WATERSHEDS IN THE ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM STUDY AREA: DRAINAGE BASIN DELINEATIONS, WATERSHED AREAS, AND STREAM PROFILES

by

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ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM

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ABSTRACT

This report contains watershed boundary delineations and associated drainage areas, and channel profiles on watersheds in the AOSERP study area. Included are watersheds larger than 50 km^2 (mi^2) tributary to the Athabasca River, and tributary sub-basins which contain standard hydrometric measurement sites. Also included are 15 sub-basins within the Muskeg River watershed at which monthly and bi-monthly discharge measurements were collected for one year as part of an intensive study. It has been necessary to include delineations to the sub-basin mouth and to the measurement site, since the latter must be located upstream of the former to avoid backwater effects. Mylar plates of individual watersheds (and township-range overlays) and one of all watersheds have been prepared for use in reports and/or slide presentations.

ACKNOWLEDGEMENTS

Thanks are expressed to the following for their co-operation in providing information and assistance: Mr. Virgilio da Silva (Hydrology Branch, Alberta Environment), for advice and technical assistance; Mr. Ben Nwachukwu (River Engineering Branch, Alberta Environment), for use of river profiles; Mr. R. Gerard, formerly with the Alberta Research Council, for use of river profiles and maps; and Mr. M. Spitzer and Mr. L. Warner of Water Survey of Canada, for the use of available watershed delineation maps at hydrometric stations. The drafting of river profiles was done by members of Alberta Environment Drafting Pool.

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1. INTRODUCTION

The information contained in this report is intended to satisfy a number of identified needs within the Alberta Oil Sands Environmental Research Program (AOSERP). These are: to have a single standardized procedure for relating research activities to location in the regional water system; to have a standardized set of basic watershed characteristics (boundary delineations, profiles, drainage areas) for use by all researchers; to obtain an initial topographic characterization of watersheds to assist in studying non-point source processes throughout the surface water system; and to assist an inventory of the regional aquatic habitat.

This report was prepared with these needs in mind and with the following objectives: (1) to produce a map (1:250 000 scale and report sized) illustrating major watersheds boundaries and a series of maps (1:50 000 scale and report sized) illustrating all significant individual watersheds in the AOSERP study area; and (2) to determine drainage areas and longitudinal profiles for selected watersheds in the AOSERP study area (Figure 1).

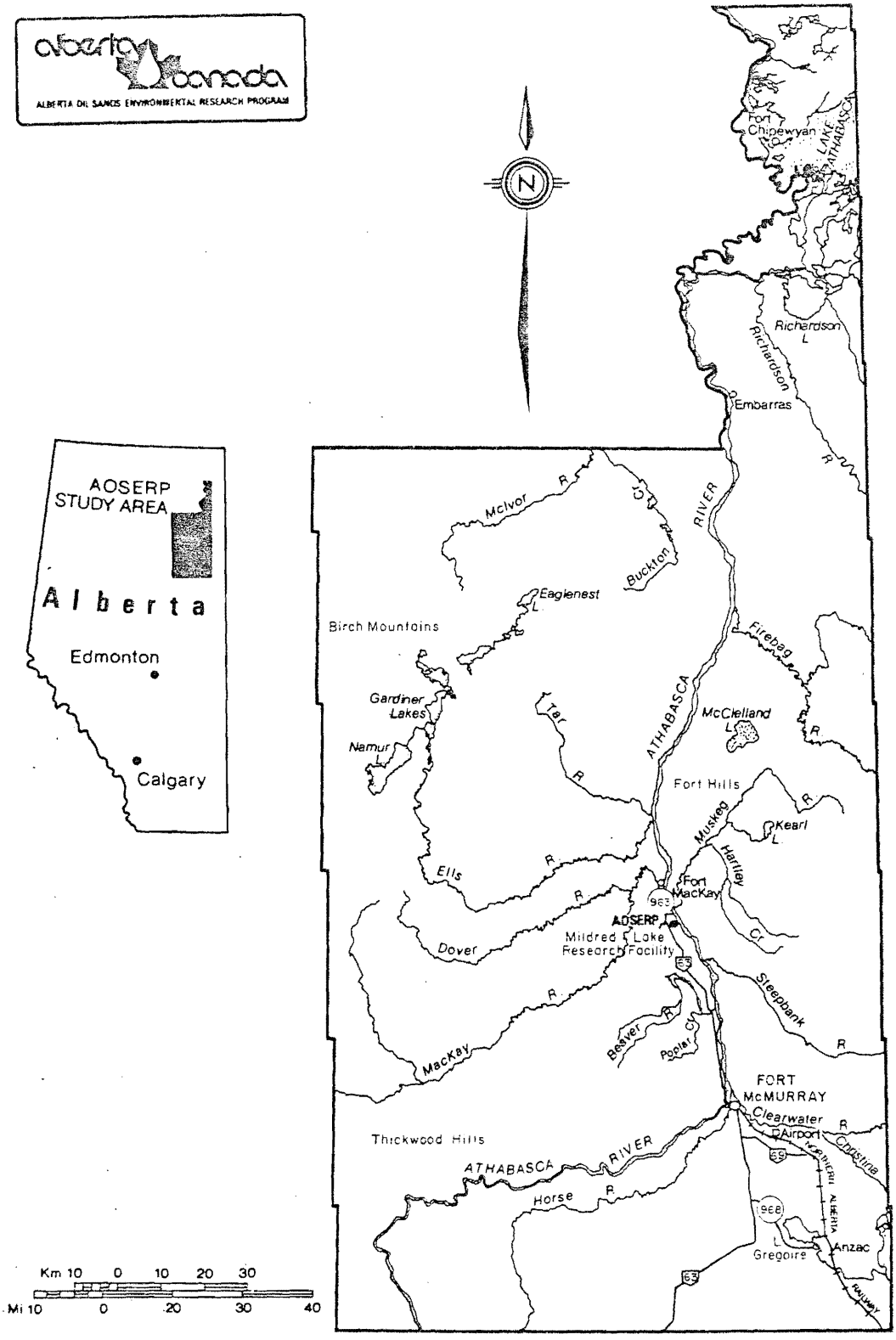

Figure 1. Location of AOSERP study area.

2. WATERSHED COVERAGE

Most watersheds larger than 50 km^2 were delineated if they drain into the Athabasca River within the AOSERP study area or if more than 20% of their drainage area is contained in this area (Figure 2). Also delineated were watersheds above designated AOSERP Water System study points and above the mouths of sub-basins containing selected existing or potential study points. These included all standard Water Survey of Canada streamflow measurement sites plus 15 sites in the Muskeg River basin (Figure 3) which were sampled monthly and bi-monthly for one year. In addition, boundaries of watersheds feeding several major lakes within the AOSERP study area were delineated.

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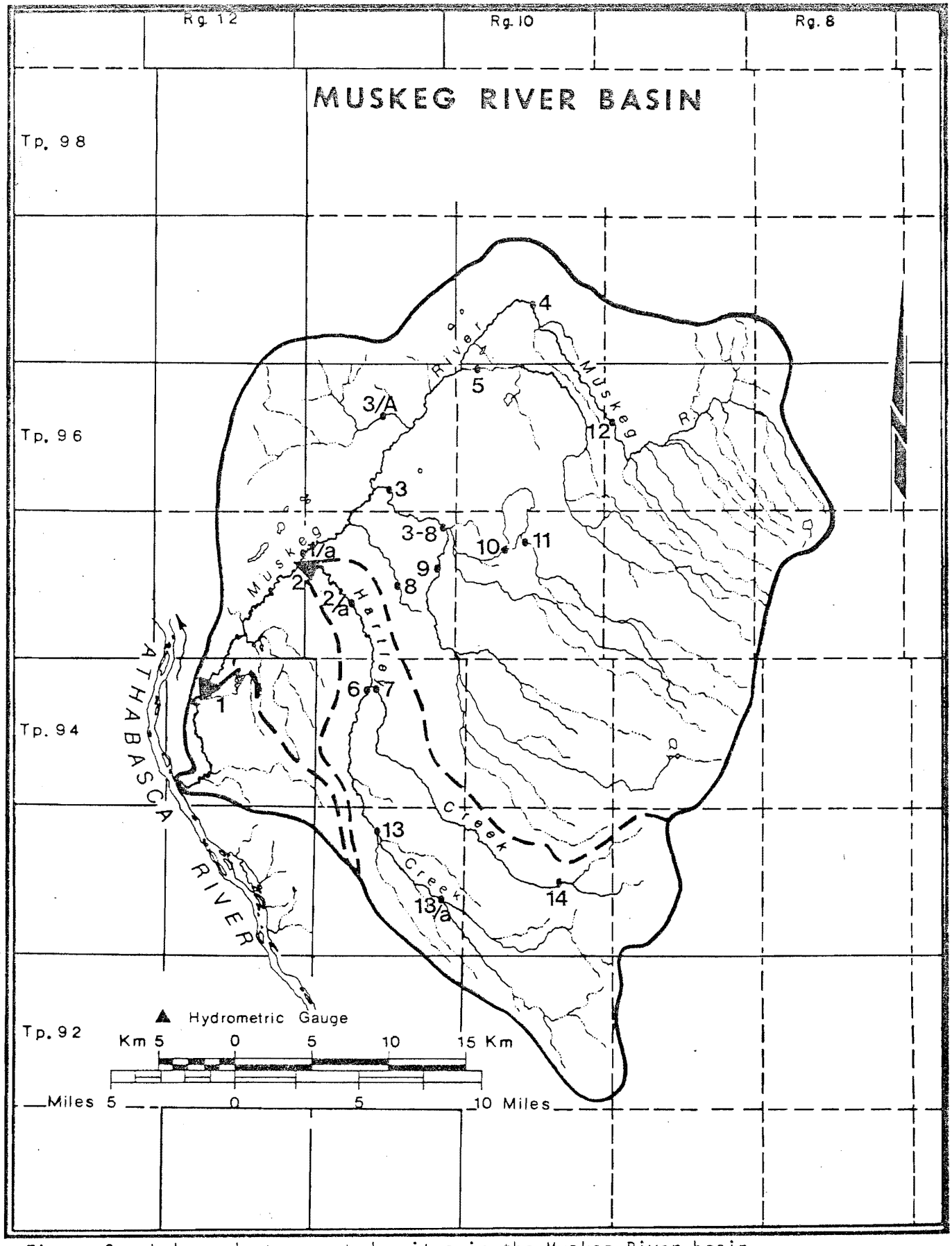


Figure 3. Lake and stream study sites in the Muskeg River basin.

Table 1. Watershed boundary delineation maps currently available for the AOSERP study area.

Watershed	Base maps used
1. Algar River	84A
2. Asphalt Creek	84H, 74E, 74E/5E, 74E/12E, 74E/12W
3. Beaver River	74D, 74E, 74E/4E, 74E/4W, 74D/13
4. Upper Beaver River	74D/13
5. Buckton Creek	74L, 74E, 74E/13W, 74L/4W, 74L/5W
6. Buffalo Creek	84A
7. Cache Creek	74D/13
8. Calumet River	74E/5E, 74E/5W
9. Christina River	74C, 74D, 73M, 73N
10. Clarke Creek	74D/14
11. Clearwater River at Draper	74B, 74C, 74D, 74F, 74G, 74D/11
12. Clearwater River at mouth	74B, 74C, 74D, 74F, 74G, 74D/11
13. Clearwater River above Christina River	74B, 74C, 74D, 74F, 74G, 74D/11
14. Conn Creek	74D/11, 74D/12, 74D/13, 74D/14
15. Deadman Creek	84A
16. Dover River	84H, 74E. 74E/4E, 74E/4W
17. Dunkirk River	84A, 84H, 74E/4E, 74E/4W

Continued . . .

Table 1. Continued.

Watershed	Base maps used
18. Eleanor Creek	74L, 74E, 74L/3W, 74L/3E, 74E/14W, 74E/14E
19. Ells River	84H, 74E, 74E/5E, 74E/5W
20. Upper Ells River	84H, 74E, 84H/7, 84H/9, 84H/10, 74E/5E, 84H/16, 74E/5W
21. Emyundson Creek	84H, 74E, 74E/5E, 74E/12E, 74E/12W
22. Firebag River	74E, 74E/6E, 74E/11E, 74E/11W, 74E/14E, 74E/14W
23. Gregoire Lake	74D, 74D/3, 74D/6
24. Hangingstone River	74D, 74D/6W, 74D/11
25. Hartley Creek	74D/14, 74E/3E, 74E/3W, 74E/6W
26. Horse River	84A, 74D, 74D/11, 74D/12
27. Joslyn Creek	84H, 74E, 74E/5E, 74E/5W
28. Keane Creek	74L, 74K, 74E, 74E/5E, 74E/5W, 74L/7, 74L/8
29. Little Fishery River	74D/11, 74D/12, 74D/13
30. Livock River	84A
31. Loon Creek	84A
32. Lost Creek	74E, 74E/2, 74E/7, 74E/8
33. MacKay River	84A, 74D, 74E, 74D/13, 74E/4E, 74E/4W
34. Maybelle River	74E, 74F, 74L, 74L/2

Continued . . .

Table 1. Concluded.

Watershed	Base maps used
35. McIvor River	84H, 84I, 74L, 74E, 84I/1, 84I/8, 74L/4W, 74L/13W
36. Muskeg River	74D, 74E, 74E/3E, 74E/3W, 74E/4E, 74E/5E, 74E/6E, 74E/6W
37. Pierre Creek	84H, 74E, 74E/5E, 74E/5W, 74E/12W
38. Poplar Creek	74D/13, 74D/14
39. Rainbow Creek	74D, 74D/10, 74D/11, 74D/14, 74D/15
40. Redclay Creek	74E/11W, 74E/12E, 74E/12W, 74E/13E, 74E/13W, 74E/14W
41. Richardson River	74L, 74E, 74F, 74L/3E, 74L/6E, 74E/6W
42. Saline Creek	74D, 74D/11
43. Saprae Creek	74D, 74D/11
44. Steepbank River	74D, 74E, 74D/14, 74E/3E, 74E/3W
45. Tar River	84H, 74E, 74E/5E, 74E/5W
46. Upper Tar River	74E/5E, 74E/5W, 84H/8, 84H/9, 74E/12, 74E/5
47. Thickwood Creek	84A, 74D, 84A/16, 74D/13
48. Unnamed Creek	84H, 74E, 74E/5E, 74E/12E, 74E/12W
49. Wood Creek	74D/14

3. METHODOLOGY

3.1 WATERSHED BOUNDARY DELINEATIONS

Boundary delineations for watersheds smaller than 300 km^2 were made on 1:50 000 scale National Topographic Series maps where they existed. Boundaries were adjusted as required for compatibility with the fine drainage patterns displayed upon 1:63 360 scale planimetric maps (no contours but complete coverage of the study area) produced by the Alberta Department of Energy and Natural Resources. Where the 1:50 000 scale map was not available, the 1:250 000 scale National Topographic Series map was utilized for small basins. Delineations checked for compatibility with the drainage patterns on 1:63 360 scale maps. All large basins were delineated solely on 1:250 000 scale maps but adjusted to follow any existing delineations of smaller sub-basins. In addition, difficult areas of delineation on 1:250 000 scale maps were checked on the larger scale maps. Occasionally, problems were resolved using aerial photographs.

All delineations were checked independently. Measurements of the drainage area having deviations more than 5% from the figure obtained by Water Survey of Canada at hydrometric gauges were re-checked. Table 1 lists the maps utilized for each delineation.

3.2 WATERSHED DRAINAGE AREA DETERMINATIONS

Watershed drainage areas were determined from the original scale of watershed delineations by an electronic planimeter at the Remote Sensing Center of Alberta Environment. Overall accuracy was ± 0.1%. The mean of three determinations was found. Drainage area figures for hydrometric stations were compared with those obtained by Water Survey of Canada. After re-checking and discussions with Water Survey of Canada, figures from a single drainage area which were mutually acceptable were selected as final. Results are present in Tables 2, 3, and 4.

Table 2. Watershed drainage areas for the AOSERP study area.

	Watershed	Basin Area			
		Measured to mouth		Measured to gauge	
		mi^2	km^2	mi^2	km^2
1.	Algar River	128	332	-	-
2.	Asphalt River	-	-	58	149
3.	Athabasca River at Embarras Airport	-	-	59 800	155 000
4.	Athabasca River below Fort McMurray	-	-	51 300	133 000
5.	Beaver River	192	479	168	435
6.	Upper Beaver River	-	-	68	176
7.	Birch River	-	-	3 860	10 000
8.	Buckton Creek	476	1 233	-	-
9.	Buffalo Creek	282	730	-	-
10.	Cache Creek	30	76	-	-
11.	Calumet River	70	182	70	181
12.	Christina River	5 110	13 200	-	-
13.	Clarke Creek	26	67	-	-
14.	Clearwater above Christina River	-	-	6 630	17 200
15.	Clearwater River above Draper	-	-	11 800	30 600
16.	Clearwater at mouth	12 200	31 600	-	-
17.	Conn Creek	35	91	-	-
18.	Dover River	-	-	369	956

Continued . . .

Table 2. Continued.

	Watershed	Basin Area			
		Measured to mouth		Measured to gauge	
		mi^2	km^2	mi^2	km^2
19.	Deadman Creek	19	50	-	-
20.	Dunkirk River	633	1 640	611	1 580
21.	Eleanor Creek	96	248	-	-
22.	Ells River	1 050	2 720	956	2 476
23.	Upper Ells River	-	-	527	1 360
24.	Eymundson Creek	117	303	-	-
25.	Firebag River	2 440	6 320	2 330	6 030
26.	Hangingstone River (excluding Saline Creek)	354	906	353	914
27.	Hartley Creek	-	-	142	368
28.	Horse River	842	2 182	842	2 180
29.	Joslyn Creek	99	256	96	248
30.	Keane Creek	163	422	-	-
31.	Little Fishery River	28	73	-	-
32.	Livock River	48	123	-	-
33.	Loon Creek	266	689	-	-
34.	Lost Creek	24	62	23	60
35.	MacKay River	2 040	5 280	2 020	5 230
36.	Maybelle River	630	1 630	-	-

Continued . . .

Table 3. Concluded.

Watershed	Basin Area			
	Measured to mouth		Measured to gauge	
	mi^2	km^2	mi^2	km^2
37. McIvor River	615	1 590	-	-
38. Muskeg River	572	1 480	562	1 460
39. Pierre River	54	140	50	130
40. Poplar Creek	60	156	58	151
41. Rainbow Creek	30	78	-	-
42. Redclay Creek	75	195	-	-
43. Richardson River	-	-	1 140	2 950
44. Saline Creek	40	104	-	-
45. Saprae Creek	57	148	-	-
46. Steepbank River	547	1 420	530	1 370
47. Tar River	130	337	121	313
48. Upper Tar River	-	-	38	97
49. Thickwood Creek	-	-	66	170
50. Unnamed Creek	121	312	108	280
51. Wood Creek	18	46	-	-

Table 3. Watershed drainage areas of Muskeg River sub-basins.

	Watershed	Basin area	
		Measured to gauge	
		mi^2	km^2
1.	Site 2a (Hartley Creek)	132	342
2.	Site 3 (Mainstem Tributary)	112	289
3.	Site 3a (Stanley Creek)	25.9	67.1
4.	Site 3-8 (Mainstem Tributary)	105.8	274
5.	Site 4 (Muskeg Mainstem)	31.9	82.6
6.	Site 5 (Mainstem Tributary)	64.6	167
7.	Site 6 (Mouth-Hartley South Fork)	80.5	208.5
8.	Site 7 (Mouth-Hartley North Fork)	41.7	108
9.	Site 8 (Mainstem Tributary)	2.66	6.89
10.	Site 9	62.3	161
11.	Site 10 (Kearl Lake Outlet)	12.3	31.9
12.	Site 11 (Kearl Lake Inlet)	6.9	17.9
13.	Site 12 (Upper Reach-Muskeg Mainstem)	60.9	157.4
14.	Site 13 (Upper Reach-Hartley South Fork)	58.0	150
15.	Site 14 (Upper Reach-Hartley North Fork)	15.3	39.5

Table 4. Watershed drainage areas of important lakes.

Watershed	Basin area measured to outlet		Lake area	
	mi^2	km^2	mi^2	km^2
1. Sandy Lake	187	484	5.54	14.3
2. Eaglenest Lake	47.4	123	3.28	8.50
3. Upper Gardiner Lake	389	1010	7.40	19.20
4. Lower Gardiner Lake	527	1360	2.56	6.63
5. Gregoire Lake	104	270	10.4	26.9
6. Big Island Lake	33	85.4	6.82	17.7
7. Namur Lake	63.7	165	17.2	44.6

3.3 MAIN CHANNEL PROFILES

The main channel profile in each watershed was measured three times from the source to the mouth utilizing a cyclometer. Discrepancies of as much as 10% were experienced. The mean distance to each contour interval was selected and plotted. Profiles were extended to the watershed divide. In a few cases, existing profiles prepared by other agencies were available for comparison. The profile of the Athabasca River was supplied by the Alberta Research Council.

4. AVAILABILITY OF WATERSHED MAPS, PROFILES, AND OTHER DATA

Presented here are report sized reductions (except for two large basins) of the watershed delineations with townships and ranges marked. Mylar plates in this size of the delineations are available for reproduction from AOSERP together with separate overlay plates of township and range. Also available for reproduction are plates at the original delineation scale as outlined for each watershed in Table 1.

In some cases, delineations of several watersheds are included on the same plate. Small sub-basins immediately above hydrometric stations or supplying important lakes usually appear on the plate of the main basin, as well as on an individual plate at a larger scale.

Another source of data for watershed properties is AOSERP Report 18, "Interim Compilation of Stream Gauging Data to December 1976 for the Alberta Oil Sands Environmental Research Program" by Loeppky and Spitzer (1977). This report summarizes and contains hydrometric data for the AOSERP study area to December 1976. All available daily discharge data are contained within the Appendices of this report. It also contains annual hydrographs of discharge data, water level information for gauged lakes in the area, stage-discharge curves for each stream gauging station and where enough data are available, plots of cross-sections, and discharge-velocity and discharge-area curves. Some information on water temperature is also included.

5. GLOSSARY OF TERMS

basin - the entire area of land drained by a stream and its tributaries.

profile - a sectional or side elevation of a watercourse from its mouth to its uppermost reach.

sub-basin - a smaller basin contained within a larger basin.

topography - the configuration of a surface, including its relief and the position of natural and man-made features.

watershed - a region or area bounded peripherally by a water parting and draining ultimately to a particular watercourse or body of water.

6. APPENDIX

6.1 WATERSHED BOUNDARY DELINEATIONS

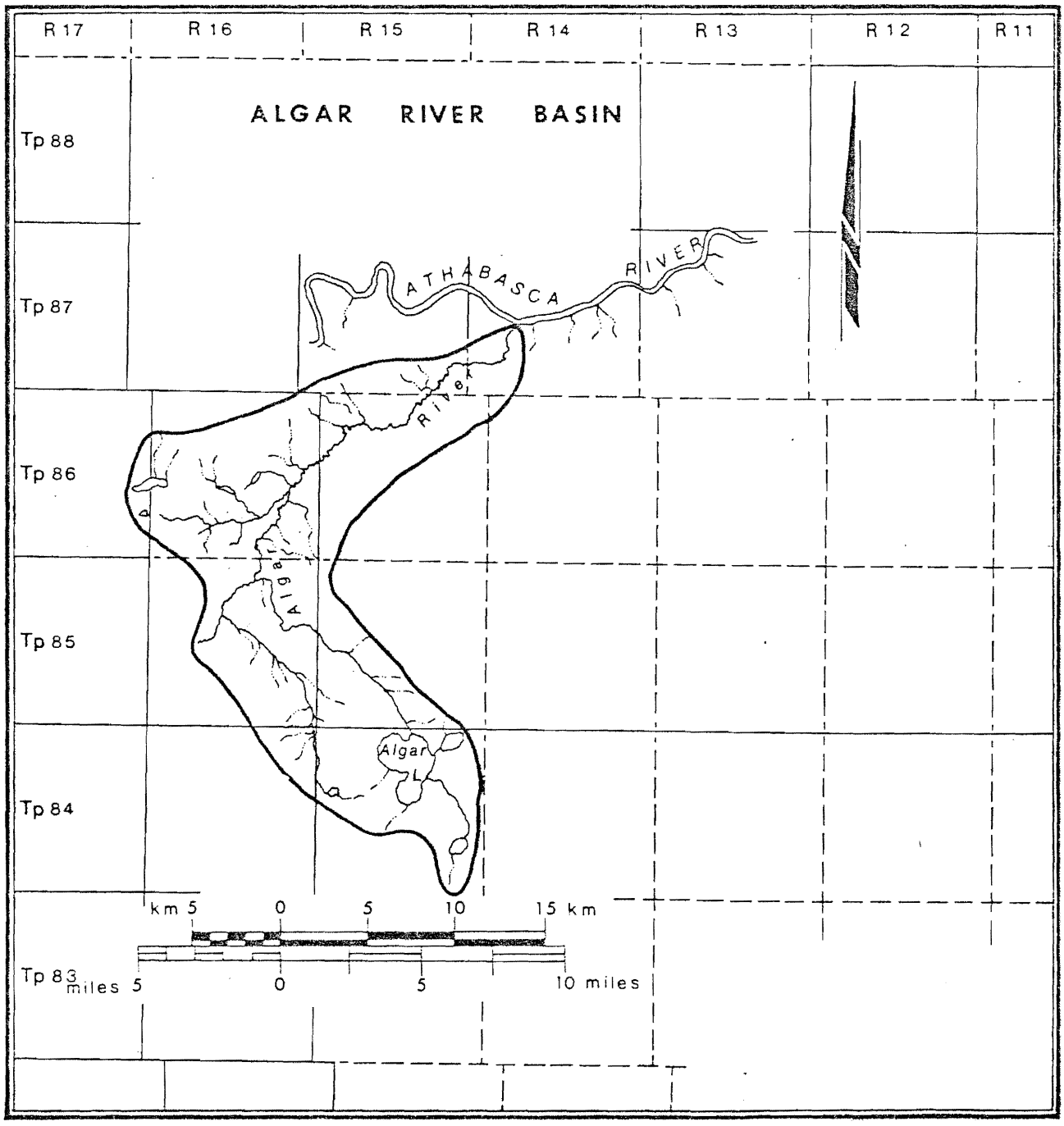


Figure 4. Algar River basin.

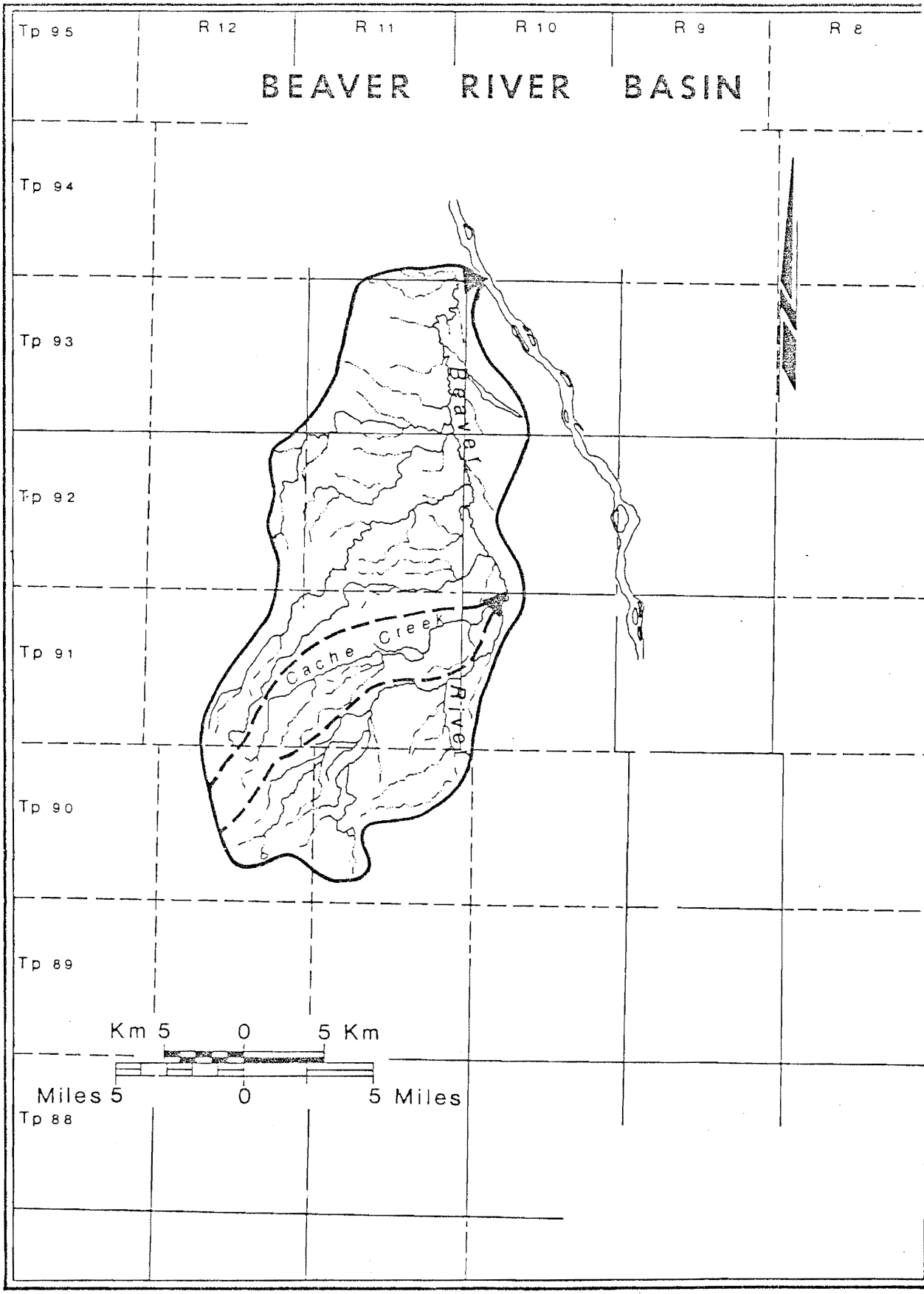


Figure 5. Beaver River basin.

