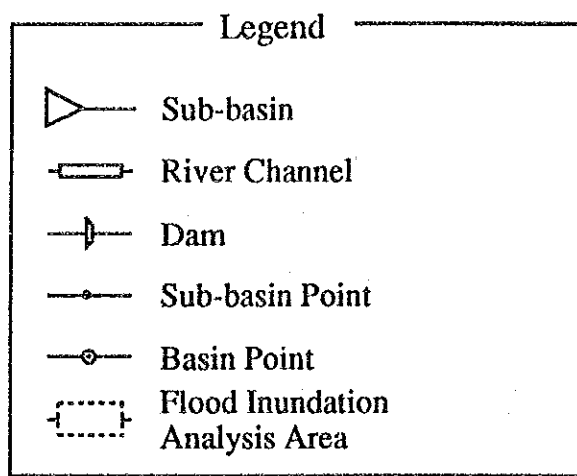


Fig. 4.3.4 Schematic Diagram of Basin and River Channel Model of Whole Apure River Basin for Storage Function Method

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 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY

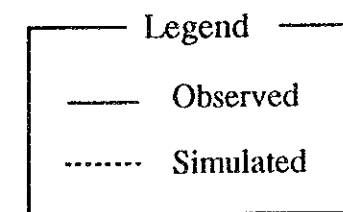
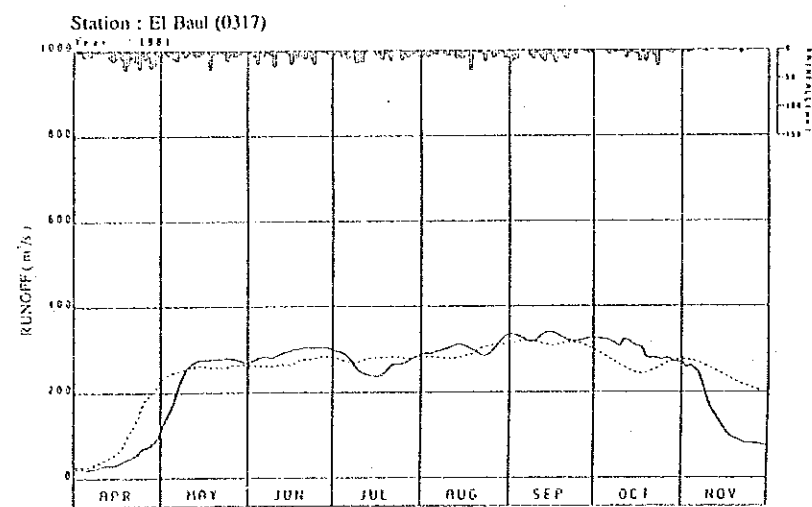
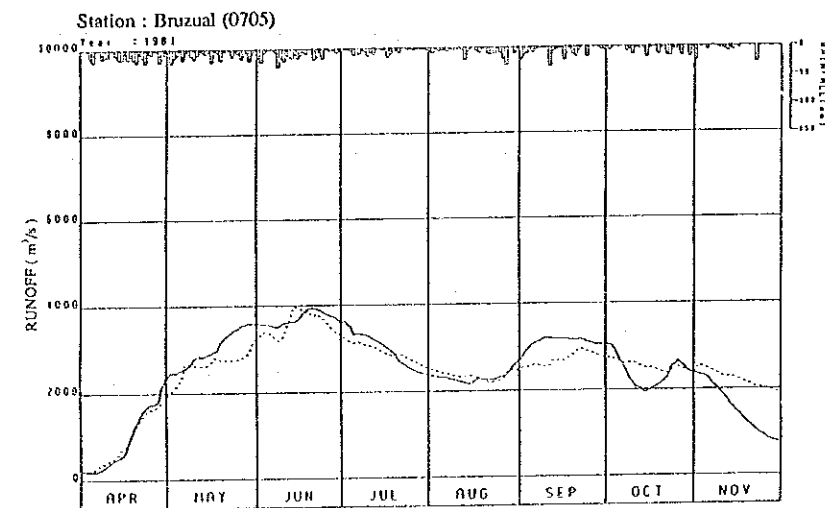
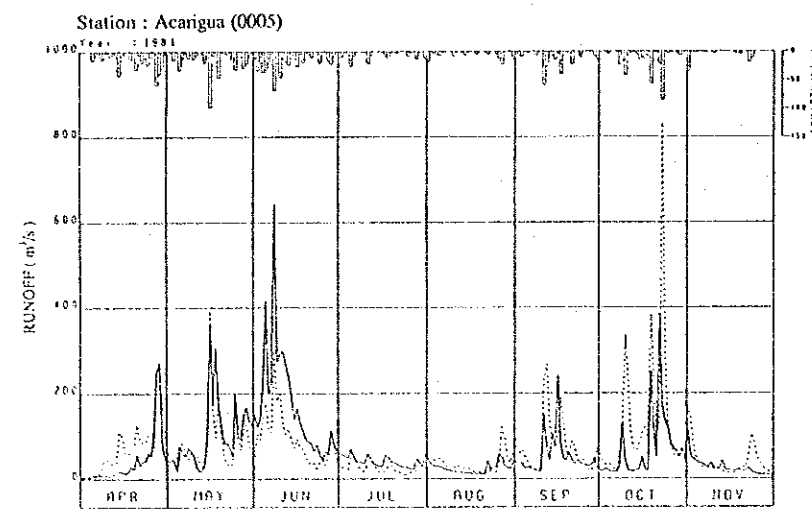
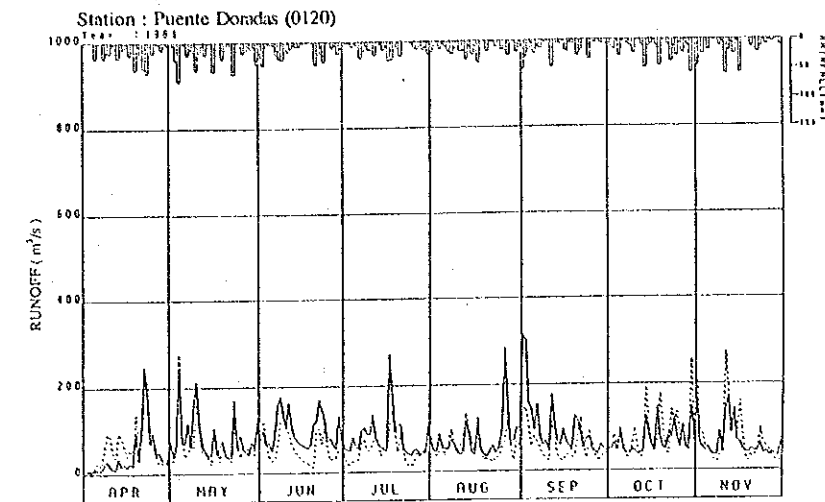
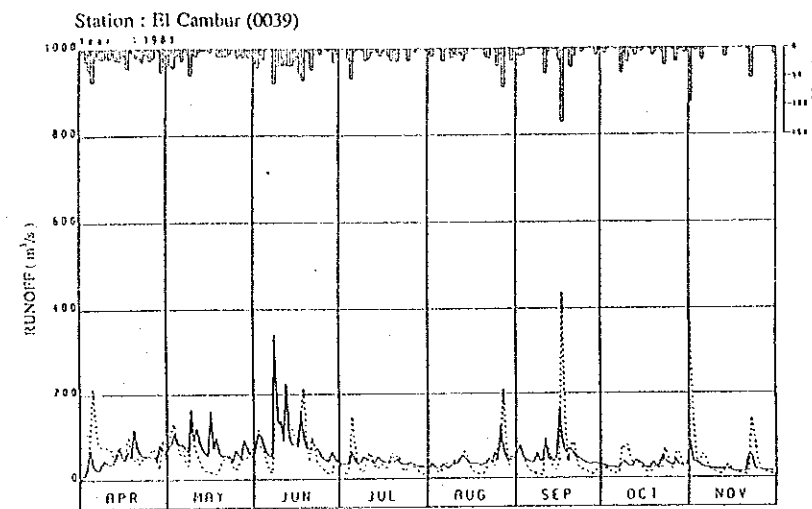


Fig. 4.3.5 Observed and Simulated Hydrographs in 1981

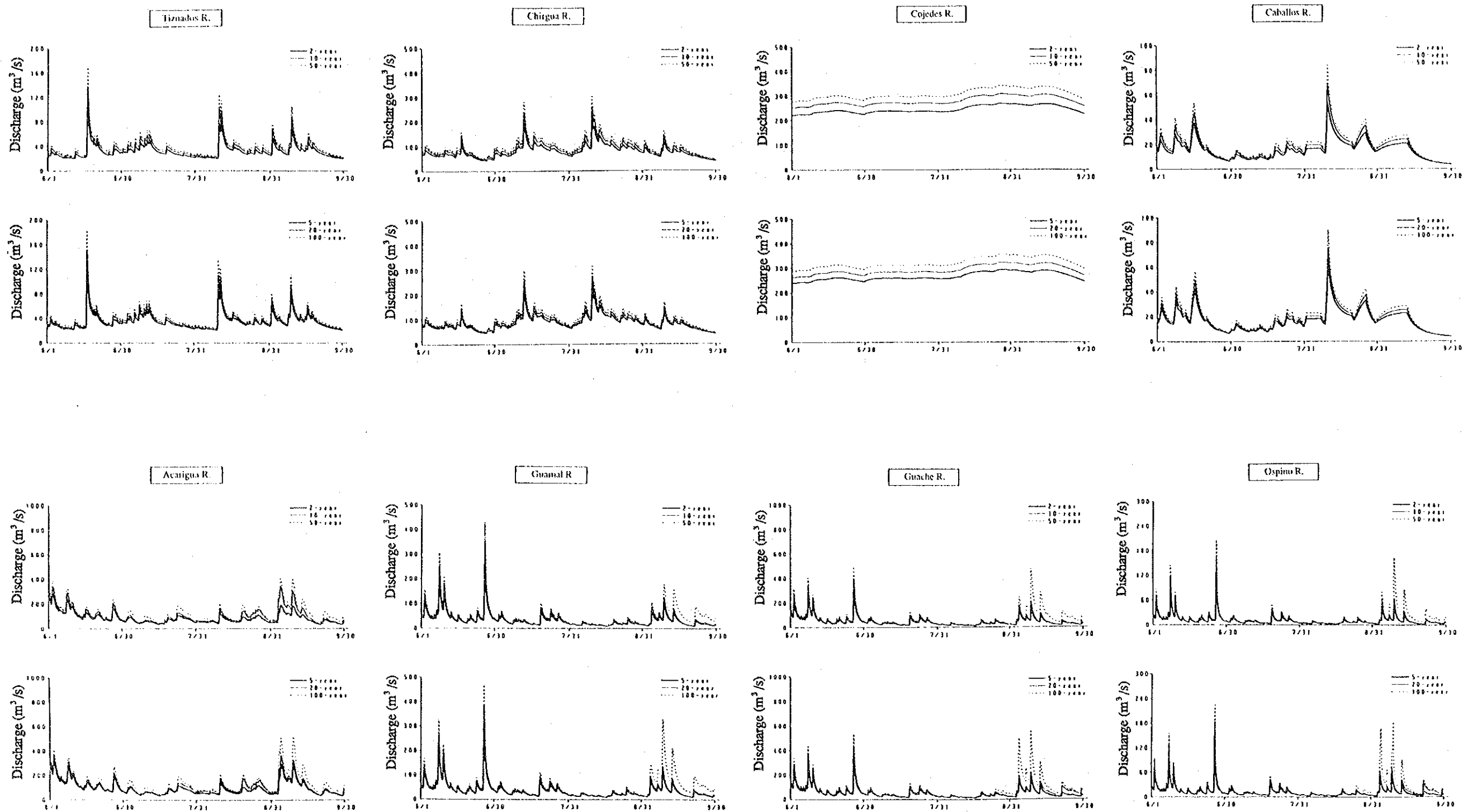


Fig. 4.3.6 Probable Flood Hydrographs of Inflow Rivers for Pond Model Method (1/2)

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 COMPREHENSIVE IMPROVEMENT  
 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY

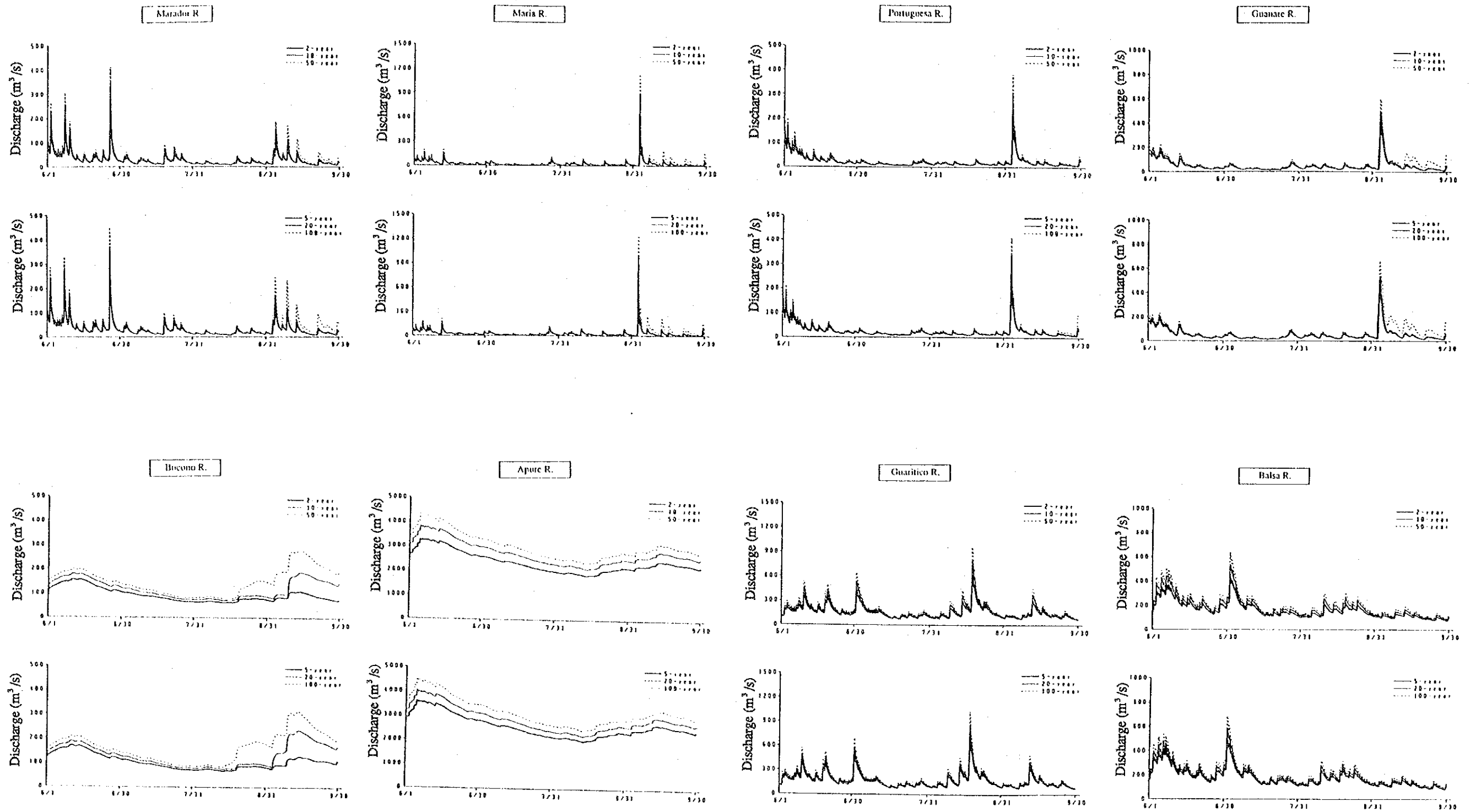


Fig. 4.3.6 Probable Flood Hydrographs of Inflow Rivers for Pond Model Method (2/2)



