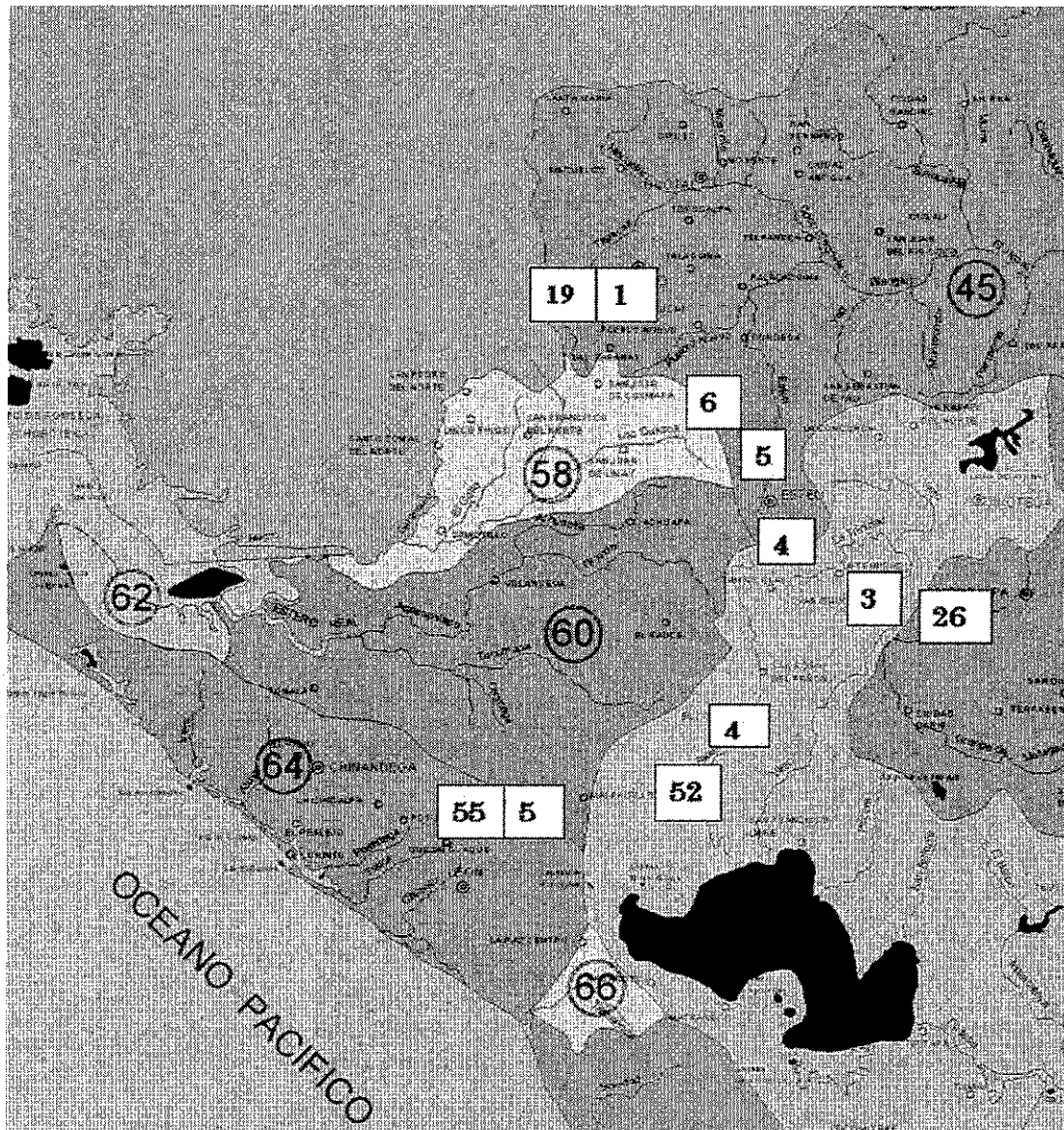


Appendix A3

Hydrological Data (Chapter 8)

- A3.1 Basin Map and Location Site*
- A3.2 Isohyet Map and Location of Stations*
- A3.3 Precipitation Data*
- A3.4 Watershed Map*

