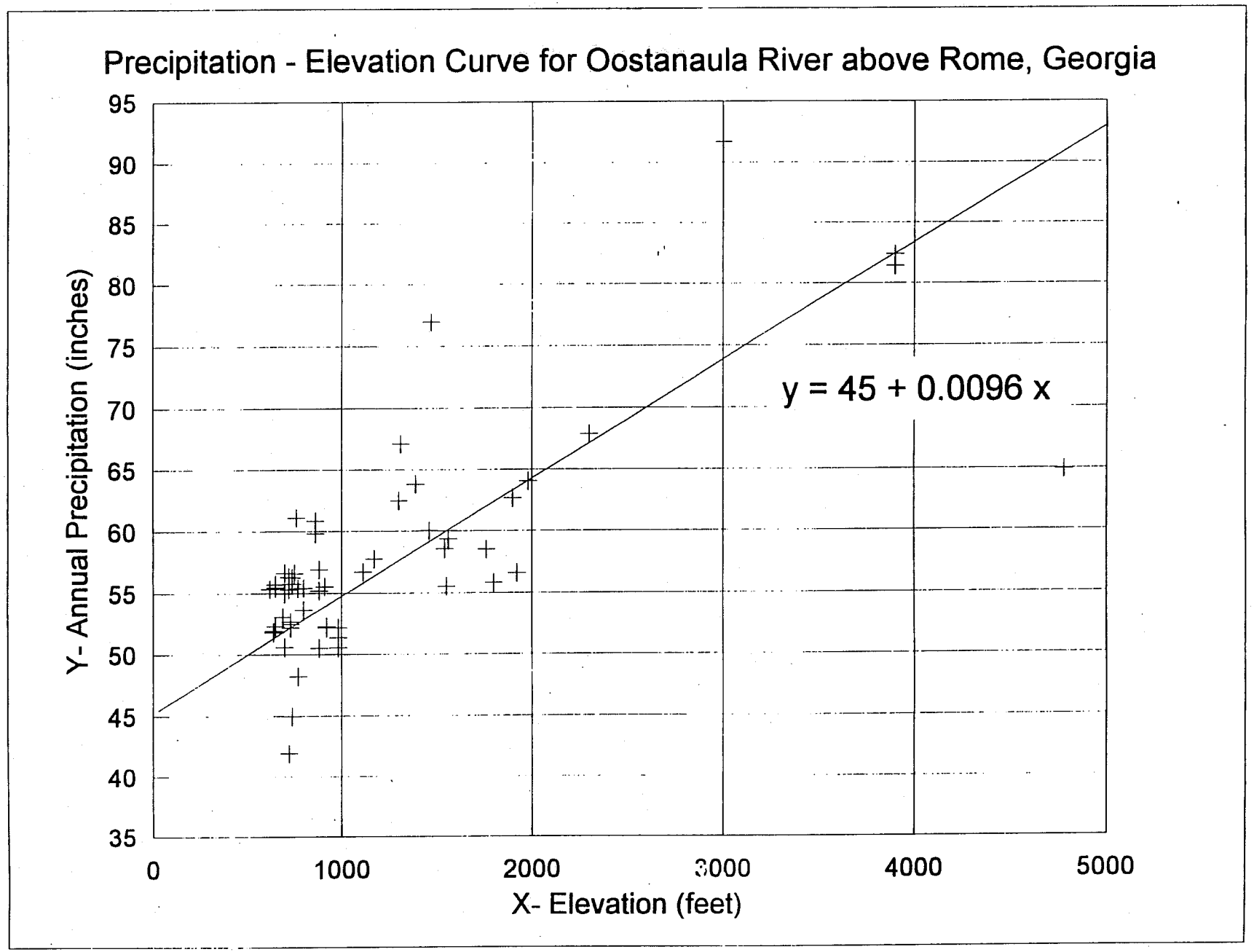
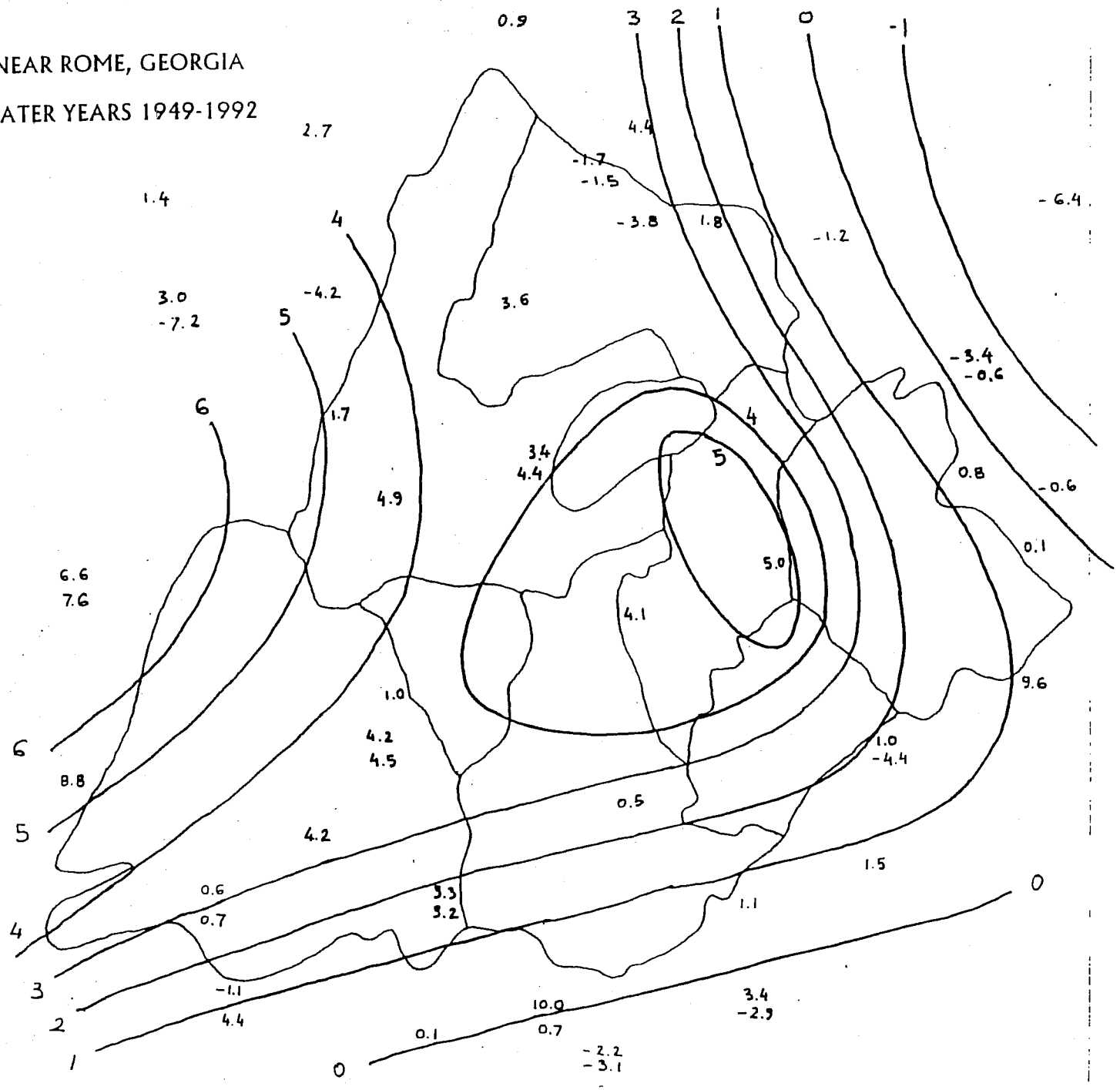
Analysis of Precipitation in Mountainous Areas