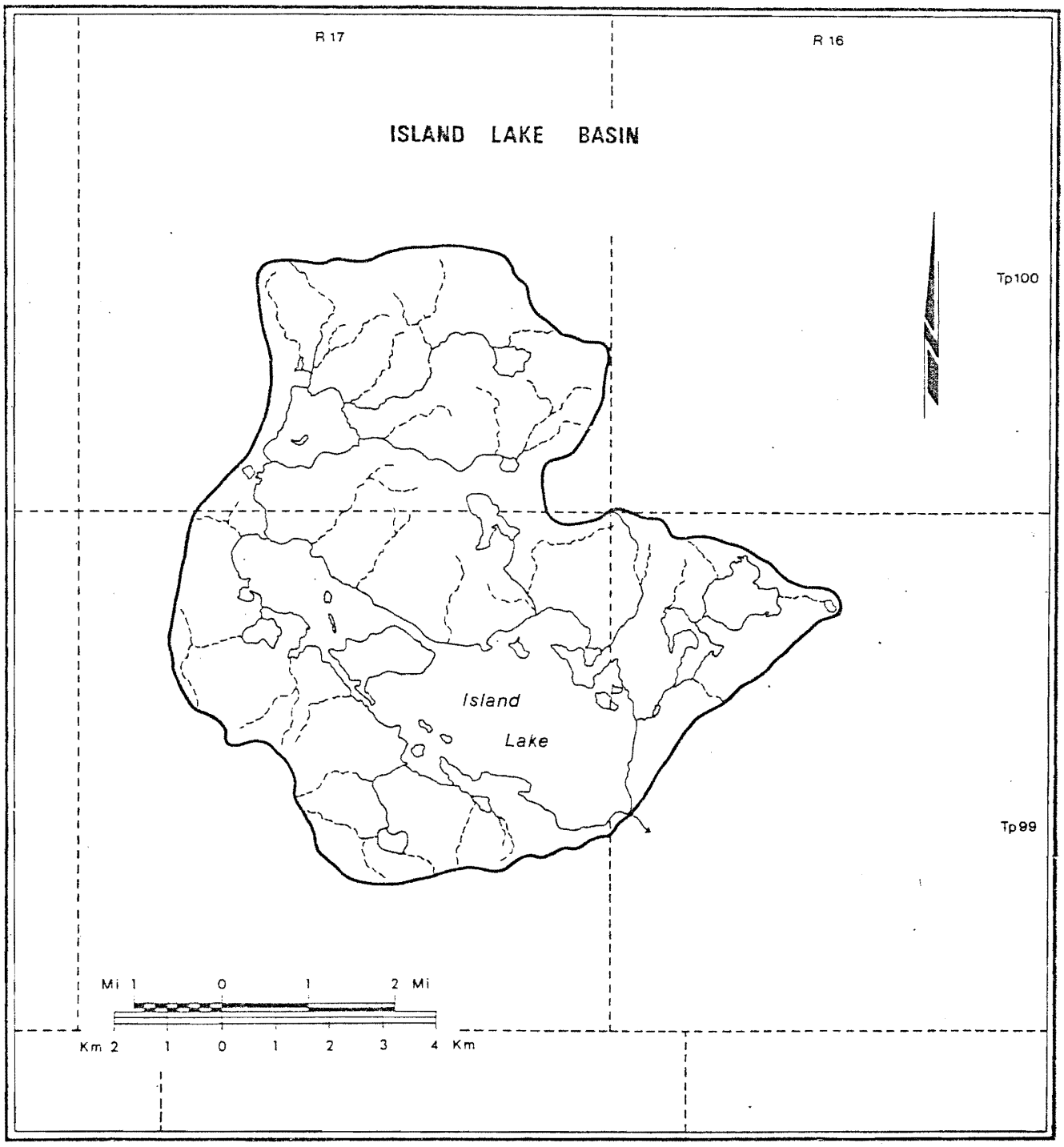


Figure 6. Big Island Lake basin.

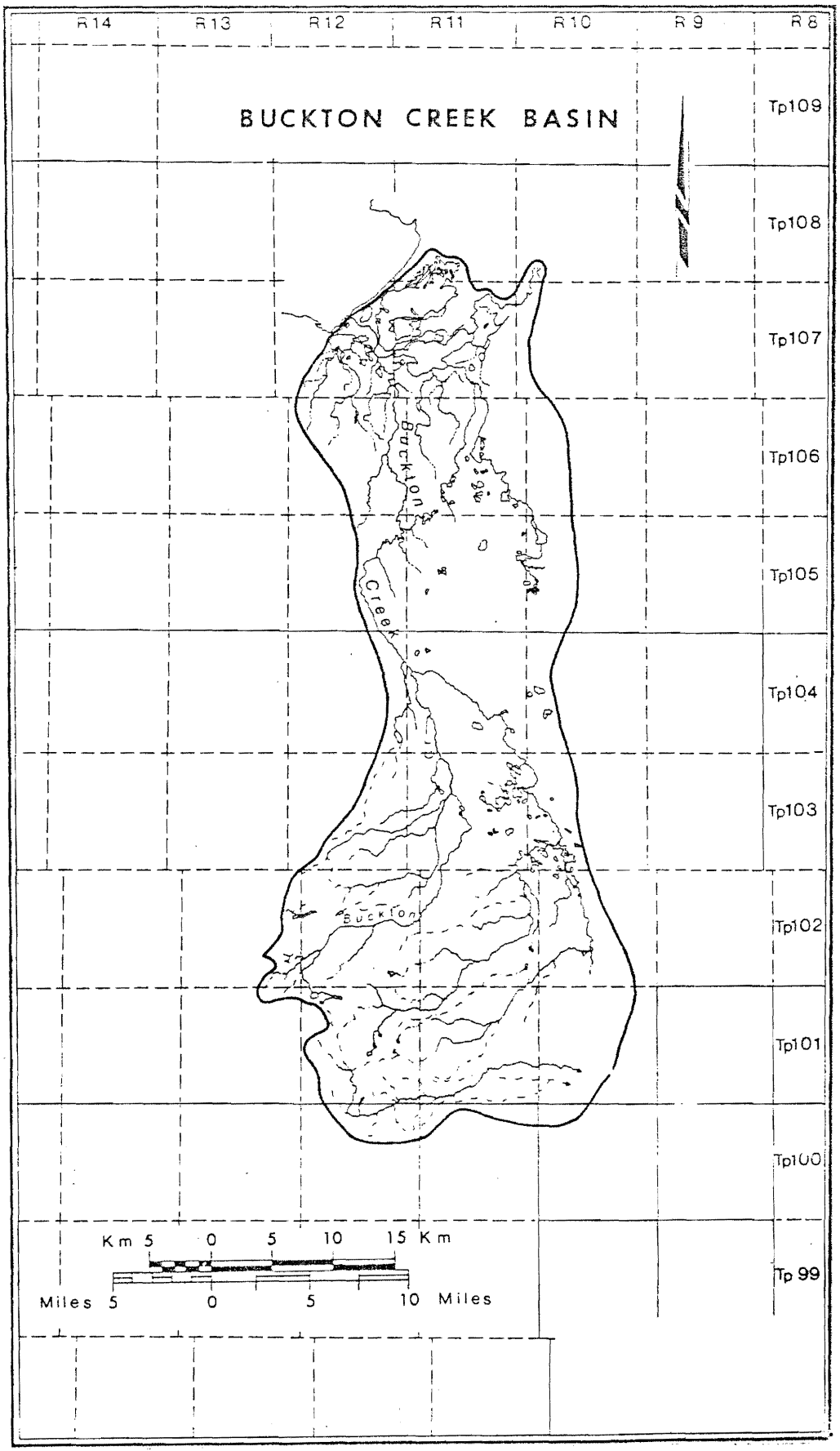


Figure 7. Buckton Creek basin.

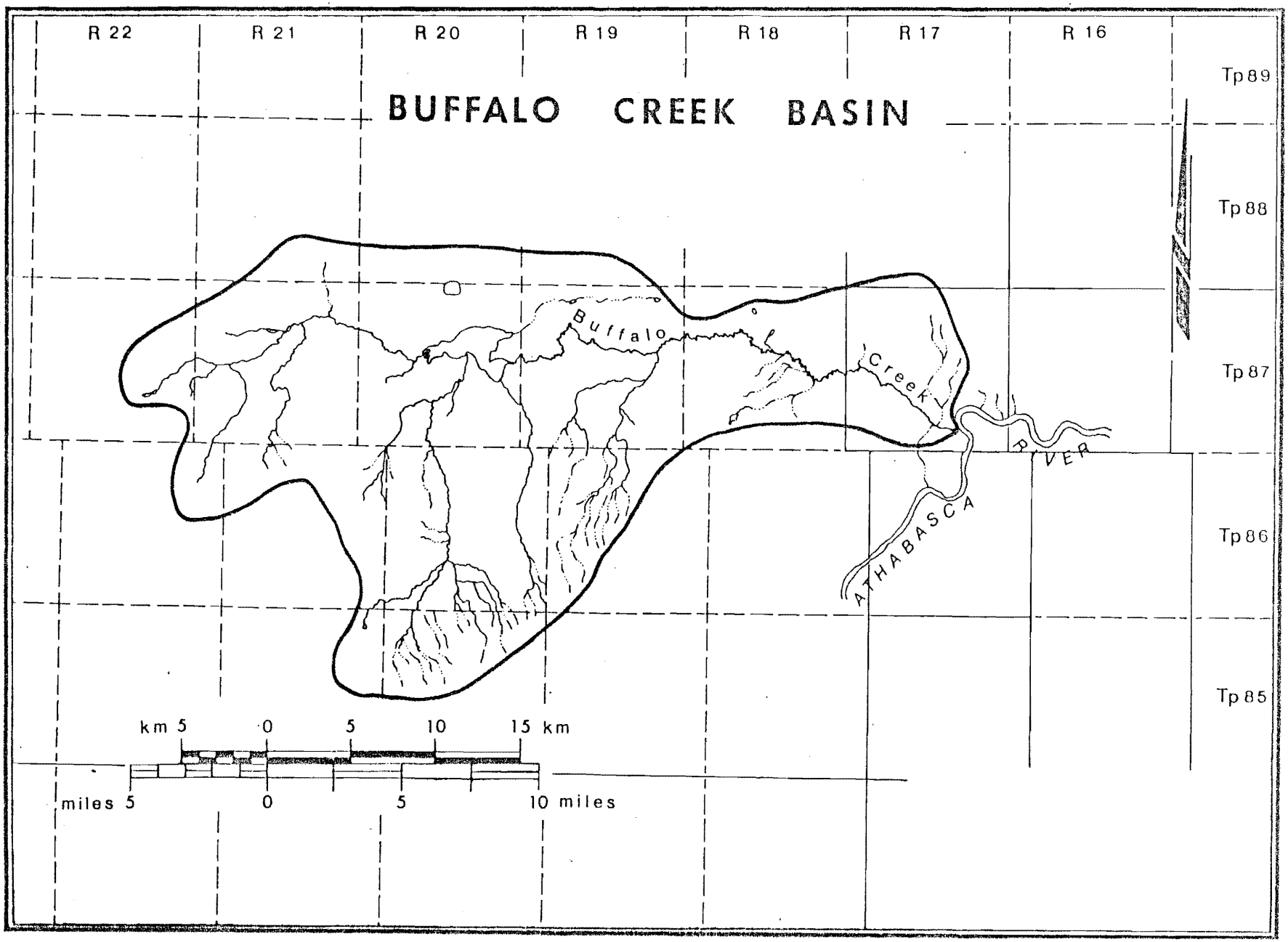


Figure 8. Buffalo Creek basin.

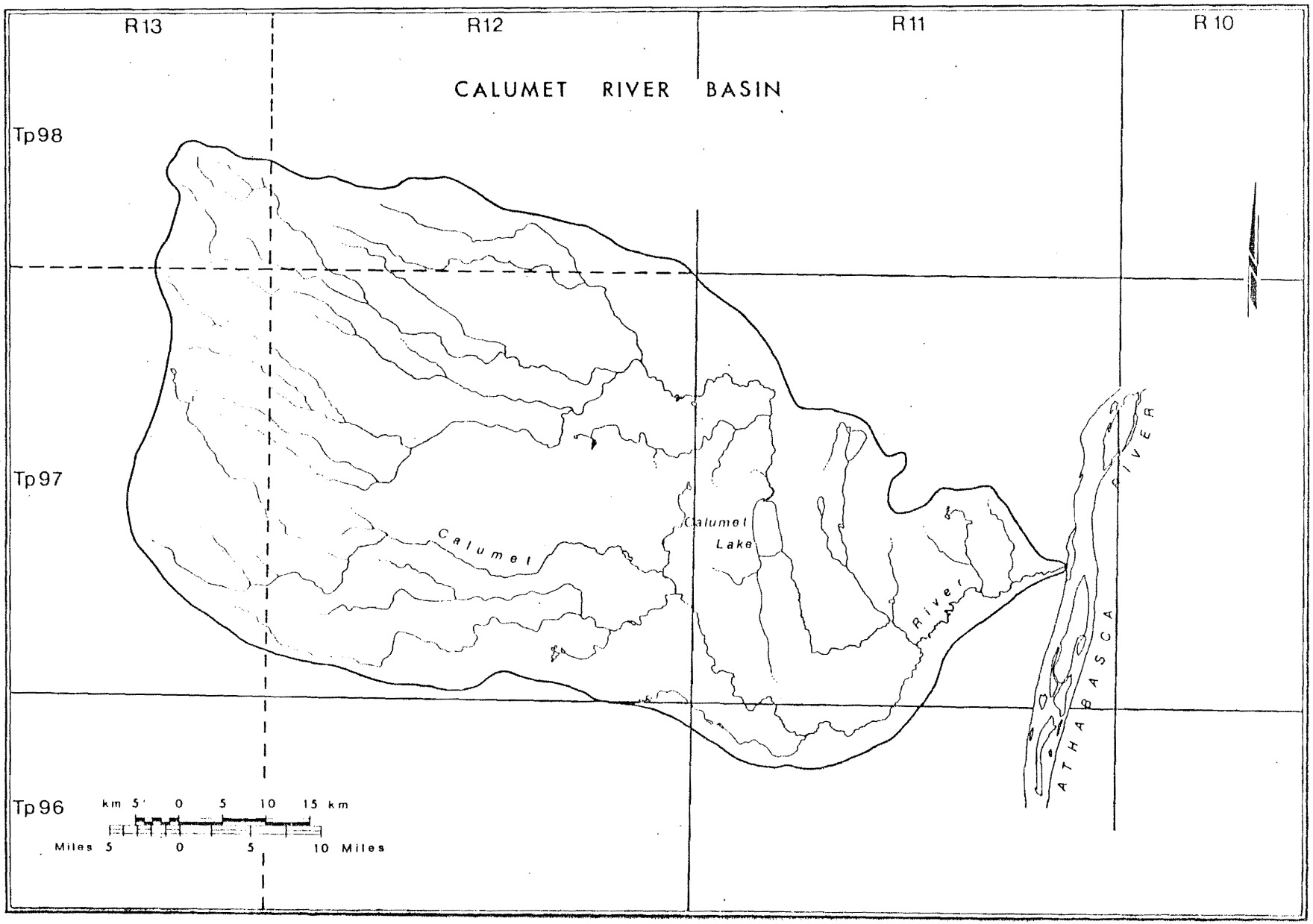


Figure 9. Calumet River basin.

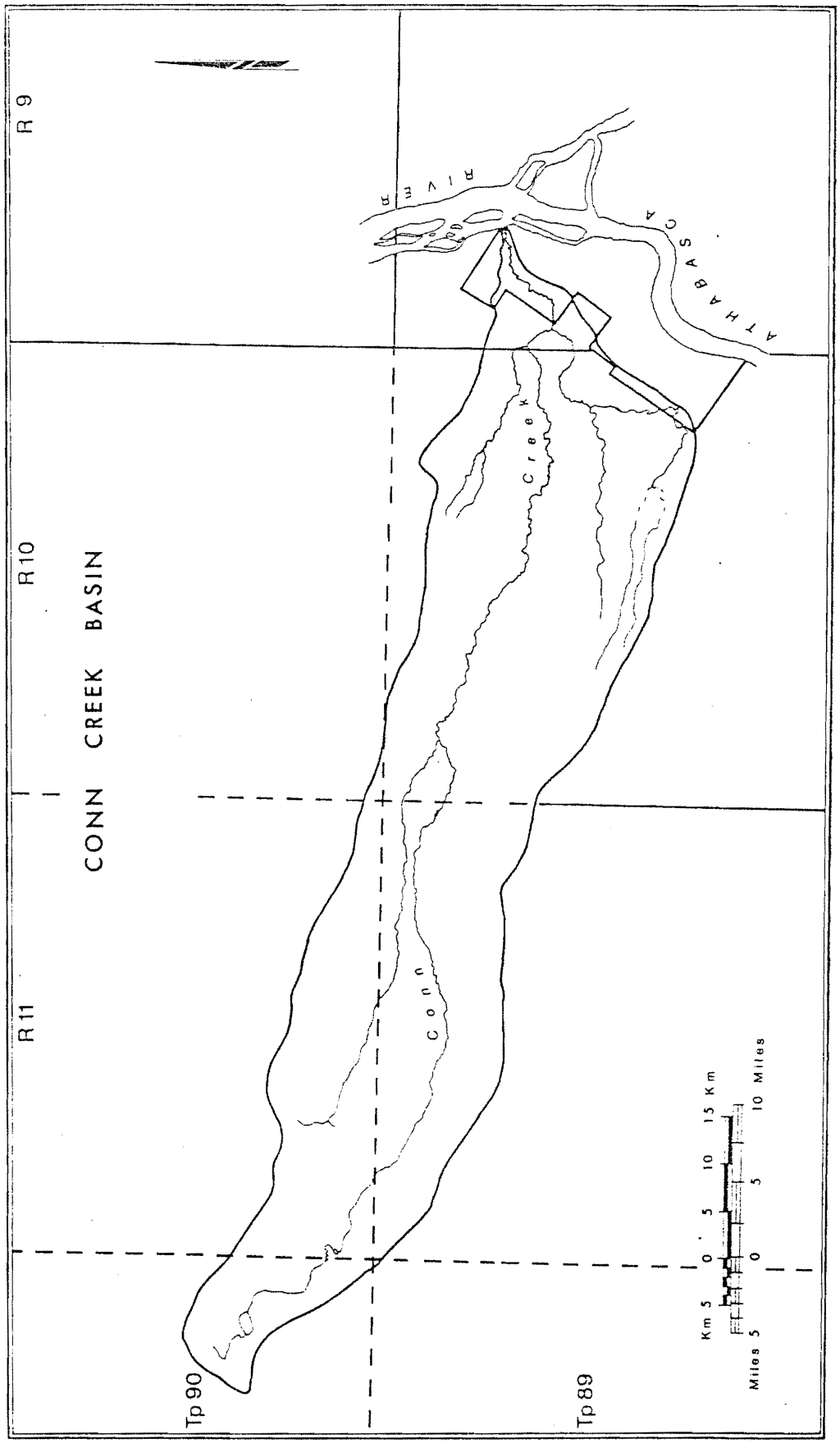


Figure 12. Conn Creek basin.

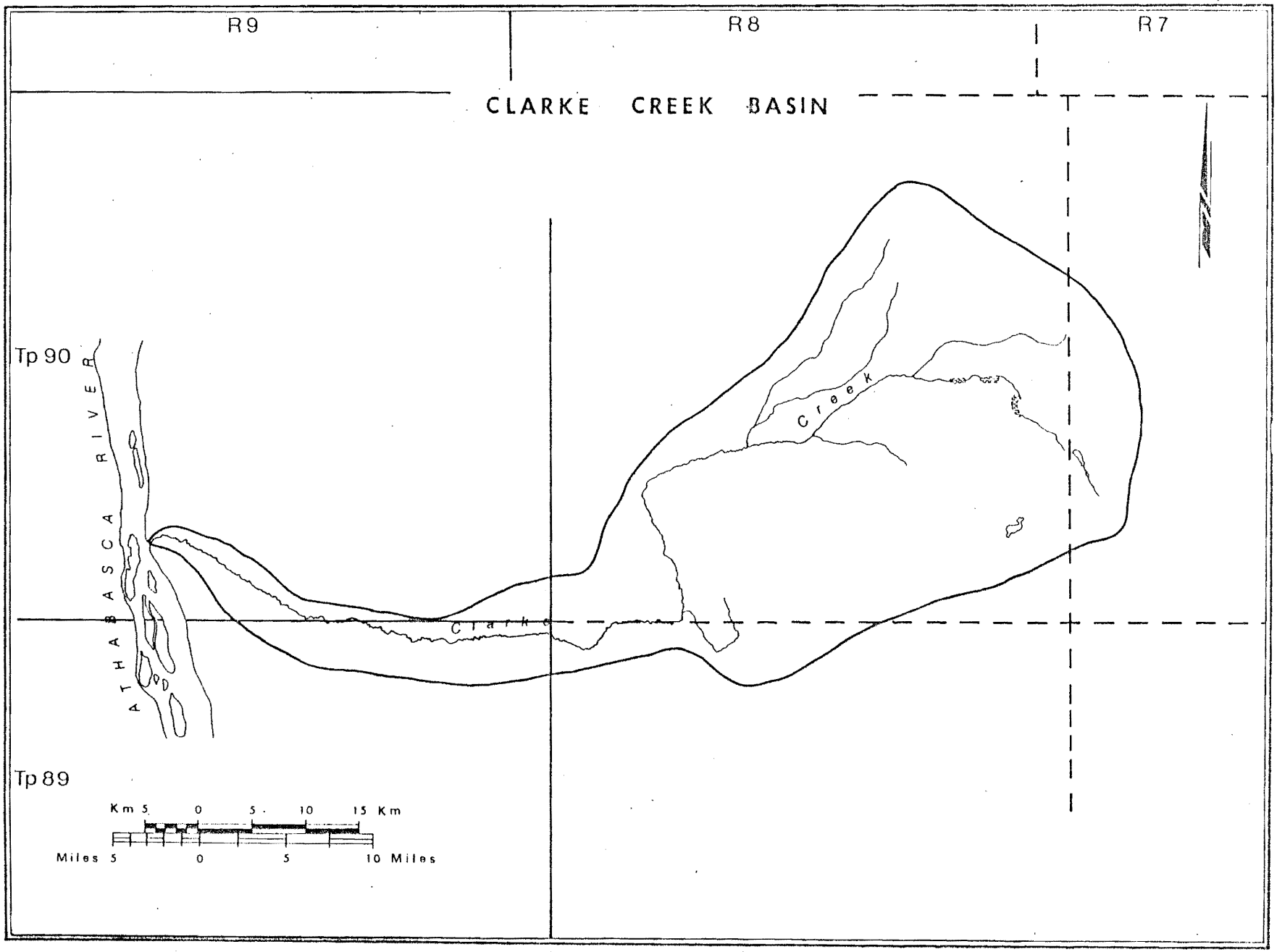


Figure 10. Clark Creek basin.

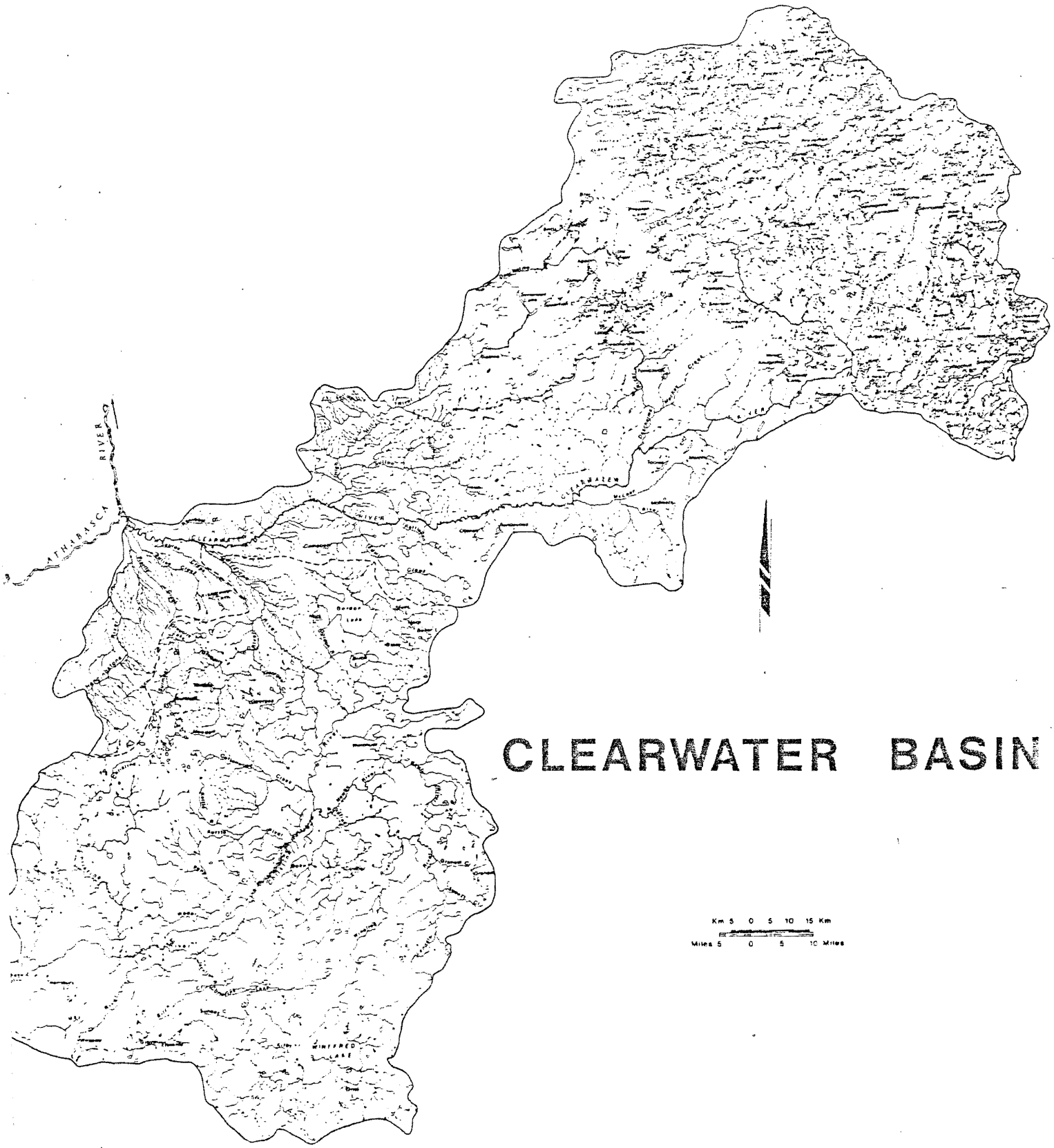


Figure 11. Clearwater River basin.

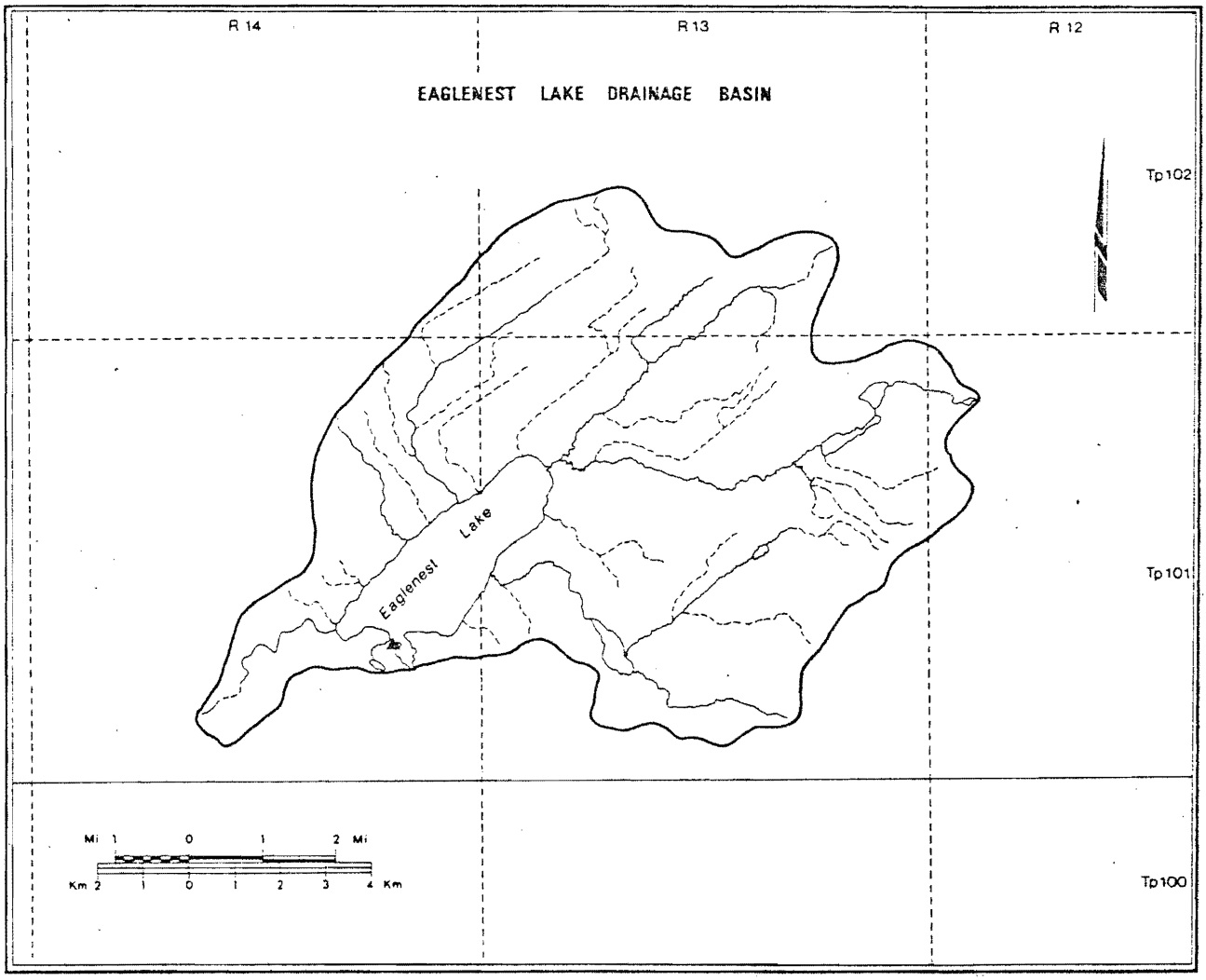


Figure 13. Eaglenest Lake Drainage basin.