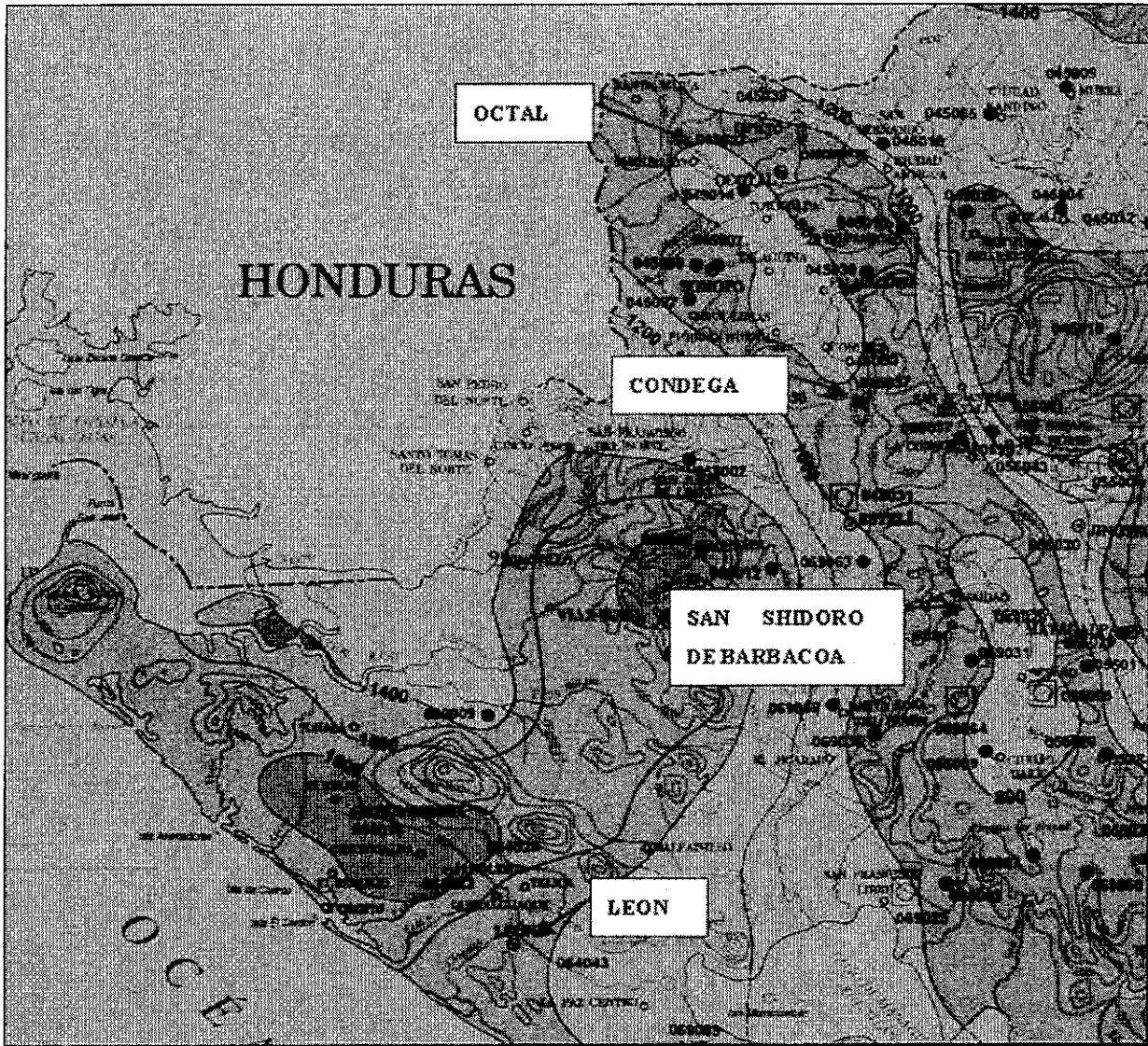
Appendix A3.1 Basin Map and Location of the Study Site



Route	Serial No.	Point from Managua	Bridge name	Remark
NIC.1	3	113.19 km	El Junquillal	Via Sebaco
-Ditto-	4	135.64	San Nicolas	-Ditto-
-Ditto-	5	150.33	Las Chanillas	-Ditto-
-Ditto-	6	151.85	San Ramón	-Ditto-
-Ditto-	18	226.89	Río Inalí	-Ditto-
-Ditto-	19	223.25	Río Tapacalí	-Ditto-
NIC.3	26	119.05	El Guayacan	Via Sebaco
NIC.26	45	170.952	La Banderita	Via Leon
-Ditto-	52	156.785	San Juan de Dios	-Ditto-
-Ditto-	54	108.154	Papalón	-Ditto-
-Ditto-	55	107.533	Solis	-Ditto-

Figure Basin Map and Location of the Study Site

Appendix A3.2 Isohyet Map and Location of Stations



Station Name	ID Code	Record Length	Basin Number
Condega	45003	1958-2001	45
Ocotal	45017	1985-2000	45
Leon	64043	1974-2002	64
San Isidro de Barbacoa	69029	1958-2000	69