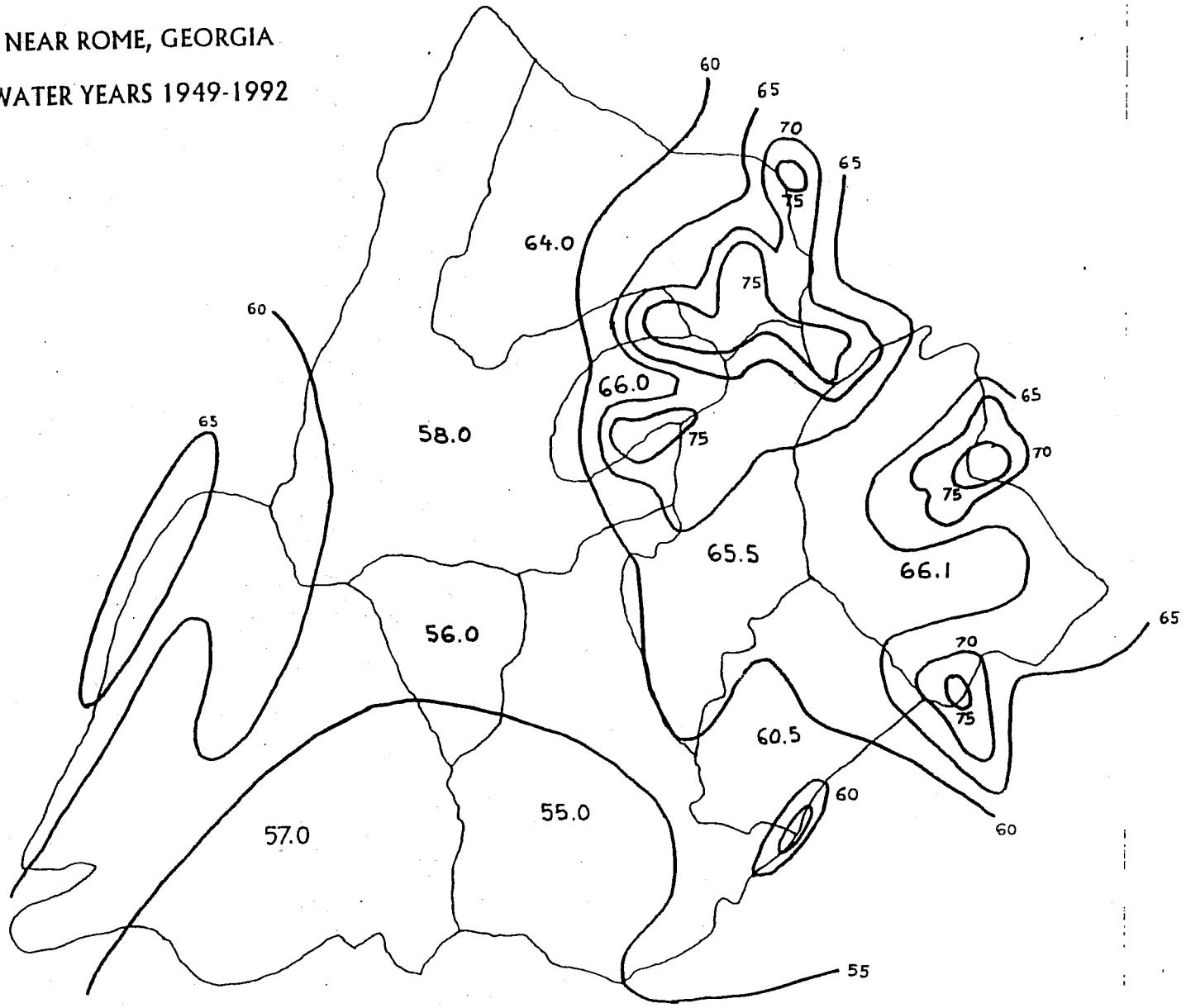
Oostanaula River above Rome, Georgia


Precipitation - Elevation Curve for Oostanaula River above Rome, Georgia
Y- Annual Precipitation (inches)
95
90
85
80
75
70
65
60
55
50
45
40
35
0
1000
2000
3000
4000
5000
X- Elevation (feet)
y = 45 + 0.0096 x