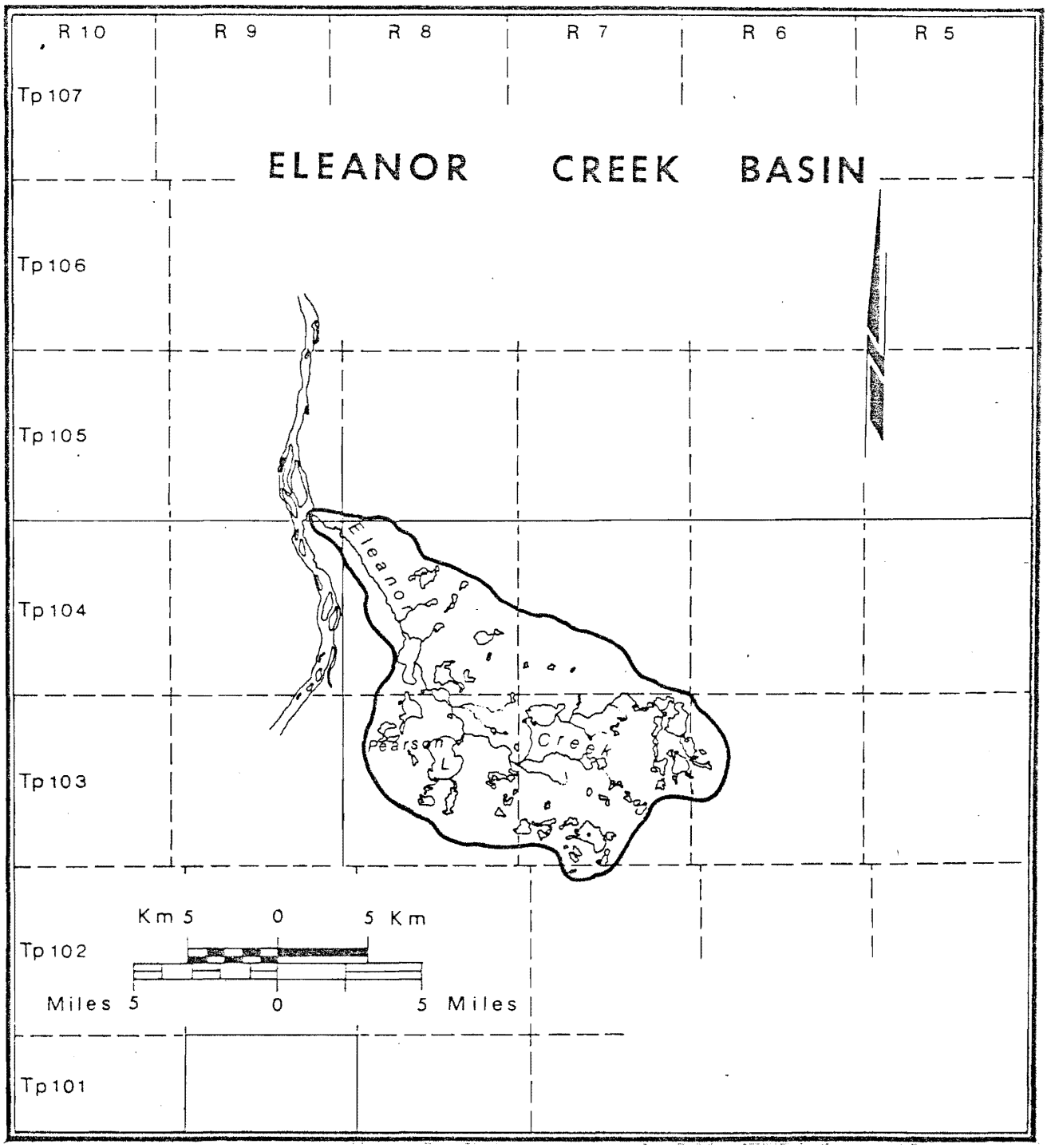


Figure 14. Eleanor Creek basin.

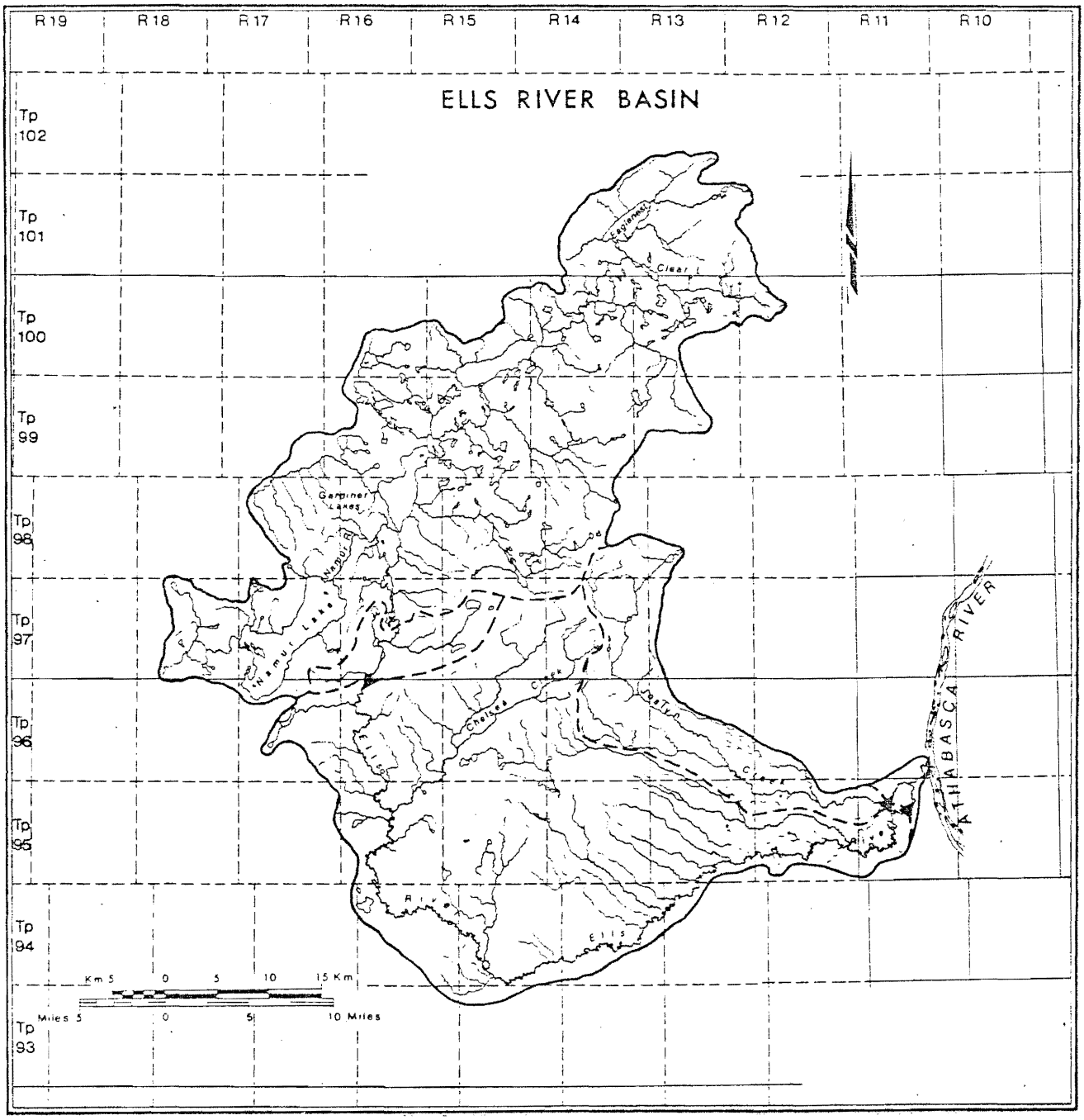


Figure 15. Ells Rivers basin.

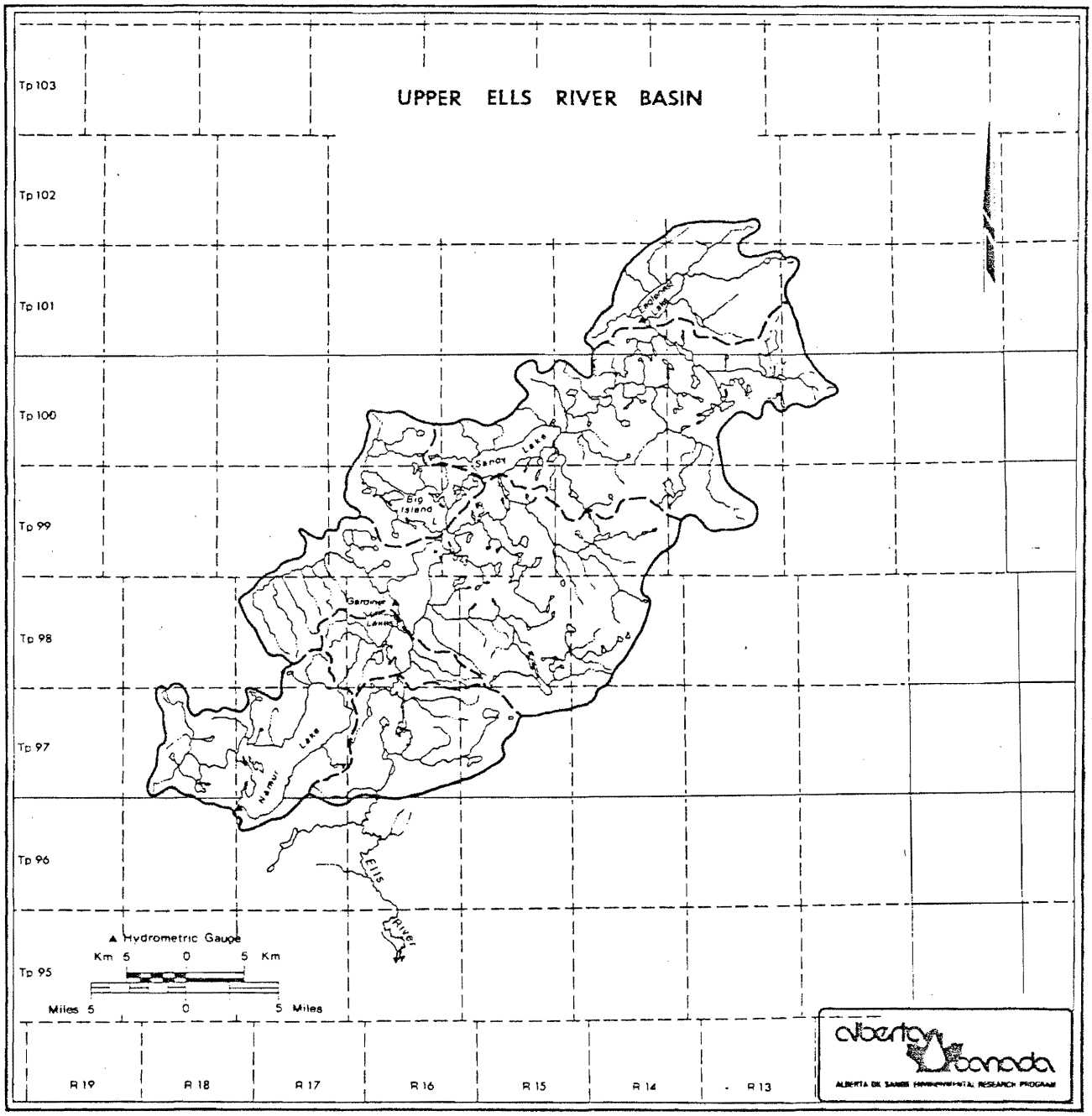


Figure 16. Upper Ells River basin.

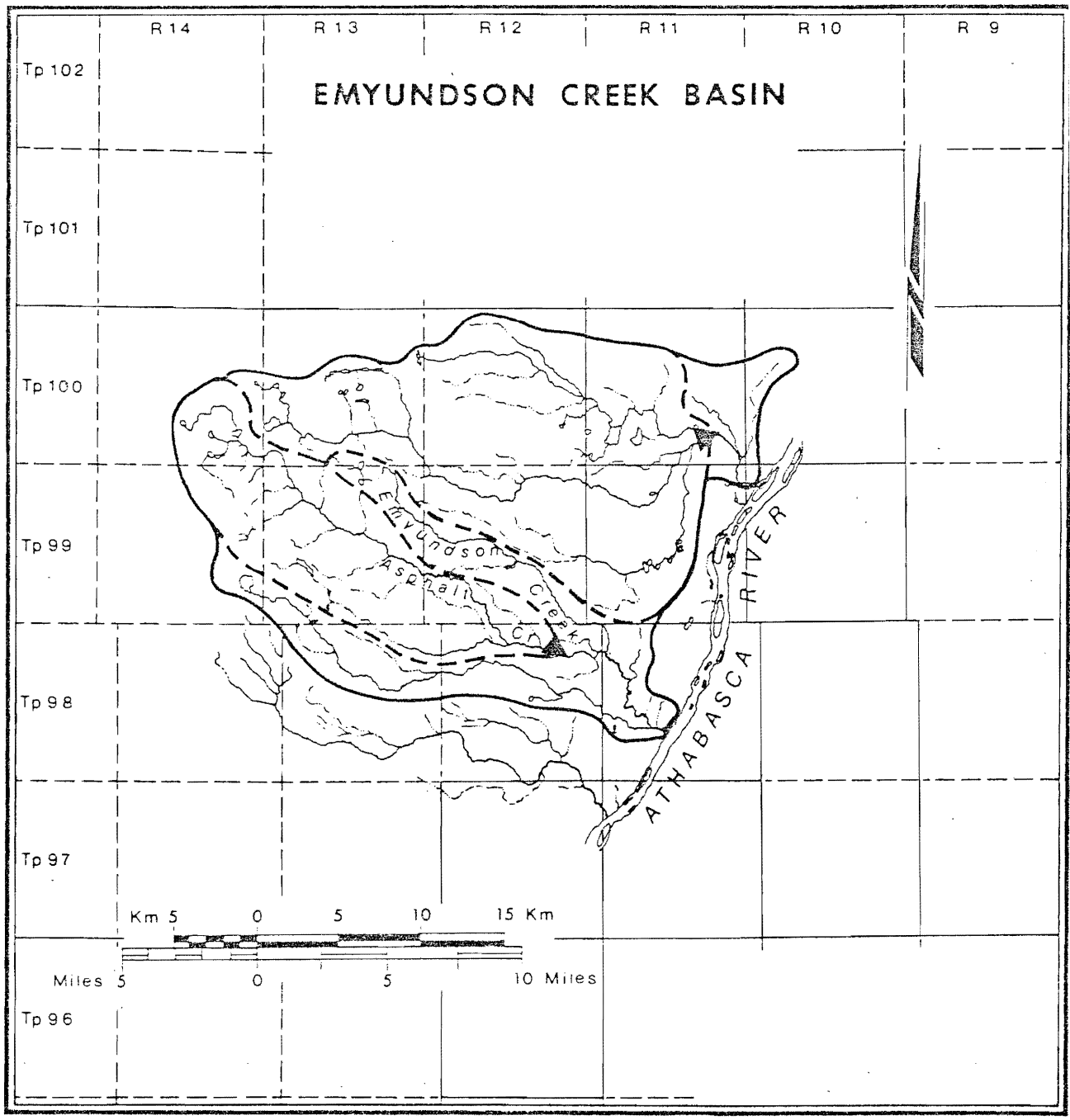


Figure 17. Eymundson Creek basin.

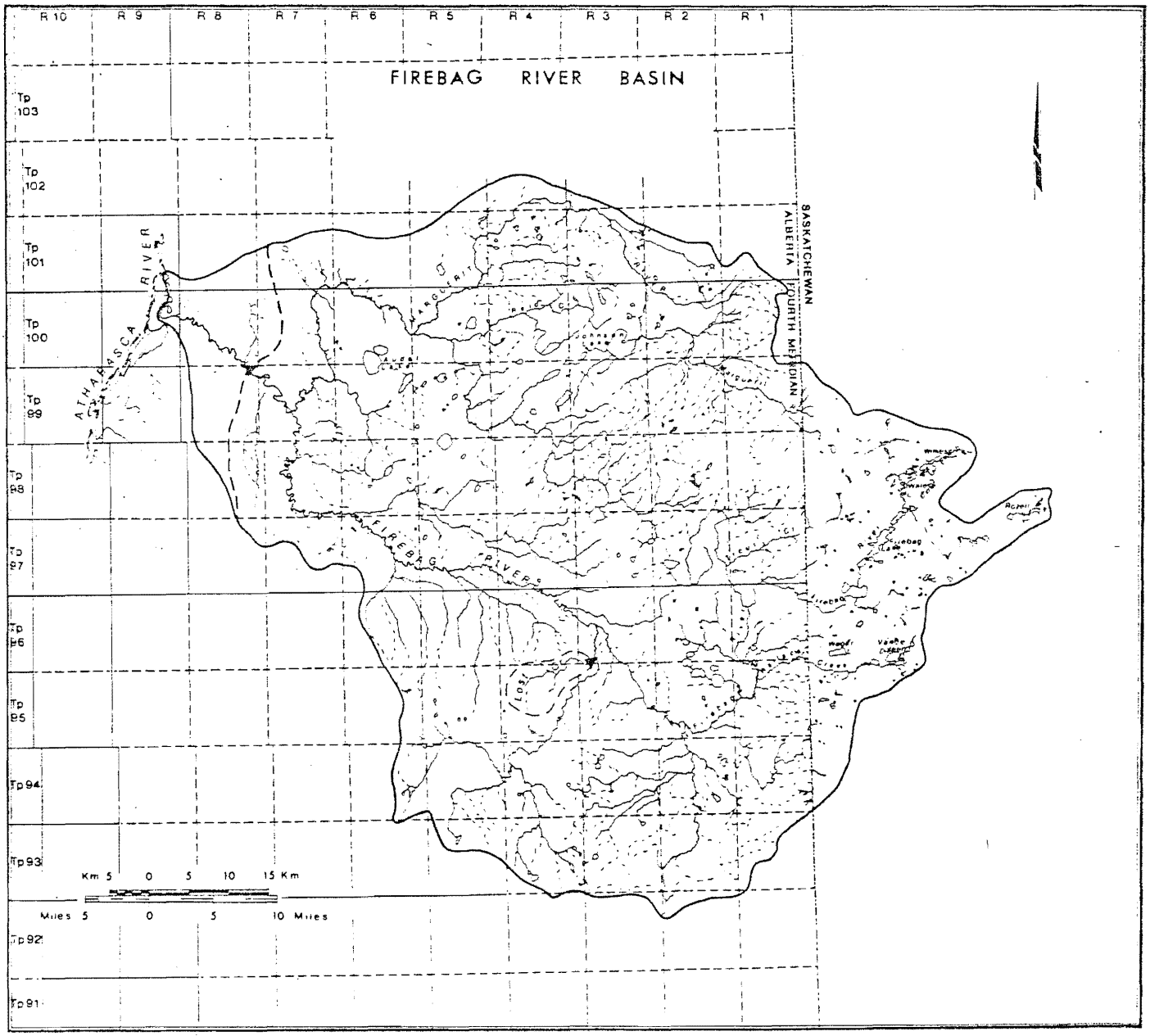


Figure 18. Firebag River basin.

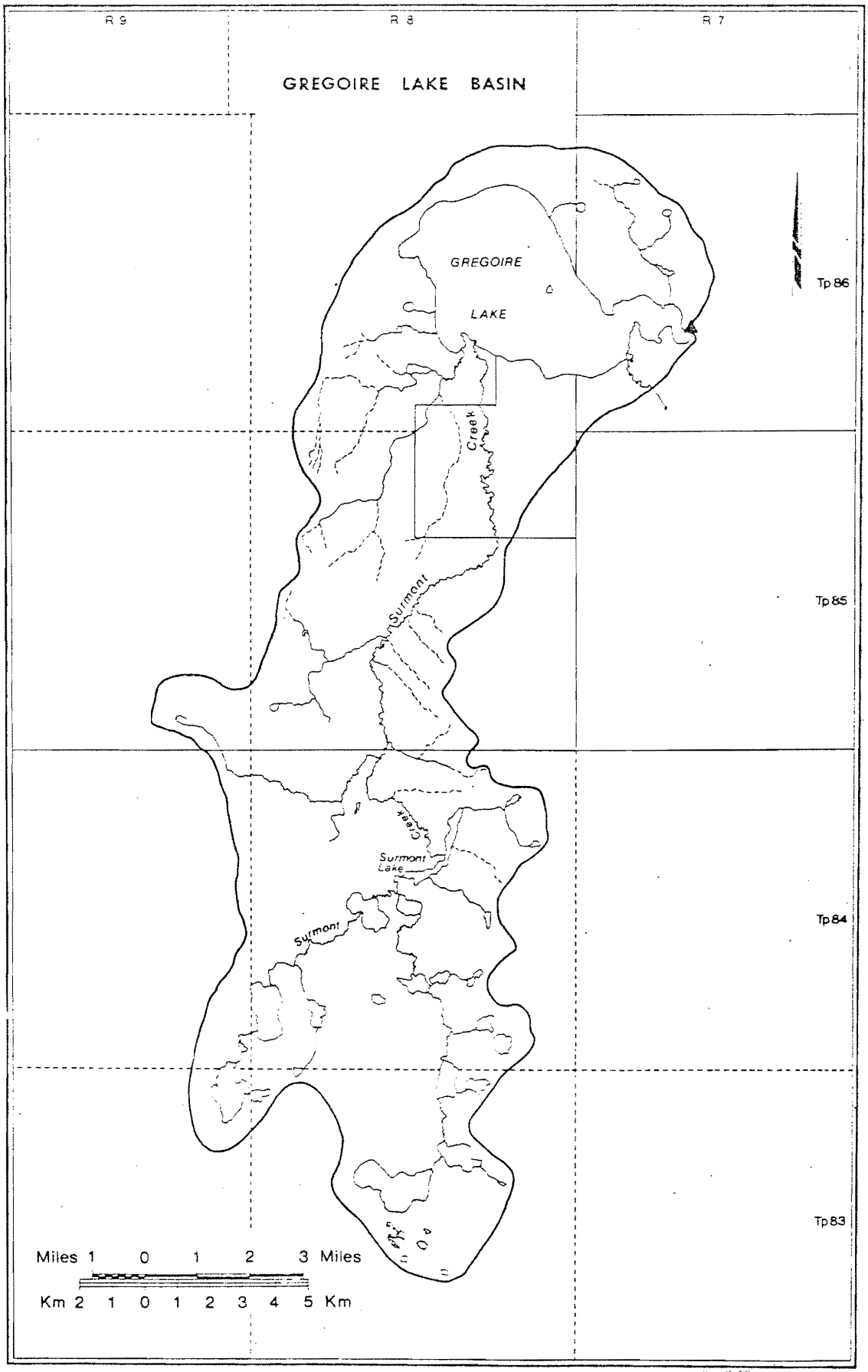


Figure 19. Gregoire Lake basin.

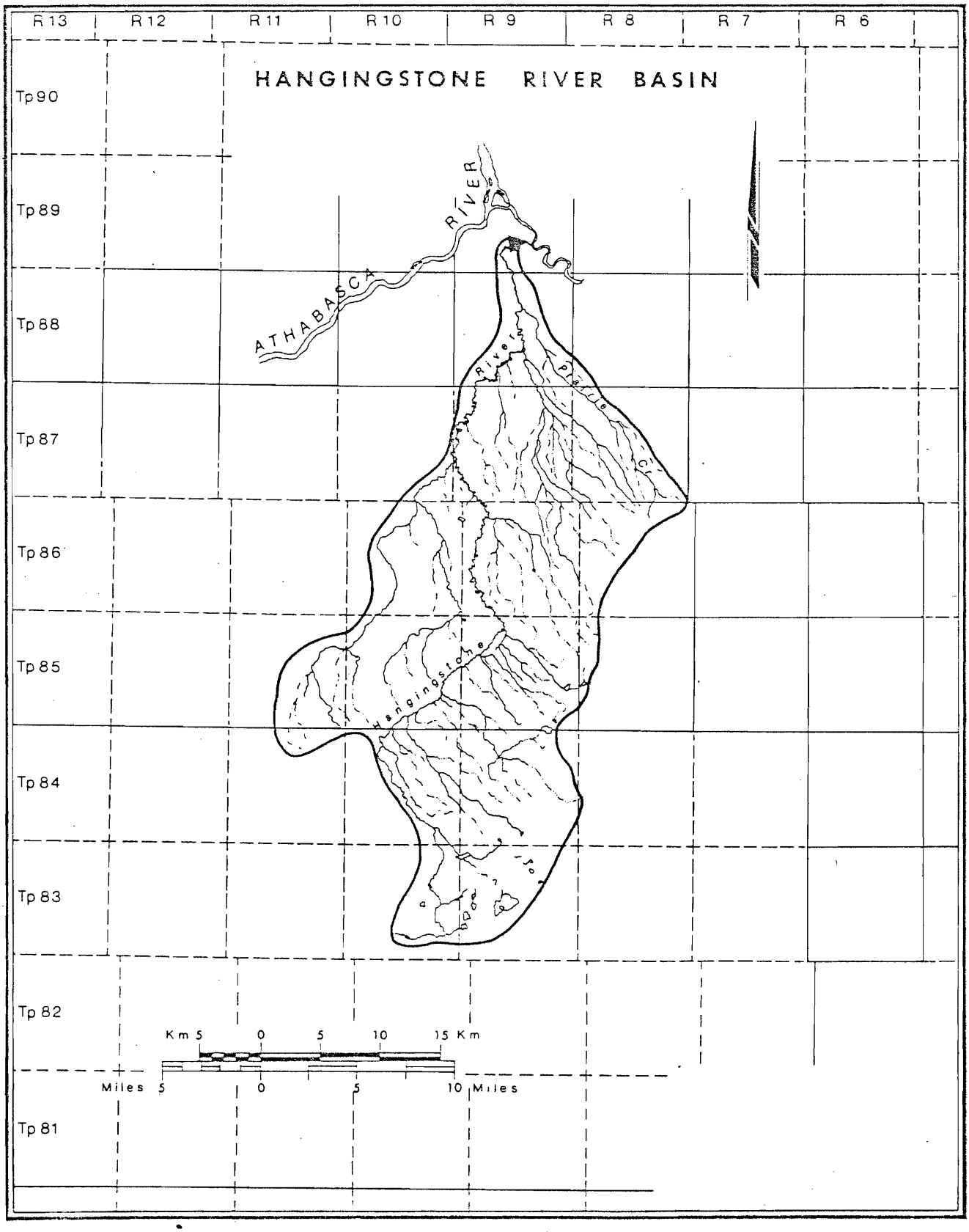


Figure 20. Hangingstone River basin.

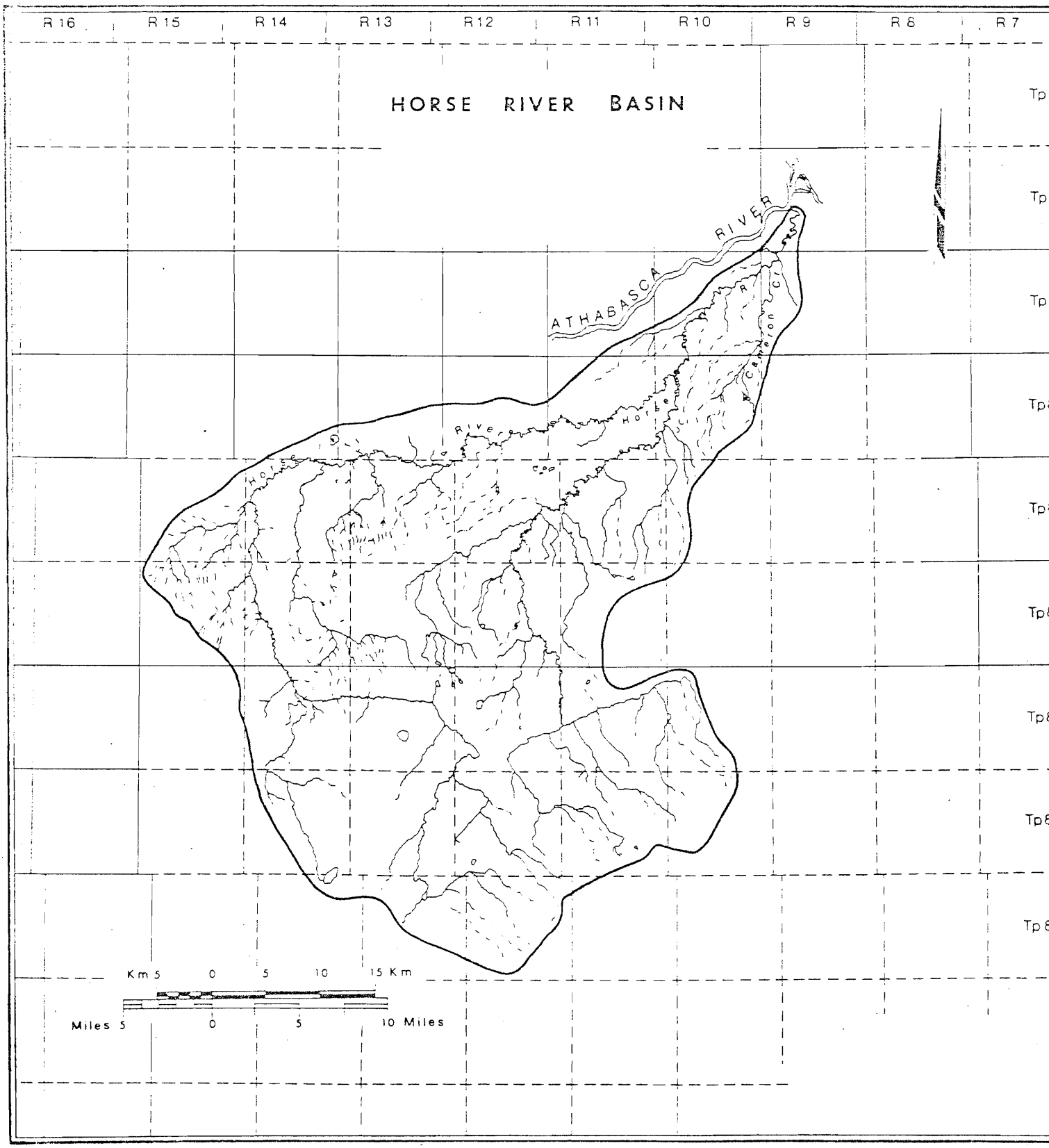


Figure 21. Horse River basin.