Figure Isohyet Map and Location of Stations

Appendix A3.3 Precipitation Data

Table Precipitation Data Ocotal

RAINFALL RECORDS FROM OCOTAL

Meteorological Station : OCOTAL

Code No.: 45017

Parameter : PRECIPITATION

Period : 1980-2000

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1980	0	1	1.2	3.3	273.8	190.5	96.8	61.1	190.3	337.1	51.6	1.6	1208.3
1981	1.6	2.6	6.4	3.9	254.7	281	46.5	250	153.5	61.6	4.5	12.7	1079.0
1982	5.9	0.8	0.9	41.4	248.4	204.7	49	46.6	117.6	91.5	11	2.4	820.2
1983	0.1	2.3	0.1	33.6	181.3	228.5	47.6	79.1	99.6	139.3	73.6	9.4	894.5
1984	7.2	4.5	79.5	55	48.3	125.2	106.9	145.8	316.4	66	4.5	3.2	962.5
1985	1.8	2.7	2.6	49.5	188.2	84.2	92.6	62.5	98.4	96.6	29.8	10.5	719.4
1986	0.8	0	0	0.5	231.3	177.7	49.5	41.6	67.2	92.1	16.4	4.5	681.6
1987	3.9	0.8	11.8	18.4	108.4	154.8	116.7	50.7	84.8	12.4	3.8	3	569.5
1988	0.6	6	17.3	163	196.1	131.2	88.5	258	307.2	168.6	24.40	5.91	1366.8
1989	2.43	2.30	0.4	0	17.2	73.3	39.9	112.2	216.4	33.9	25.7	10.3	534.0
1990	1.2	1.5	0.4	86	100.2	61	44.4	100.8	92.5	95.4	156.7	30.1	770.2
1991	1.3	0	1.2	1.4	188	99.8	39.1	59.4	33.8	191.5	33.3	4.52	653.3
1992	4.6	23	0.9	0.5	130.4	122.1	61.8	56.4	62.2	86.6	2.1	6.1	556.7
1993	2.3	0	11.3	70.8	256.5	120.8	43.7	84.6	269.5	53.8	2.9	1.8	918.0
1994	5.4	1.1	2.2	47.3	112.7	44.5	30.5	60.9	106.8	98.9	37.1	5.3	552.7
1995	0.8	1.8	44.2	161.3	67	148.4	45.7	288.9	169.7	153.4	14.3	14.2	1109.7
1996	2.8	0.7	1	30.7	163.7	26.4	161.3	230.7	89.6	311.3	82.8	0.2	1101.2
1997	3.6	2.6	3.7	24.6	25.6	229.2	58.4	30	157.3	140.5	21.3	0	696.8
1998	0	0	24.9	2	107.1	109.4	169.4	252.3	208.2	776.2	66.3	1.3	1717.1
1999	5.7	38.6	11.1	10.7	68.5	68.6	132.7	82.7	310.3	150.3	41.7	1.6	922.5
2000	6.4	4	0	0	61	12.1	42.3	46.6	179.6	75.1	2.2	10.2	439.5
Average	2.8	4.6	10.5	38.3	144.2	128.3	74.4	114.3	158.6	153.9	33.6	6.6	870.2
MAX	7.2	38.6	79.5	163.0	273.8	281.0	169.4	288.9	316.4	776.2	156.7	30.1	1717.1
MIN	0.0	0.0	0.0	0.0	17.2	12.1	30.5	30.0	33.8	12.4	2.1	0.0	439.5