ISOANOMALY MAP
OOSTANAULA RIVER NEAR ROME, GEORGIA
UNITS: INCHES
PERIOD OF RECORD: WATER YEARS 1949-1992



ISOHYETAL MAP
OOSTANAULA RIVER NEAR ROME, GEORGIA
UNITS: INCHES
PERIOD OF RECORD: WATER YEARS 1949-1992



MAP analysis
Stations and Weightings

General Equation:

$$W_i = R_i \frac{\overline{A}}{\sum_{i=1}^{N} \overline{S}_i R_i}$$

W_i = Final Station Weight
$\overline{A}$ = Annual Mean from Isohyetal Map
$\overline{S}_i$ = Station Mean (from PXPP)
R_i = Relative Weight

Coosawattee River @ Ellijay

Areal mean ($\overline{A}$) from isohyetal map = 66.10

$$\sum_{i=1}^{N} \overline{S}_i \times R_i = 66.80$$

Relative Weight Adjustment = 66.10/66.80 ≈ 0.989

station	daily/ hourly	PXPP mean ($\overline{S}i$)	Relative weight (R_i)	Final weight (W_i)
Stanley Gap	d	67.88	0.120	0.119
Flat Top	d	91.69	0.120	0.119
Blue Ridge	d	58.51	0.120	0.119
Johntown	h	67.13	0.120	0.119
Noontootla	d	64.07	0.060	0.059
Ellijay	d	62.49	0.460	0.455
		Σ	1.000	0.990

Conasauga River @ Tilton

Areal mean ($\overline{A}$) from isohyetal map = 60.95

$$\sum_{i=1}^{N} \overline{S}_i \times R_i = 56.98$$

Relative Weight Adjustment = 60.95/56.98 ≈ 1.070

station	daily/ hourly	PXPP mean ($\overline{S}i$)	Relative weight (R_i)	Final weight (W_i)
Dalton	d	56.65	0.190	0.203
Tunnel Hill	d	55.17	0.090	0.096
Beaverdale	d	55.75	0.180	0.192
Cleveland	d	53.60	0.030	0.032
Conasauga	d	52.29	0.100	0.107
Chatsworth	d	56.28	0.200	0.214
Cisco	h	50.56	0.070	0.075
Double Springs	h	55.53	0.090	0.096
Flat Top	d	91.69	0.050	0.053
		Σ	1.000	1.068