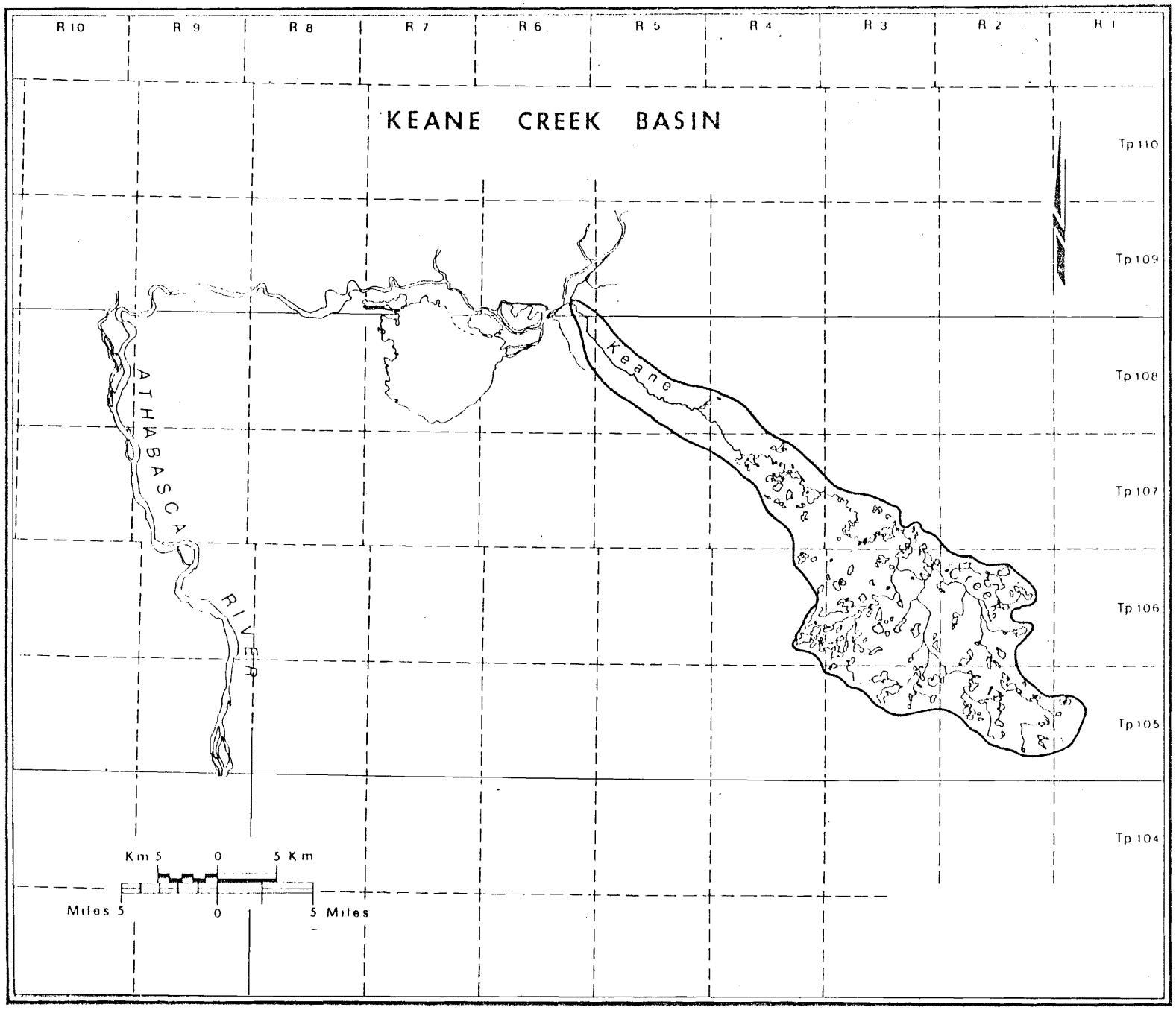


Figure 22. Keane Creek basin.

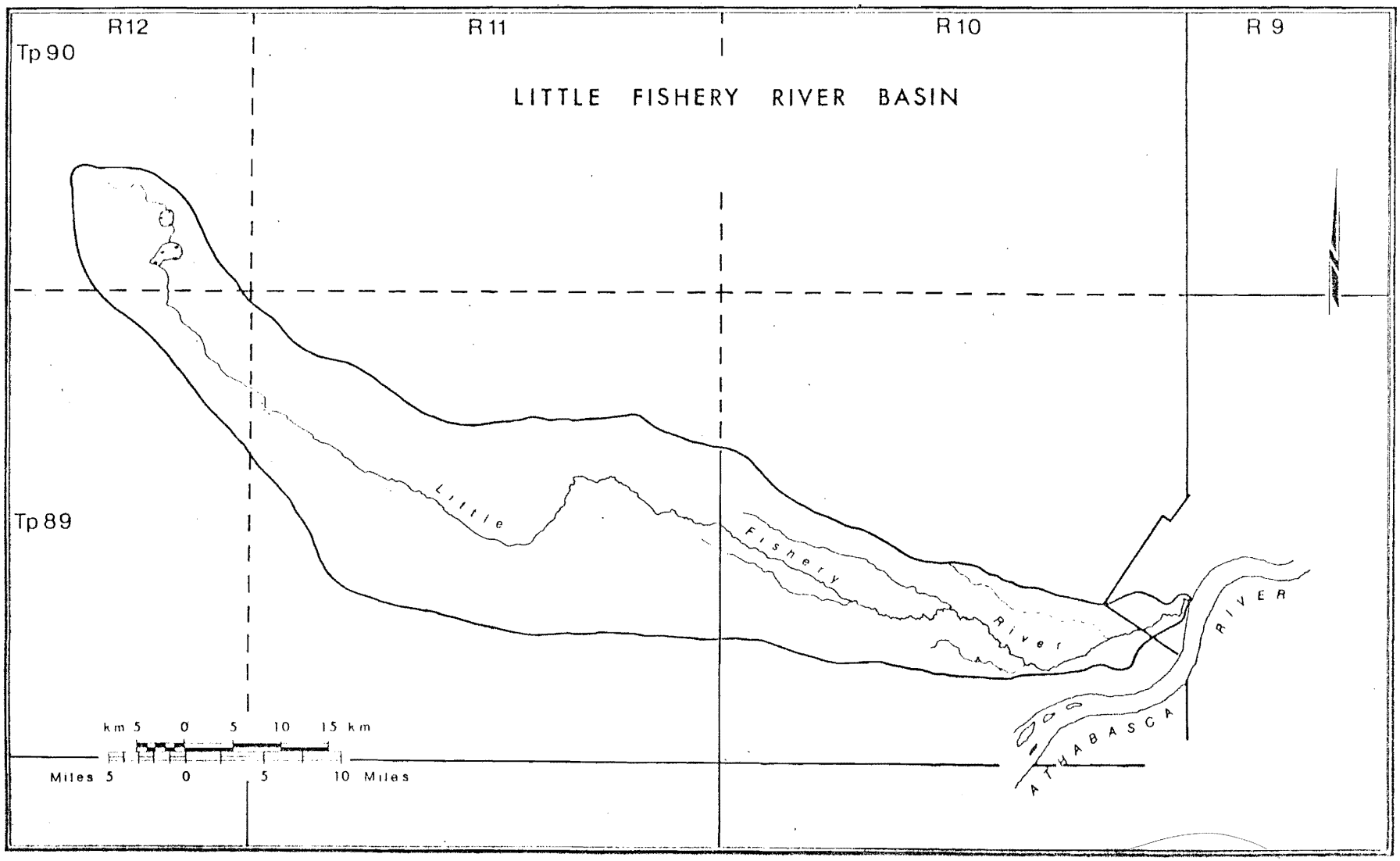


Figure 23. Little Fishery River basin.

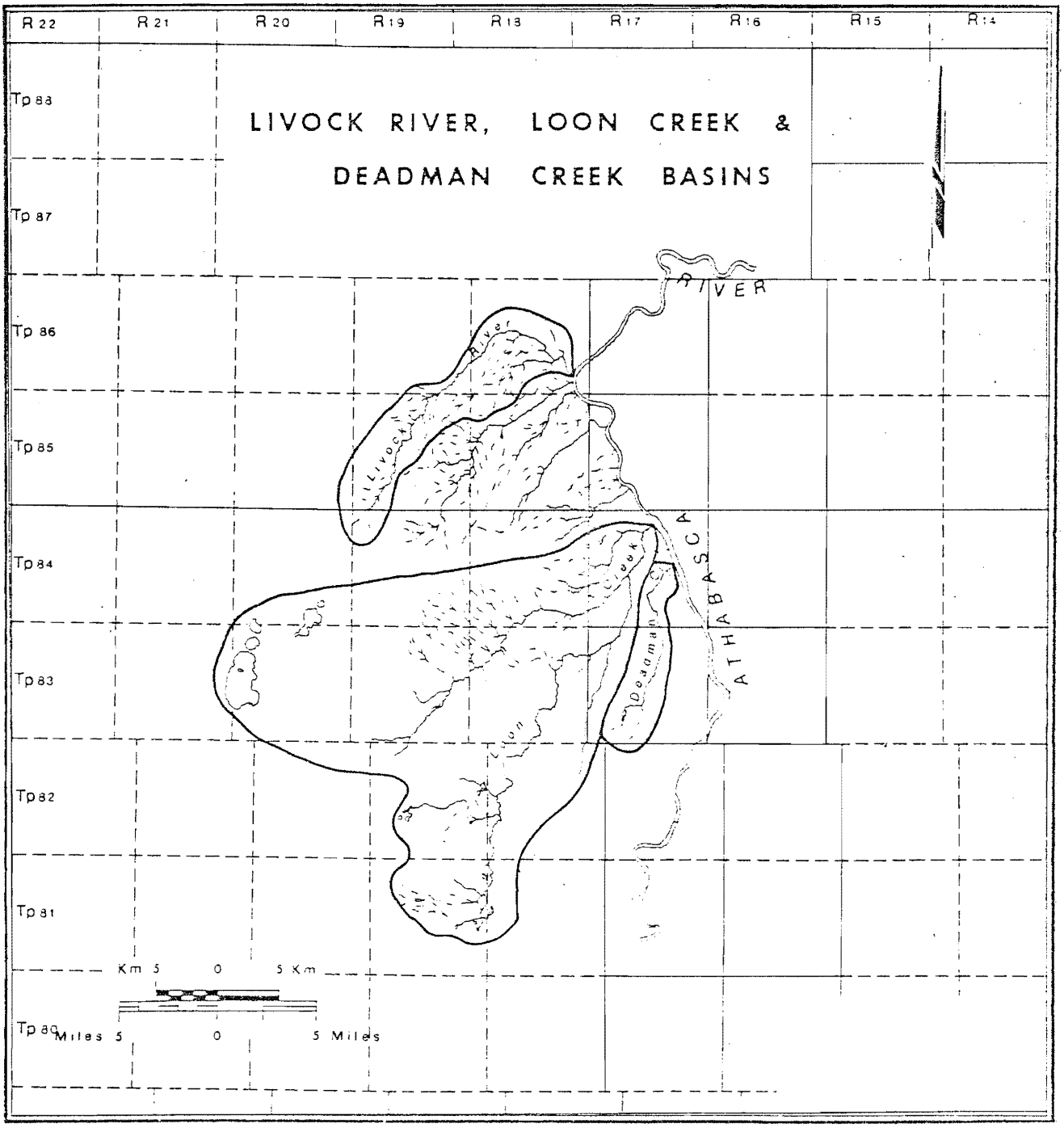


Figure 24. Livock River, Loon Creek, and Deadman Creek basins.

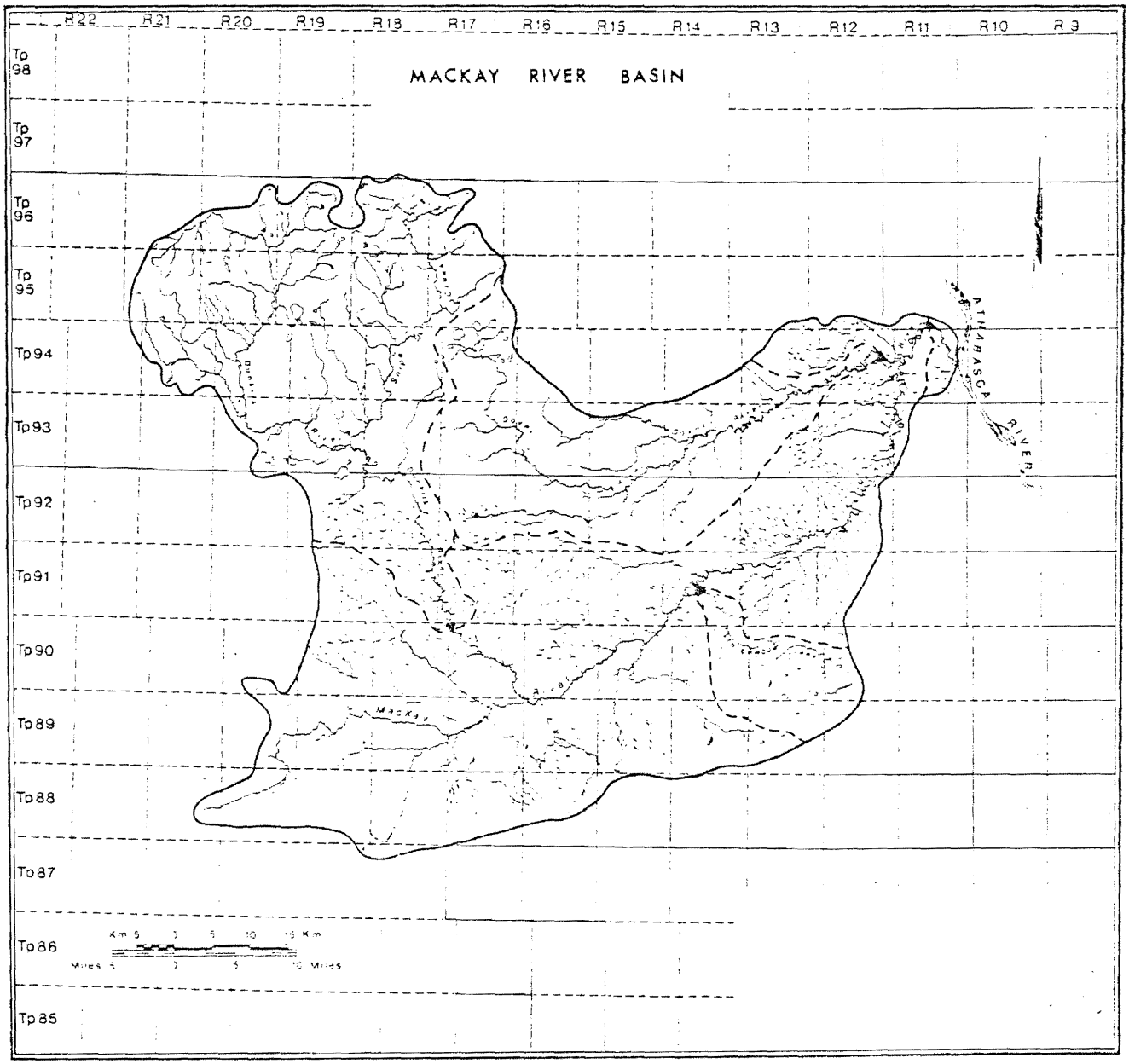


Figure 26. MacKay River basin.

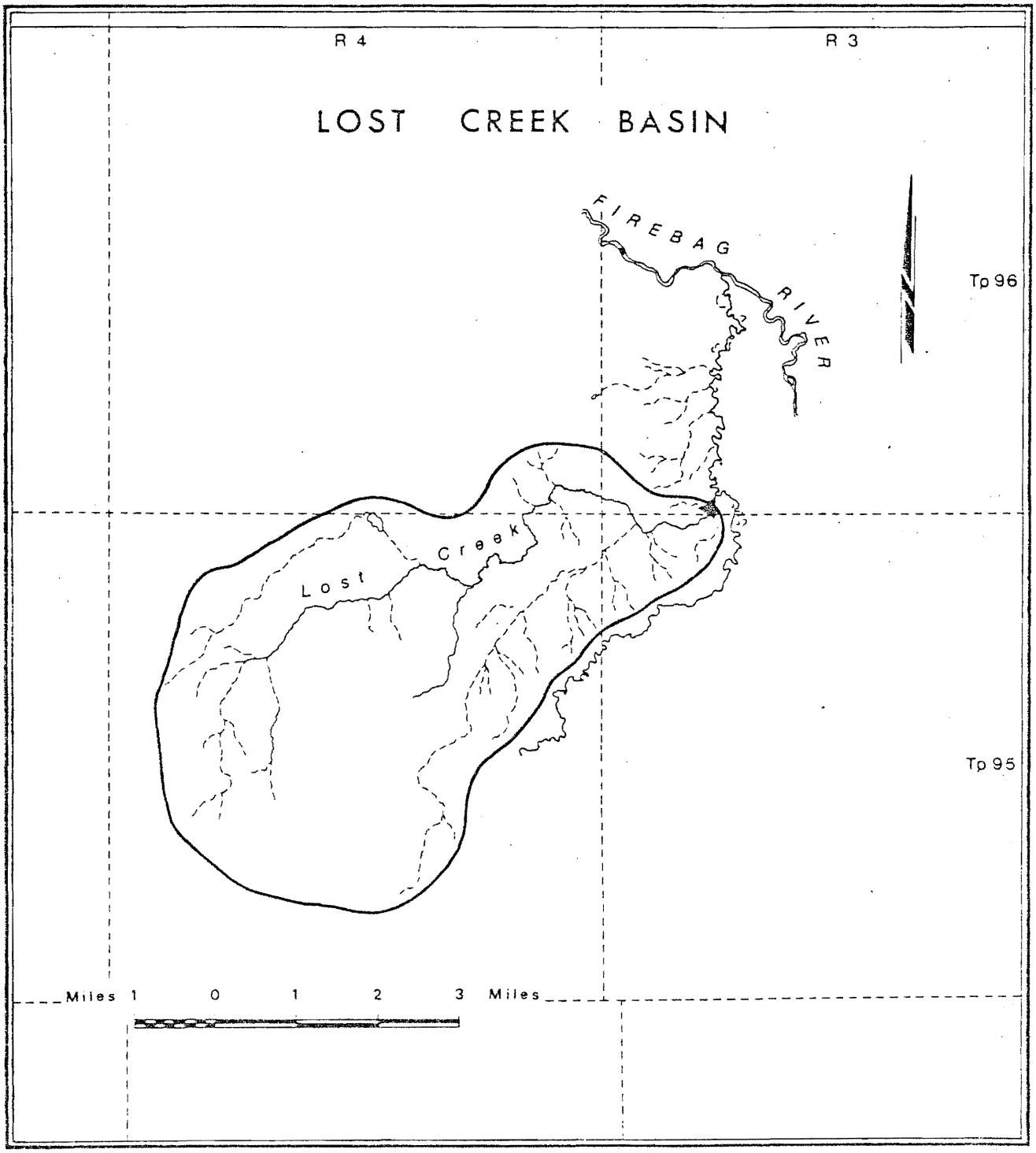


Figure 25. Lost Creek basin.

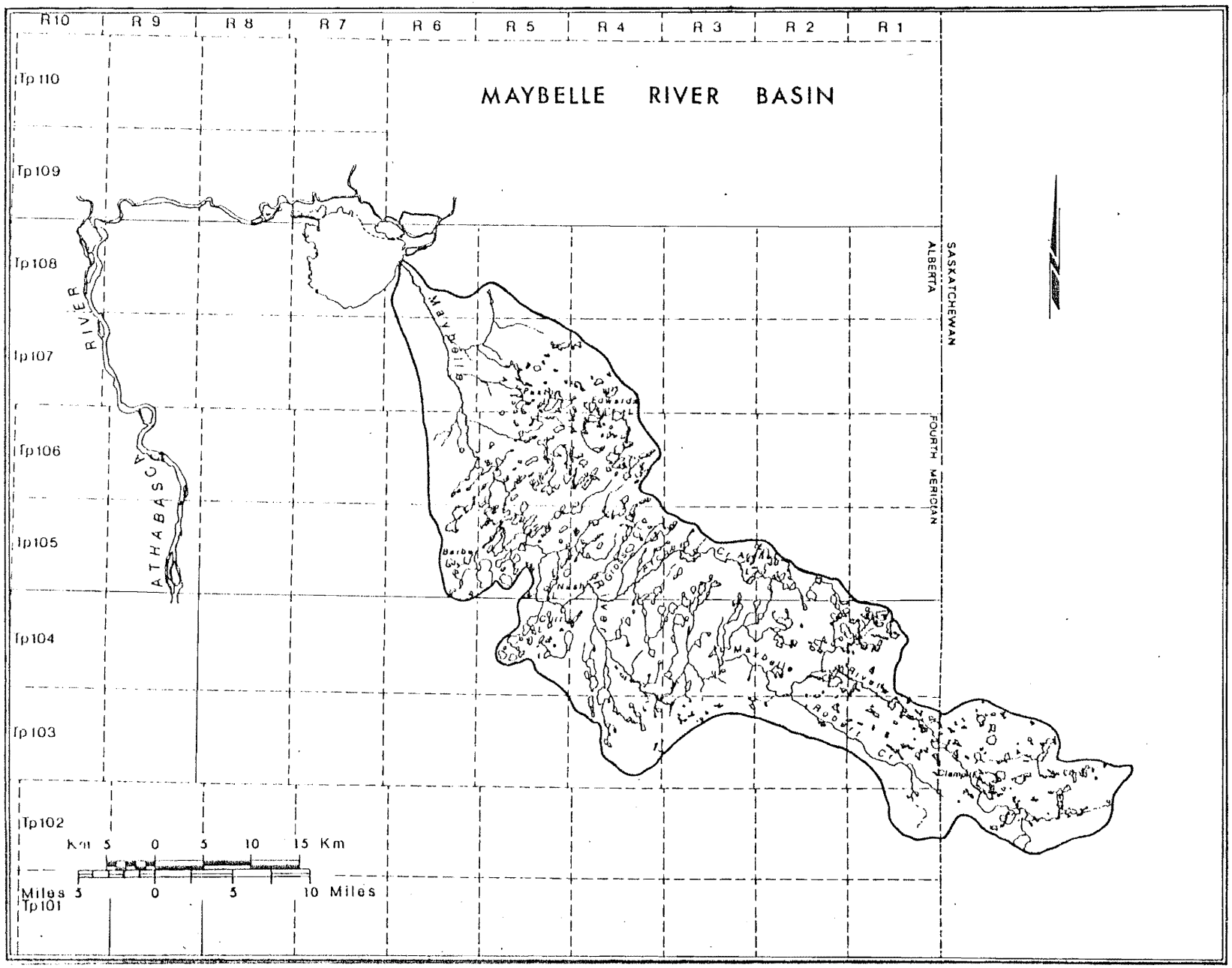


Figure 27. Maybelle River basin.

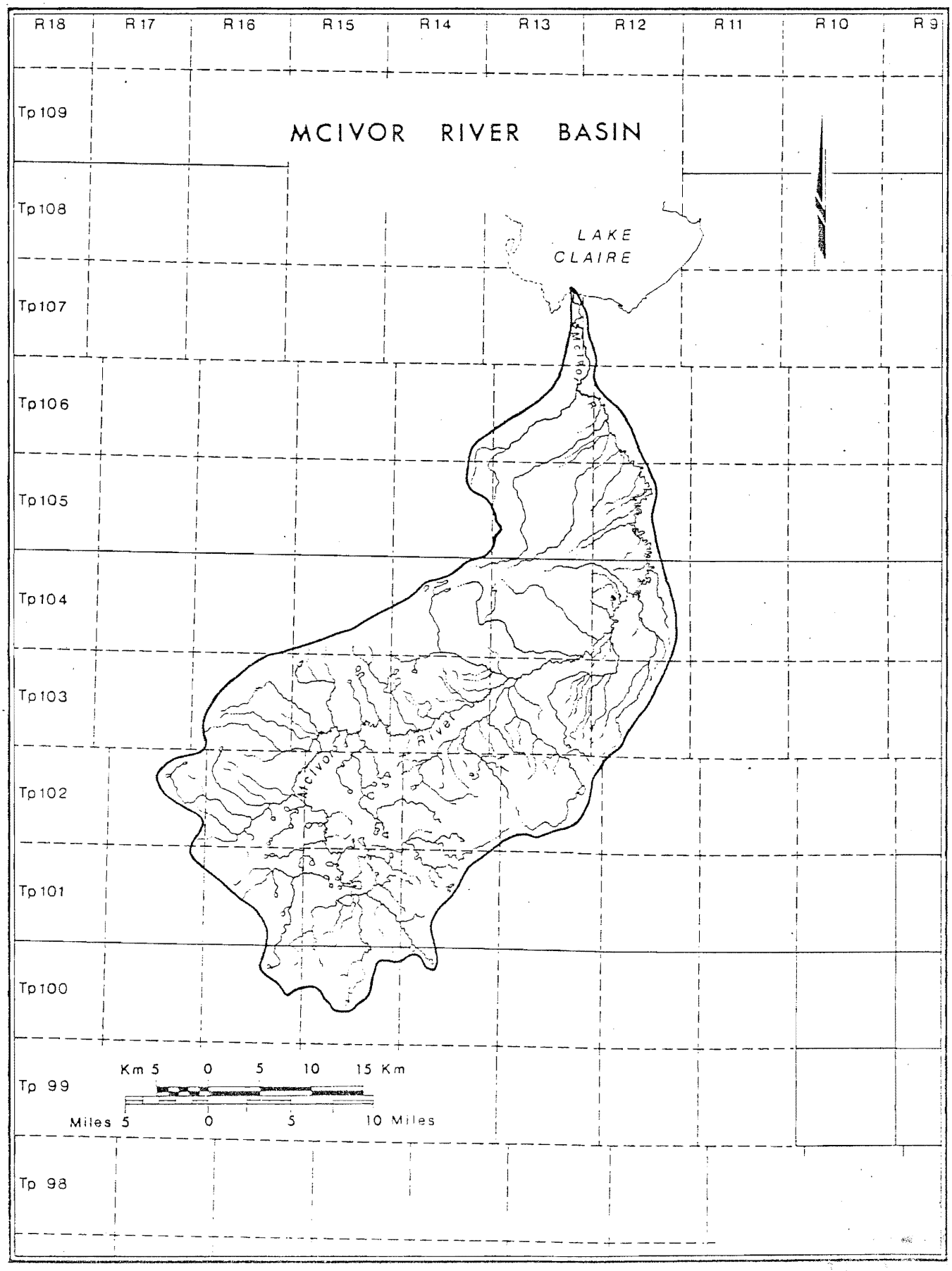


Figure 28. McIvor River basin.

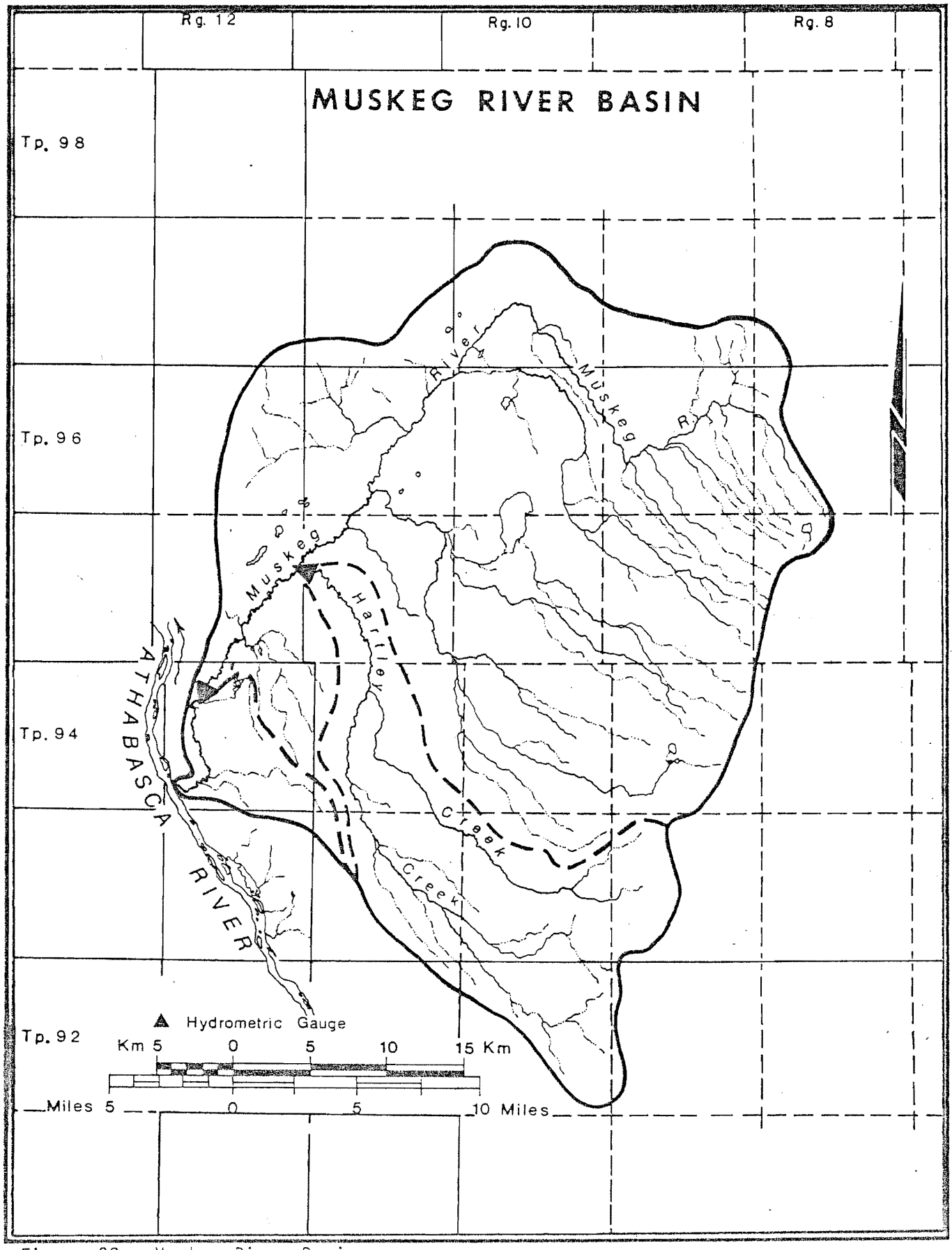


Figure 29. Muskeg River Basin.