Table Precipitation Data Condega

RAINFALL RECORDS FROM CONDEGA

Meteorological Station : CONDEGA

Code : 45003

Parameter : PRECIPITATION

Period : 1980-2000

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1980	1.5	1.5	0	4.5	207.8	119.8	108.4	101.6	140.9	294.2	42.3	7	1029.5
1981	0	4.5	36.6	16.4	185.5	310.5	43.7	166	53.4	118	9.6	32.7	976.9
1982	2.5	7.8	0.5	67.8	307.4	170.8	52.8	39.8	89.3	62.3	18.3	10.3	829.6
1983	0.3	2.7	7.7	69.2	72.2	191.5	45.5	138	90.1	52.7	51.1	14.7	735.7
1984	1.2	6	54.5	14.9	58	82.2	161.9	164.7	214.2	72.8	3.5	4.5	838.4
1985	2.6	0.5	2.4	19.4	79.5	37.4	82.7	24.5	47.1	143	43.9	7.5	490.5
1986	3	1	0	0	291.9	107.3	71.4	65.7	79.9	78.1	10.2	2.7	711.2
1987	22.5	2.2	63.6	18.4	119	63.4	75.4	143	75.1	115.1	27.1	15.9	740.7
1988	17.2	2.4	15.2	104.1	103.7	186.2	53.4	209	355.1	105.3	16.5	8.7	1176.8
1989	11.2	13.1	1.5	0	39.4	100.2	58.4	138.9	289.9	22.5	39.9	7.6	722.6
1990	8.4	6.3	3	15.7	97.4	31.1	40.2	115.8	85.4	194.3	104.2	26.1	727.9
1991	9	2.4	0.2	0.2	126	86.7	115.3	48.6	0	140	54.4	14.4	597.2
1992	5.1	8.8	2.5	2.7	95.6	68.2	59.5	25.6	141.7	61.7	3.8	17.1	492.3
1993	10.6	4.3	2	93.6	213.8	234.7	49.6	104.7	200.9	80.1	11.4	14.9	1020.6
1994	12.7	9.8	1.7	34.8	66.1	65.8	19.3	82.8	138.8	107.2	57.5	3.6	600.1
1995	2.8	2.2	59.6	85.9	38.9	184.5	118.6	215.8	203.9	197.9	32.7	16.6	1159.4
1996	8.1	2	2.8	0.7	192.2	52.1	136.3	170.7	108.2	226.3	189.4	9.3	1098.1
1997	60	3.6	13.2	2.7	10.7	179.3	58.9	54.5	76.1	226.3	51.8	2.3	739.4
1998	3.8	0	80.1	0.2	61.6	98.2	70.2	214.7	197.7	615.1	1.6	17.6	1360.8
1999	12.1	74.2	14.7	24.1	97.1	97	62.2	47.1	262.2	221.5	23.3	3.9	939.4
2000	11	4.2	0	0.1	110.3	96.4	39.9	64.1	218.6	84.4	28	10.3	667.3
Average	9.8	7.6	17.2	27.4	122.6	122.1	72.6	111.2	146.1	153.3	39.1	11.8	840.7
MAX	60.0	74.2	80.1	104.1	307.4	310.5	161.9	215.8	355.1	615.1	189.4	32.7	1360.8
MIN	0.0	0.0	0.0	0.0	10.7	31.1	19.3	24.5	0.0	22.5	1.6	2.3	490.5

Table Precipitation Data San Isidro de Barbacoa**RAINFALL RECORDS FROM SAN ISIDRO BARBACOA**

Metorological Station : San Isidro de Barbacoa/Raúl González
 Code : 69029
 Parameter : PRECIPITATION
 Period : 1980-2000