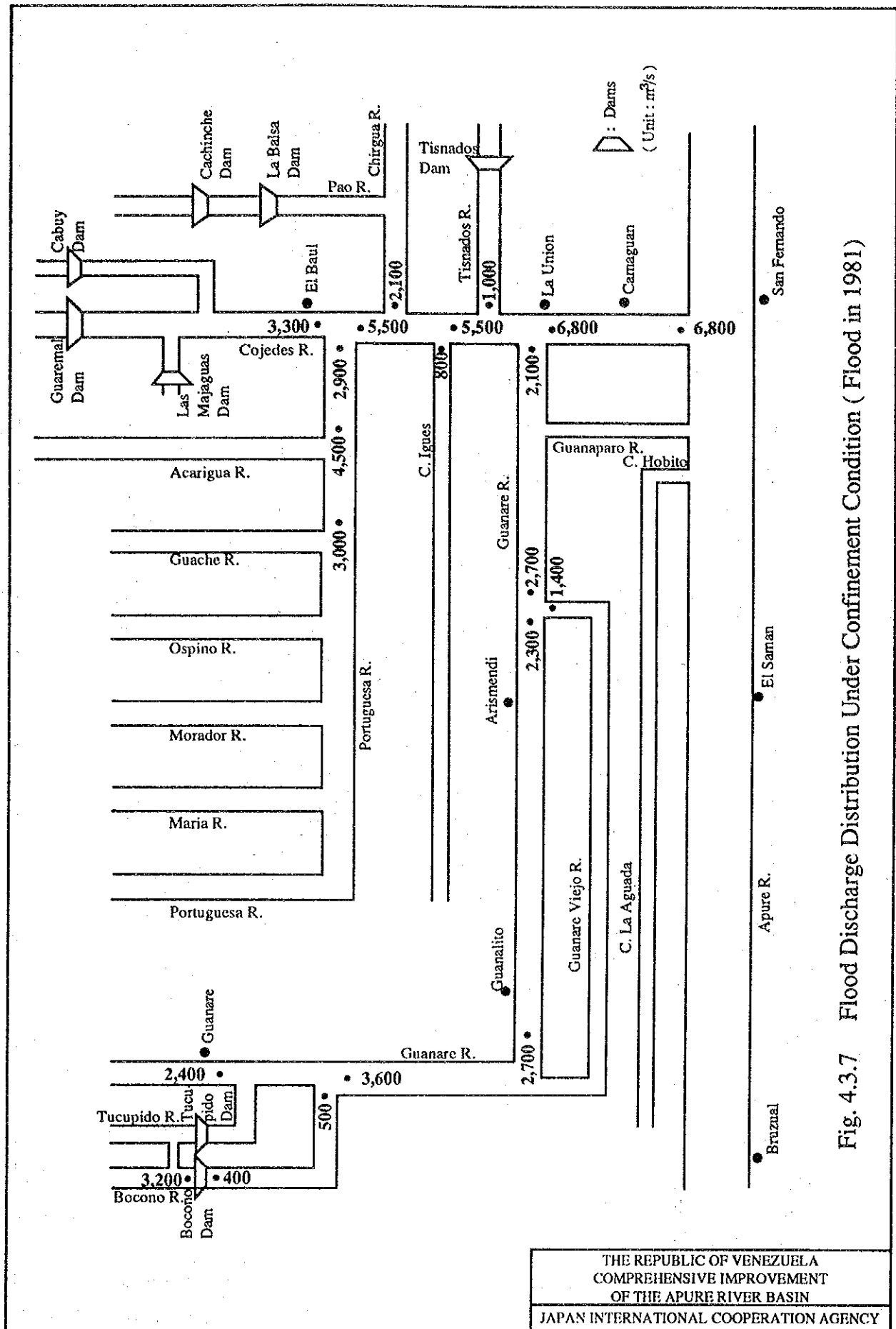


Fig. 4.3.7 Flood Discharge Distribution Under Confinement Condition (Flood in 1981)



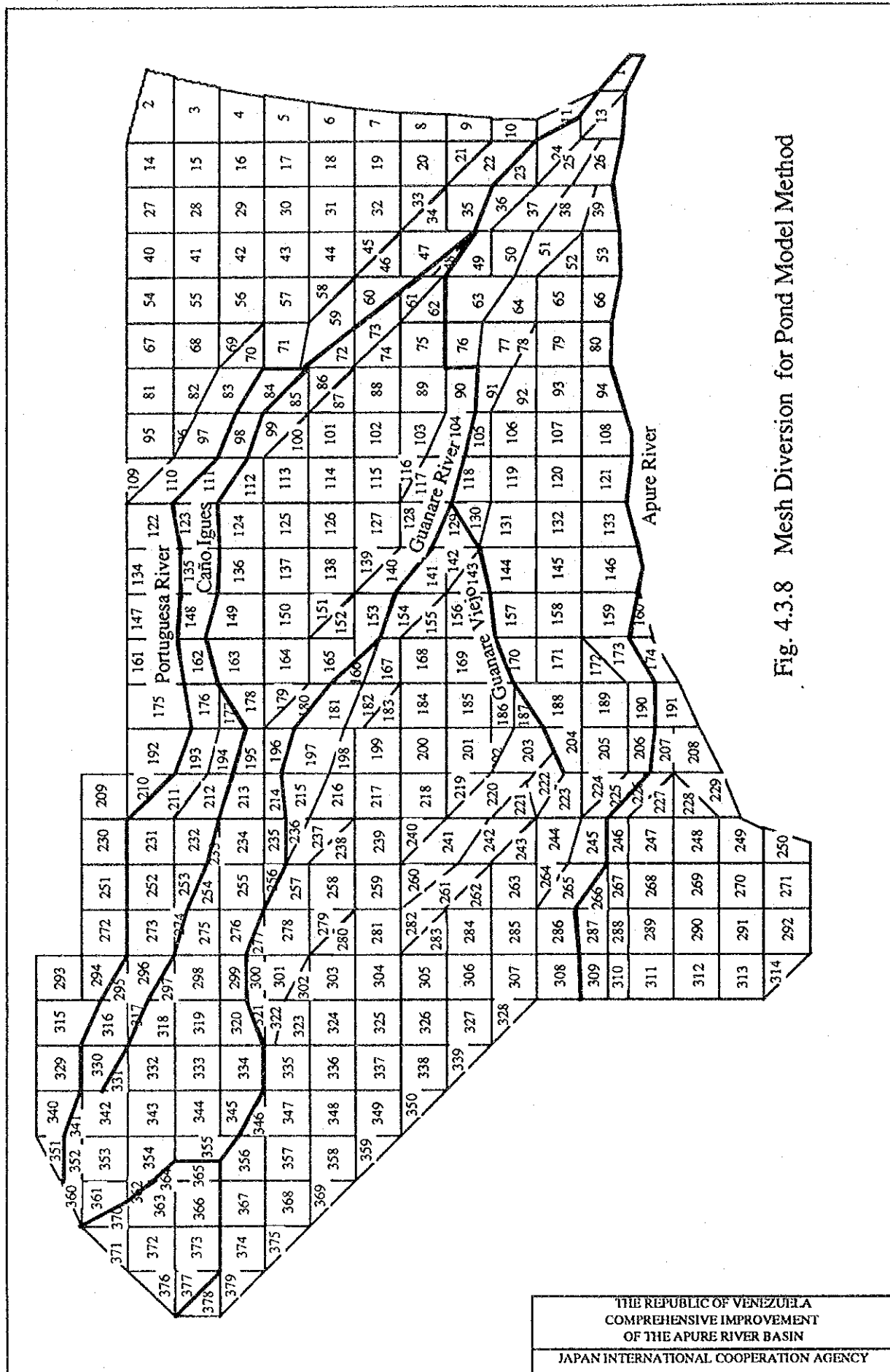
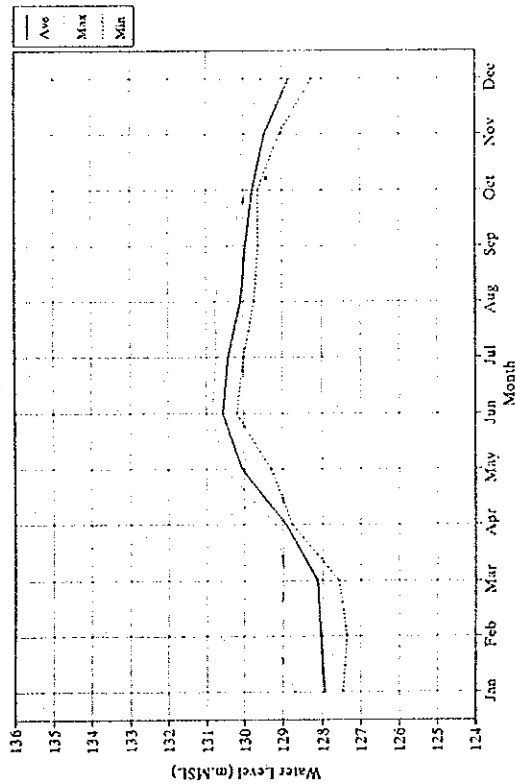
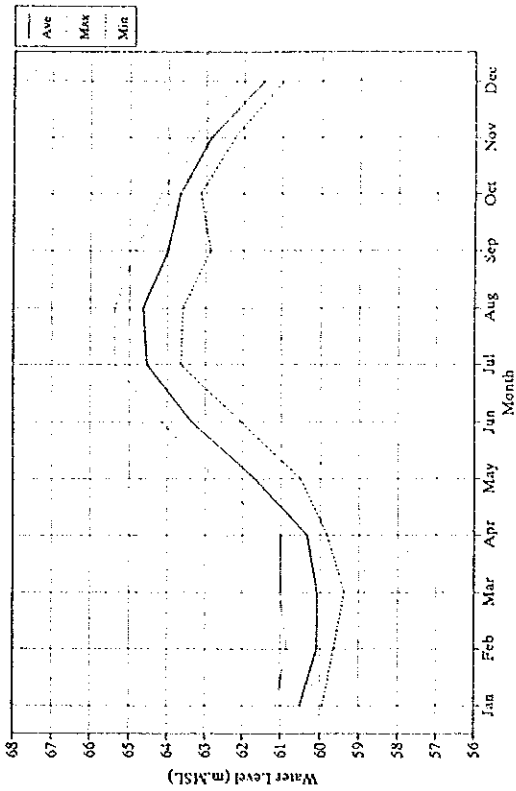


Fig. 4.3.8 Mesh Diversion for Pond Model Method

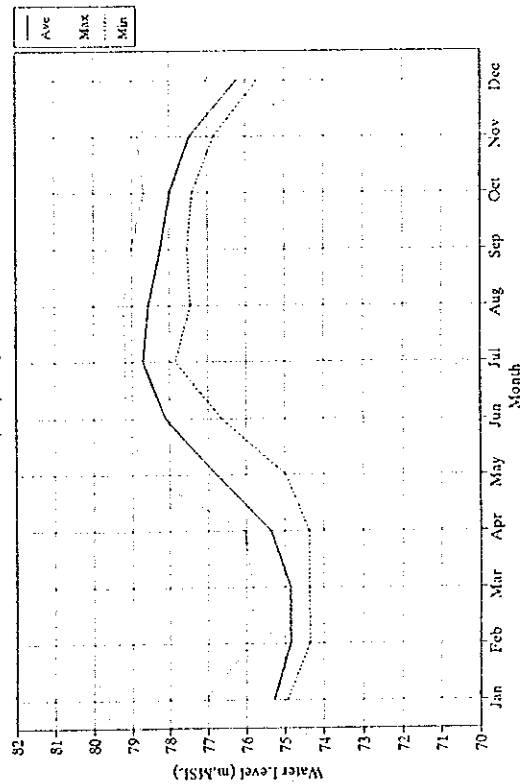
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El Samau (710) / Apure R.



Bruzual (705) / Apure R.



San Fernando (022) / Apure R.

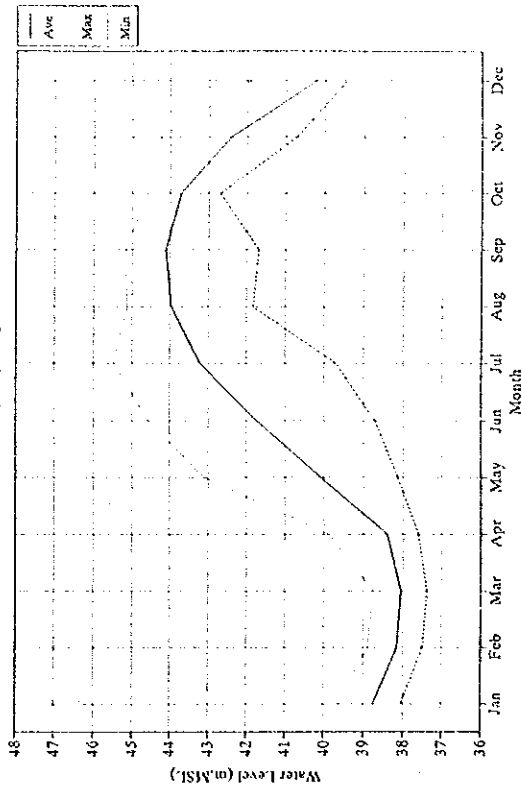
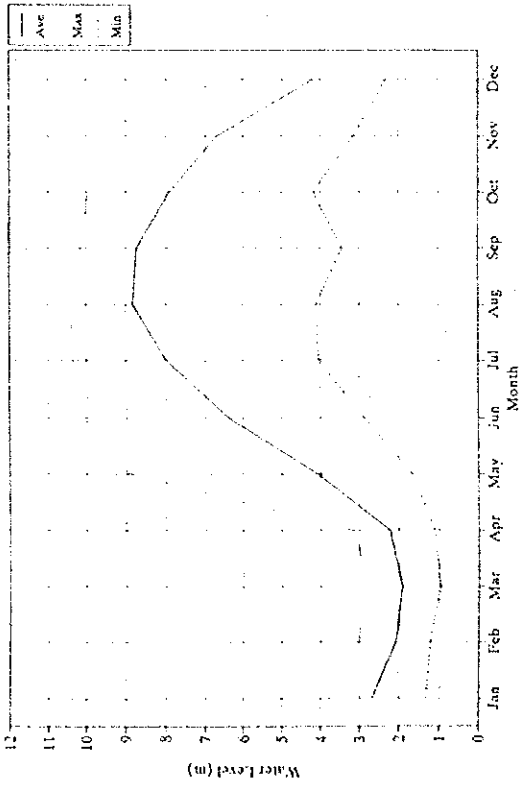


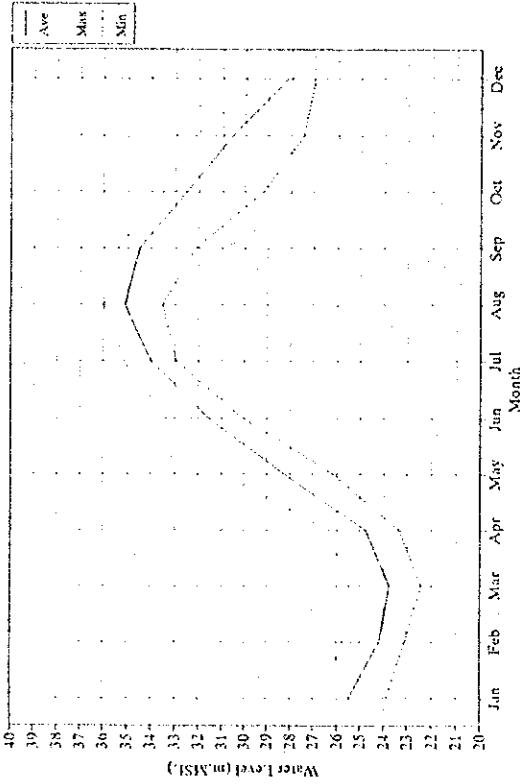
Fig. 4.4.1 Monthly Water Level (1/2)

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 OF THE APURE RIVER BASIN  
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Jobalito (895) / Portuguesa R.