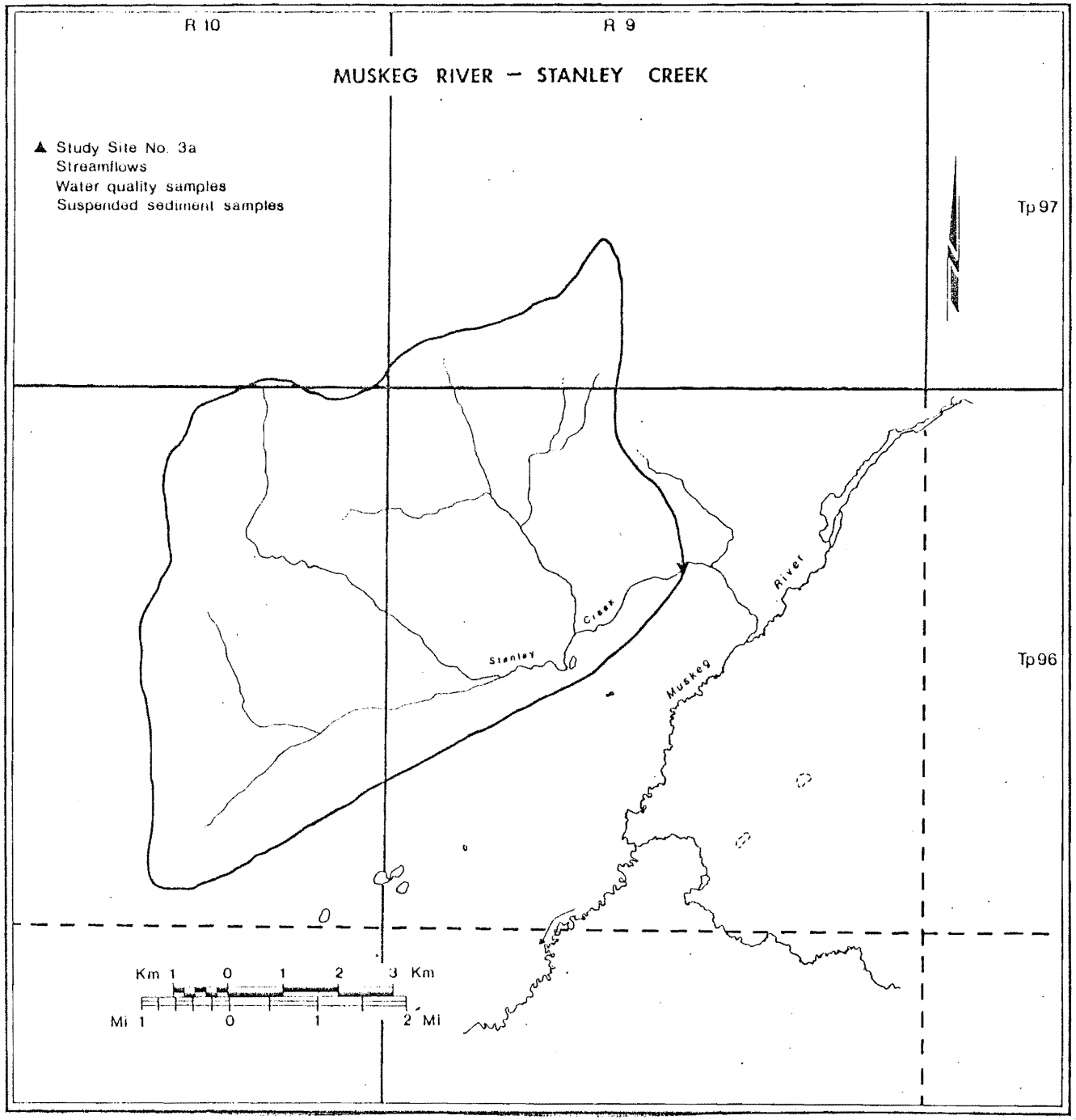


Figure 30. Muskeg River basin, Stanley Creek sub-basin.

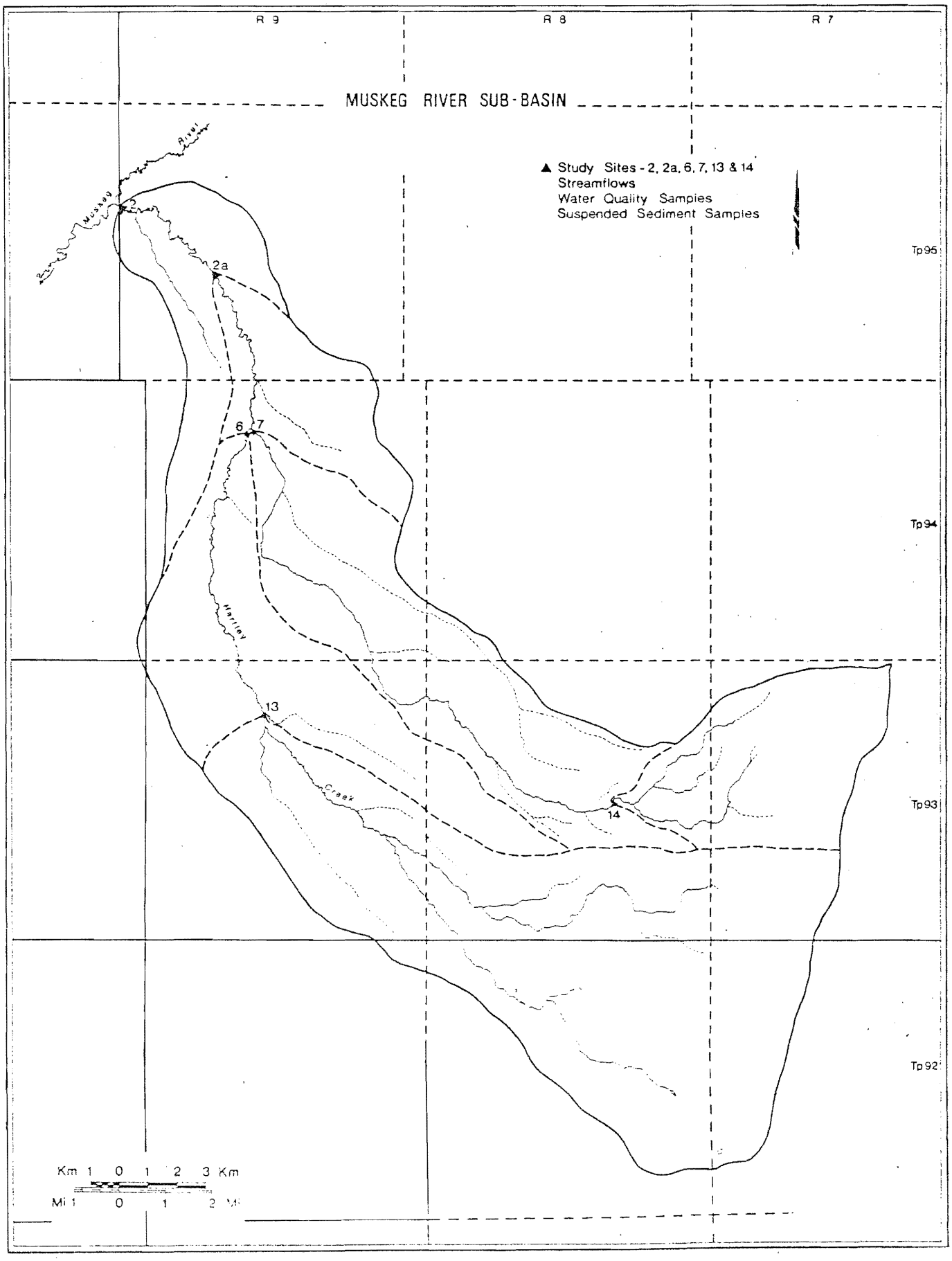


Figure 31. Muskeg River basin, Hartley Creek sub-basin.

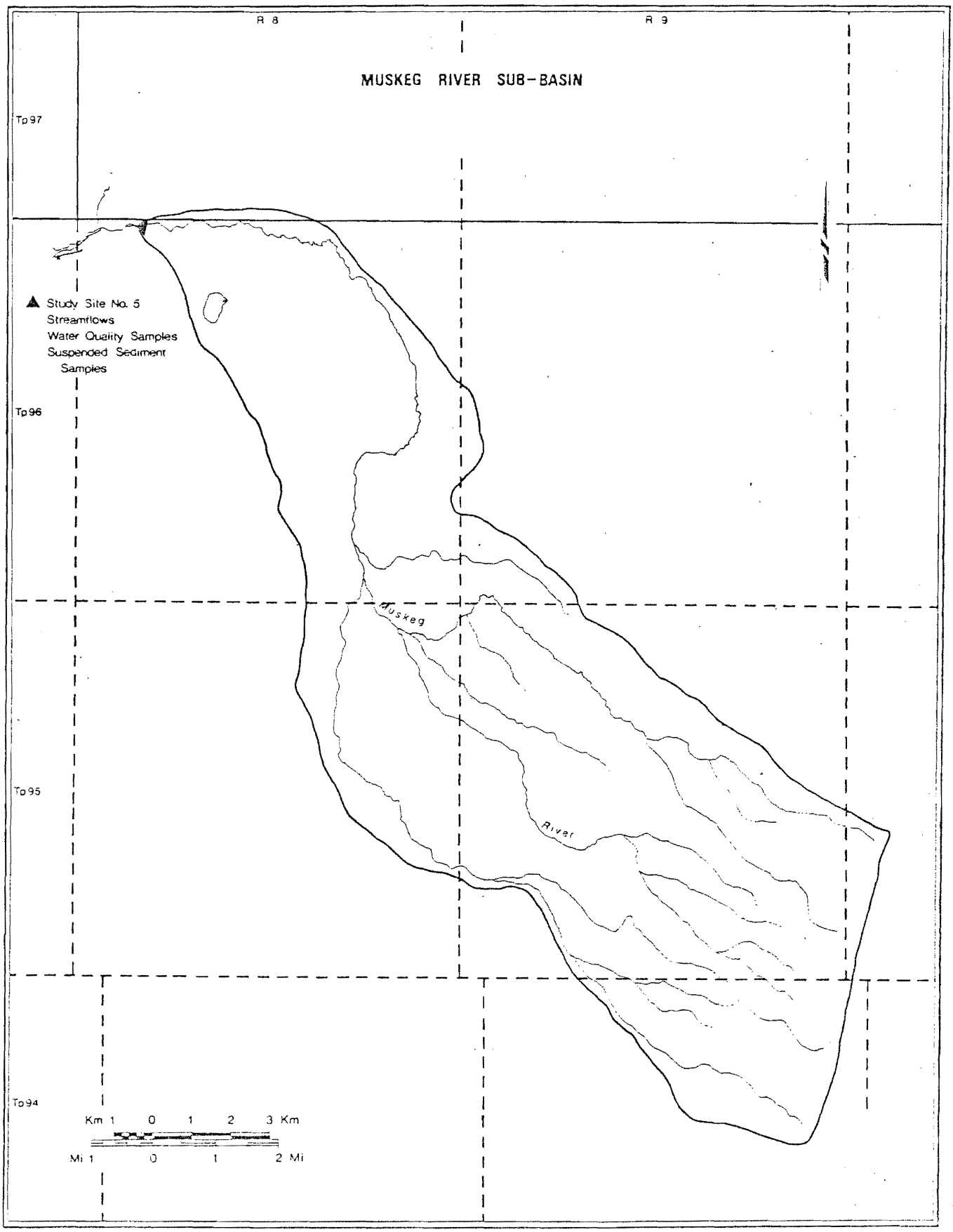


Figure 32. Muskeg River sub-basins, headwaters of mainstem.

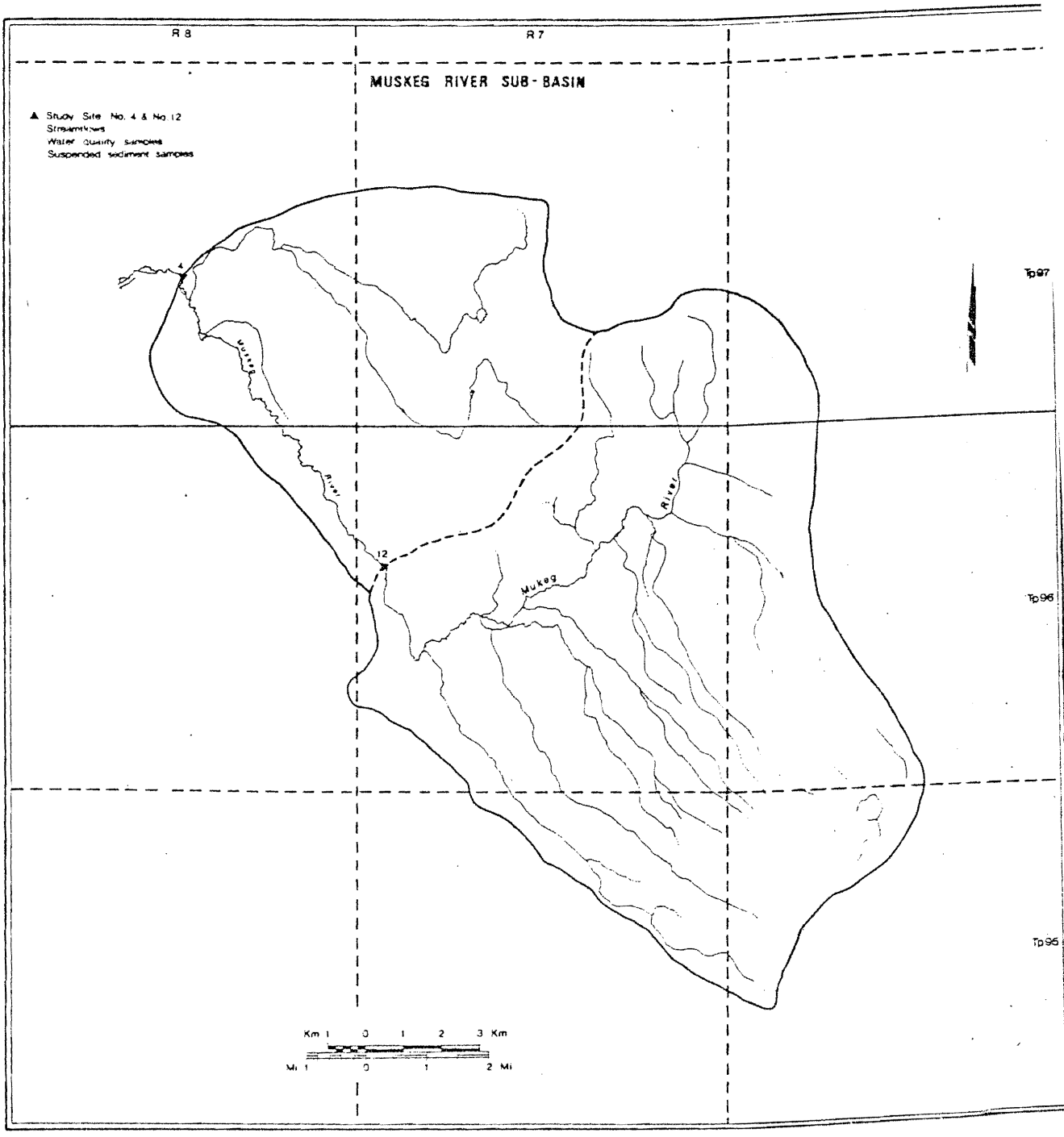


Figure 33. Muskeg River sub-basins, headwaters of mainstem.

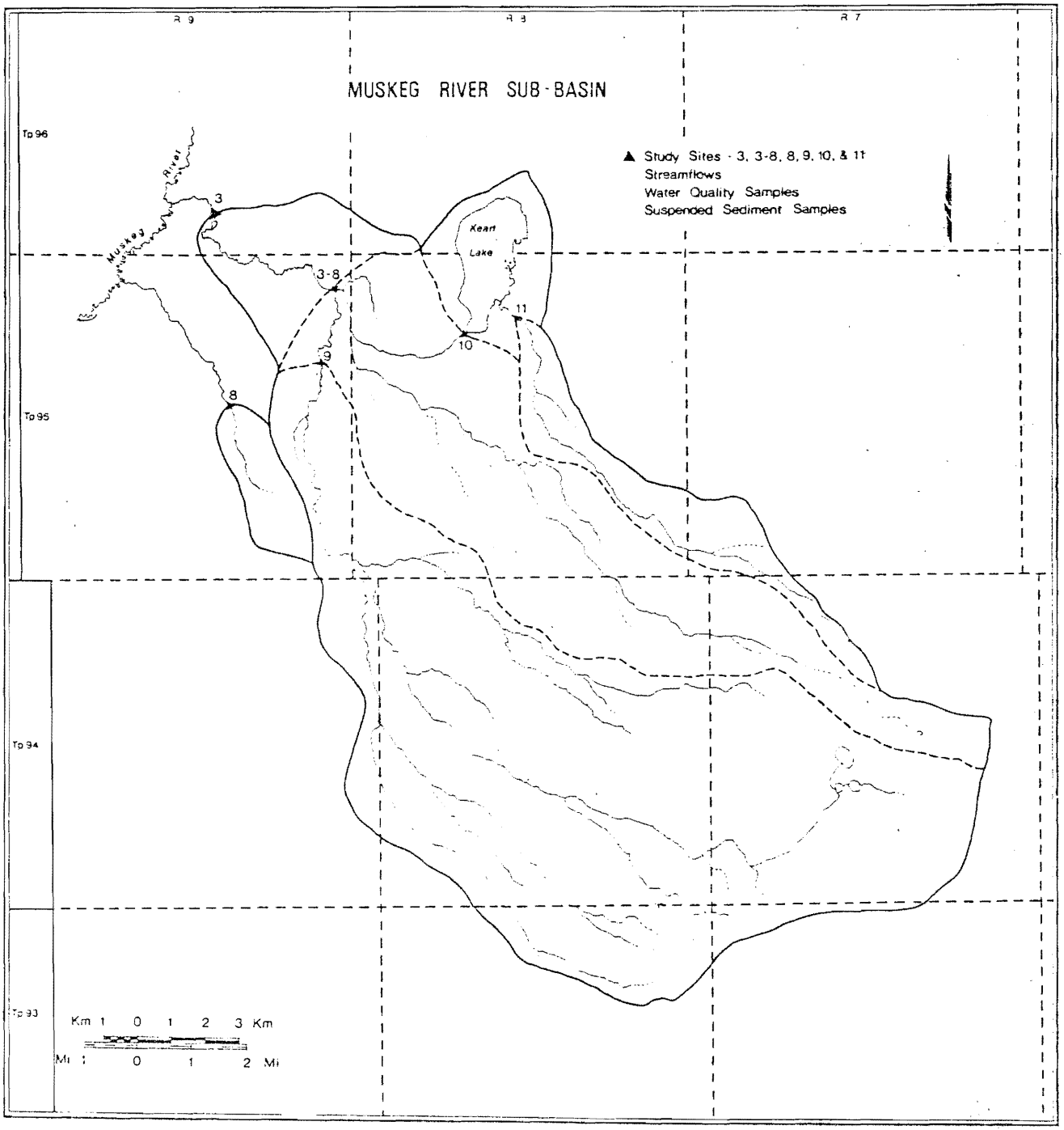


Figure 34. Muskeg River sub-basins, headwaters of mainstem.

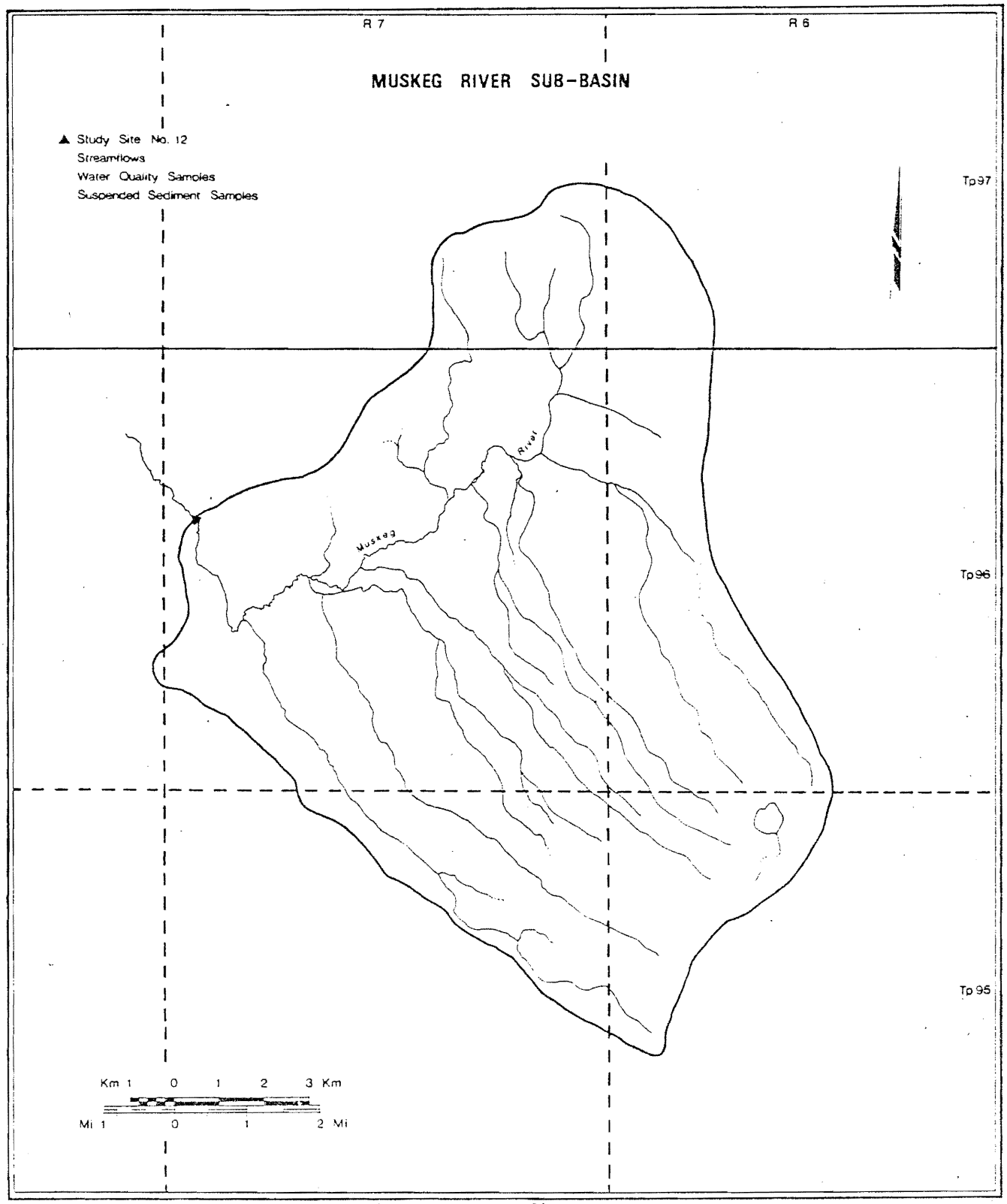


Figure 35. Muskeg River Sub-basins, headwaters of mainstem.

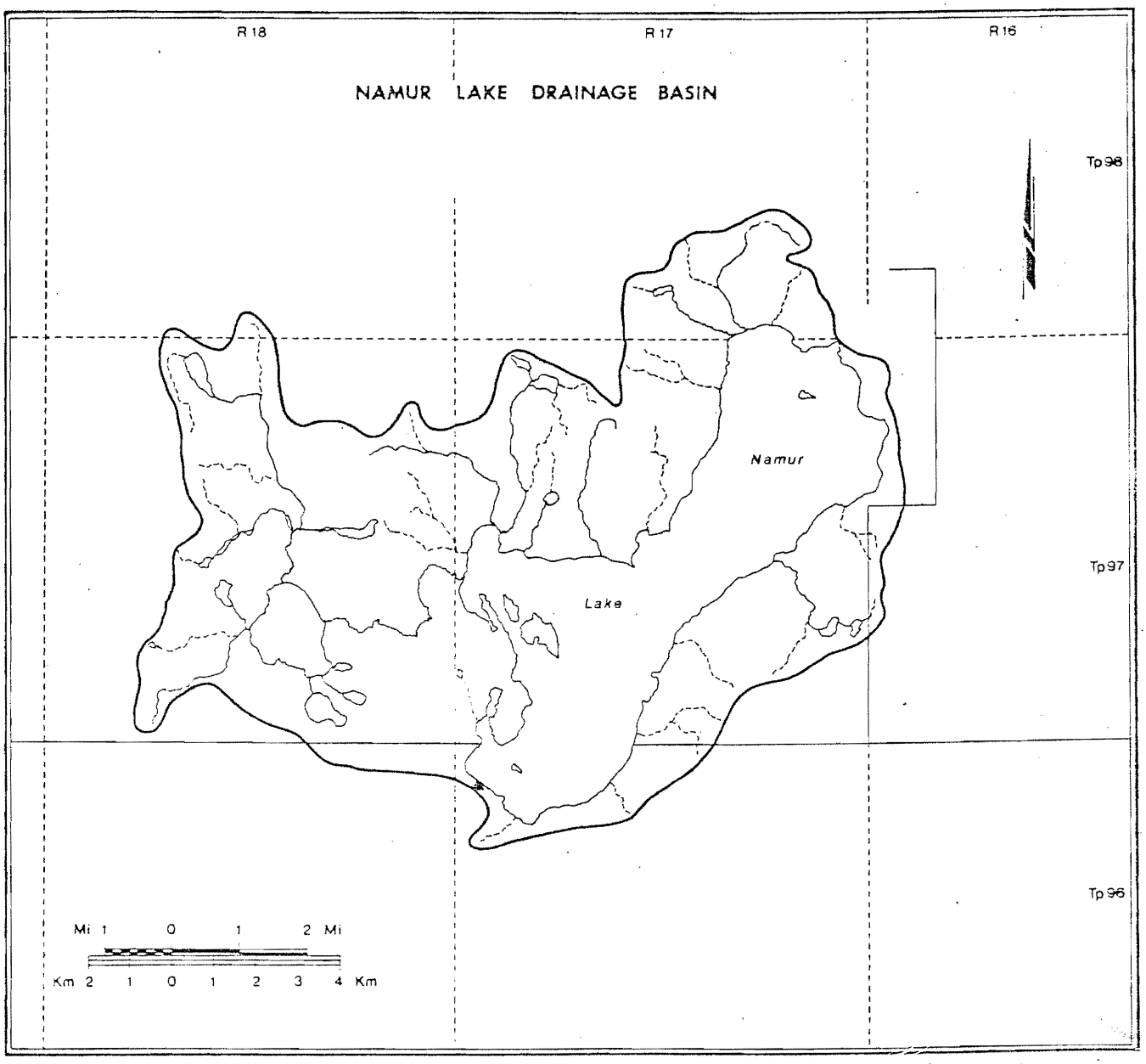


Figure 36. Namur Lake Drainage basin.

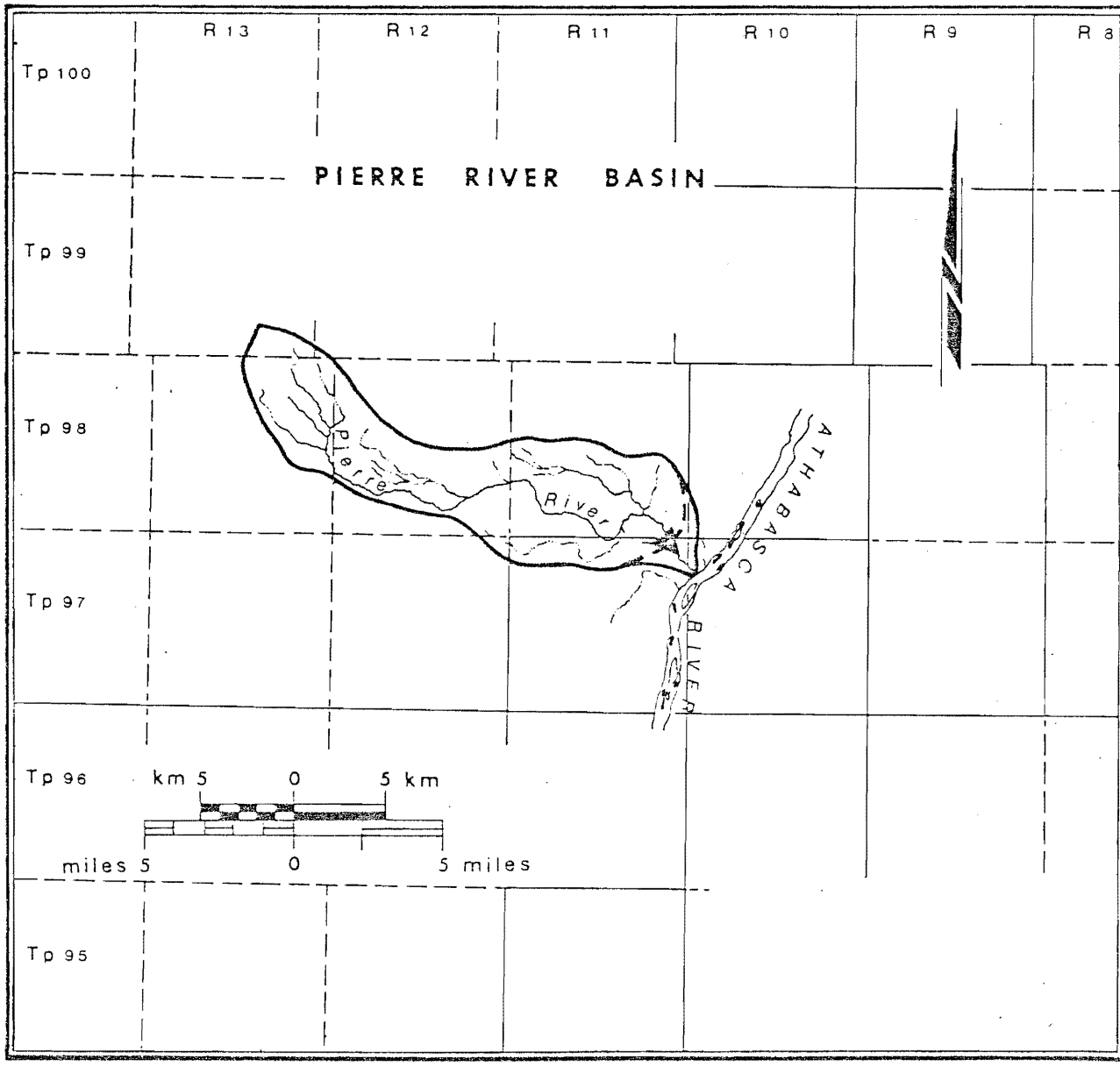


Figure 37. Pierre River basin.