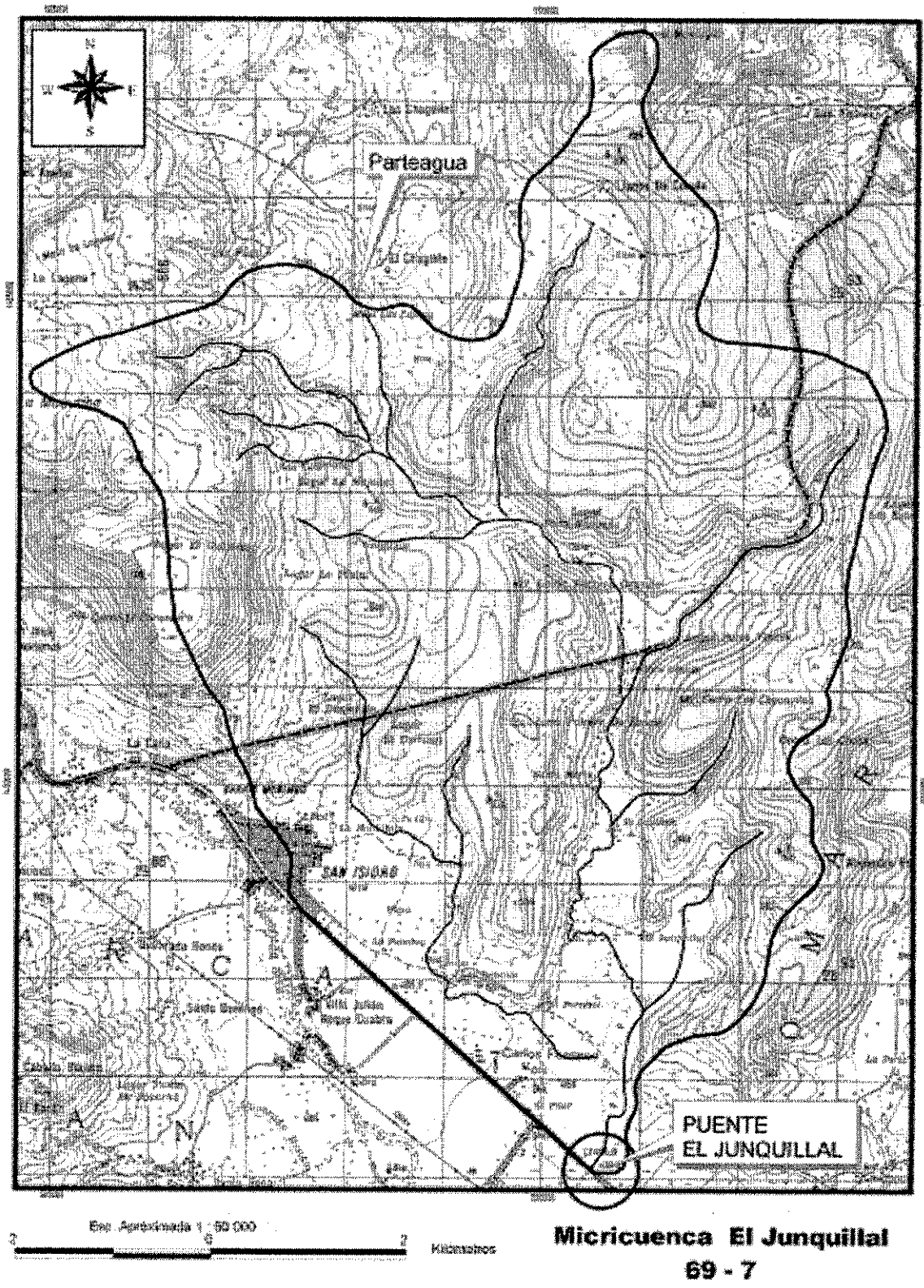
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1980	0.8	0	0	0	344.7	162.2	145.3	151.3	133.7	283.3	164.6	0.5	1386.4
1981	0	0	31.4	21.7	183.3	300.5	40.3	291.3	58.2	98.9	31.5	7.5	1064.6
1982	0.7	1.1	1	12.8	438.6	167.6	47.9	15.9	83.9	85.1	20.9	16	891.5
1983	0	0.9	9.5	26.5	84.2	100.9	54.1	148.7	108.4	37.3	44.2	4.5	619.2
1984	0	0	12.5	13.6	10.4	113.3	112.6	192	301.7	48.5	5.2	3	812.8
1985	0	0	0	55	82.8	88.4	64.1	89.1	117.7	245.9	80.9	0.2	824.1
1986	0	5.3	0.5	0	161.2	46	69.5	75.1	96.6	50.1	15.9	1	521.2
1987	9.5	0	11	0	36.3	95.6	138.4	109.3	198.6	47.5	1.7	220.8	868.7
1988	0.4	1.3	22.3	103.7	115.7	166.2	55.8	120.3	193.4	217.1	58.1	4.6	1059.0
1989	3.1	1.0	0	0	33.8	131.5	150	184.9	166.5	57	20	15.6	763.4
1990	0	0.5	0	20.9	117.1	78	75.8	67.8	111.2	143.6	107.6	7.3	729.8
1991	1.6	1	0	1.6	182.1	96	17.9	14.2	121.4	96.3	40.2	0.3	572.6
1992	0.3	5.7	0	0	73	130.9	70.3	43.5	188	57.6	29.7	8.1	607.1
1993	7.6	0	0.9	0.9	275.3	208.4	61.6	69.6	335.2	129.4	13.9	1.6	1104.4
1994	1.5	1.8	2	84.6	91.6	154.9	21.8	70.8	198.7	112.4	88.9	2	831.0
1995	0.4	0	67.5	57.7	129	184.6	32.4	439.3	297	324.9	18.7	15.9	1567.4
1996	9.9	0.3	38.4	2.6	149.5	43.2	204.4	215.3	101.1	340.4	221.8	0.6	1327.5
1997	2.5	0	18.8	5.9	10.1	252	97.6	11.4	102.1	157.7	67.6	0	725.7
1998	0	0	3.5	0	125.8	92.6	44.8	154.9	139.7	888.4	65	3.2	1517.9
1999	10.1	1.8	1.7	8.8	56.3	144.3	95.4	101.7	265.5	215	11.9	0	912.5
2000	0	0.1	0.9	0	71	70.7	87	69.7	294.9	82.6	12.3	0.7	689.9
Average	2.3	1.0	10.6	19.8	132.0	134.7	80.3	125.5	172.1	177.1	53.4	14.9	923.7
MAX	10.1	5.7	67.5	103.7	438.6	300.5	204.4	439.3	335.2	888.4	221.8	220.8	1567.4
MIN	0.0	0.0	0.0	0.0	10.1	43.2	17.9	11.4	58.2	37.3	1.7	0.0	521.2