Caicara (855) / Orinoco R.



Canaguan (890) / Portuguesa R.

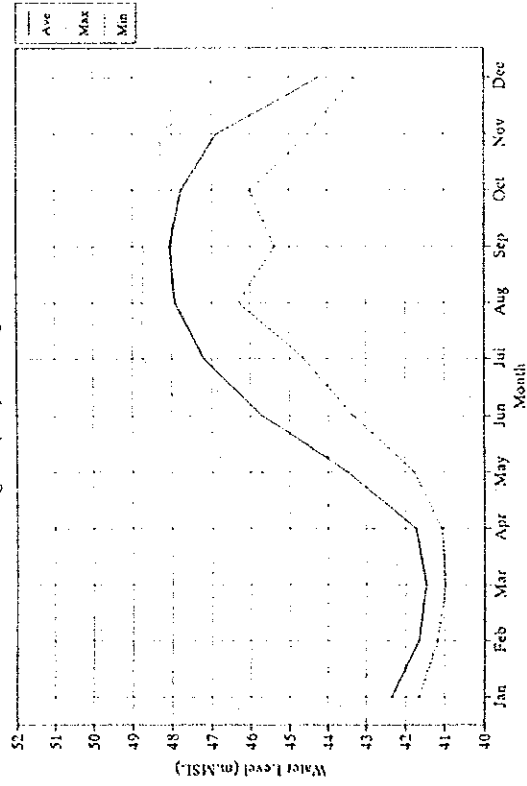
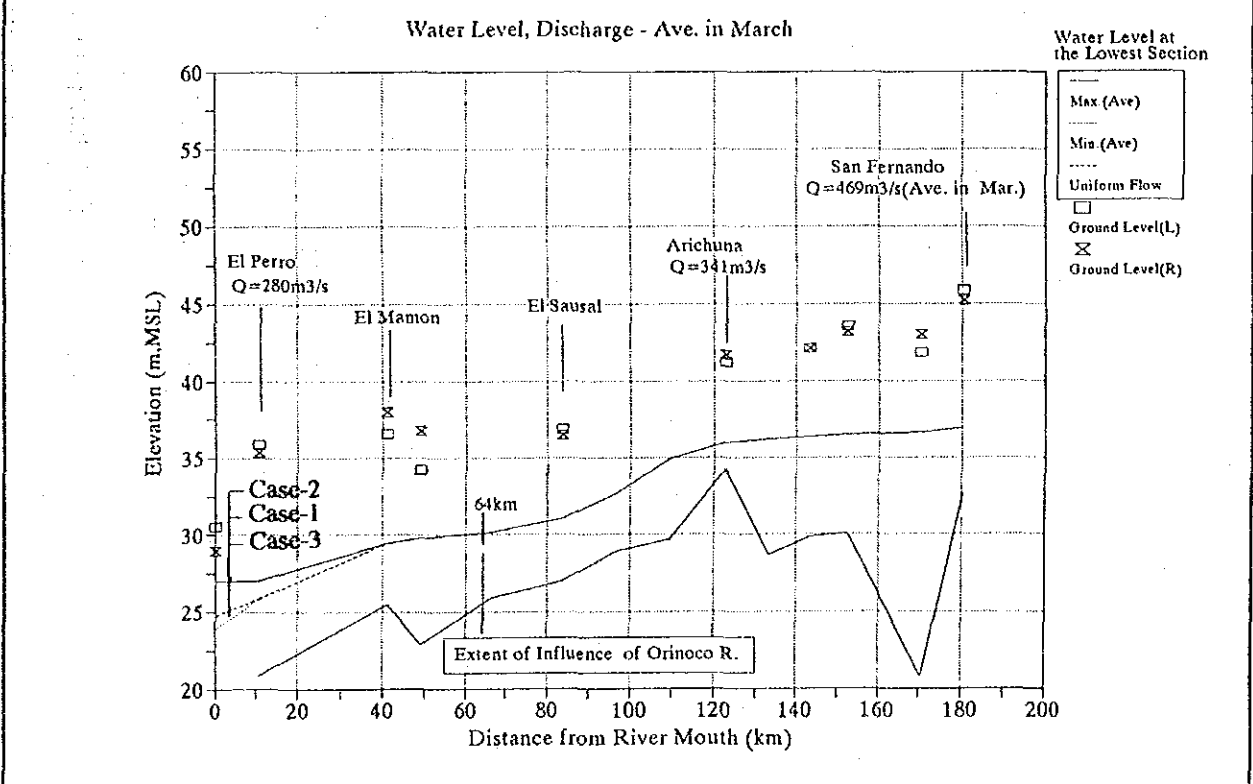
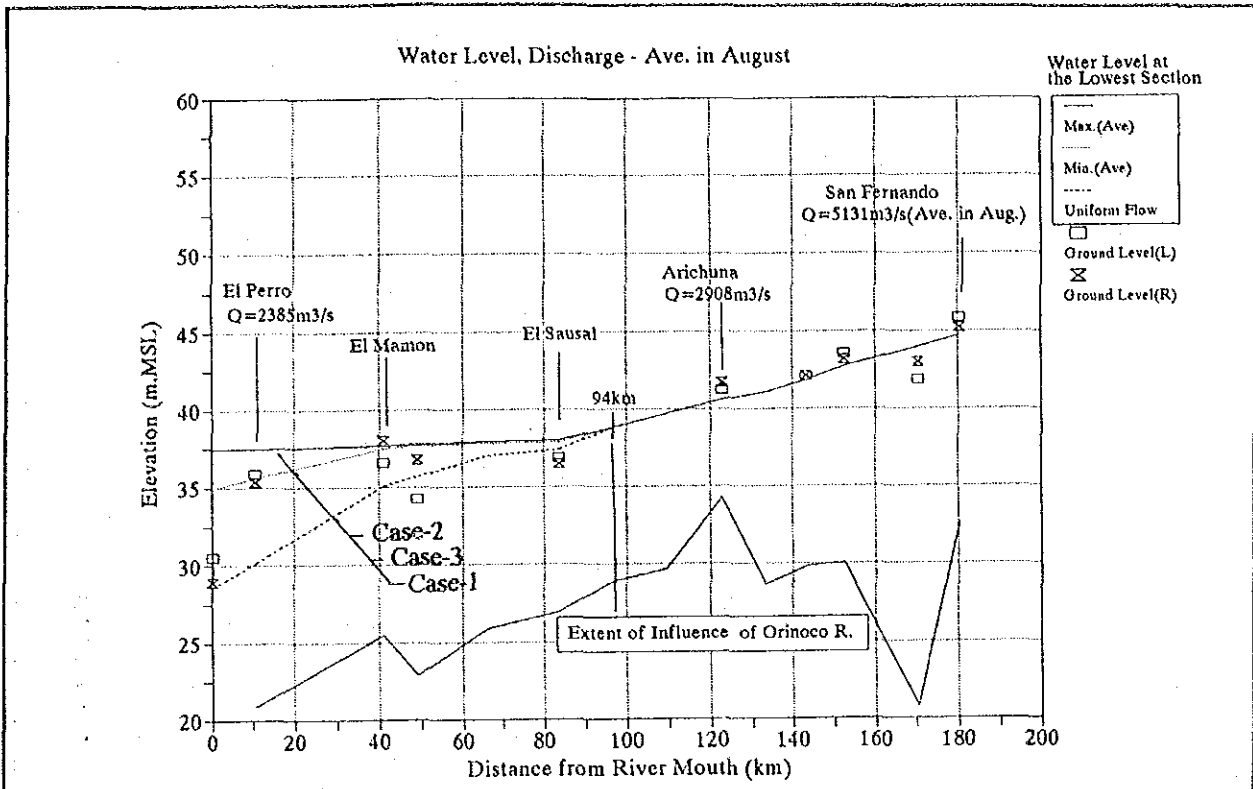
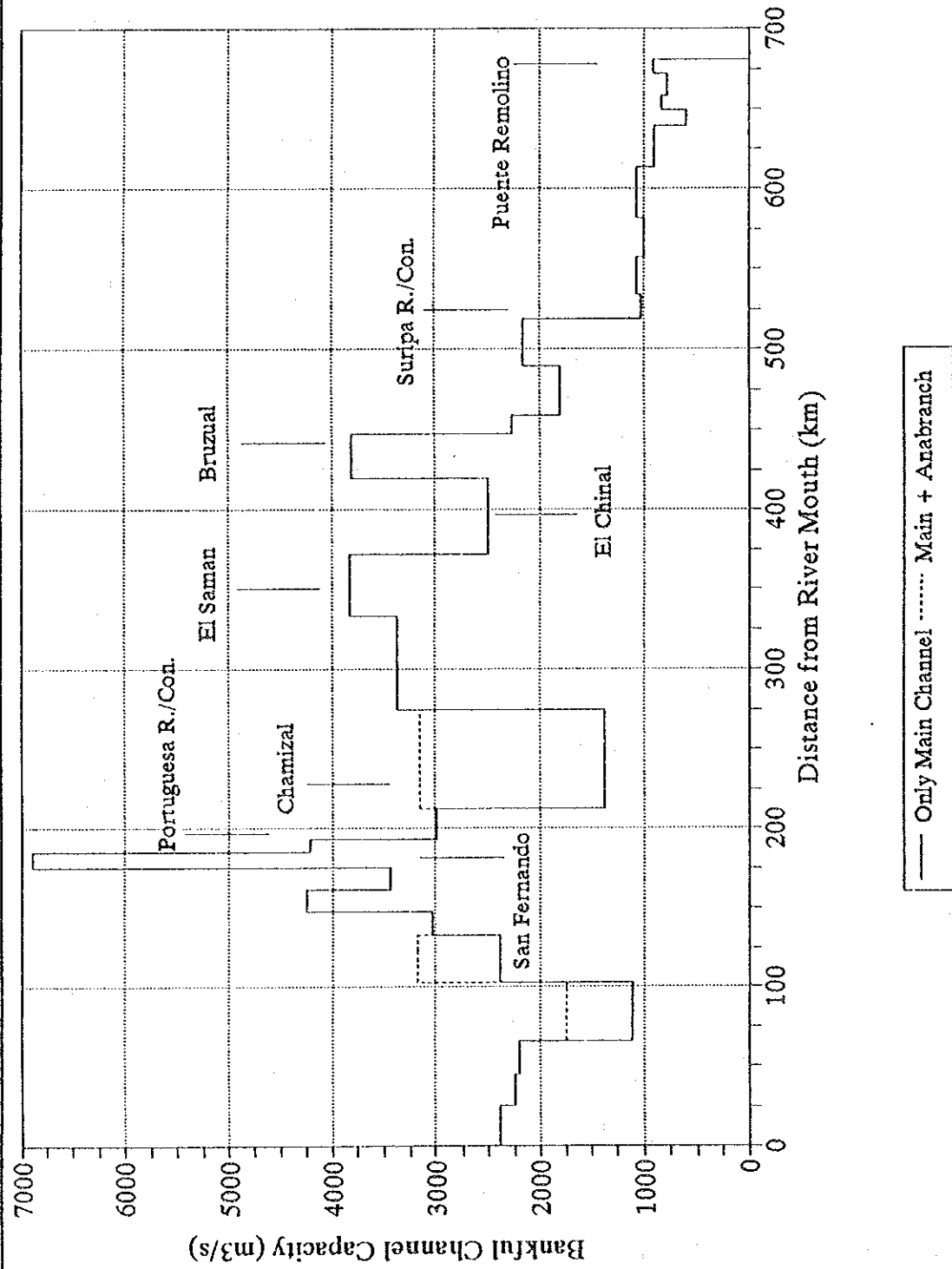


Fig. 4.4.1 Monthly Water Level (2/2)



**Fig. 4.4.2 Extent of Influence of Orinoco River**

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 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY



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Fig. 4.4.3 Bankful Channel Capacity of Apure River