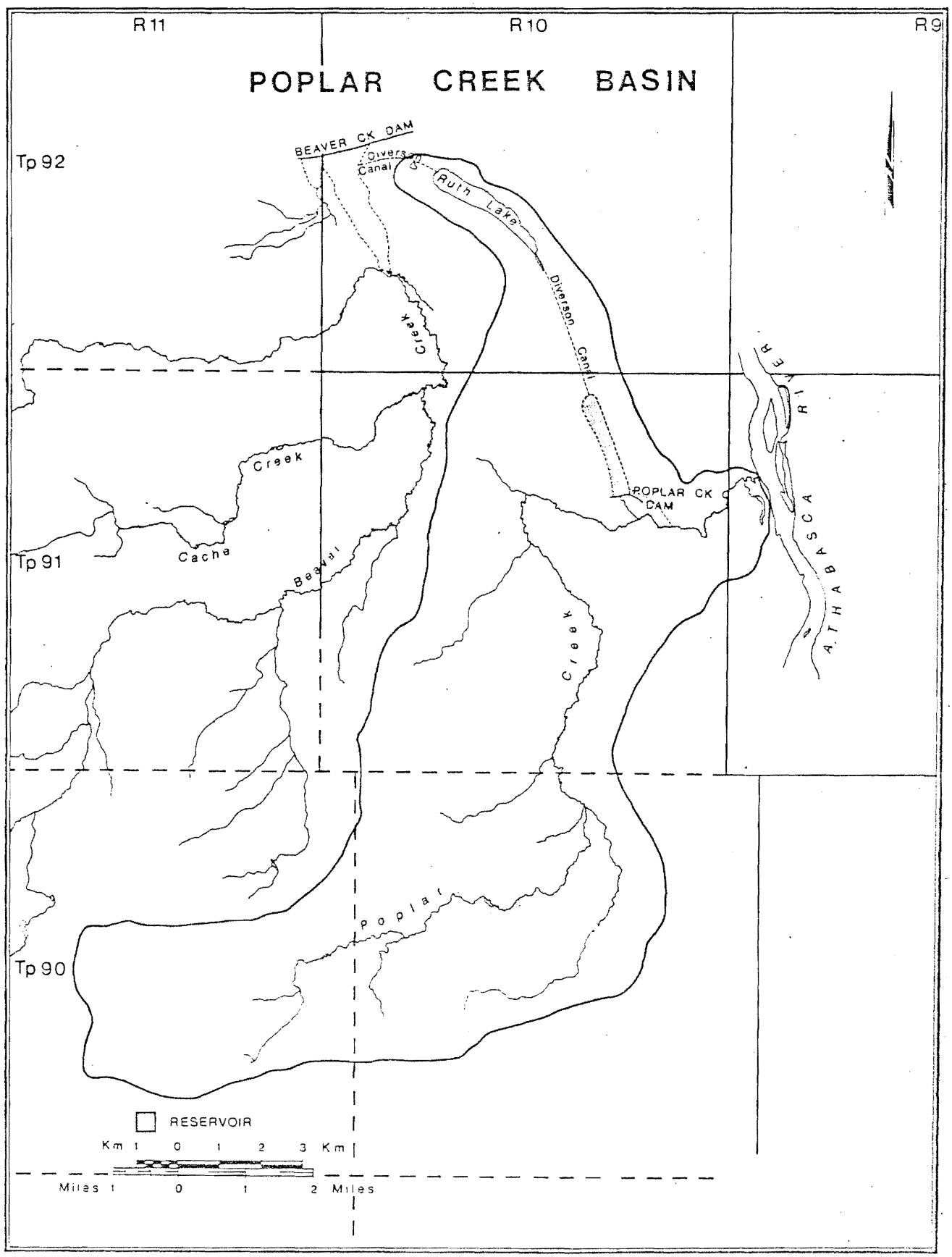


Figure 38. Poplar Creek basin.

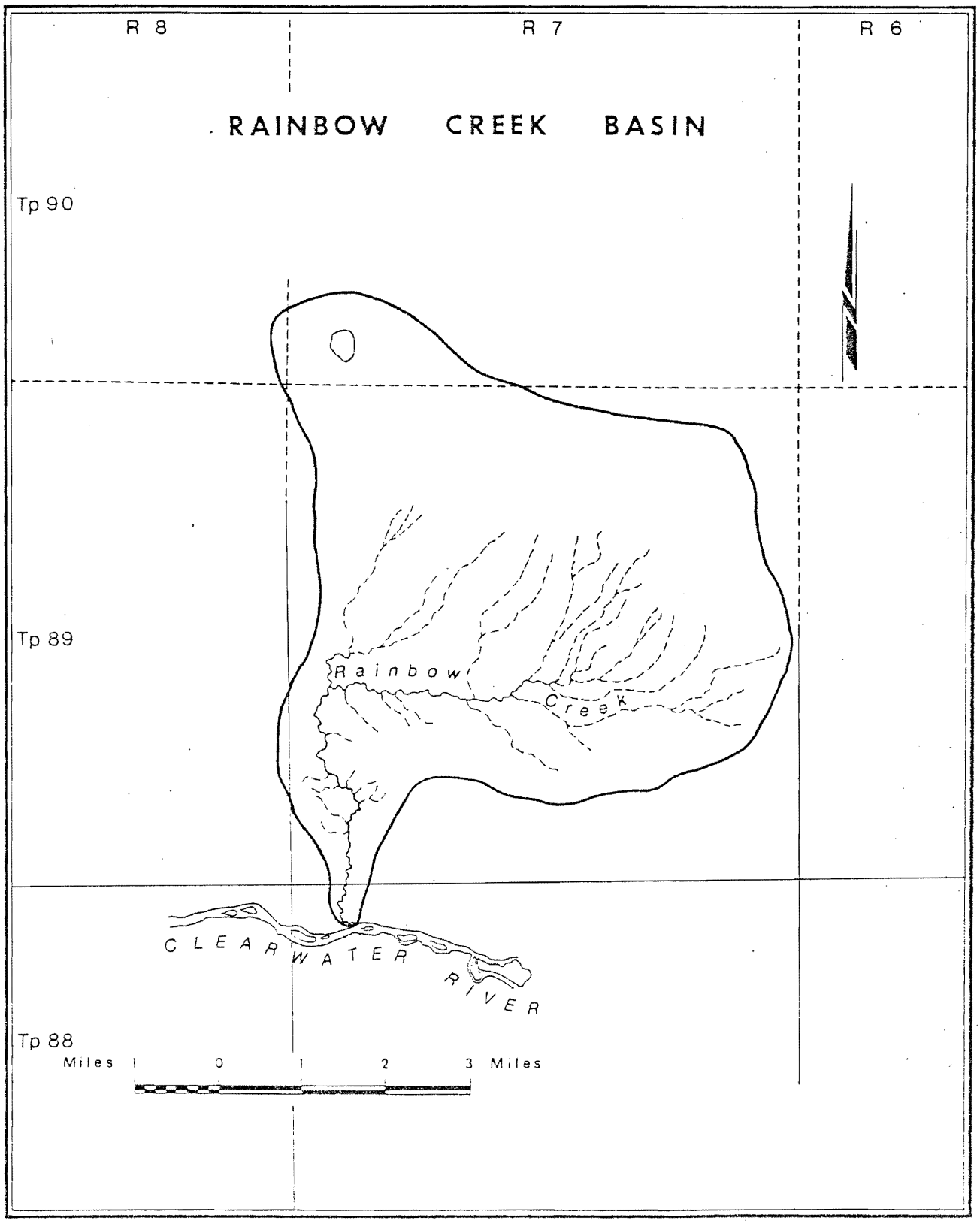


Figure 39. Rainbow Creek basin.

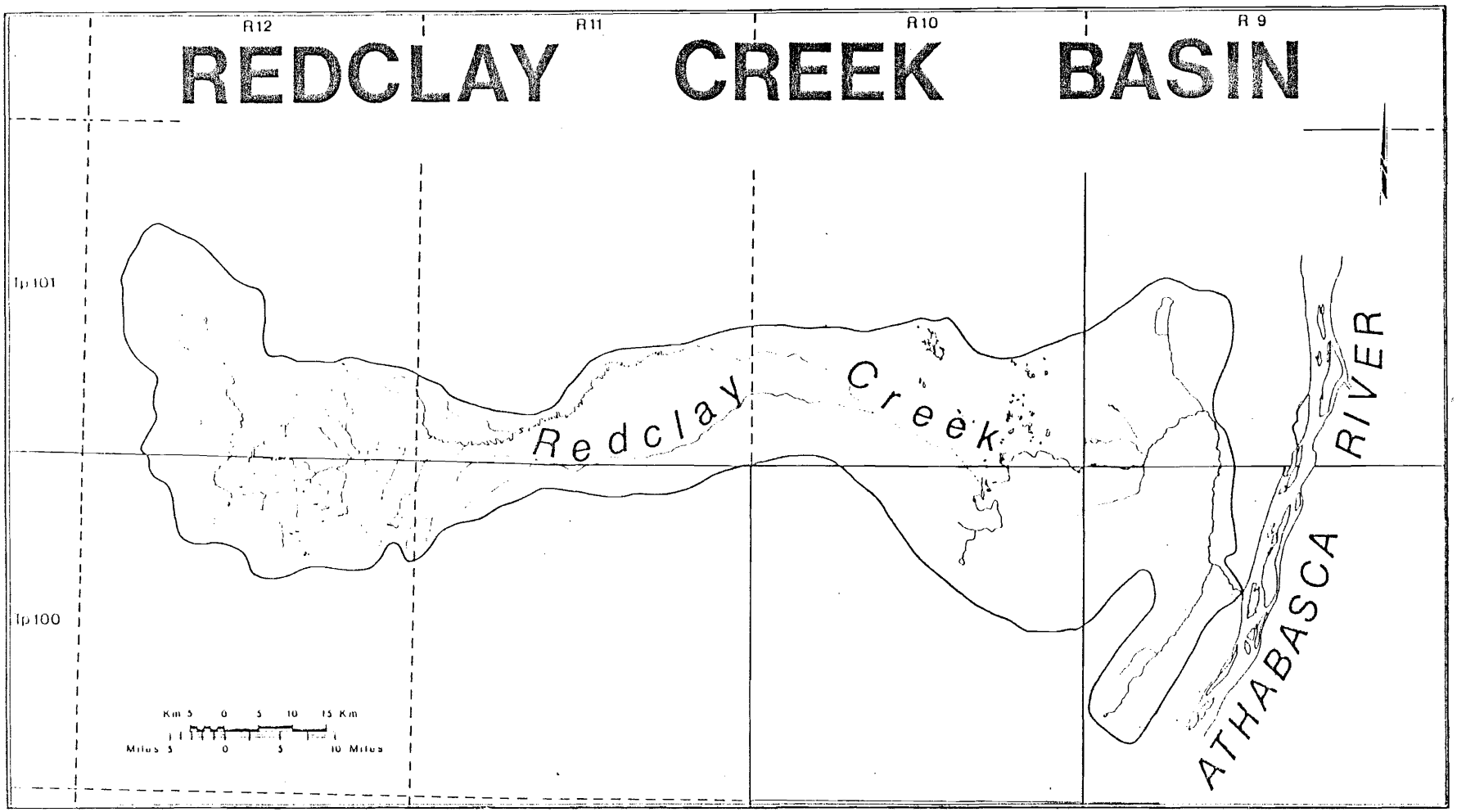


Figure 40. Redclay Creek basin.

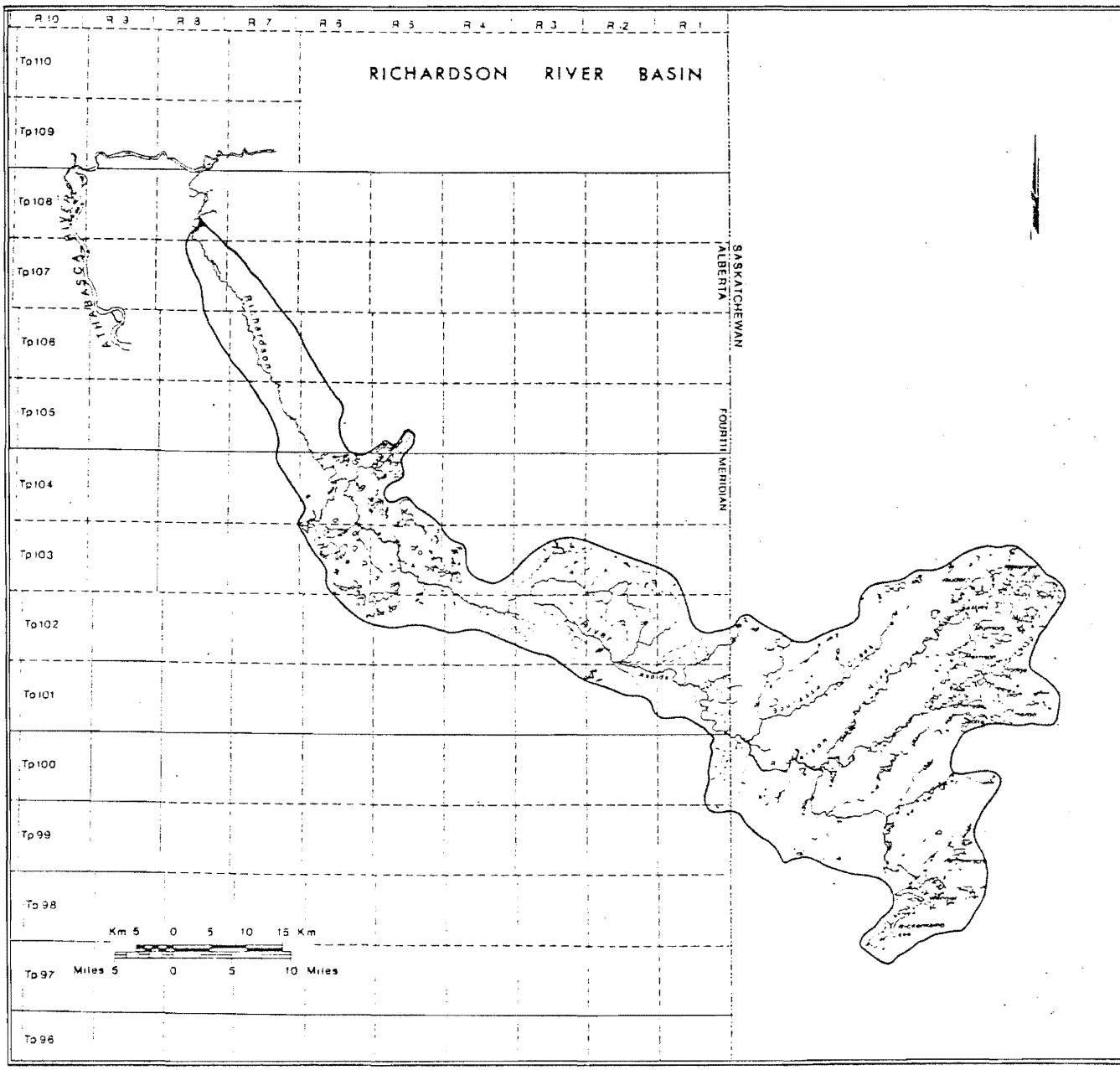


Figure 41. Richardson River basin.

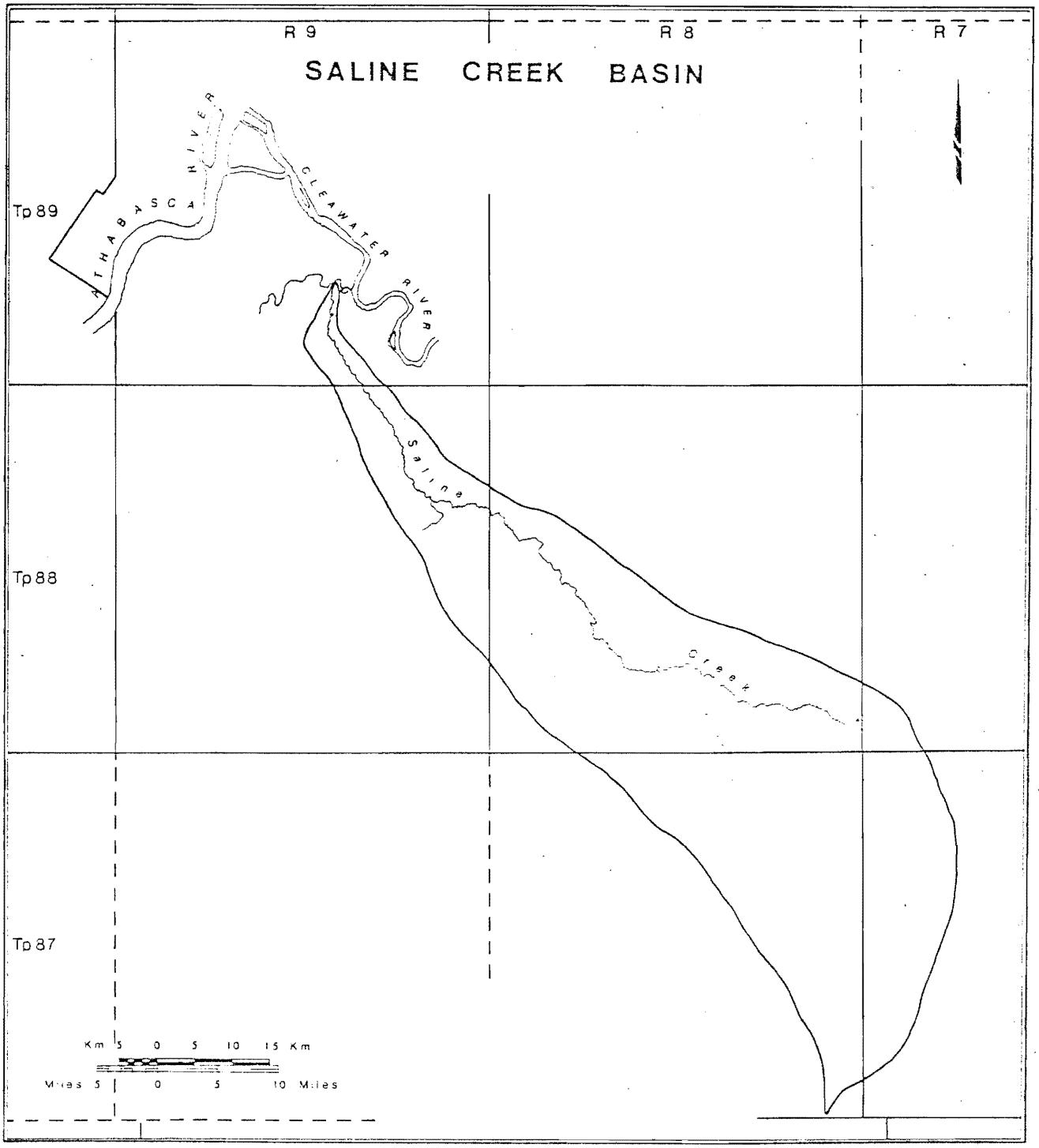


Figure 42. Saline Creek basin.

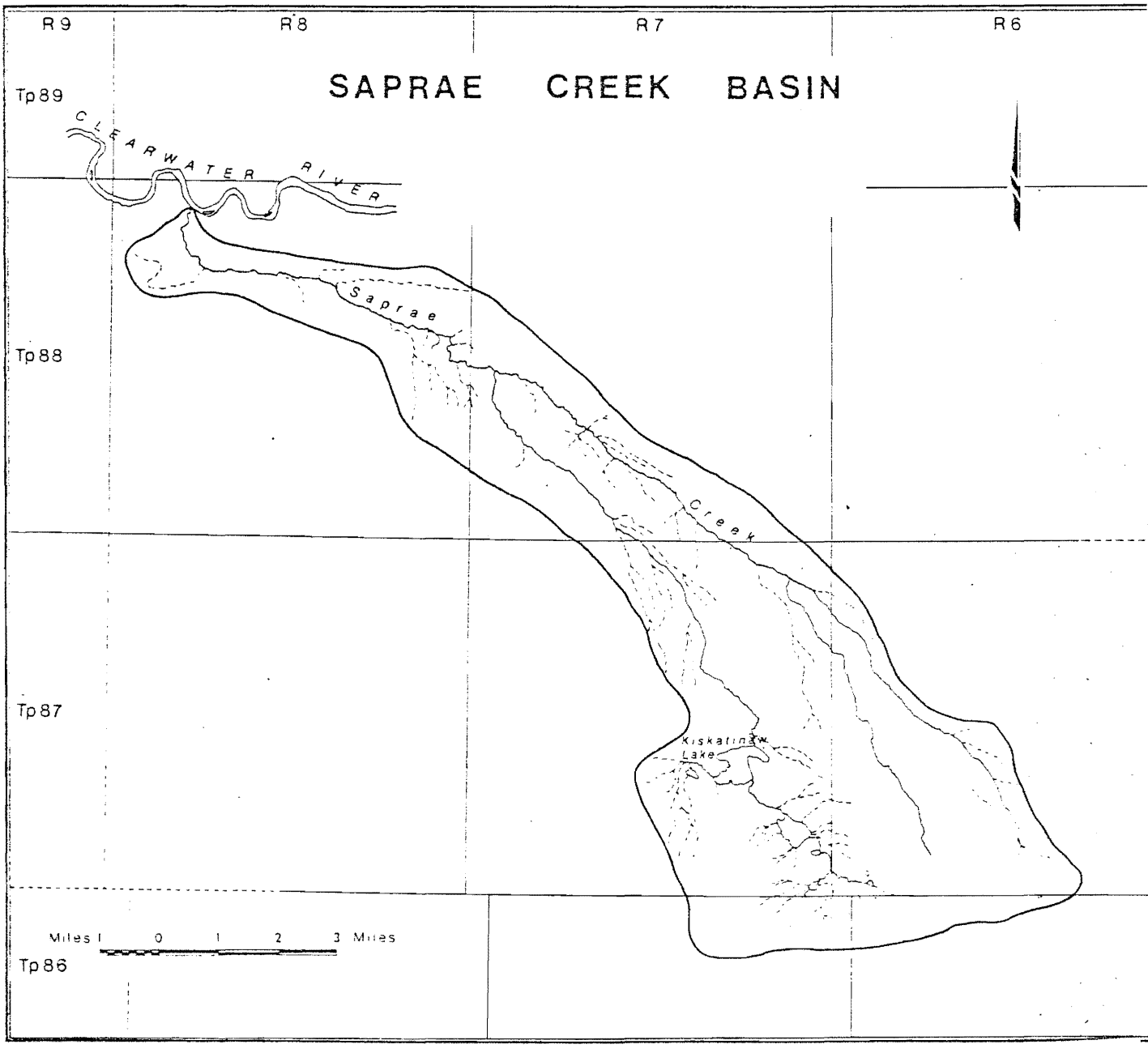


Figure 43. Saprae Creek basin.

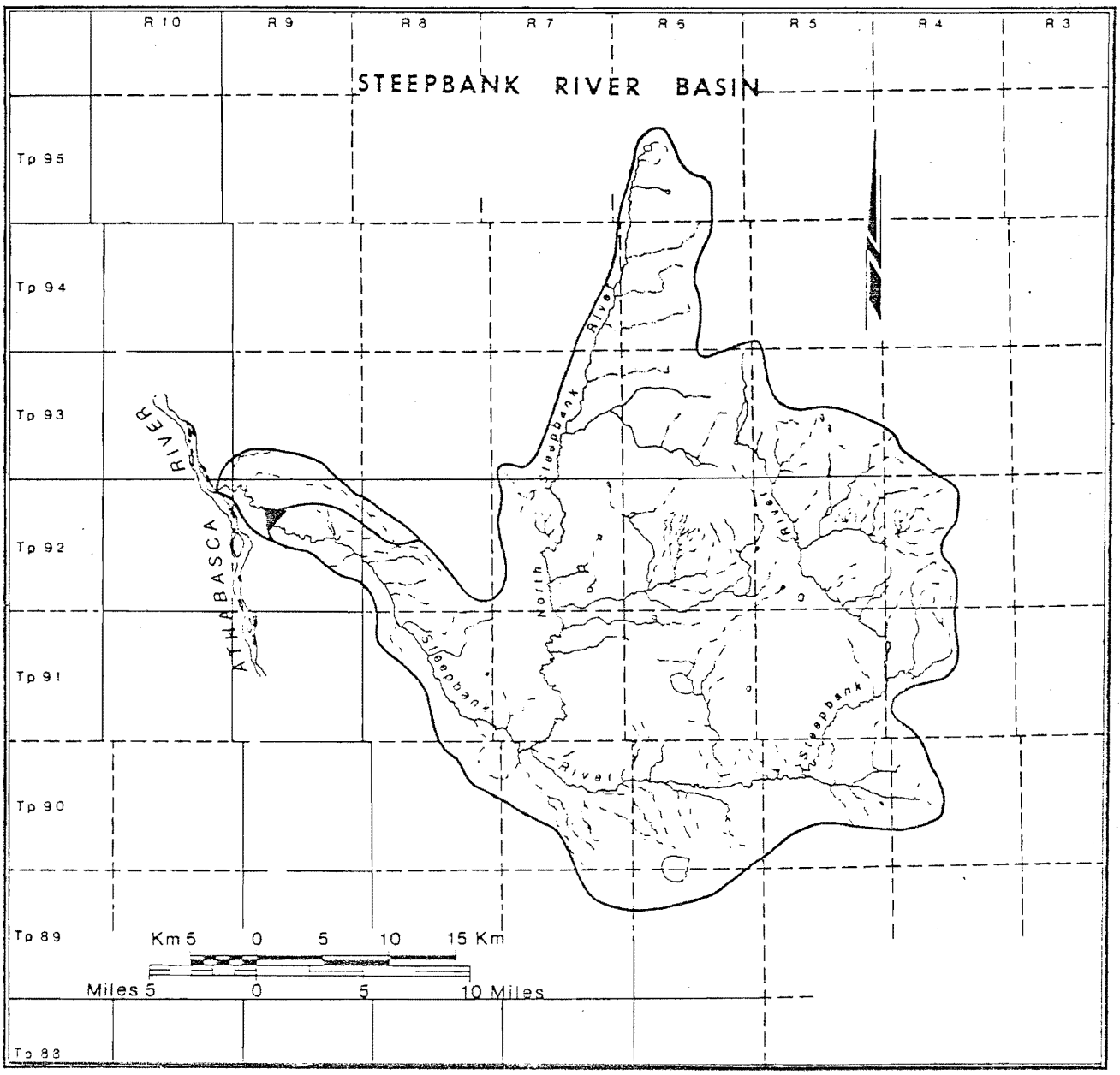


Figure 44. Steepbank River basin.

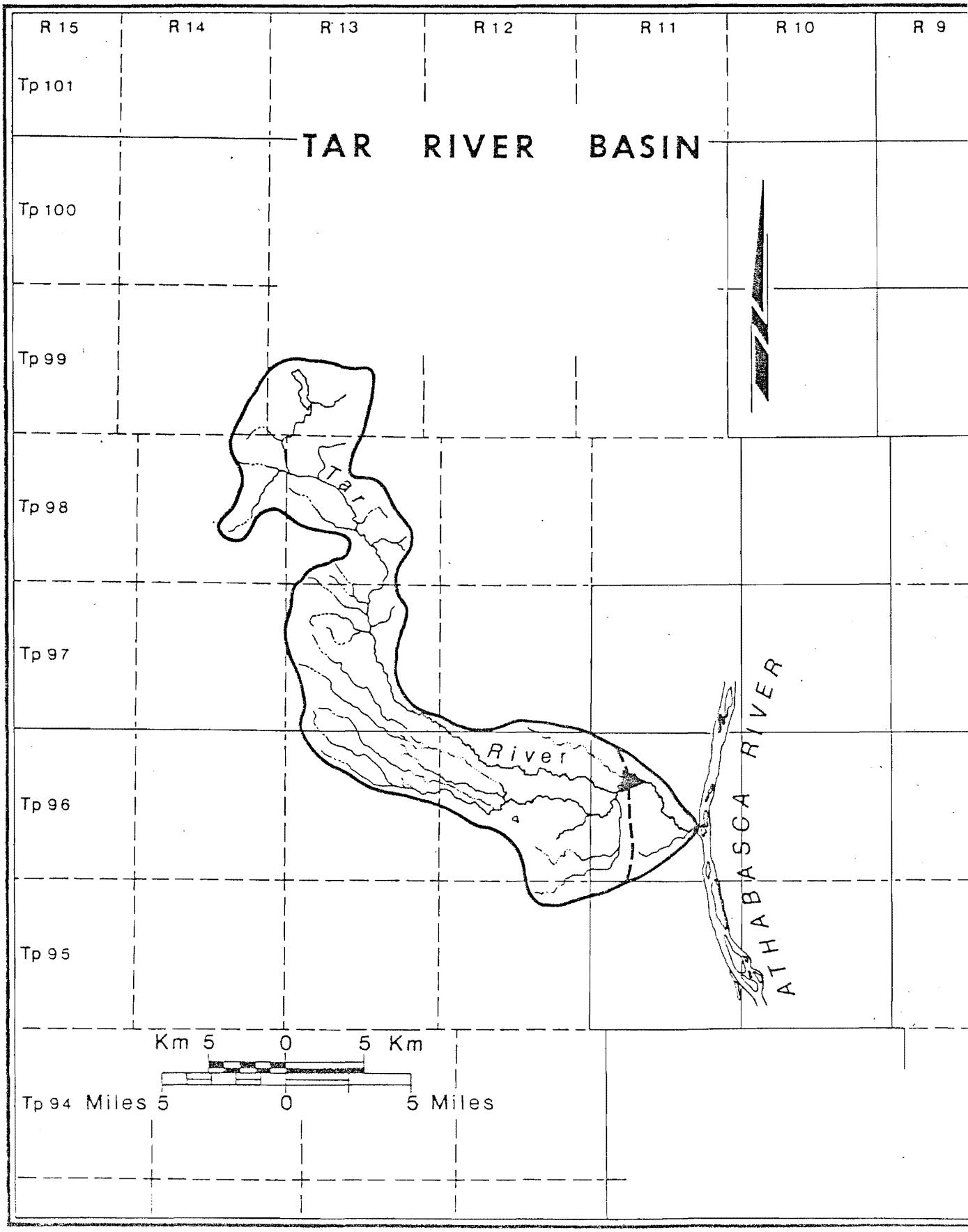


Figure 45. Tar River basin.