Table Precipitation Data Leon**RAINFALL RECORDS FROM LEON**

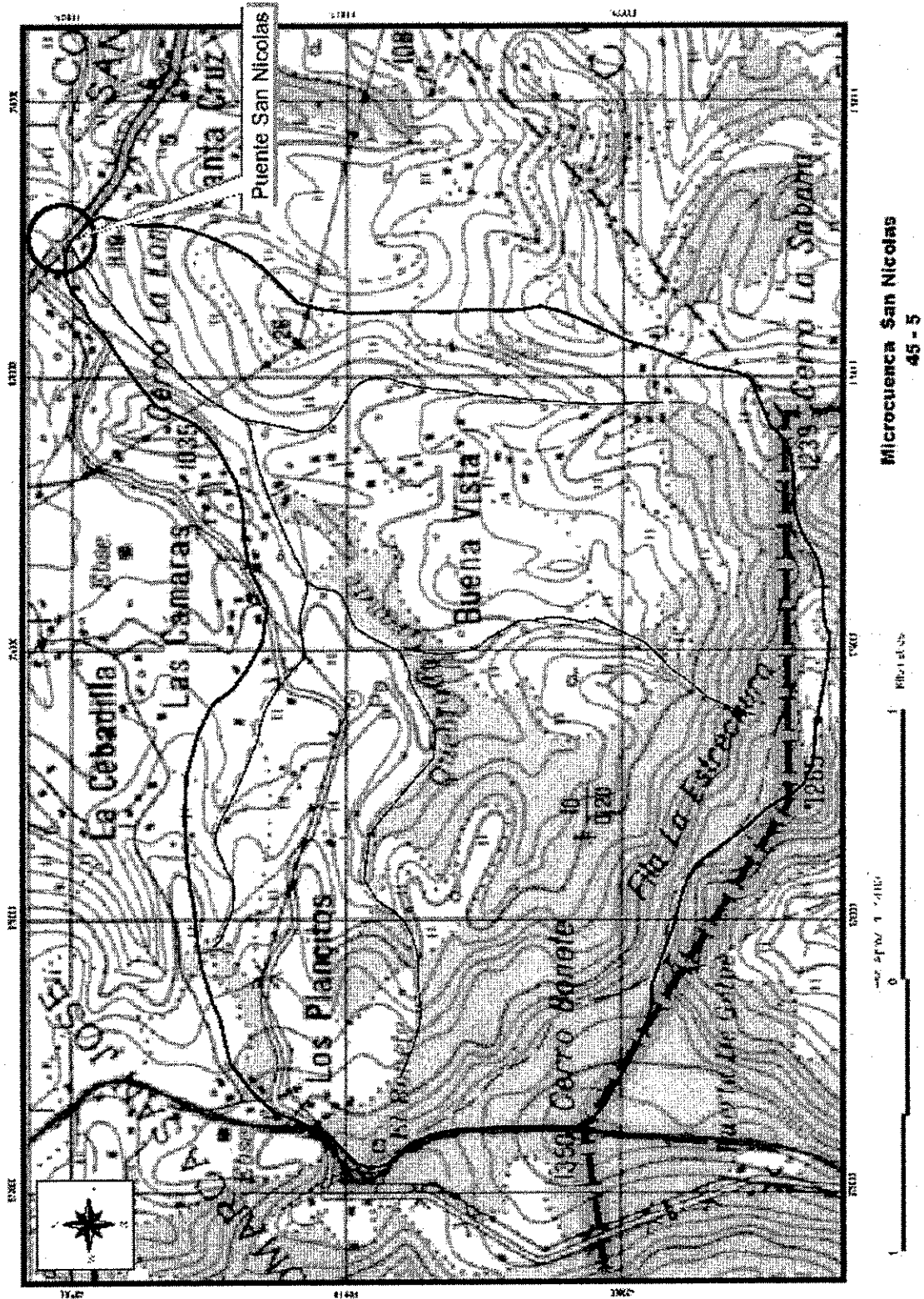
Metorological Station : LEON-Aeropuerto Godoy
 Code : 64043
 Parameter : PRECIPITATION
 Period : 1980-2000