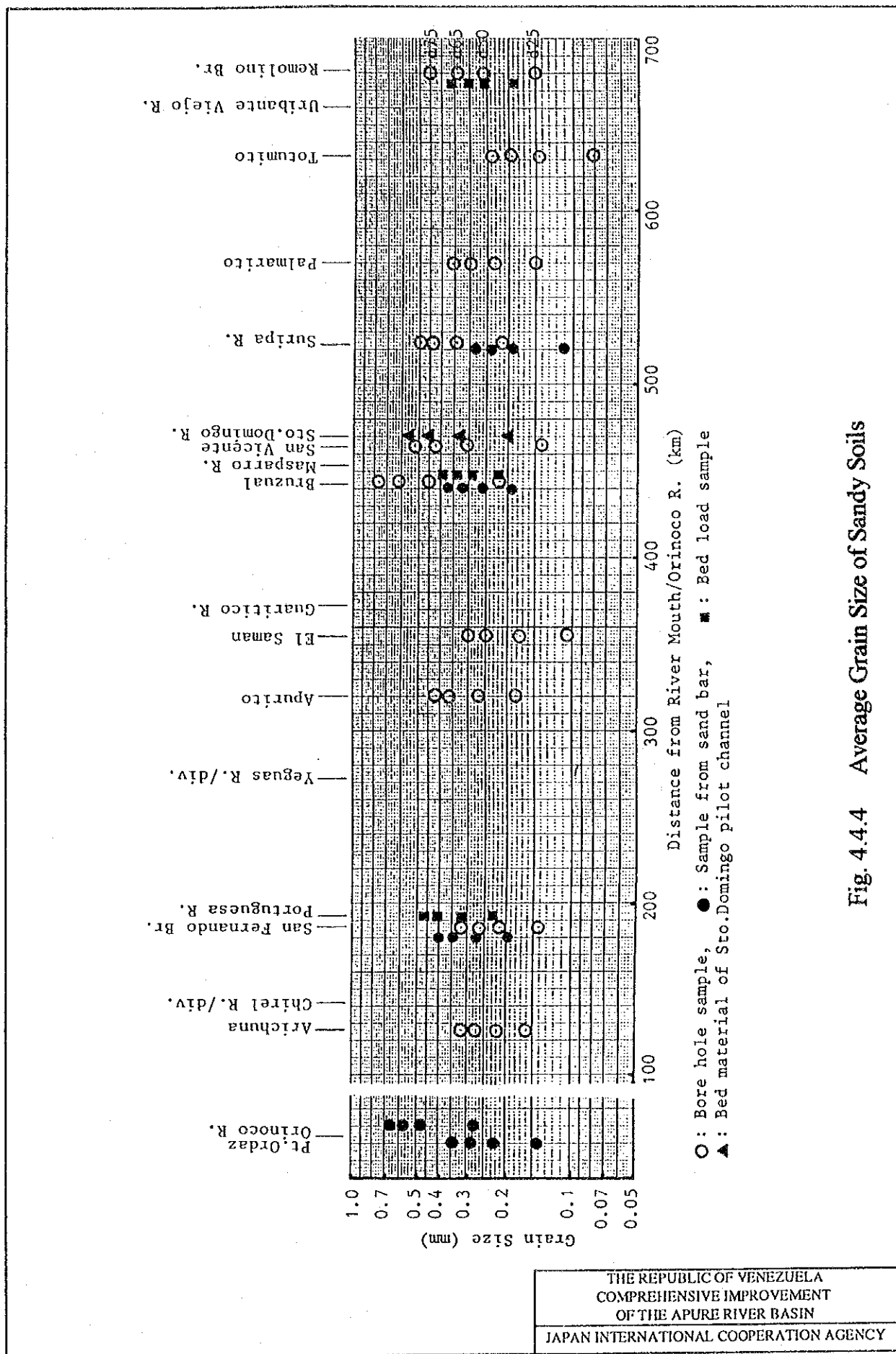
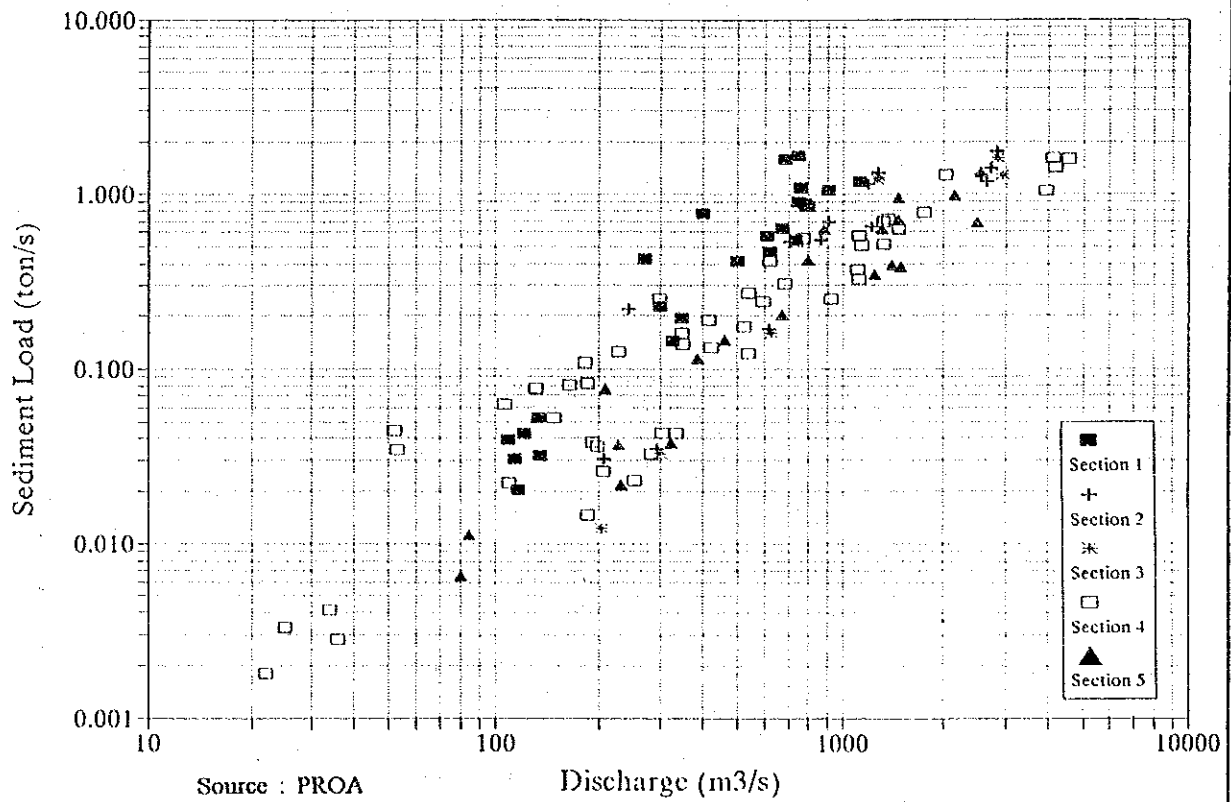


Fig. 4.4.4 Average Grain Size of Sandy Soils

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- Section 1 : Puente Remolino ~ Suripa River /con. (Puente Remolino + Palmalito)  
 Section 2 : Suripa River /con. ~ Bruzual (Bruzual)  
 Section 3 : Bruzual ~ El Saman (El Saman)  
 Section 4 : El Saman ~ San Fernando  
 (Boca de la Rompida + El Foment + Mis Descos + Chamizal  
 + Brazo las Yeguas + San Fernando)  
 Section 5 : San Fernando ~ River Mouth (El Sausal + El Perro)

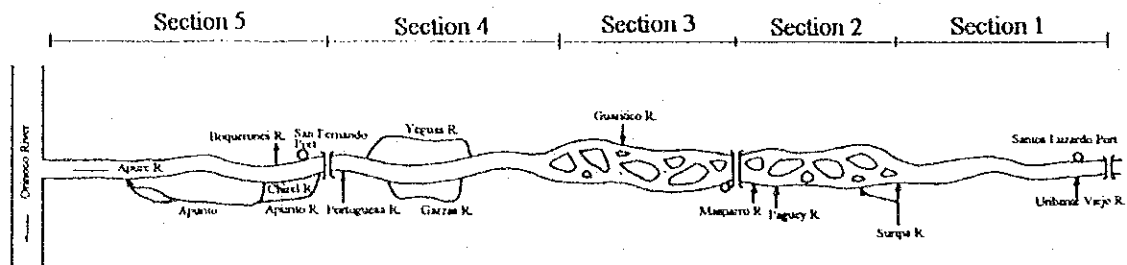


Fig. 4.4.5 Relationship between Sediment Load and Discharge

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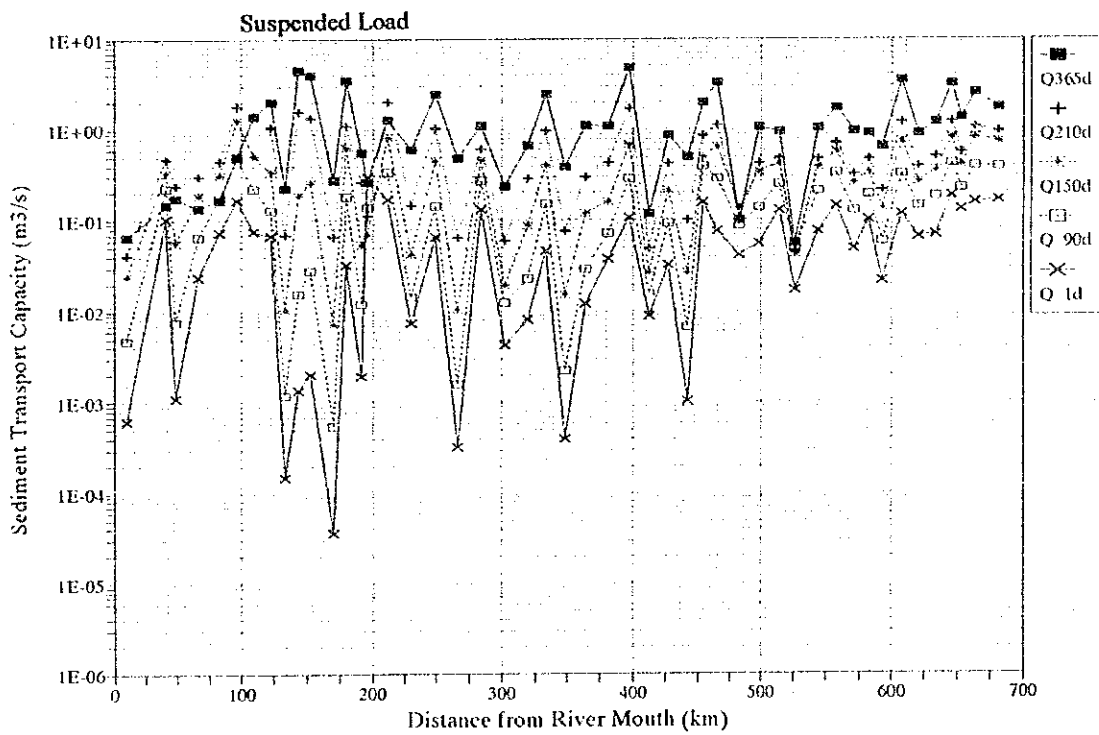
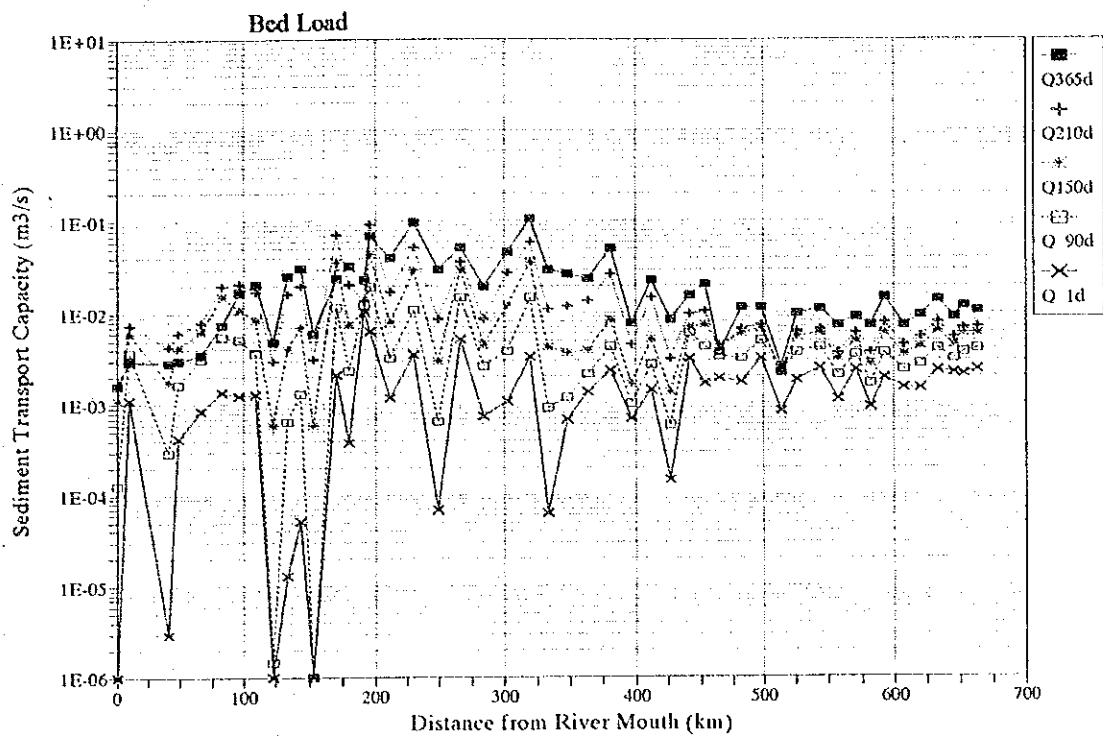
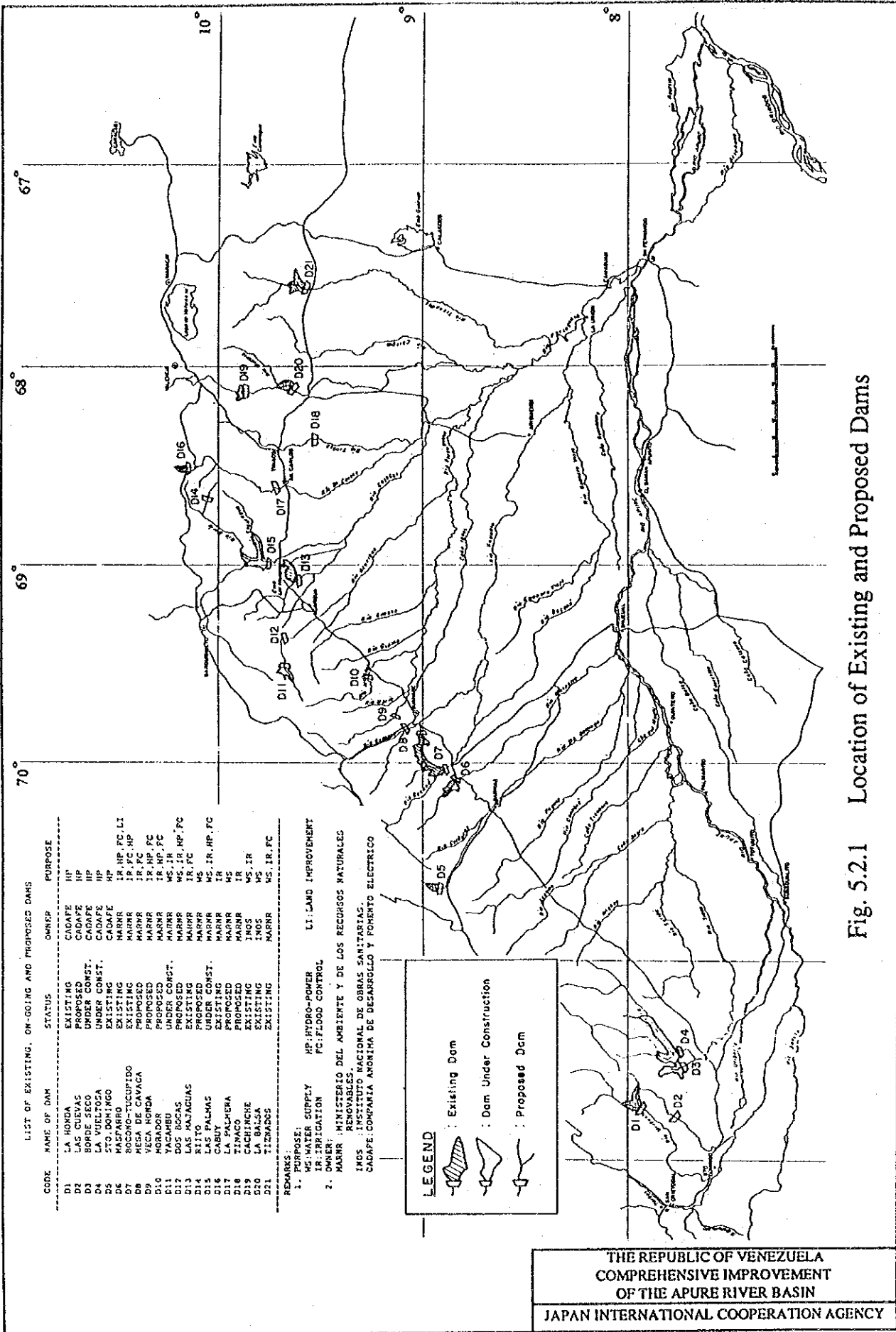