Talking Rock Creek @ Hinton

Areal mean ($\overline{A}$) from isohyetal map = 60.50

$$\sum_{i=1}^{N} \overline{S}_i \times R_i = 58.90$$

Relative Weight Adjustment = 60.50/58.90 ≈ 1.027

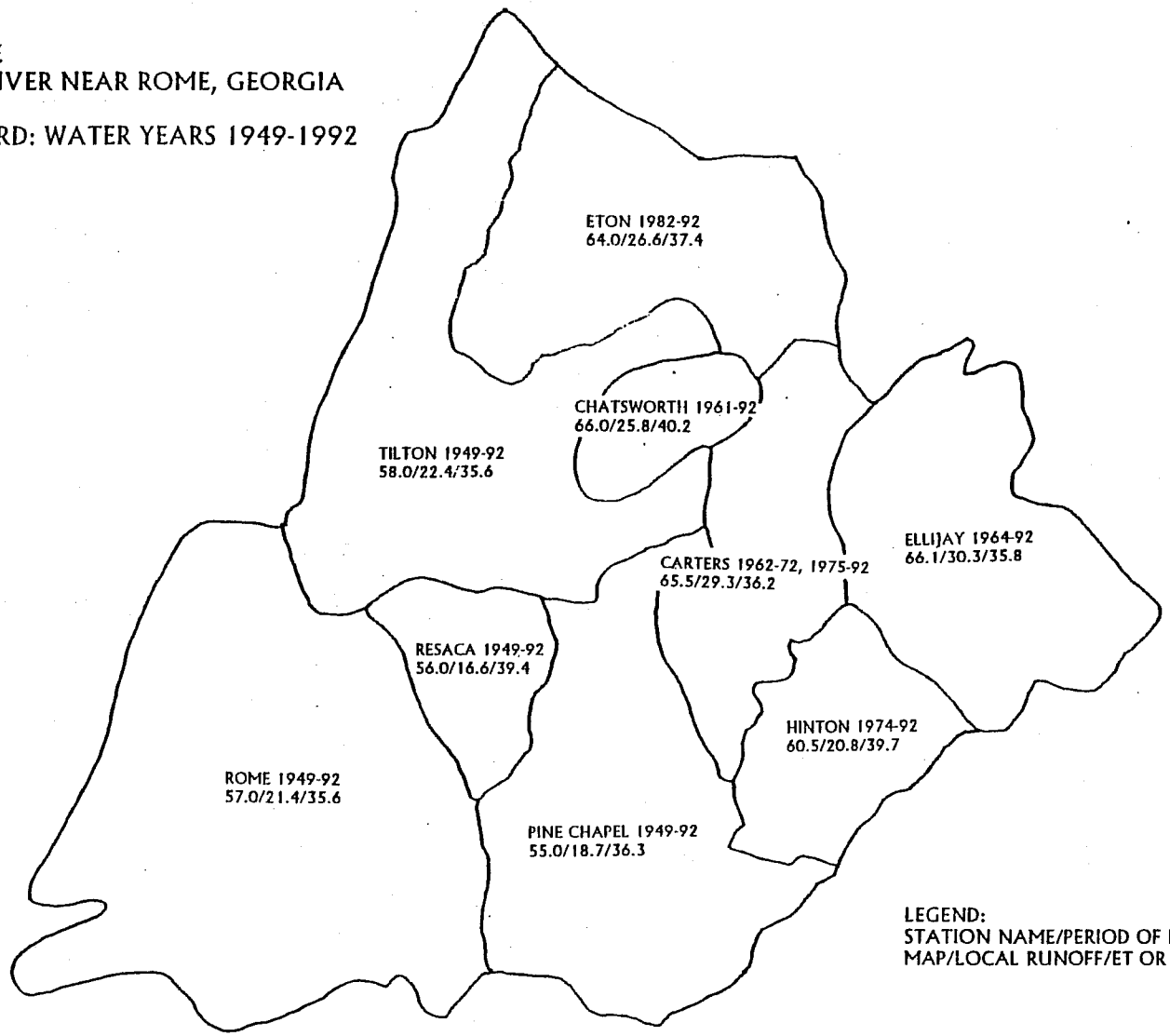
station	daily/ hourly	PXPP mean ($\overline{S}i$)	Relative weight (R_i)	Final weight (W_i)
Jasper	d	60.03	0.350	0.359
Ellijay	d	62.49	0.330	0.339
Fairmount	d	52.46	0.200	0.205
Carters	d	56.25	0.100	0.123
		Σ	1.000	1.026

Water Balance for Oostanaula River near Rome
Period of Record: Water Years 1949-1993

Sub-basin (local)	Elevation (feet)	Total area (sq.mi.)	Total Runoff (inch)	Local area (sw.mi.)	MAP (inch)	Local Runoff (inch)	ET or other loss (inch)	Deviation from mean (%)
Rome	600	2120	23.4	520	57	21.4	35.6	-5.26
Resaca	643	1600	24.1	82	56	16.6	39.4	4.86
Pine Chapel	645	831	24.6	310	55	18.7	36.3	-3.39
Carters	698	521	28.1	166	65.5	29.3	36.2	-3.66
Elijay	1300	236	30.3	235	66.1	30.3	35.8	-4.72
Hinton	950	119	20.8	119	60.4	20.8	39.7	5.66
Tilton	675	687	24.3	371	58	22.4	35.6	-5.26
Eton	730	252	23.9	252	64	26.6	37.4	-0.46
Chatsworth	750	64	25.8	64	66	25.8	40.2	6.99
						Average =	37.6	

Note: Total Runoff for the partial record for Eton (1982-1992) was adjusted to the entire period (1949-1993) by a factor equal to the ratio between the means of the partial record and the entire record for Tilton, which has a complete record. No corrections for other stations with incomplete records were made, since mean values for the other incomplete periods are not significantly different than the means for the whole periods for the stations with complete records.

WATER BALANCE
OOSTANAULA RIVER NEAR ROME, GEORGIA
UNITS: INCHES
PERIOD OF RECORD: WATER YEARS 1949-1992



LEGEND:
STATION NAME/PERIOD OF RECORD
MAP/LOCAL RUNOFF/ET OR OTHER LOSS