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
1980	0	0	0	0	169.1	218.3	121.6	61.5	283.3	183.9	125.7	22.9	1186.3
1981	0	0	54.8	0	444.9	550.2	142.7	276.5	263	446.7	2.6	7.2	2188.6
1982	39.6	0	0	0	1214.9	126.1	8.1	7.5	383.3	110	1	13.5	1904
1983	0.4	0	1.4	2.8	91.8	158.2	59.8	94	308	251.8	176.2	9.8	1154.2
1984	0	0.1	1	11.3	150	184.8	121.2	94	507.8	151	27.1	0	1248.3
1985	0	0	0	75.2	66.4	146.9	229.5	230.9	179.2	595.7	91.2	1.9	1616.9
1986	0	5.7	1	0	470.9	251.9	15.5	84.4	170	238.1	9.7	0	1247.2
1987	1.8	0	2.4	0	157.4	266	155.9	143.8	301.1	168.6	0.2	0.5	1197.7
1988	0	0	0.6	1.8	264.9	282.9	231.8	732.7	386.2	483.5	17.5	0.8	2402.7
1989	0	0	0	0	60.8	270.7	190	291	472.6	117.5	126.7	46.7	1576
1990	0	0	0	100	139.8	57.8	81.6	97.8	326.5	282.9	92.8	1.1	1180.3
1991	1.4	0	0	61	274.8	188.6	24.3	92.9	209.1	203.3	33.3	1.2	1089.9
1992	0	3.3	0	0	59.1	173.9	19.6	129.8	376.7	39.3	49.2	13	863.9
1993	2.3	0	0.3	4.9	474.8	322.5	16.9	128.9	681.4	89.2	38.4	0	1759.6
1994	0.5	0	1.7	81.8	131.7	106.1	1.8	218	295.8	239	282.8	0	1359.2
1995	0	0	5.5	13.9	150.4	275.7	193	390.7	441.1	645.9	12.3	21.2	2149.7
1996	8.4	0	0	1.6	255.9	202.7	336.3	203	319.2	495.3	430.6	0	2253
1997	0.6	0	0	13.1	42.3	543.1	32.5	36.8	145.2	227.2	58.2	0	1099
1998	0	0	0.6	15	76.1	114.3	132.7	245.7	495	1338.6	129.3	0.2	2547.5
1999	0	0	0.9	12.1	98.1	257.8	83.8	211.3	1107.9	336.3	116.4	0.5	2225.1
2000	0.3	0	0	0	93.4	112	64.2	116.9	703.6	279.2	109.4	0.1	1479.1
Average	2.6	0.4	3.3	18.8	232.7	229.1	107.8	185.1	397.9	329.7	91.9	6.7	1606.1
MAX	39.6	5.7	54.8	100	1214.9	550.2	336.3	732.7	1107.9	1338.6	430.6	46.7	2547.5
MIN	0	0	0	0	42.3	57.8	1.8	7.5	145.2	39.3	0.2	0	863.9