Fig. 4.4.6 Sediment Transport Capacity of Apure River

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LIST OF EXISTING, OR-GOING AND PROPOSED DAMS

CODE	NAME OF DAM	STATUS	OWNER	PURPOSE
D1	LA RONDA	EXISTING	CADAFE	IIP
D2	LAS CUEVAS	PROPOSED	CADAFE	IIP
D3	BORDE SECO	UNDER CONST.	CADAFE	IIP
D4	LA VUELTOZA	UNDER CONST.	CADAFE	IIP
D5	LA VUELTOZA	EXISTING	CADAFE	HP
D6	MARFARRO	EXISTING	MARNR	IR, HP, FC, LI
D7	BOCANO-TUCUPIDO	EXISTING	MARNR	IR, FC, HP
D8	MESA DE CAVACA	PROPOSED	MARNR	IR, HP, FC
DB	MESA RONDA	PROPOSED	MARNR	IR, HP, FC
D9	YACABO	UNDER CONST.	MARNR	IR, HP, FC
D10	DOS BOGAS	PROPOSED	MARNR	WS, IR, HP, FC
D11	LAS MAJAGUAS	EXISTING	MARNR	IR, FC
D12	LA PALMERA	UNDER CONST.	MARNR	WS, IR, HP, FC
D13	RITO	EXISTING	MARNR	IR
D14	LAS PALMAS	UNDER CONST.	MARNR	WS
D15	CABUY	EXISTING	MARNR	IR
D16	LA PALMERA	PROPOSED	MARNR	WS
D17	LA PALMERA	EXISTING	MARNR	IR
D18	CACHICHE	EXISTING	MARNR	WS, IR
D19	LA BALSA	EXISTING	INOS	WS, IR
D20	LA BALSA	EXISTING	INOS	WS, IR
D21	TIZNADOS	EXISTING	MARNR	WS, IR, FC

REMARKS:

- PURPOSE:  
 WS: WATER SUPPLY  
 IR: IRRIGATION  
 HP: HYDRO-POWER  
 FC: FLOOD CONTROL  
 LI: LAND IMPROVEMENT
- OWNER:  
 MARNR: MINISTERIO DEL AMBIENTE Y DE LOS RECURSOS NATURALES  
 INOS: INSTITUTO NACIONAL DE OBRAS SANITARIAS  
 CADAFE: COMANIA ANONIMA DE DESARROLLO Y FOMENTO ELECTRICO

**LEGEND**

- Existing Dam
- Dam Under Construction
- Proposed Dam

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 COMPREHENSIVE IMPROVEMENT  
 OF THE APURE RIVER BASIN  
 JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 5.2.1 Location of Existing and Proposed Dams

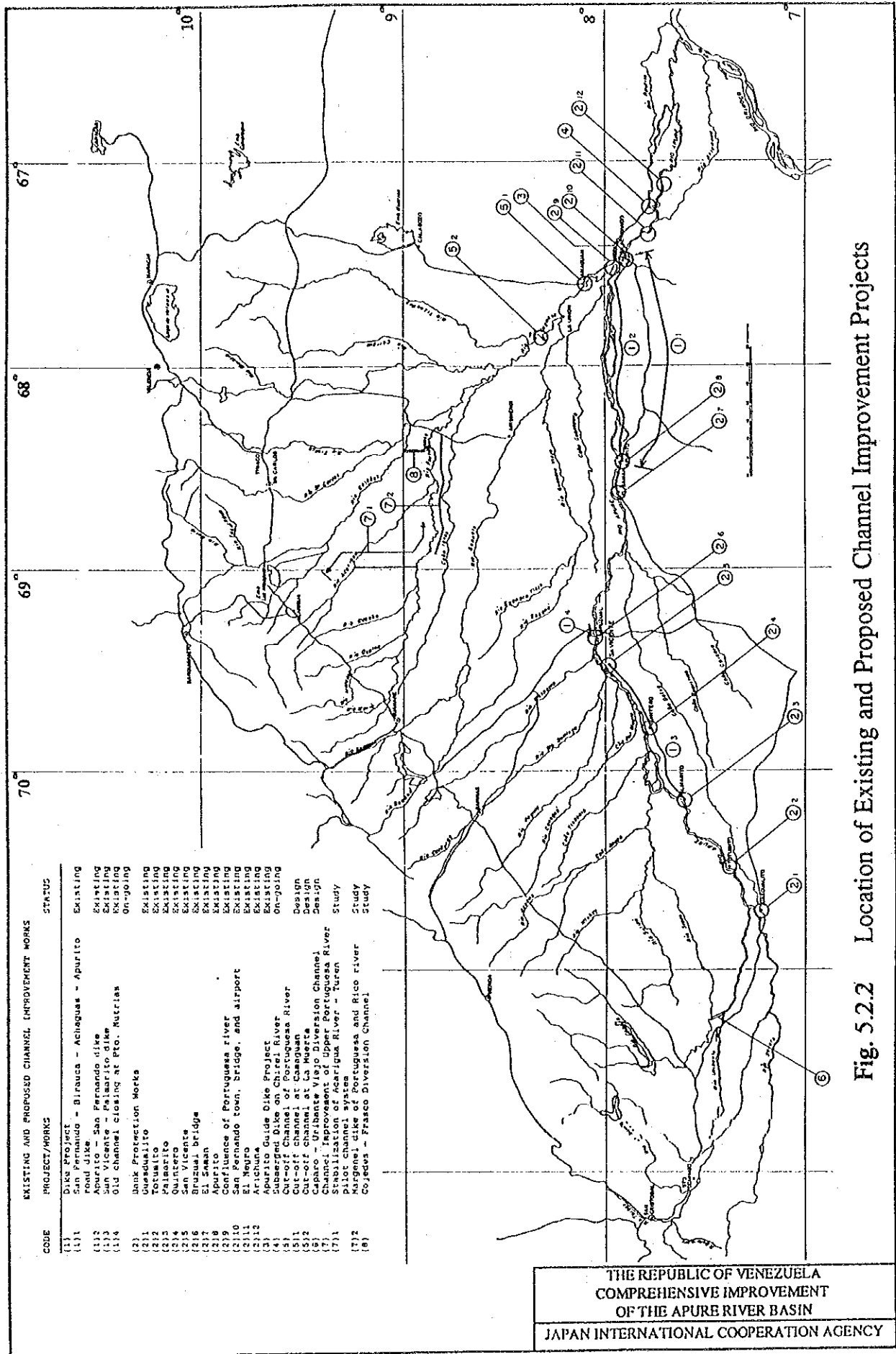


Fig. 5.2.2 Location of Existing and Proposed Channel Improvement Projects

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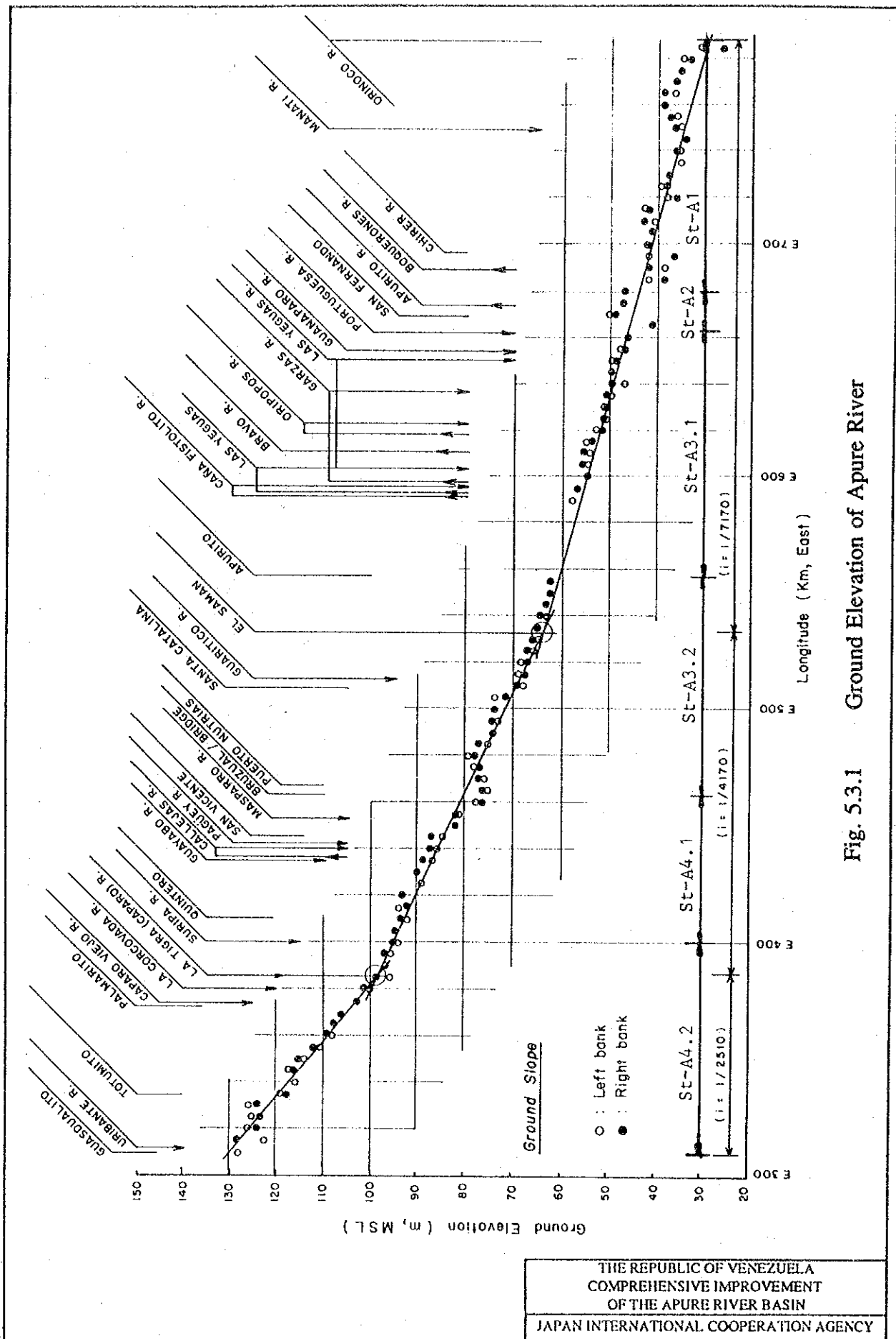