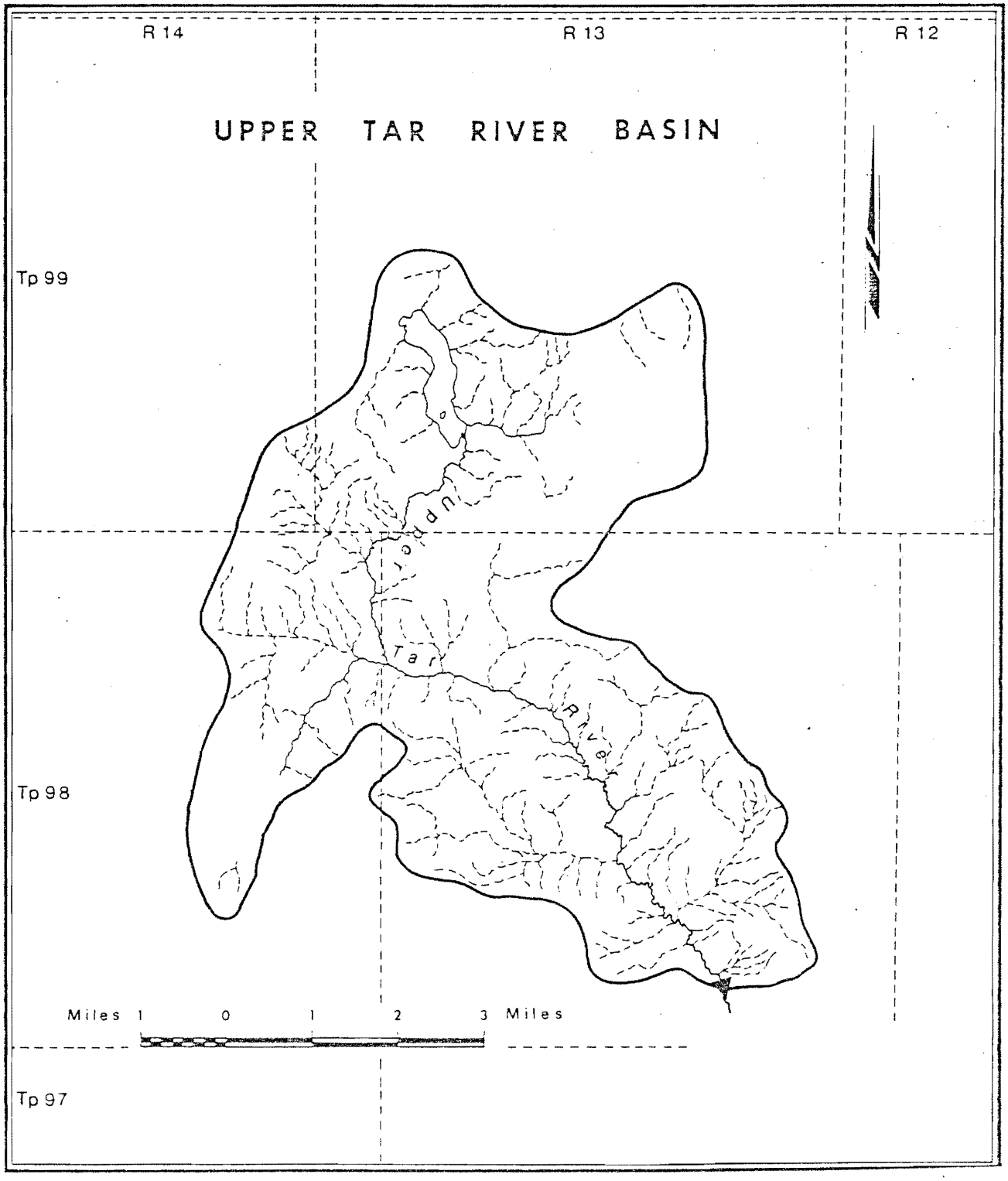
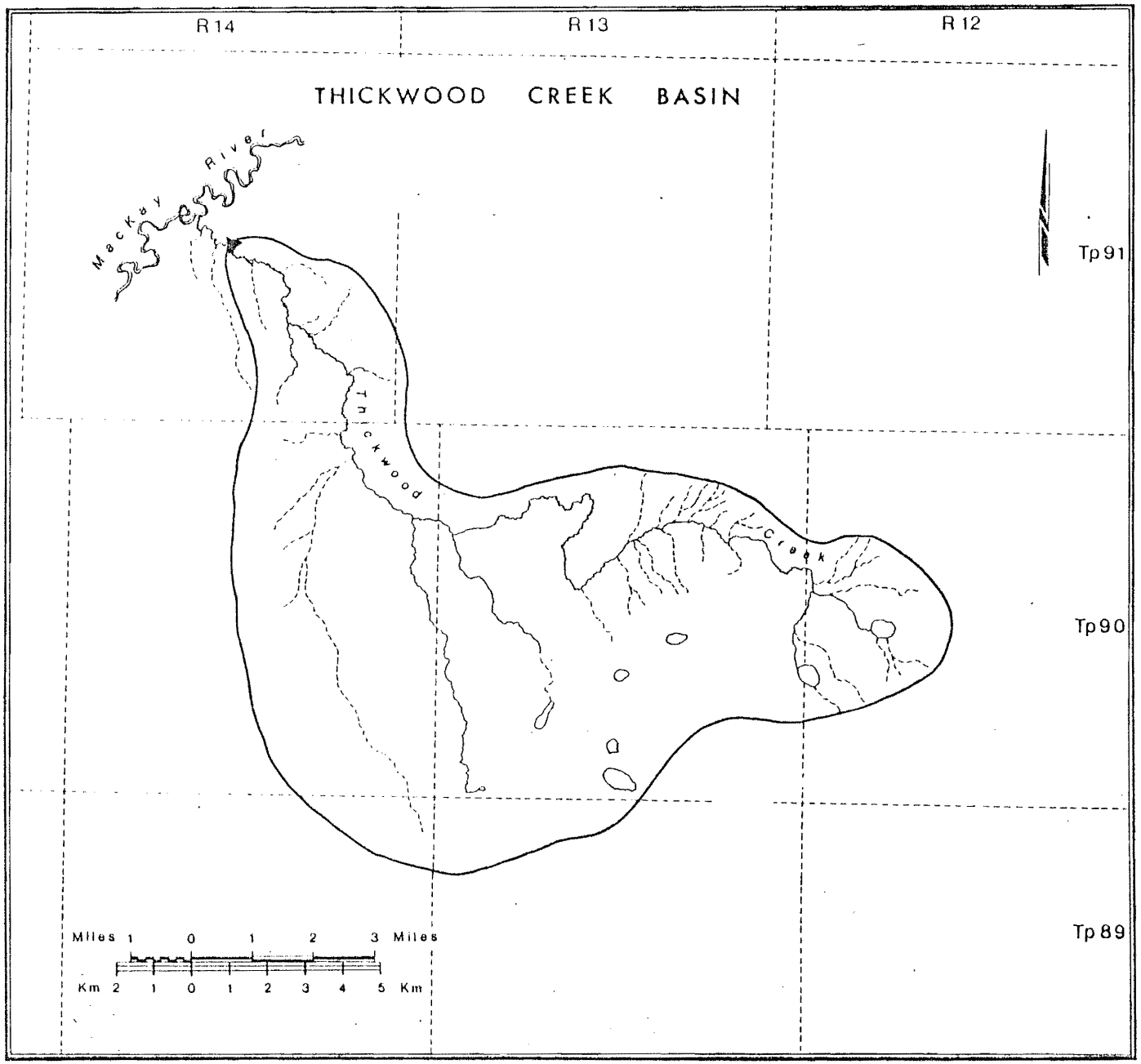


Figure 46. Upper Tar River basin.


R14
R13
R12
THICKWOOD CREEK BASIN
Mackay River
Thickwood Creek
Tp91
Tp90
Tp89
Miles 1 0 1 2 3 Miles
Km 2 1 0 1 2 3 4 5 Km

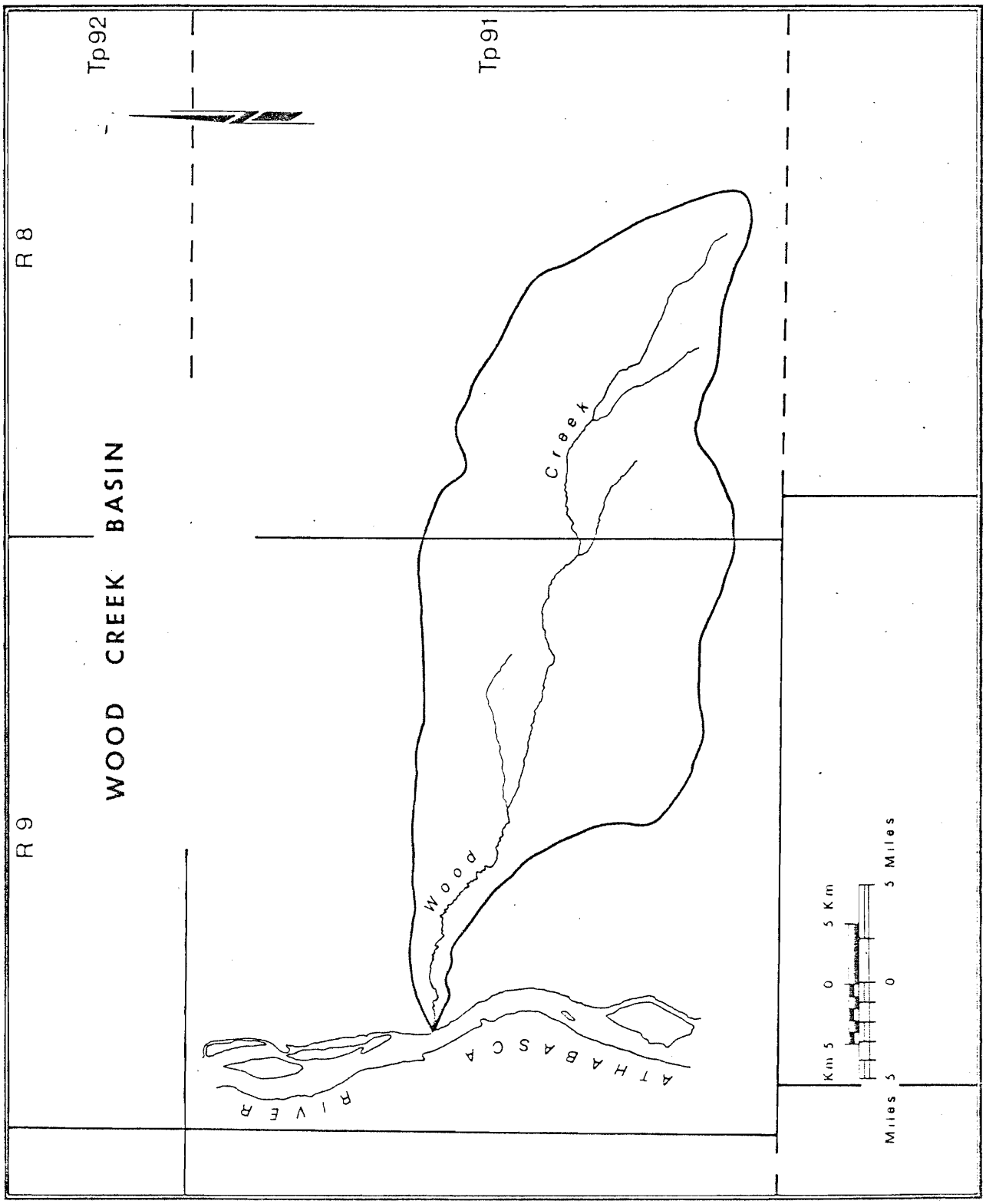
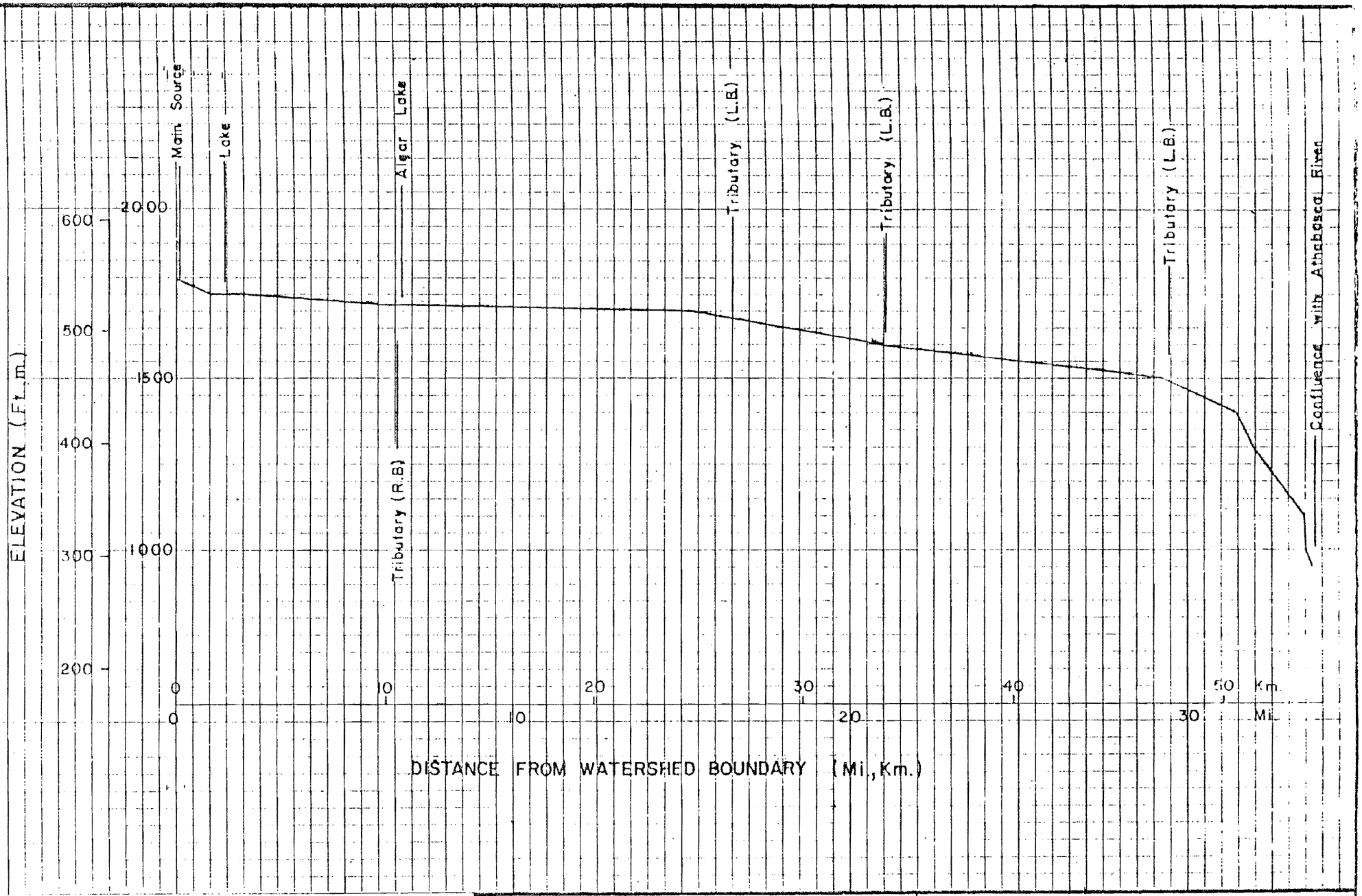


Figure 48. Wood Creek basin.

6.2 WATERSHED PROFILES



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PROFILE-ALGAR RIVER LOOKING D/S
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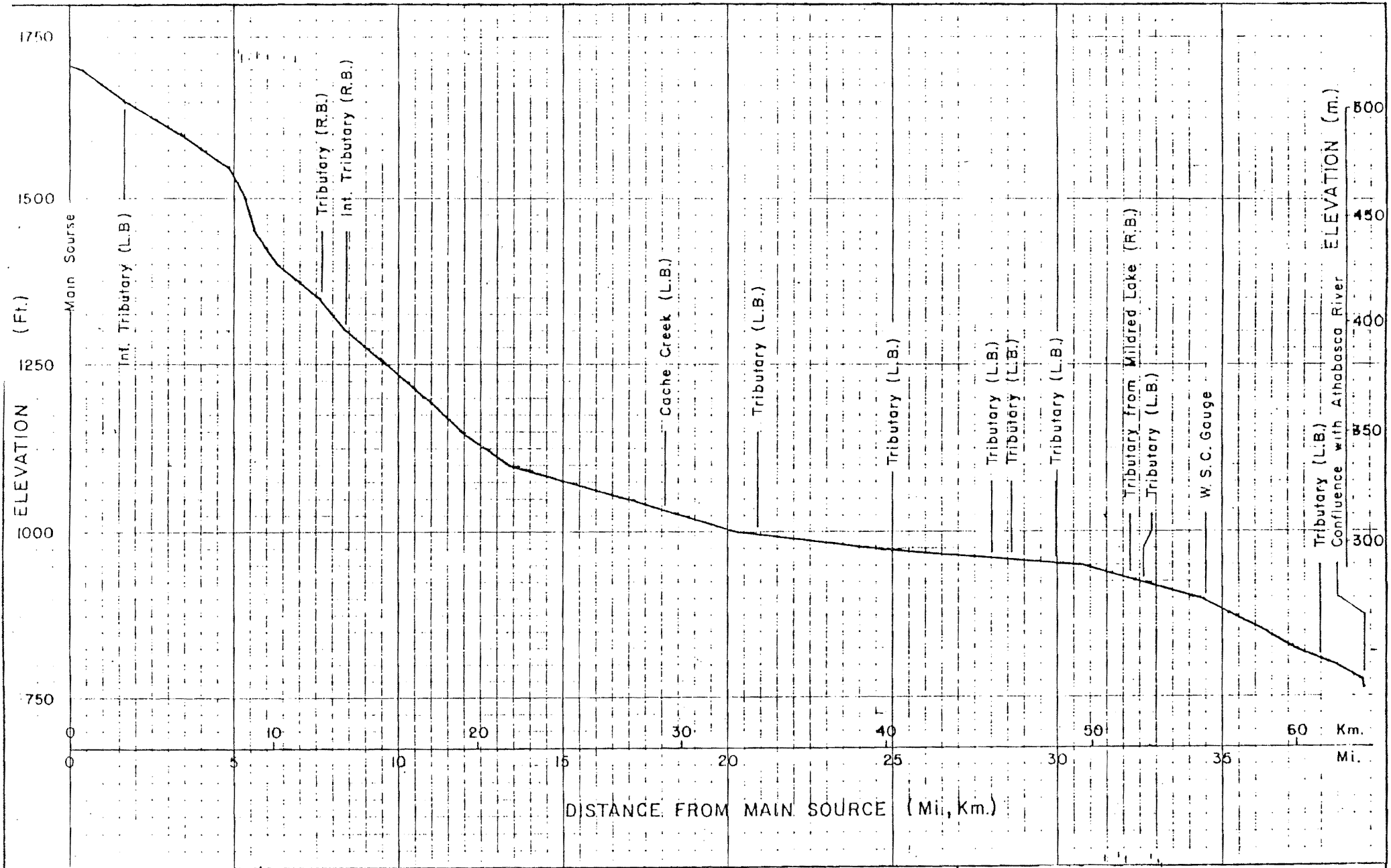

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PROFILE-BEAVER R. LOOKING D/S
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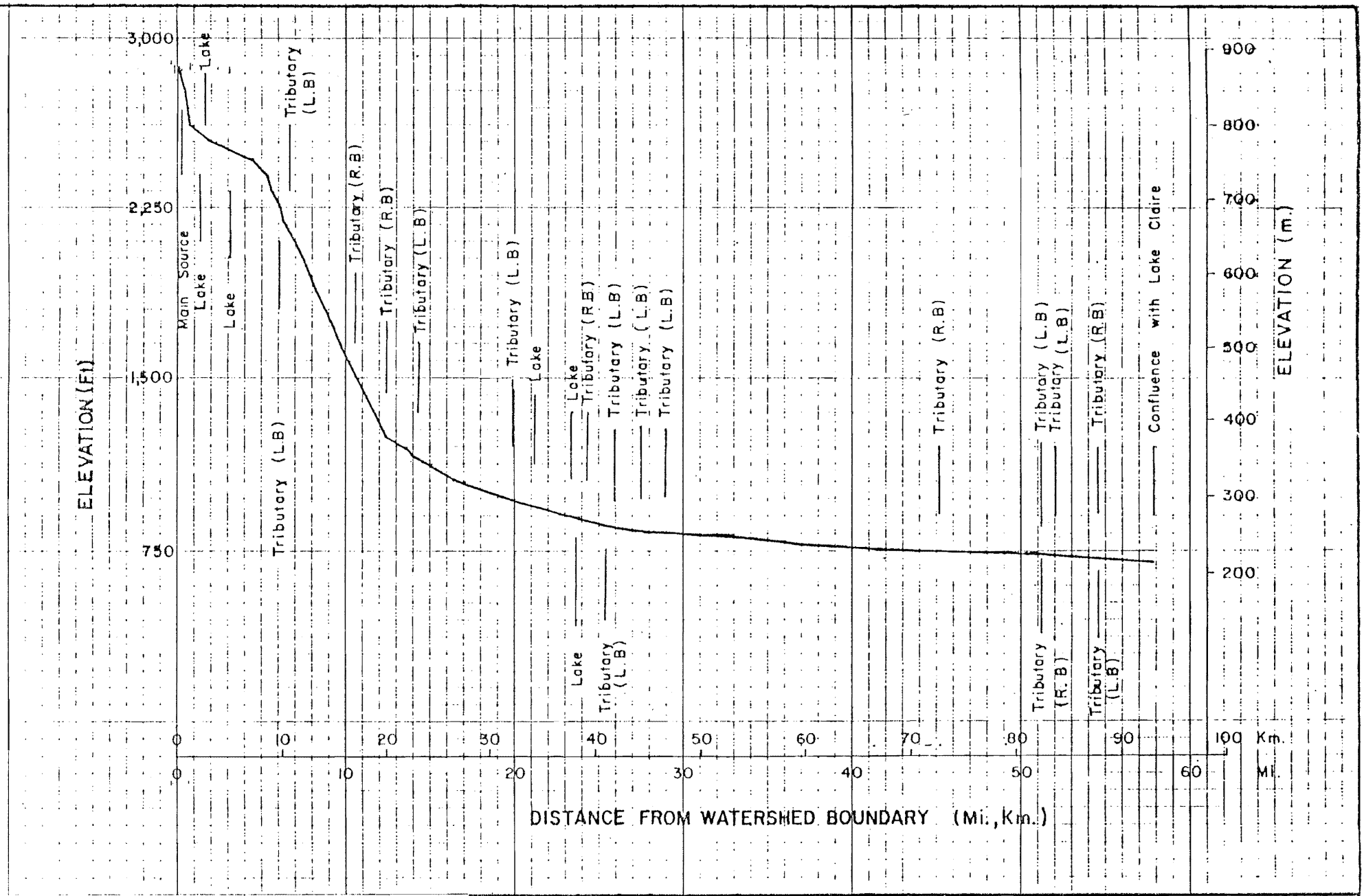

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PROFILE-BUCKTON Ck. LOOKING D/S

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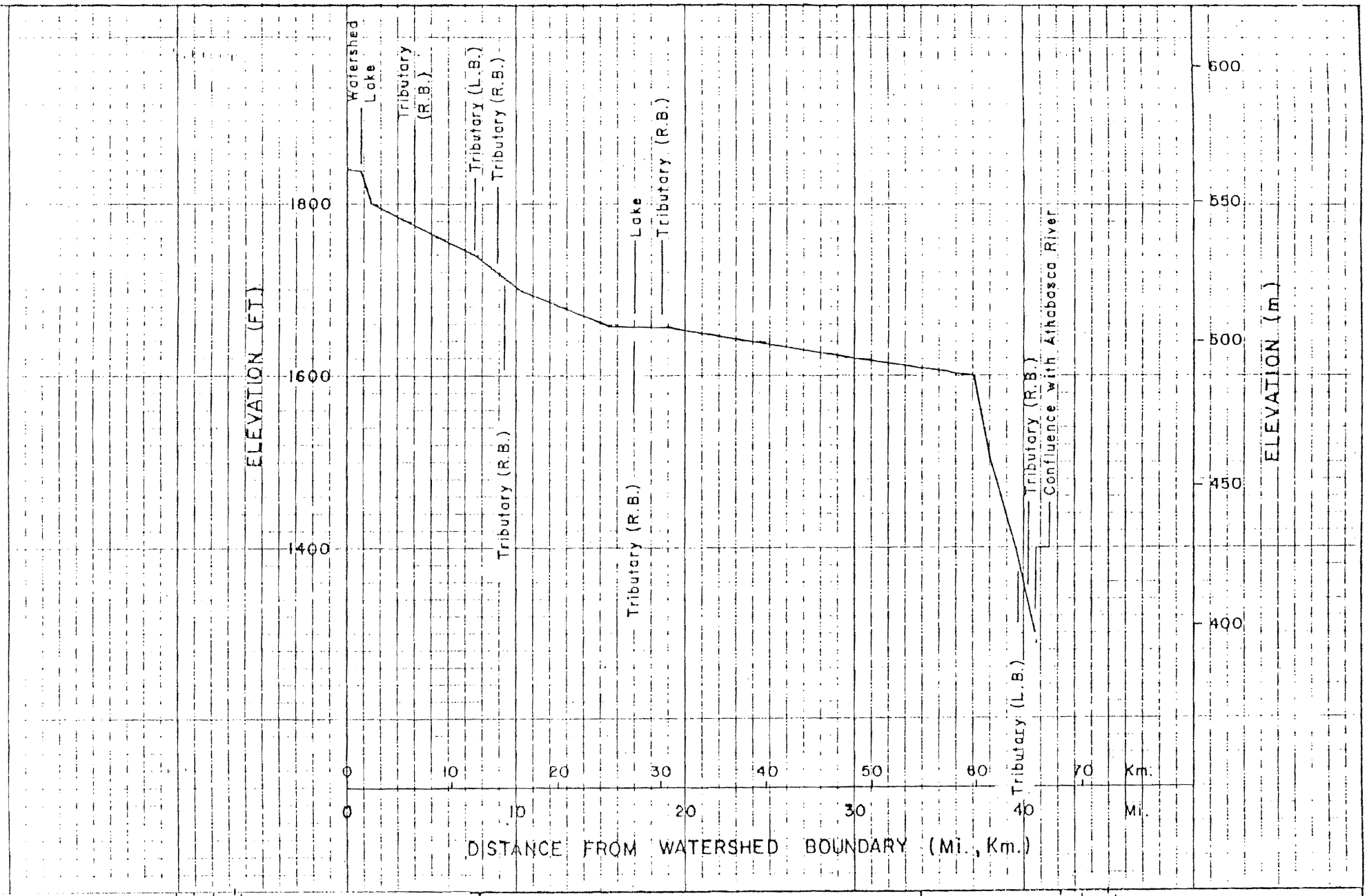

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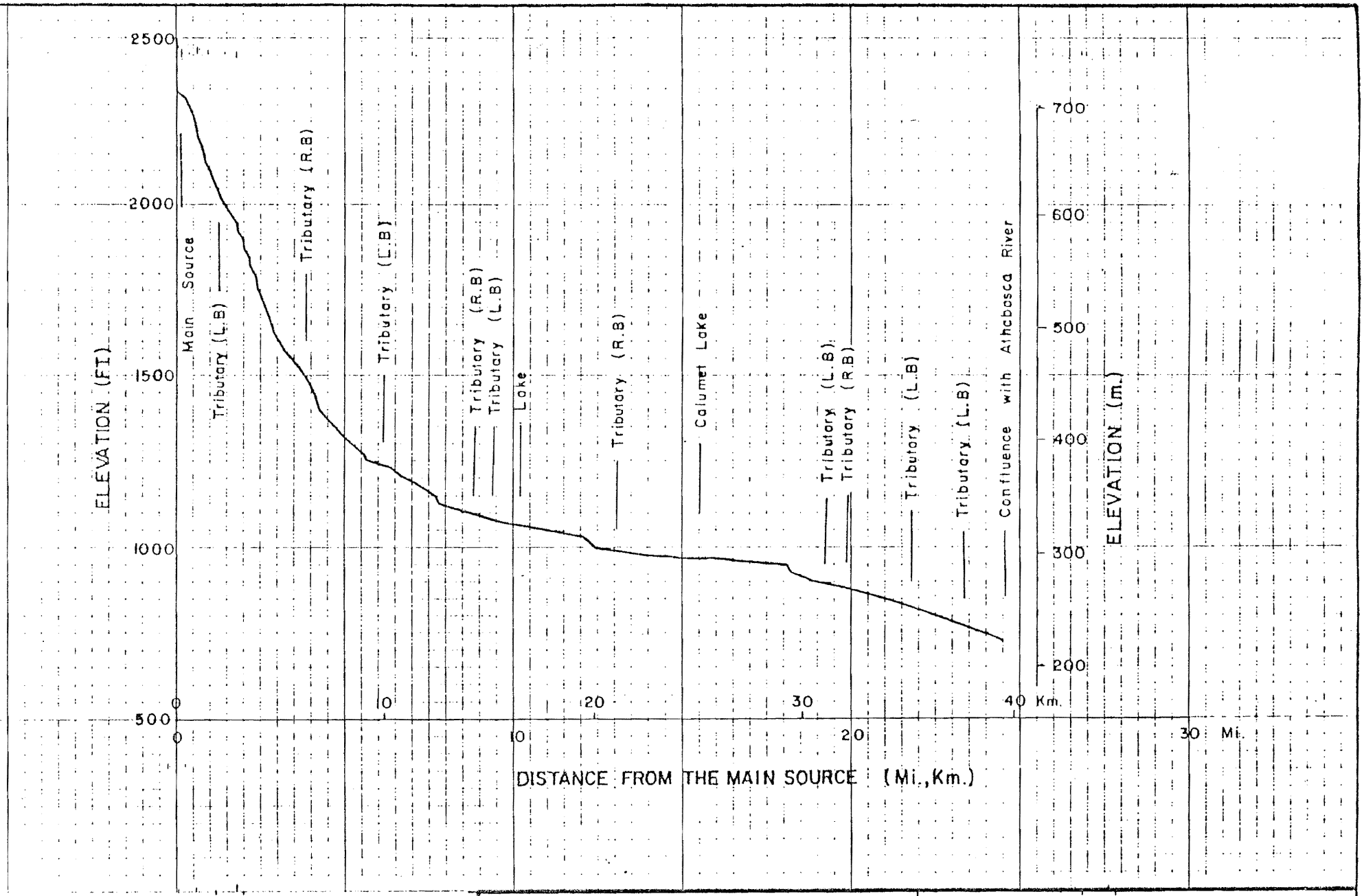