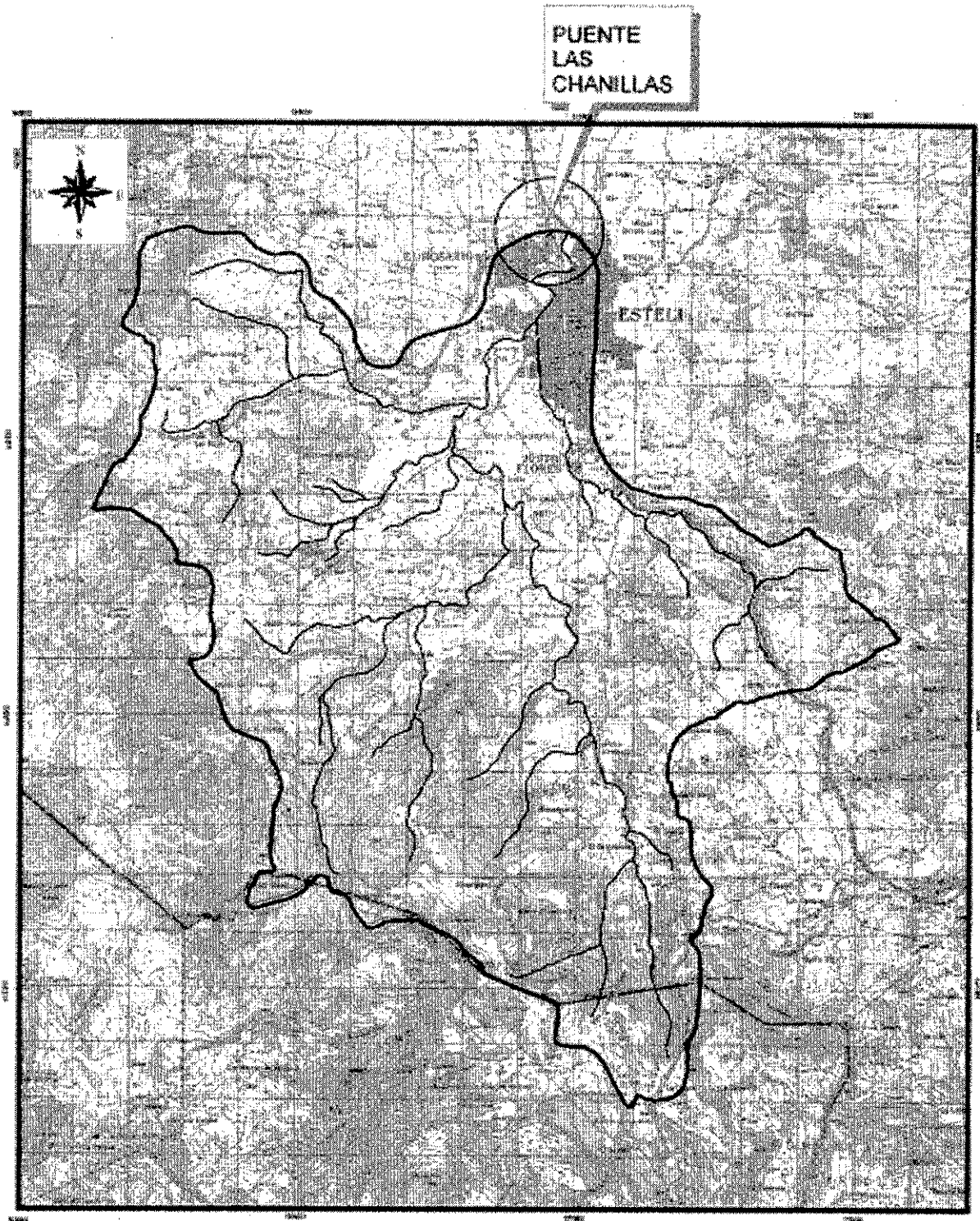
Appendix A3.4 Watershed Map



Watershed El Junquollal



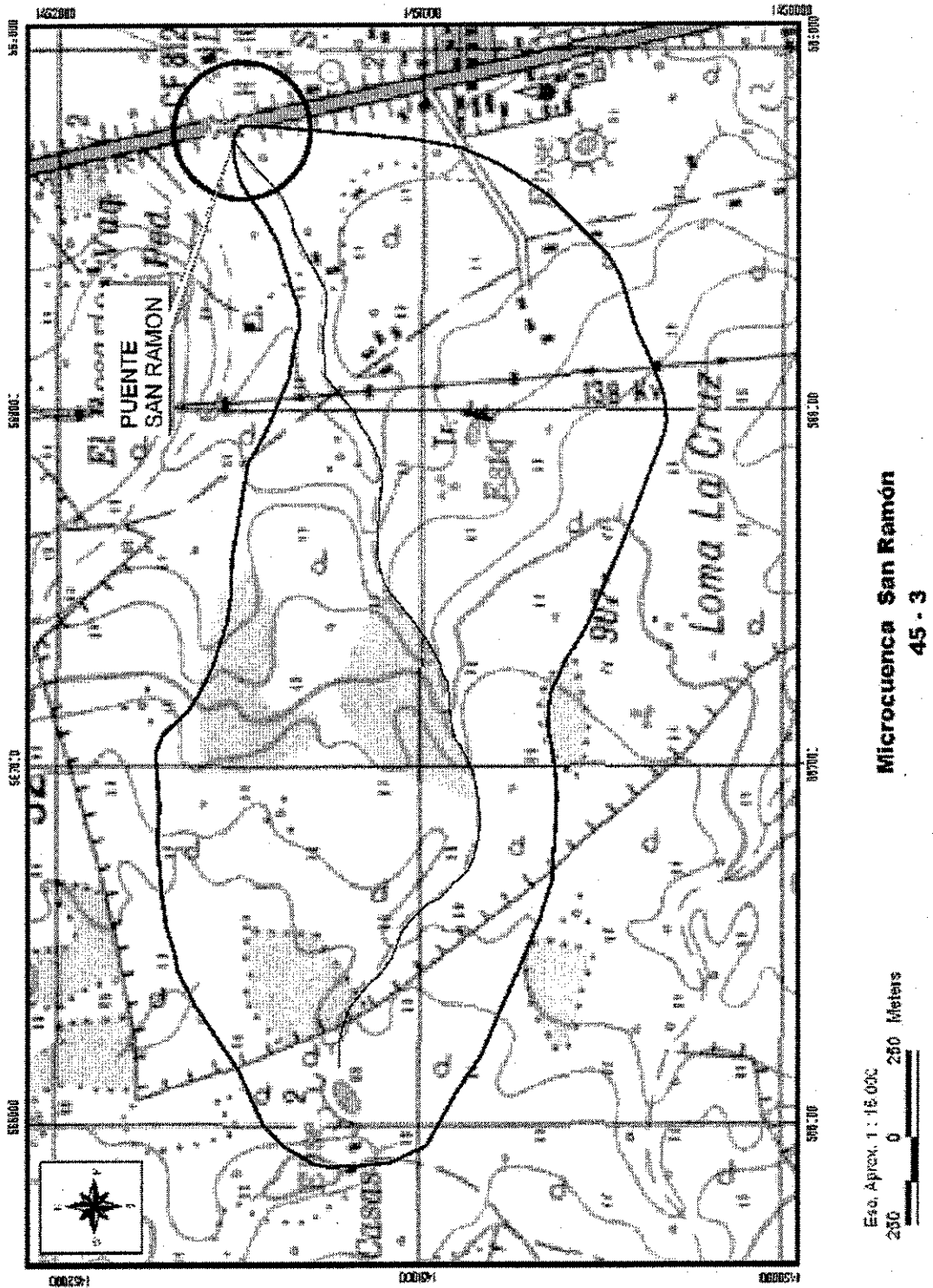
Watershed San Nicolas



Escala Aprox. 1 : 90 000
0 2.5 Kilómetros

Microcuenca Las Chanillas
45 - 4

Watershed Las Chanillas



Microcuencas San Ramon
45 - 3

Watershed San Ramon