Fig. 5.3.1 Ground Elevation of Apure River

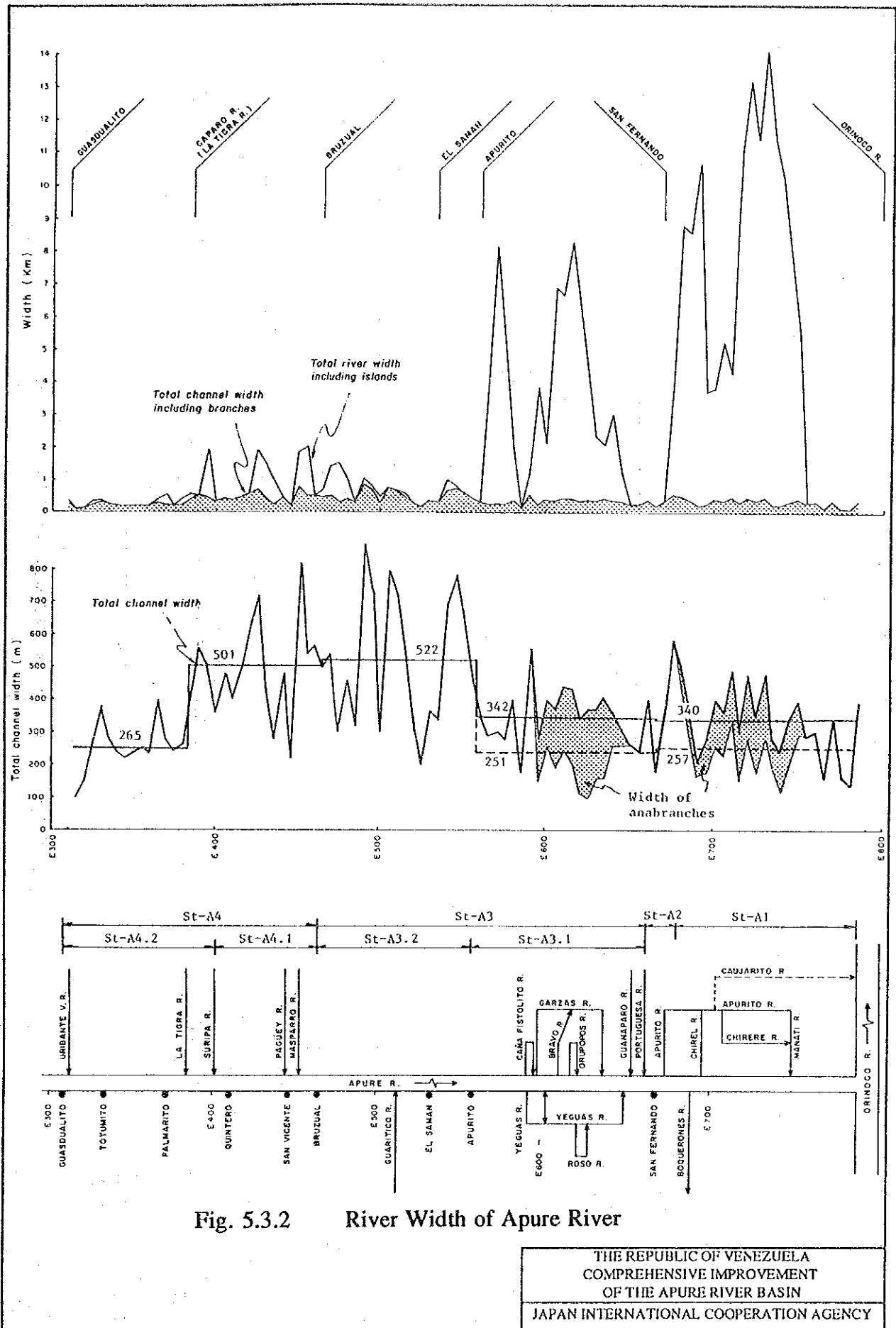


Fig. 5.3.2 River Width of Apure River

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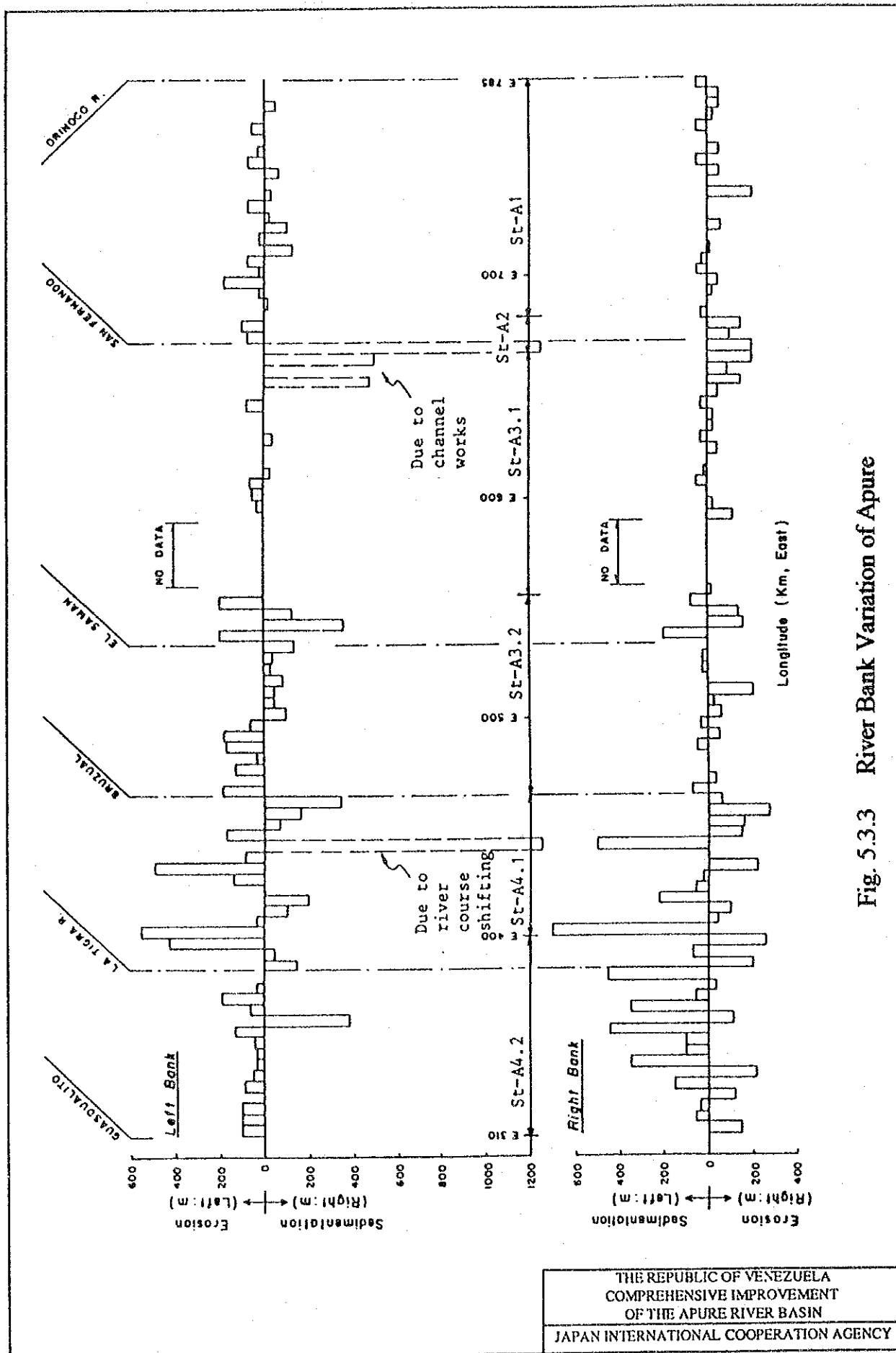


Fig. 5.3.3 River Bank Variation of Apure

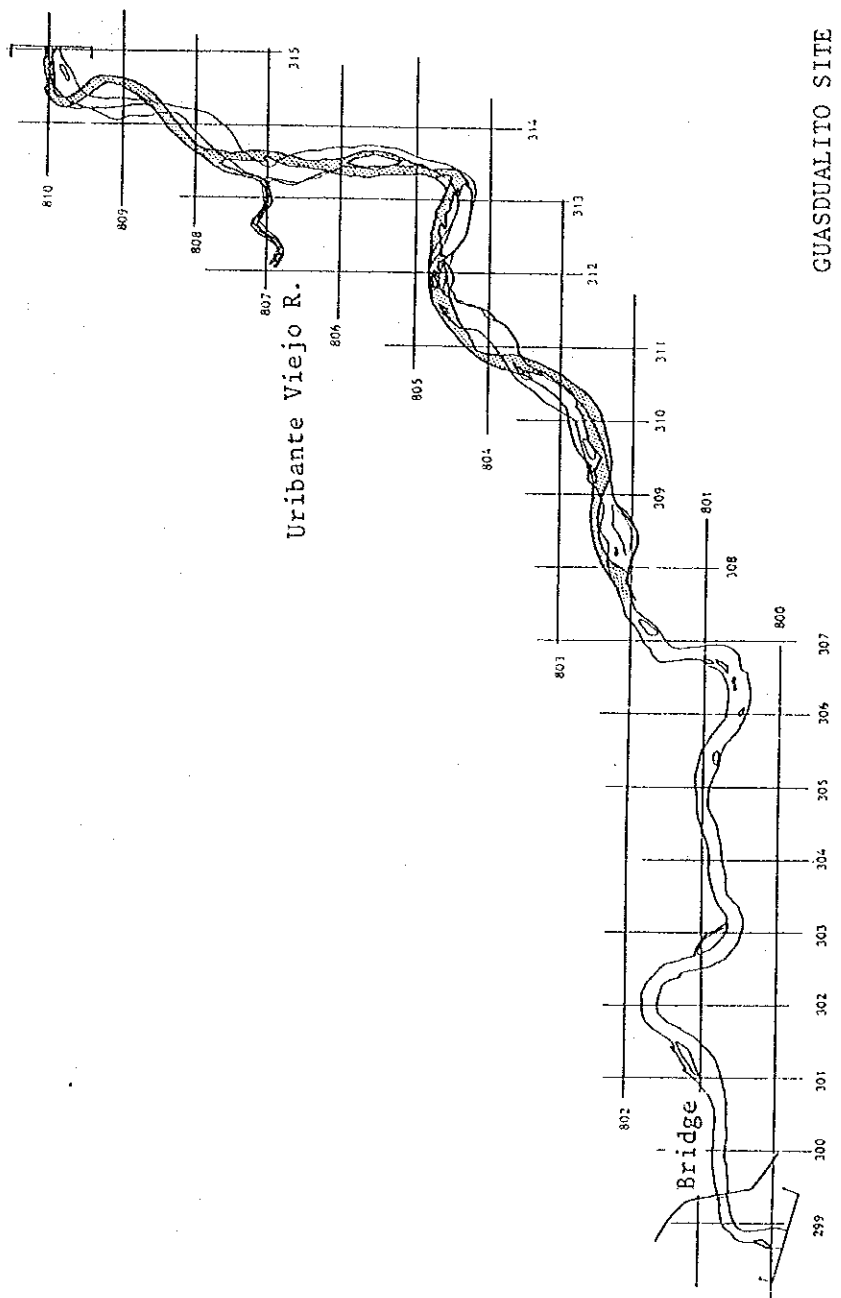


Fig. 5.3.4 River Course Shifting (1/3)

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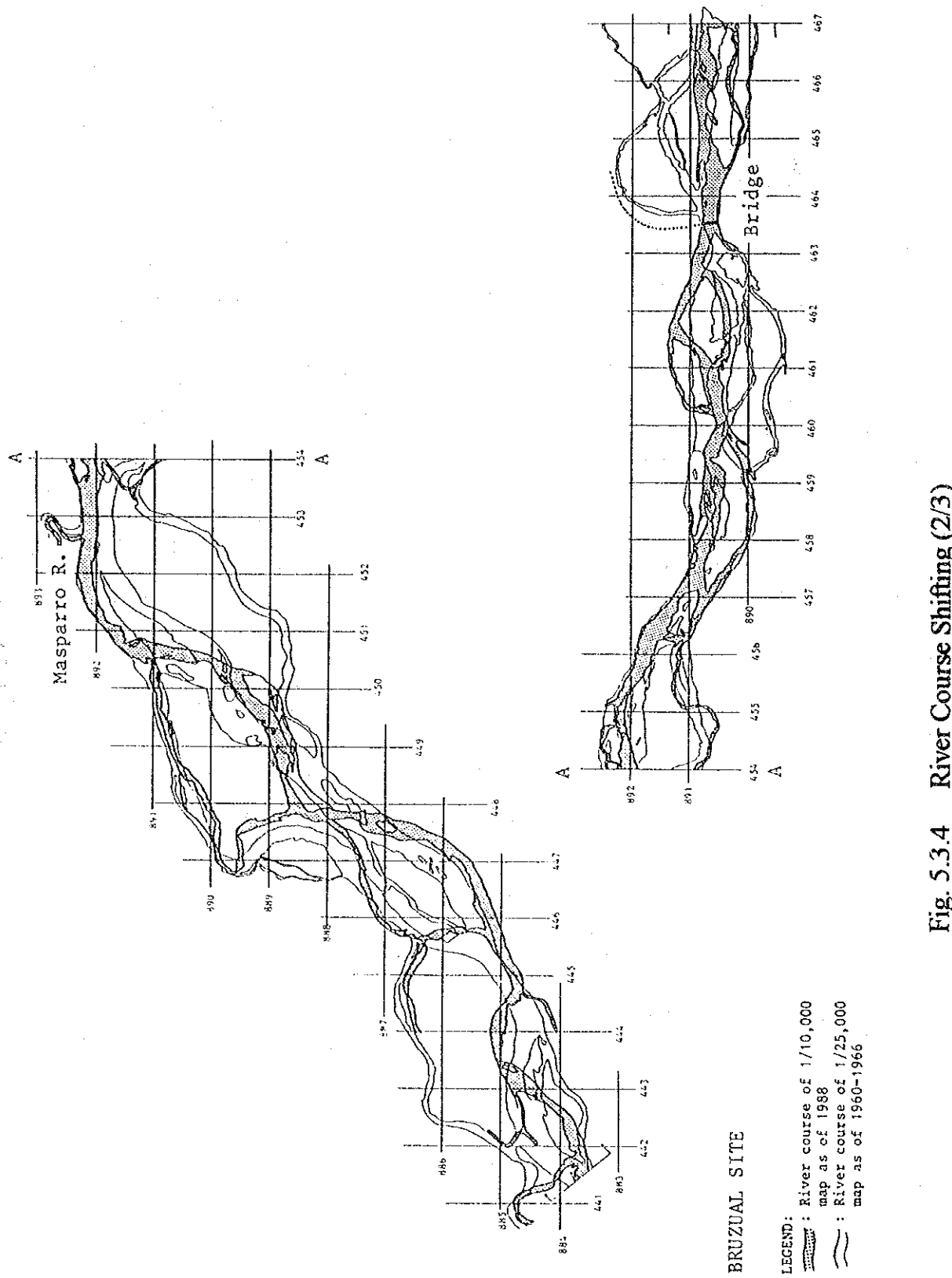


Fig. 5.3.4 River Course Shifting (2/3)

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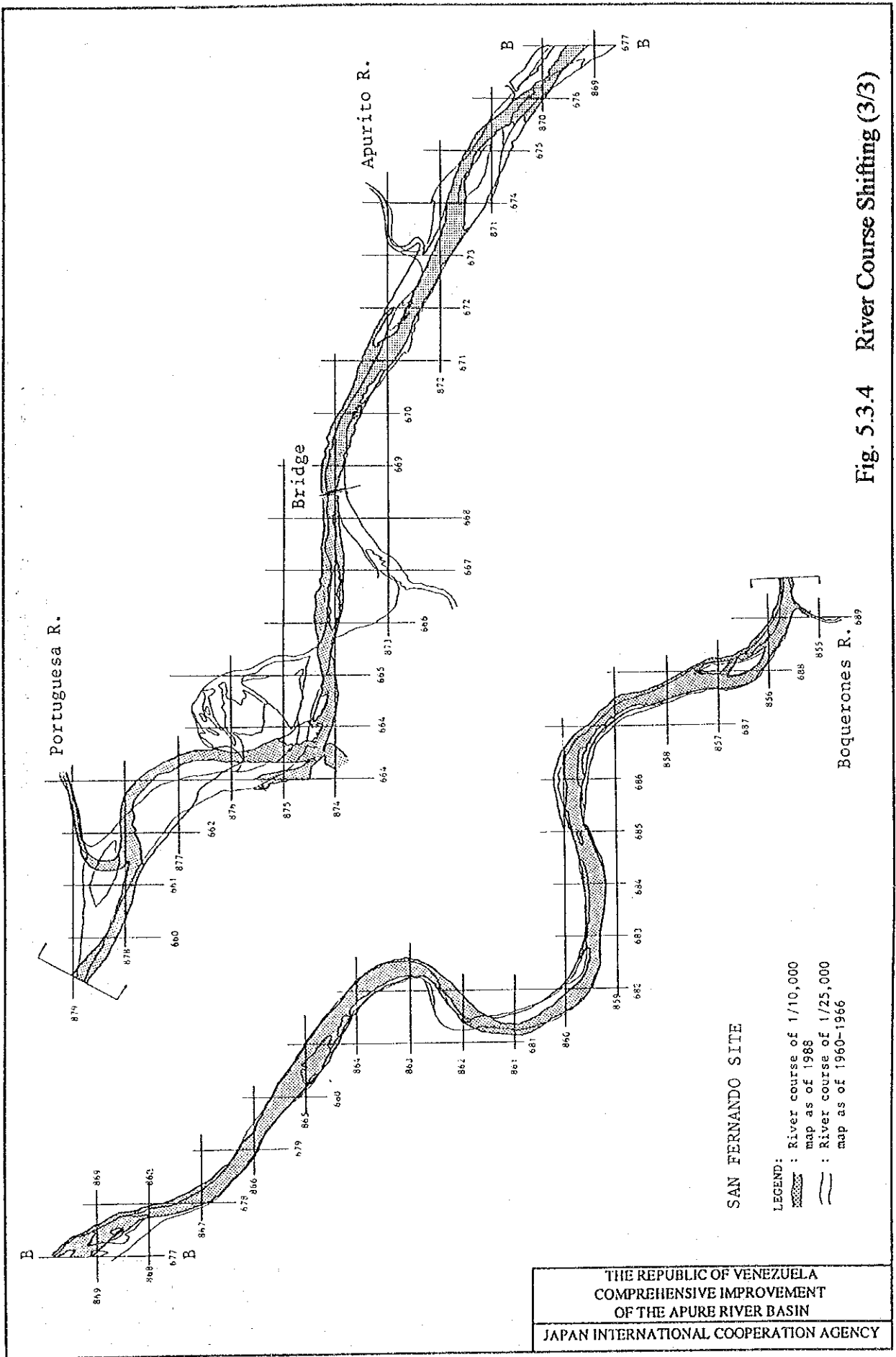
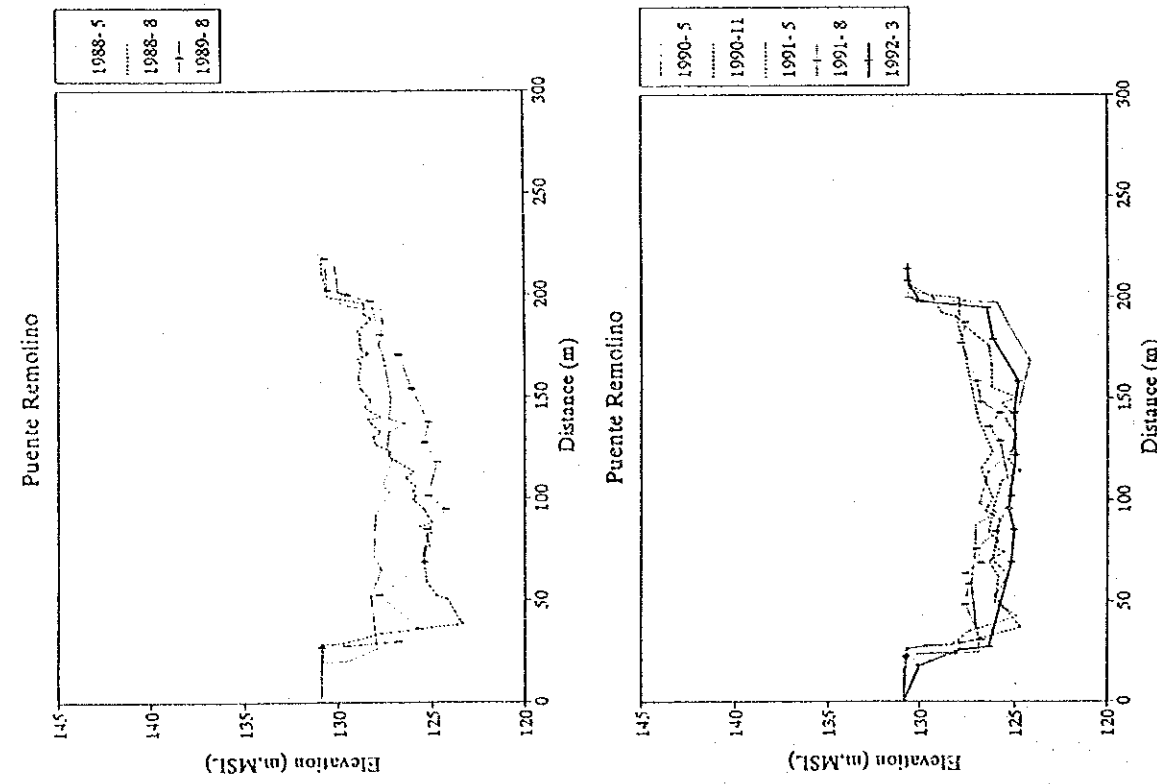
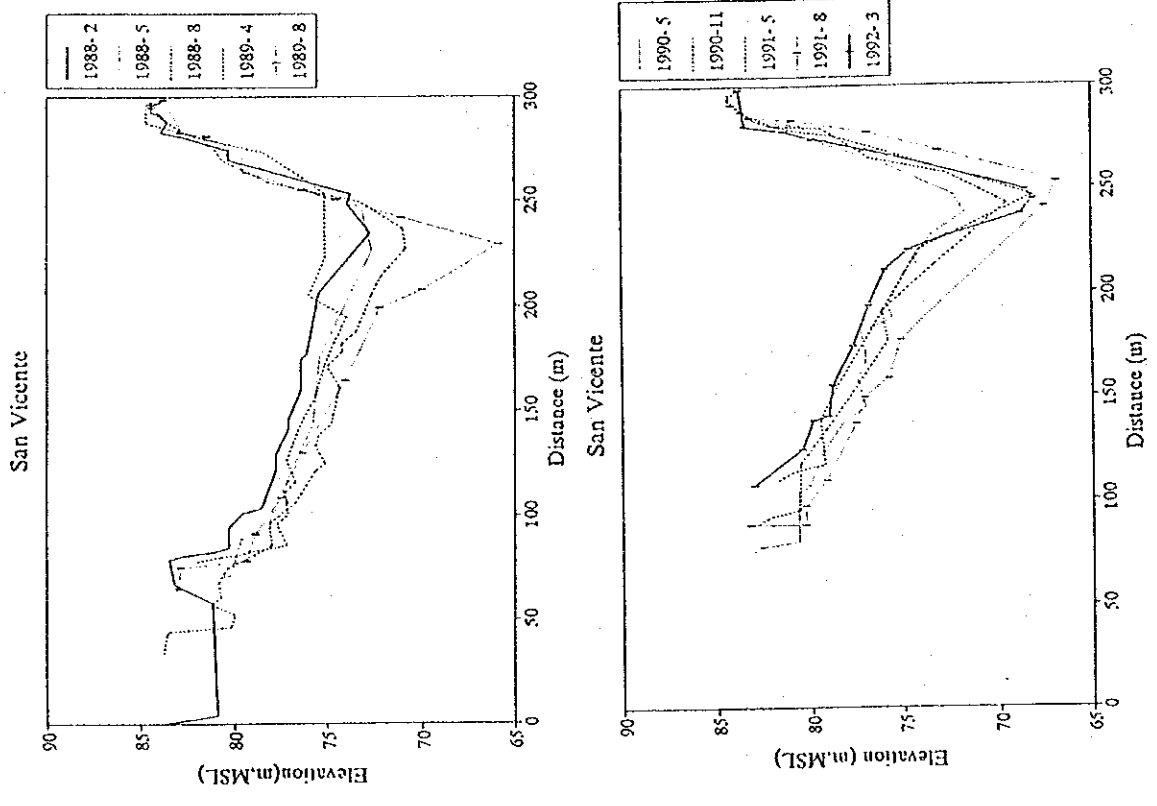


Fig. 5.3.4 River Course Shifting (3/3)





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Fig. 5.3.5 Change of Representative River Sections (1/3)

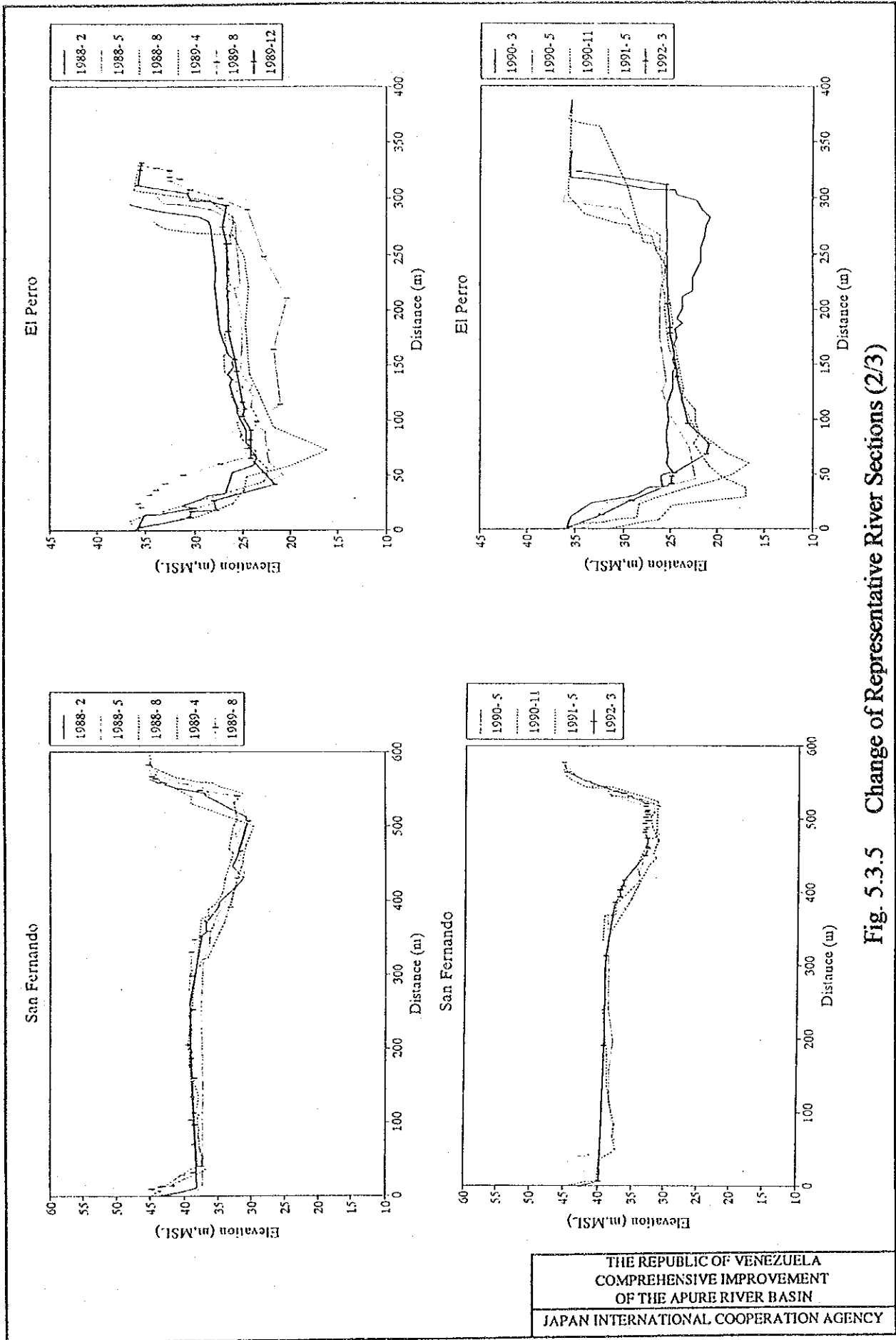


Fig. 5.3.5 Change of Representative River Sections (2/3)

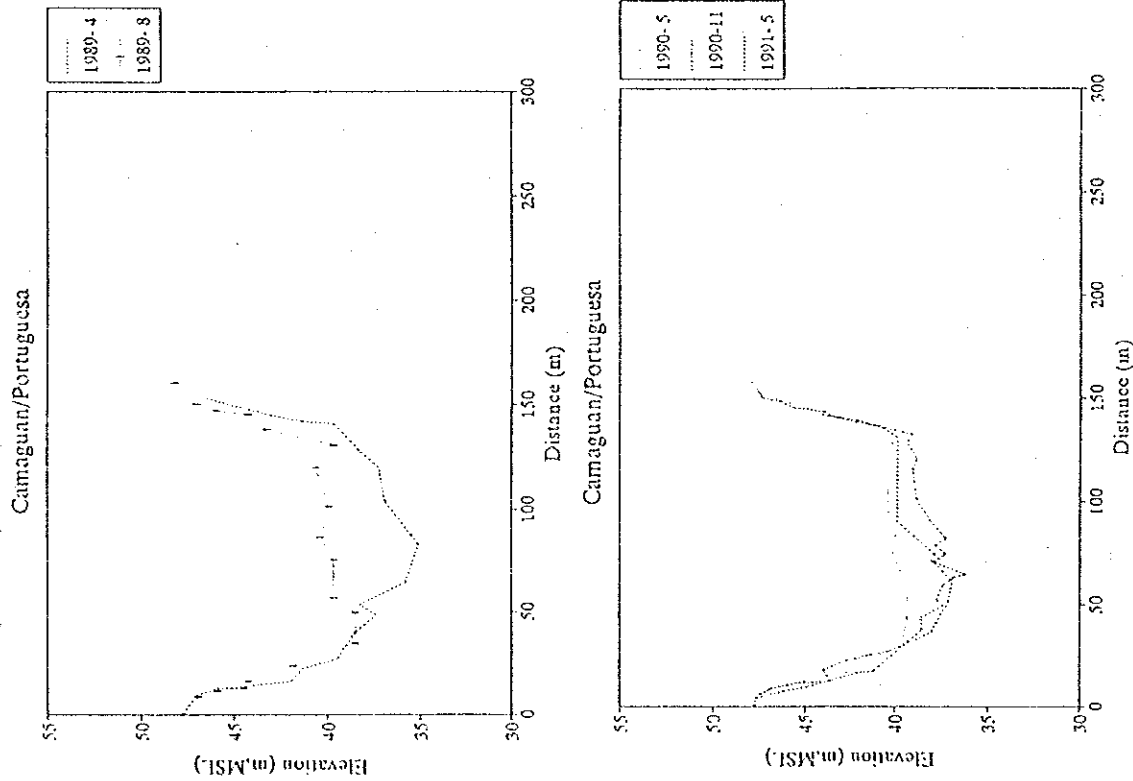


Fig. 5.3.5 Change of Representative River Sections (3/3)

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 OF THE APURE RIVER BASIN  
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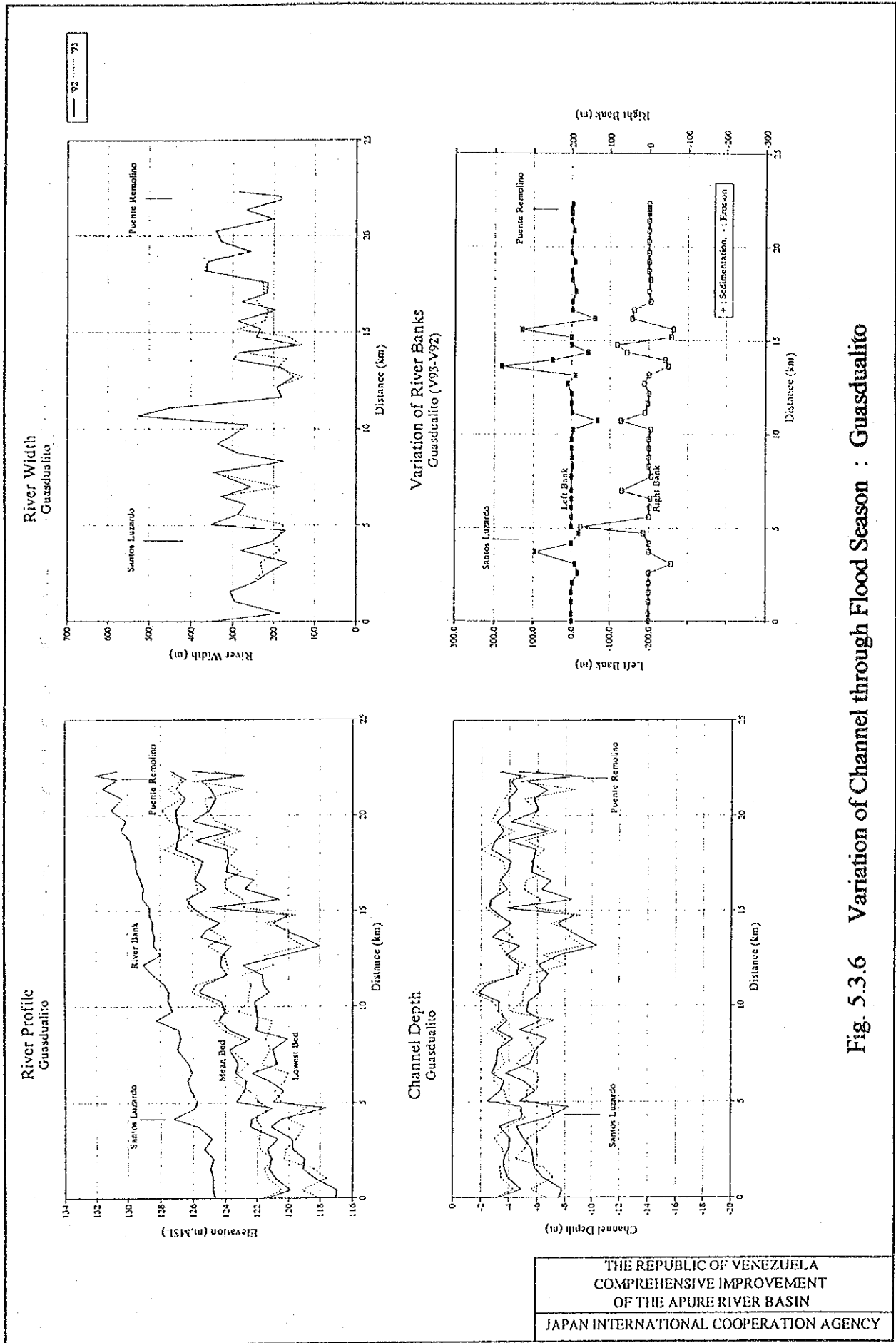
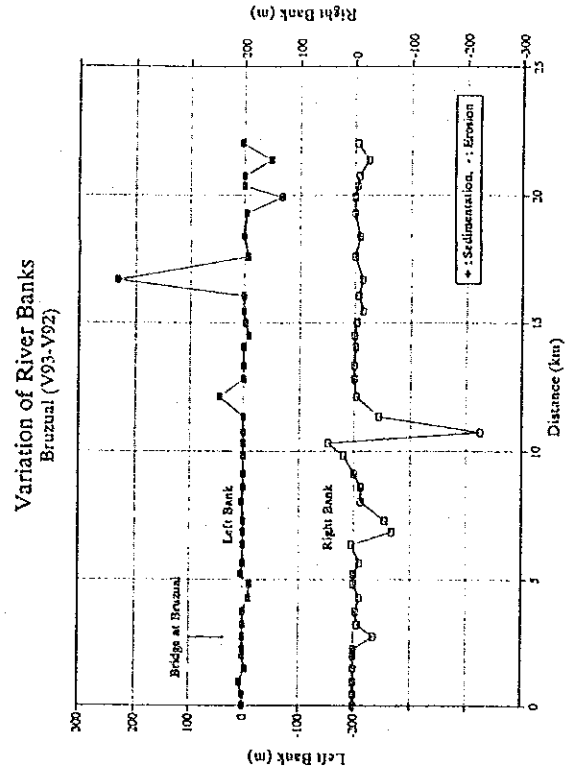
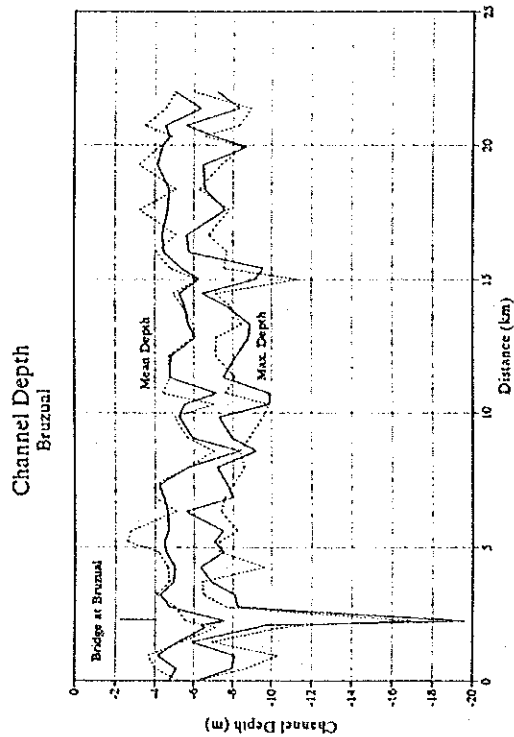
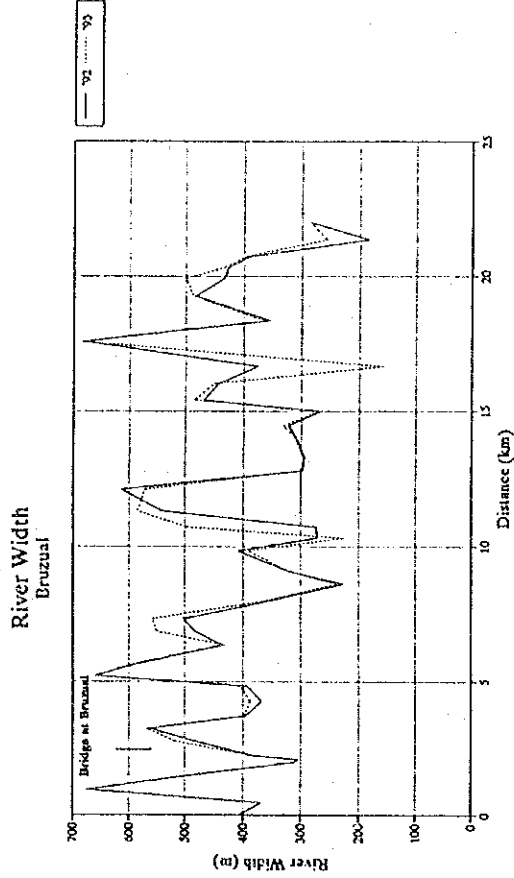
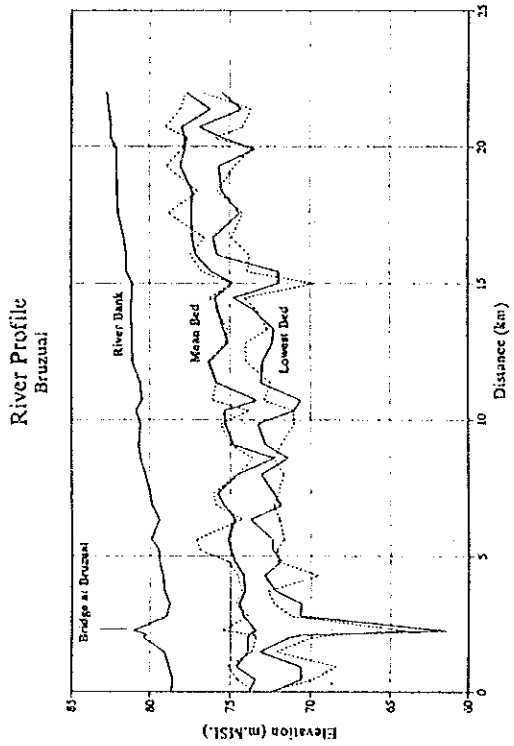


Fig. 5.3.6 Variation of Channel through Flood Season : Guasualito

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**Fig. 5.3.7 Variation of Channel through Flood Season : Bruzual**

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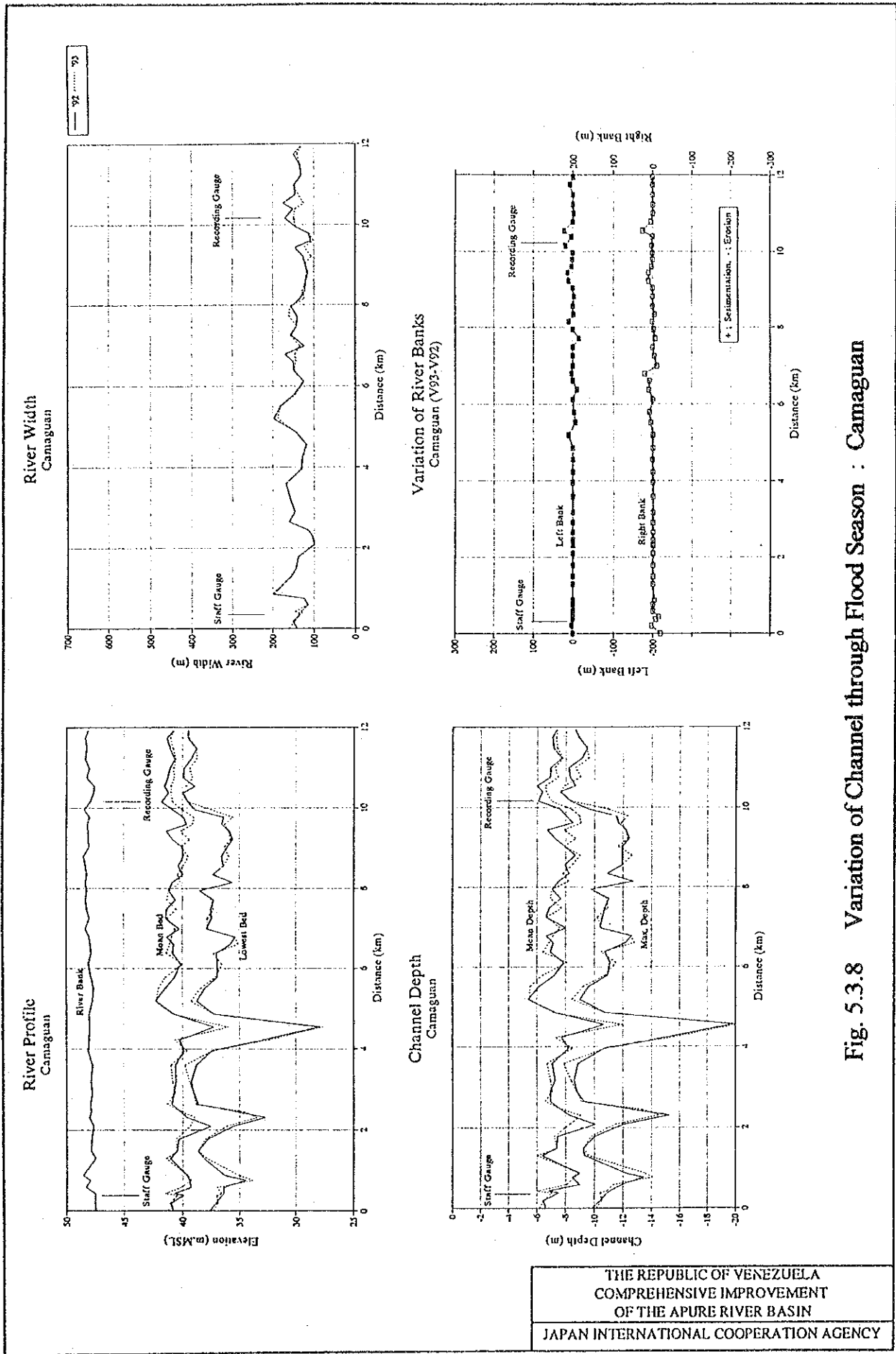


Fig. 5.3.8 Variation of Channel through Flood Season : Camaguan

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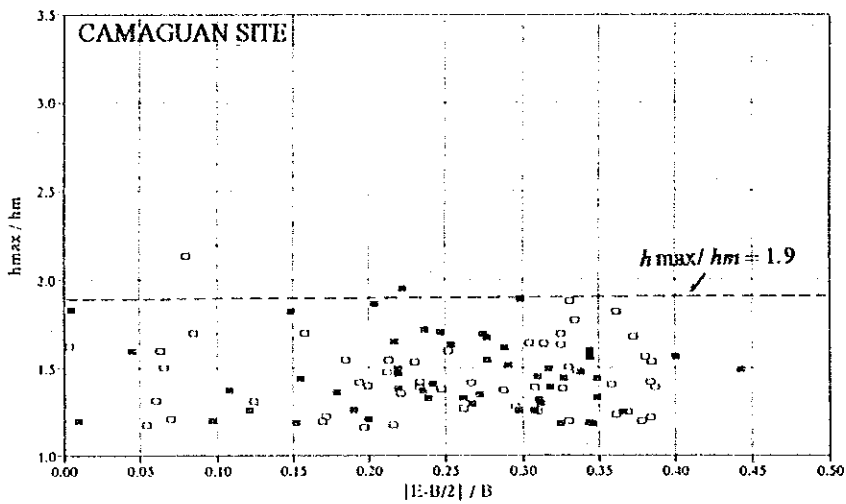
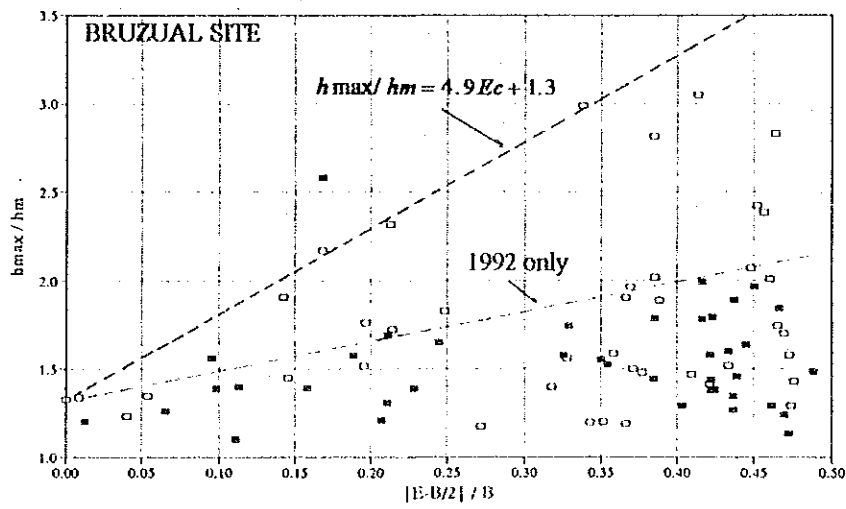
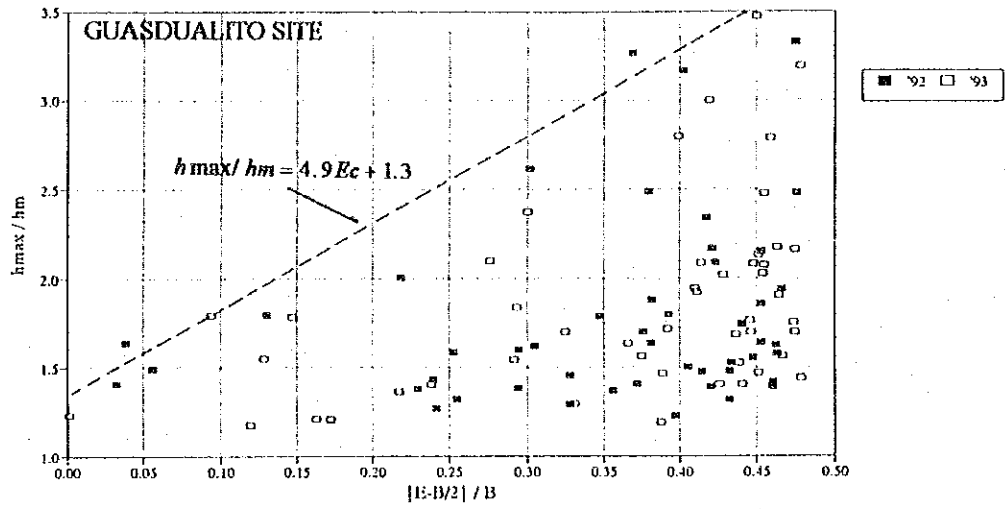


Fig. 5.3.9 Relationship between Eccentricity and Depth Ratio

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