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PROFILE — CALUMET R. LOOKING D/S
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DATE MAR, 1977
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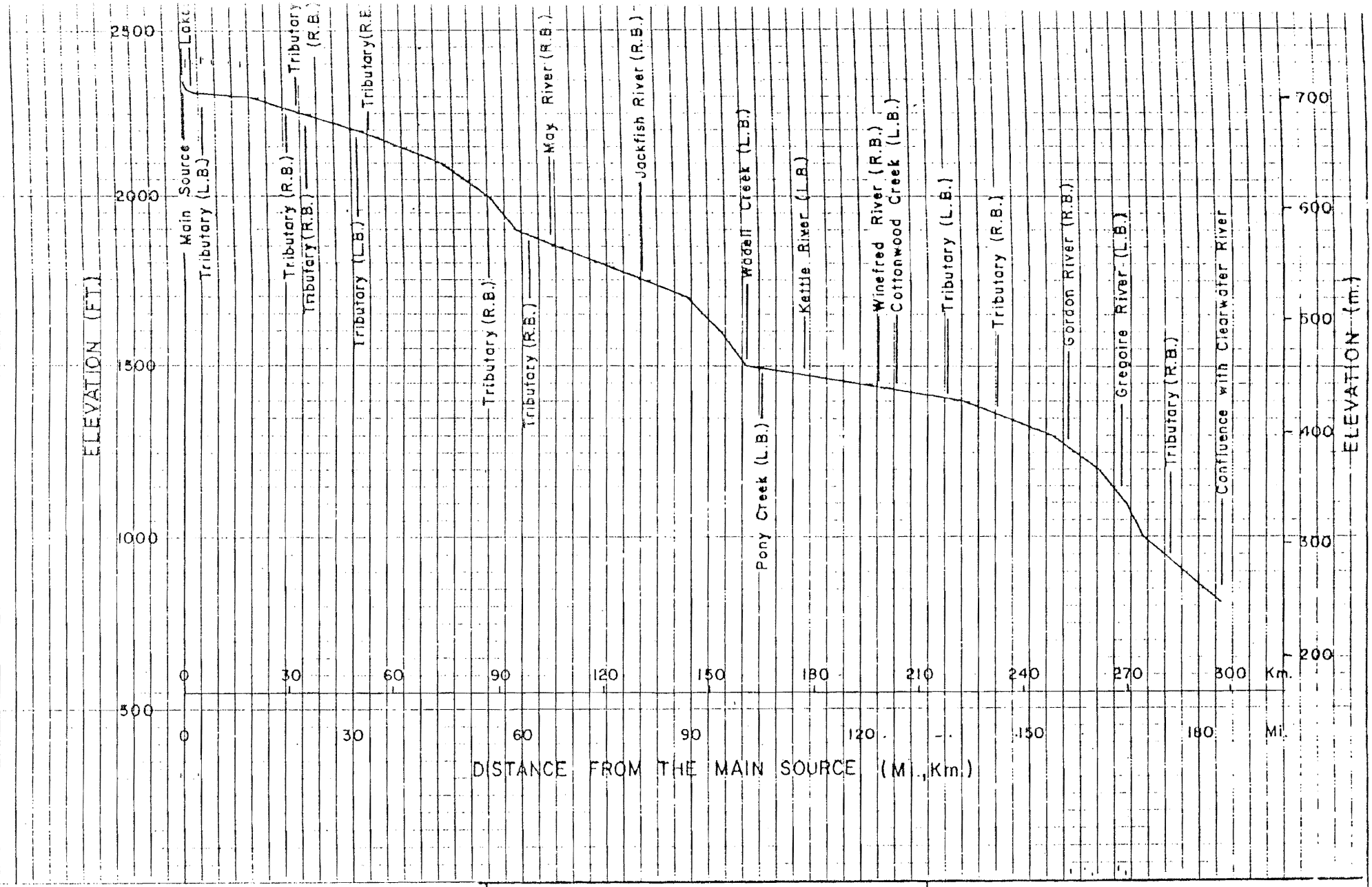

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PROFILE-CHRISTINA RIVER LOOKING D/S
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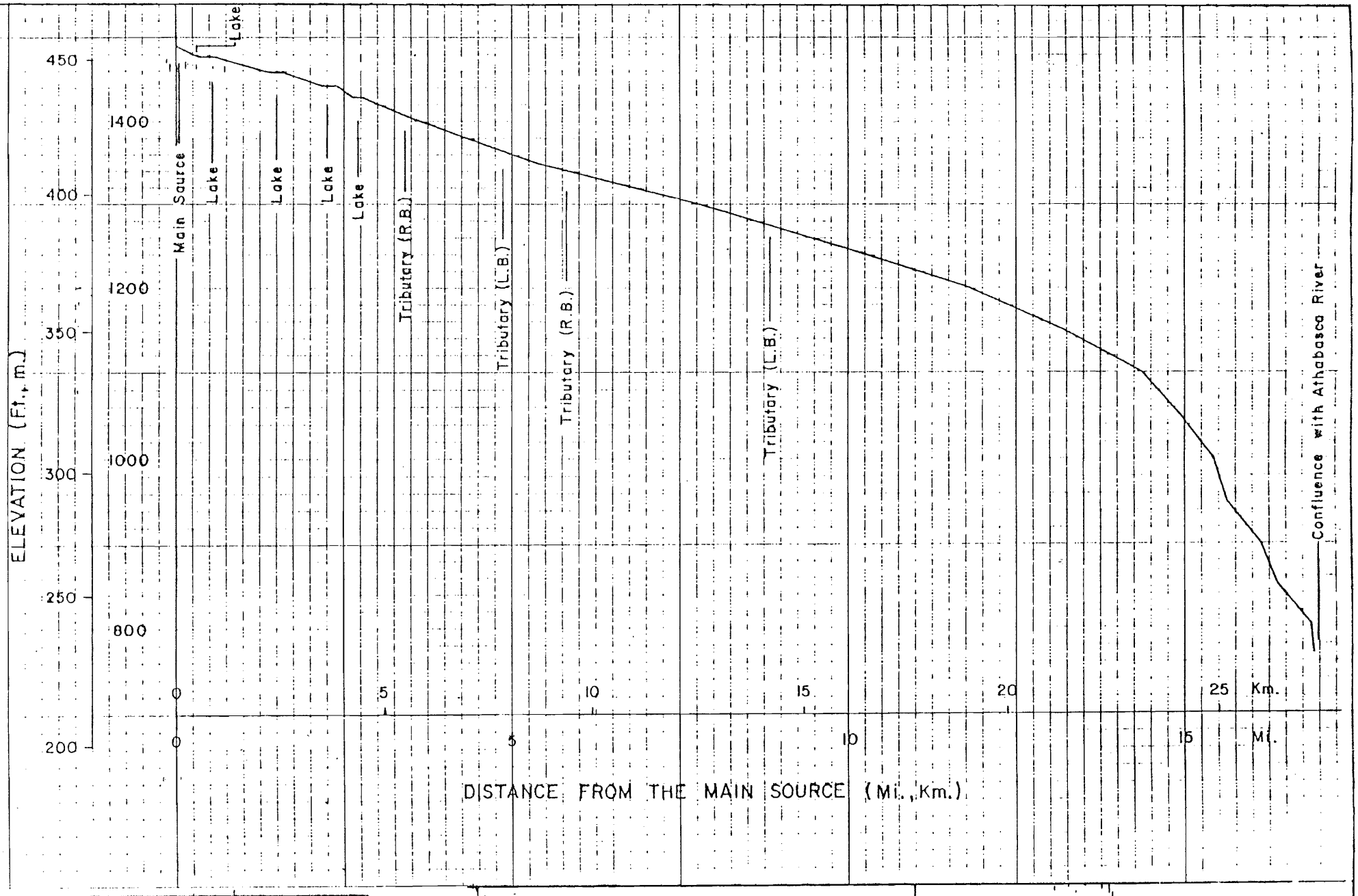

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PROFILE - CLARKE CR. LOOKING D/S
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PROFILE-CLEARWATER RIVER
LOOKING DOWNSTREAM
PLOTTED FROM TOPOGRAPHIC MAP
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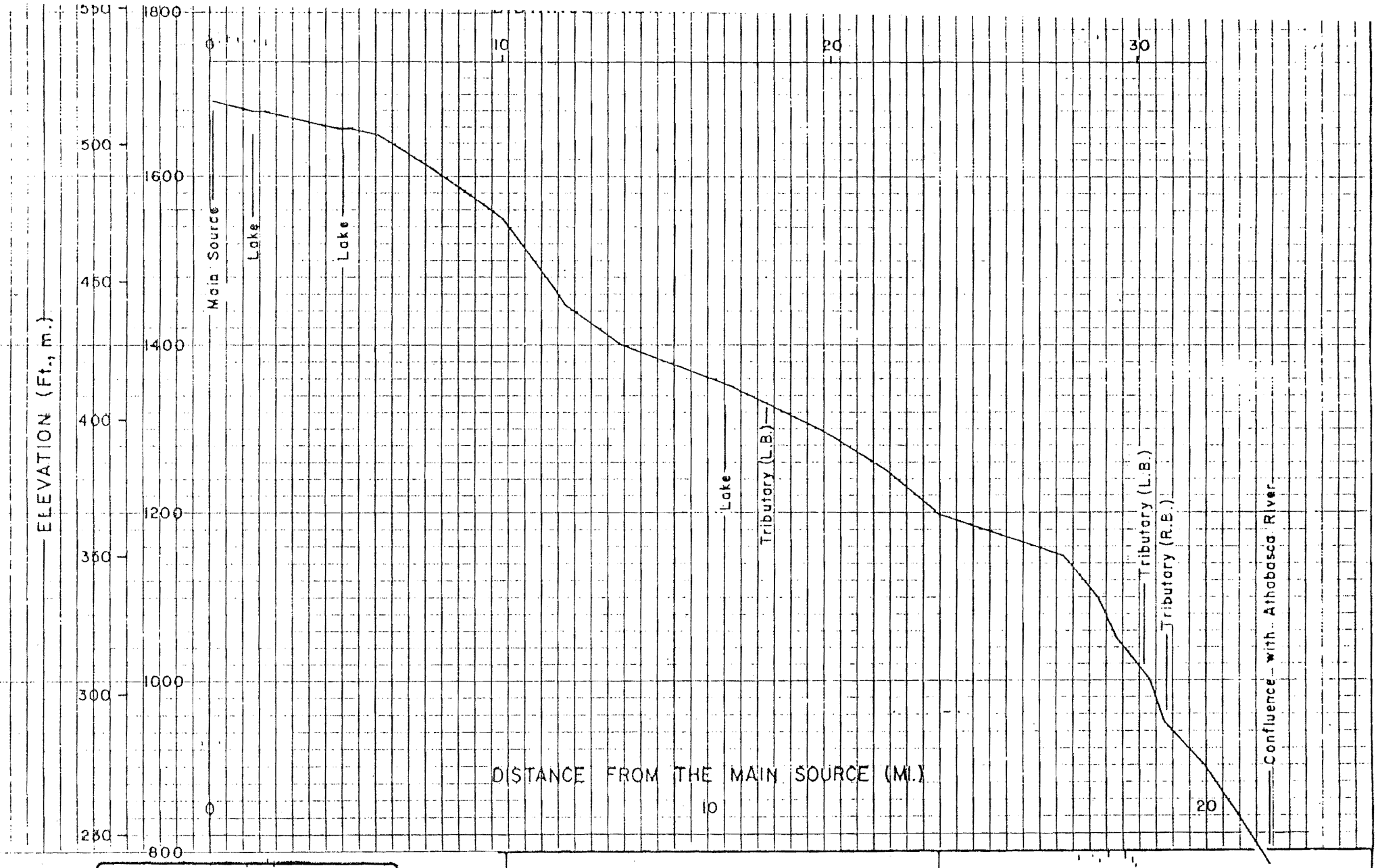
ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM
ELEVATION (m.)
ELEVATION (F.T.)
DISTANCE FROM THE MAIN SOURCE (Mi., Km.)
Mi.
Km.
Confluence with Athabasca River
Hangingstone (L.B.)
Christina River (L.B.)
Rainbow Ck. (R.B.)
SASKATCHEWAN
ALBERTA
Robillard Creek (L.B.)
Edwin Creek (L.B.)
High Hill River (L.B.)
McLean River (L.B.)
Deschenne River (R.B.)
Fortin R. (L.B.)
Tributary connected to Pickford Lake (R.B.)
Tributary connected to Craig L. (L.B.)
Latitrus L. (L.B.)
Tributary connected to Killgard L.(R.B.)
Lloyd Lake
Dell Lake
Dyck L. (L.B.)
Mirror R. (L.B.)
Lake
Noomt Lake
Forrest L. (R.B.)
Lake
Lake
Patterson L. (R.B.)
Lake
Beech Lake
Gedak Lake
Lake



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PROFILE-CONN CREEK LOOKING D/S
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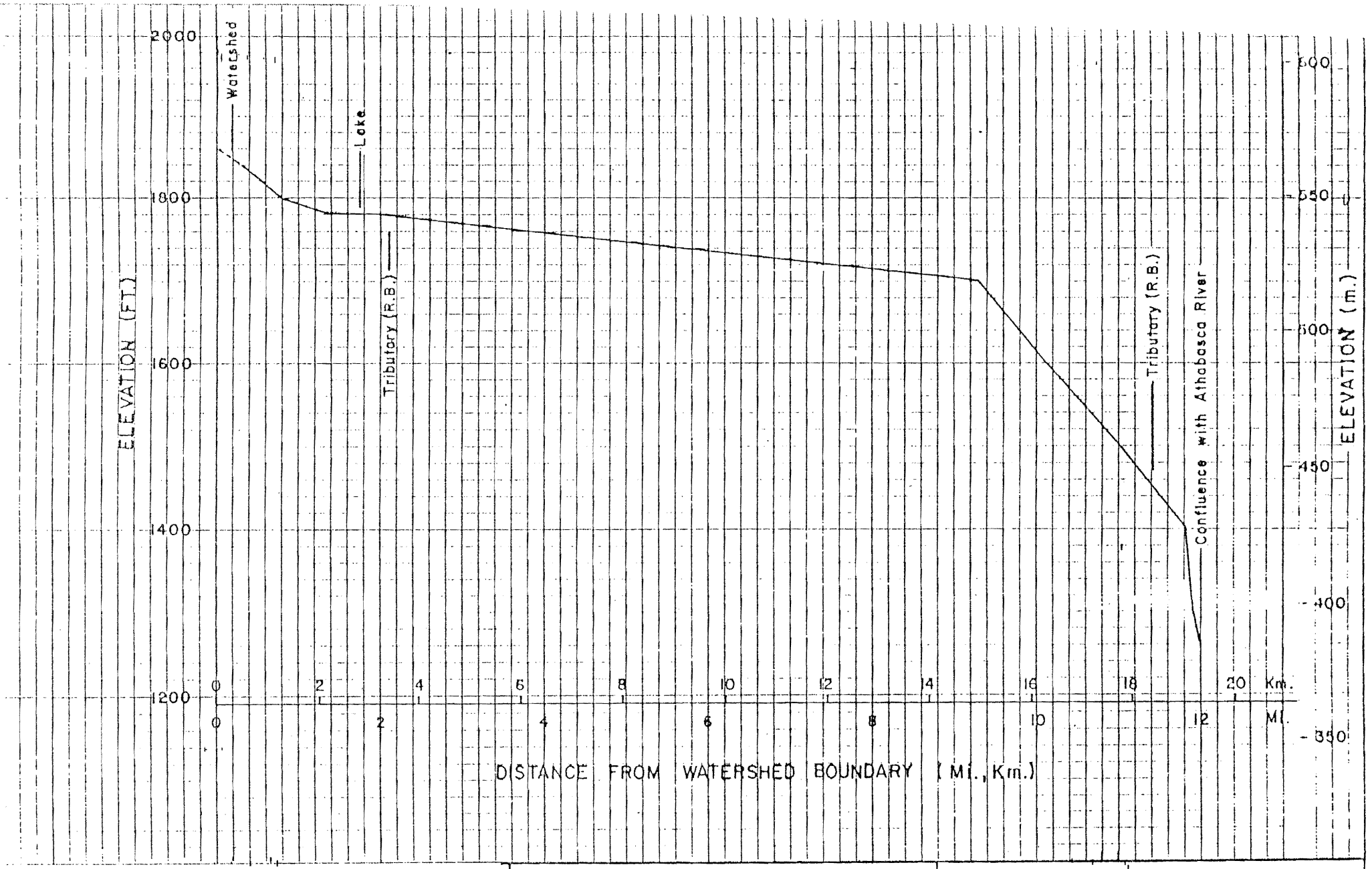

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PROFILE - DEADMAN CK. LOOKING D S
PLOTTED FROM TOPOGRAPHIC MAP

SCALE
DATE MAR. 1977

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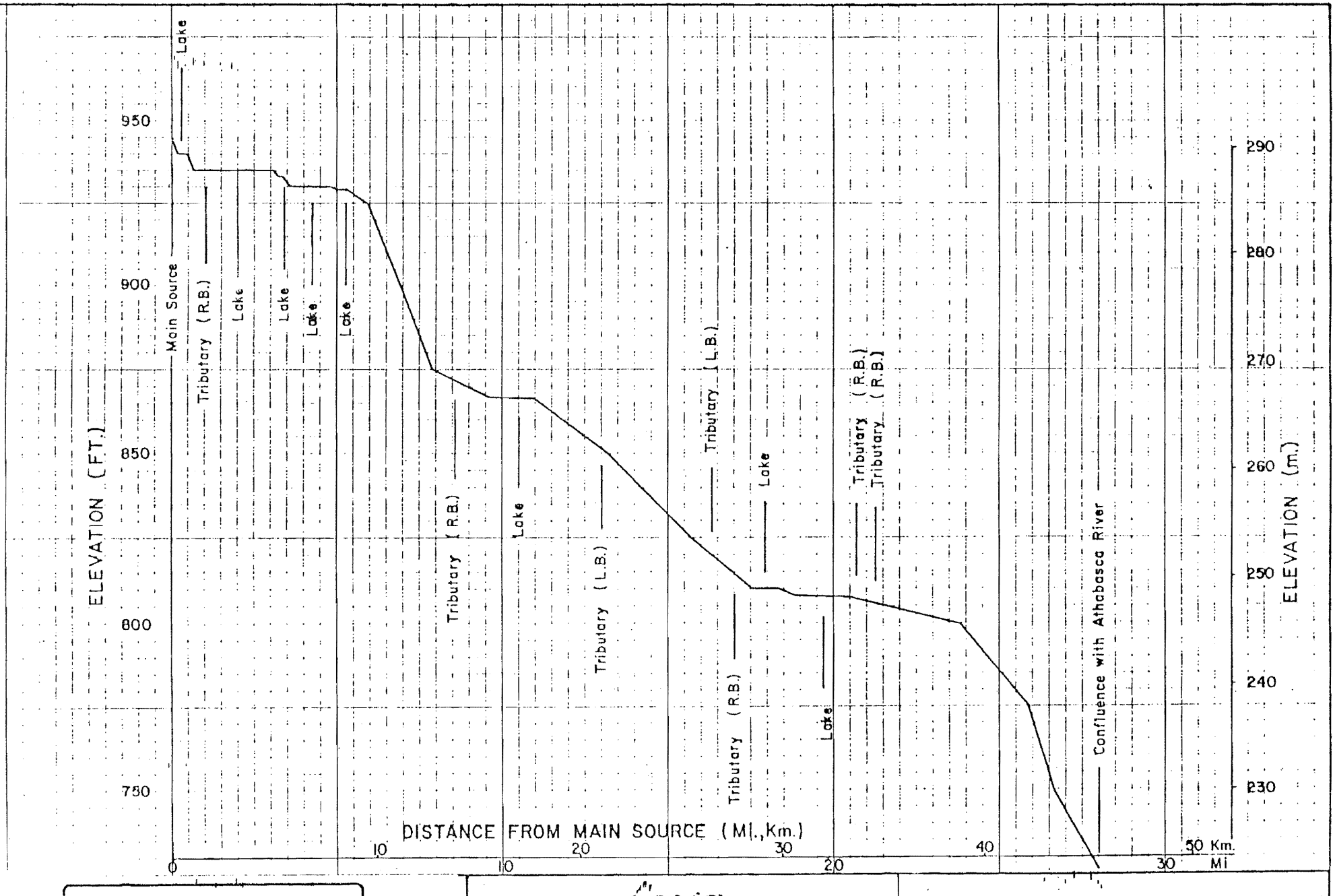

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PROFILE OF ELEANOR CREEK LOOKING D/S
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DATE AUGUST, 1977

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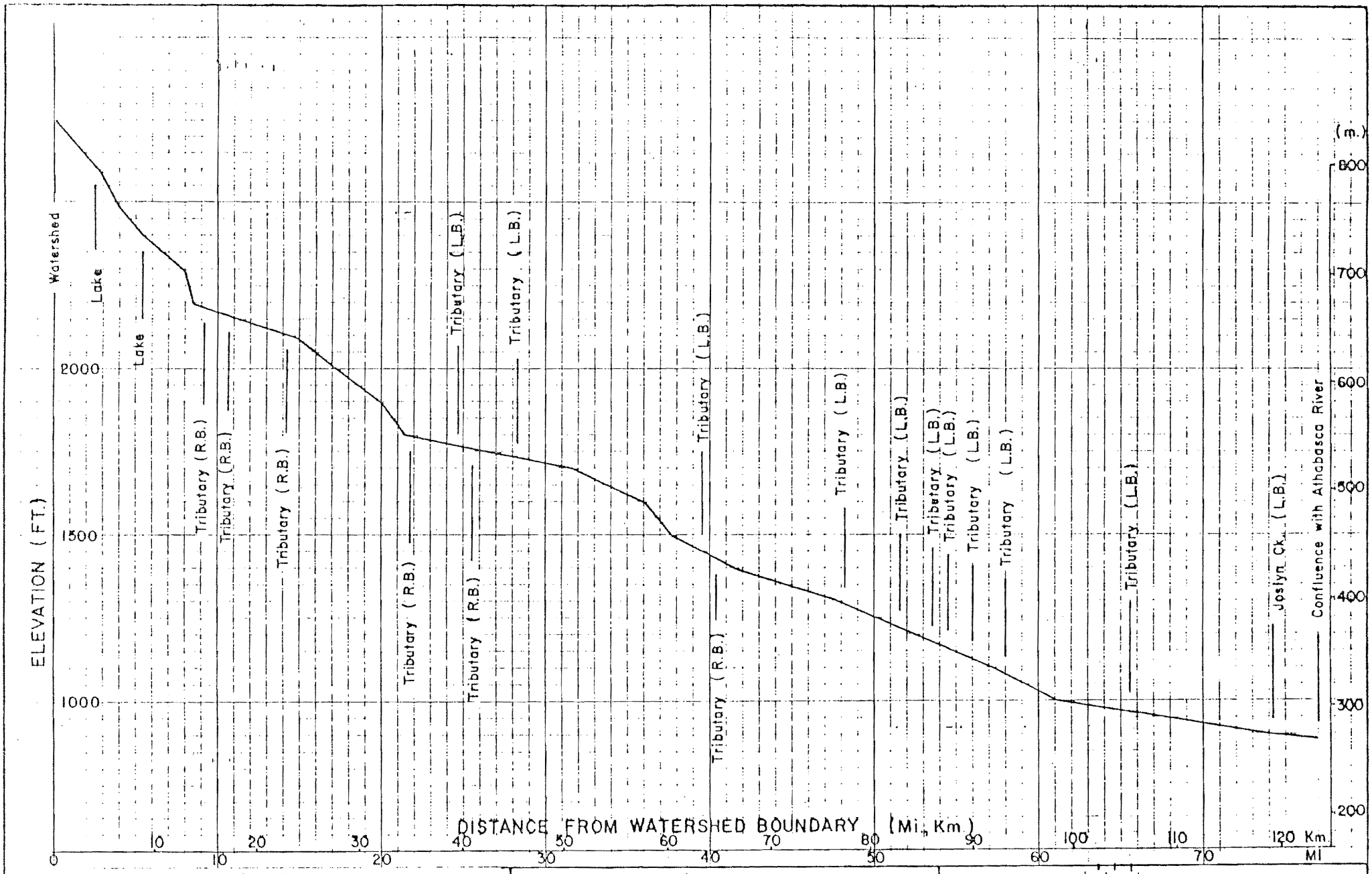
PLATE No

77



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RESEARCH ON OILSANDS ENVIRONMENTAL RESEARCH PROGRAM

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PROFILE OF ELLS RIVER LOOKING D/S PLOTTED FROM TOPOGRAPHIC MAP

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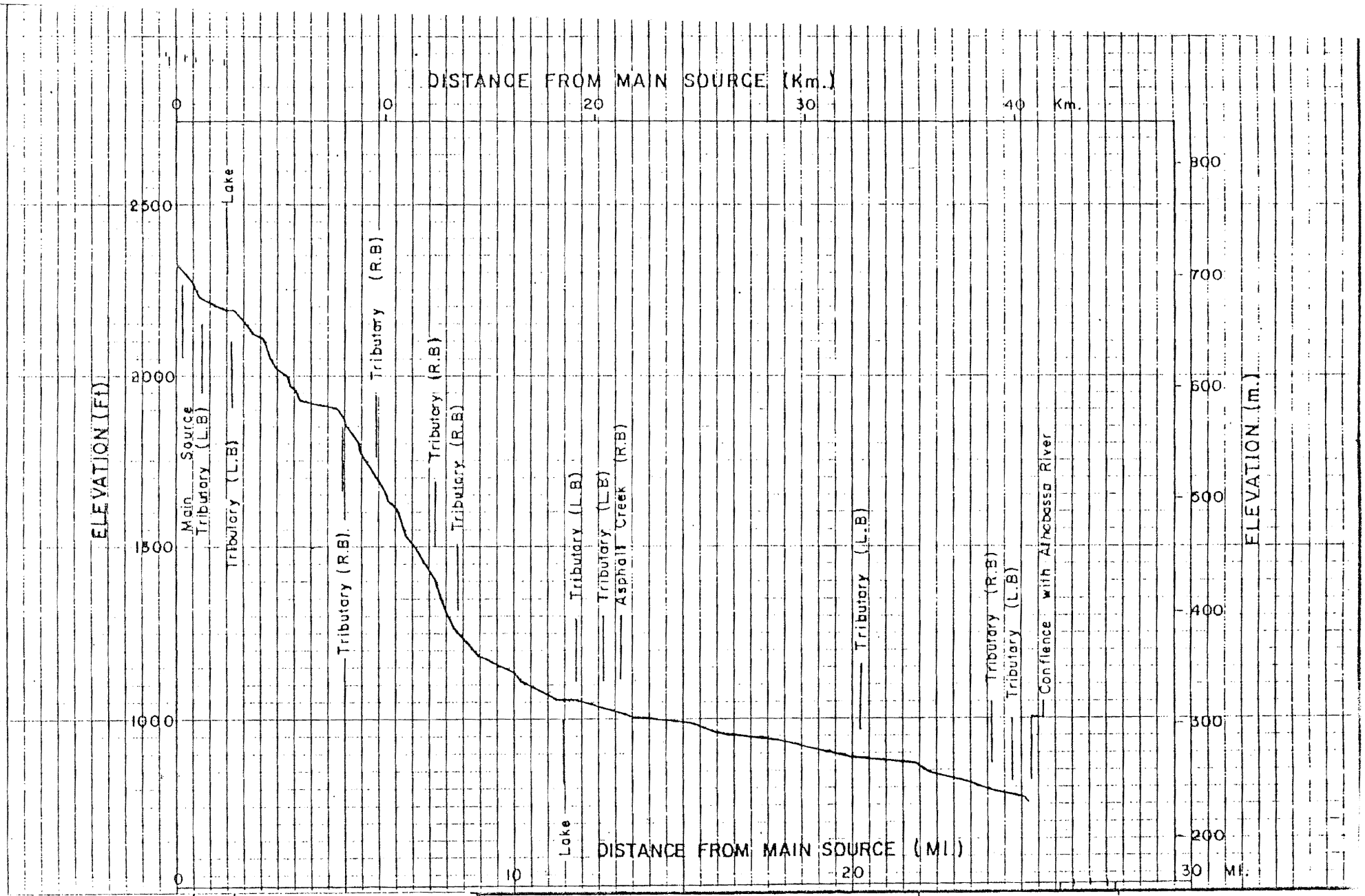

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PROFILE-EYMUNDSON Ck. LOOKING D/S

PLOTTED FROM TOPOGRAPHIC MAP

SCALE

DATE MAR., 1977

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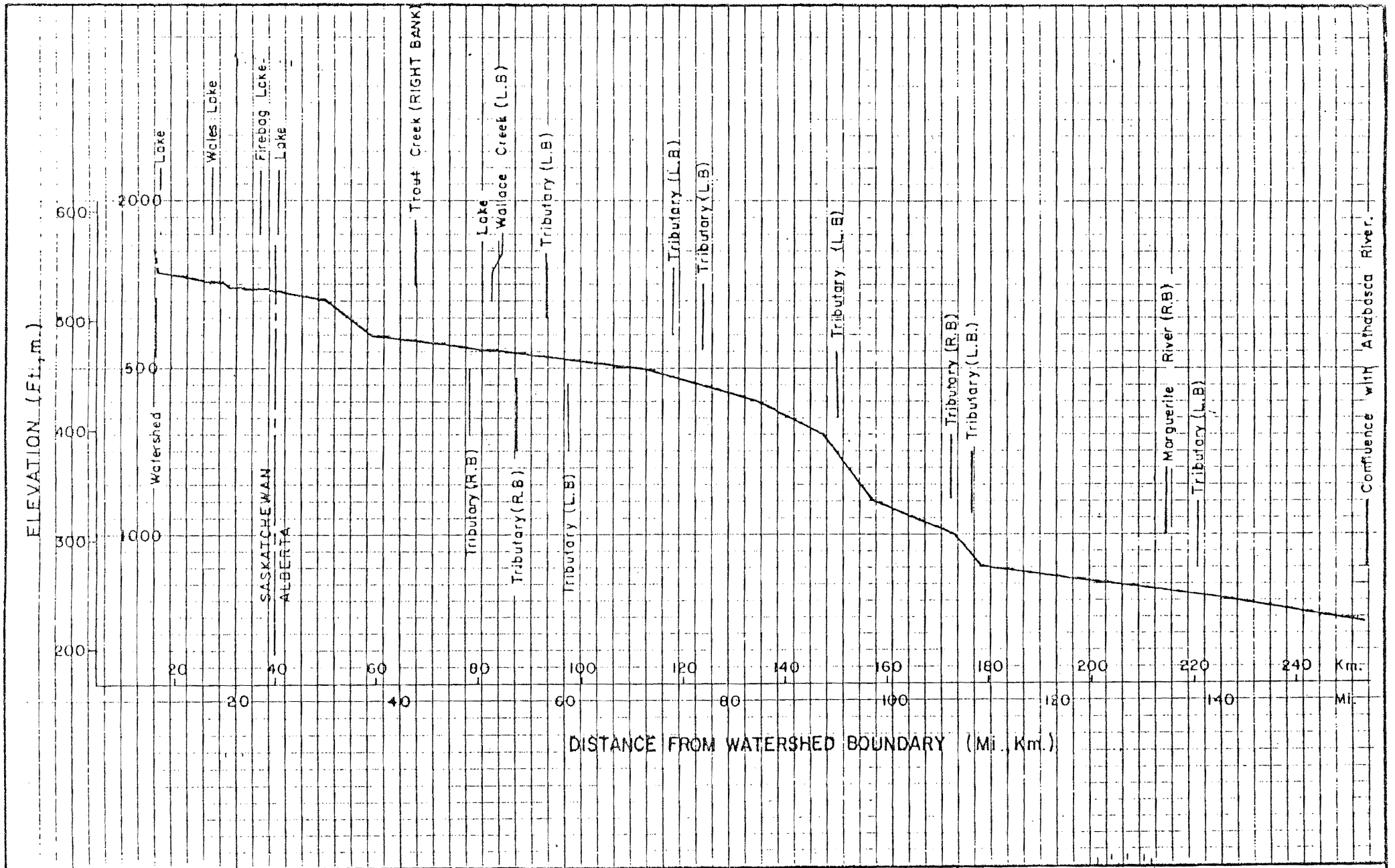
PLATE No

79



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PROFILE-FIREBAG RIVER LOOKING D/S
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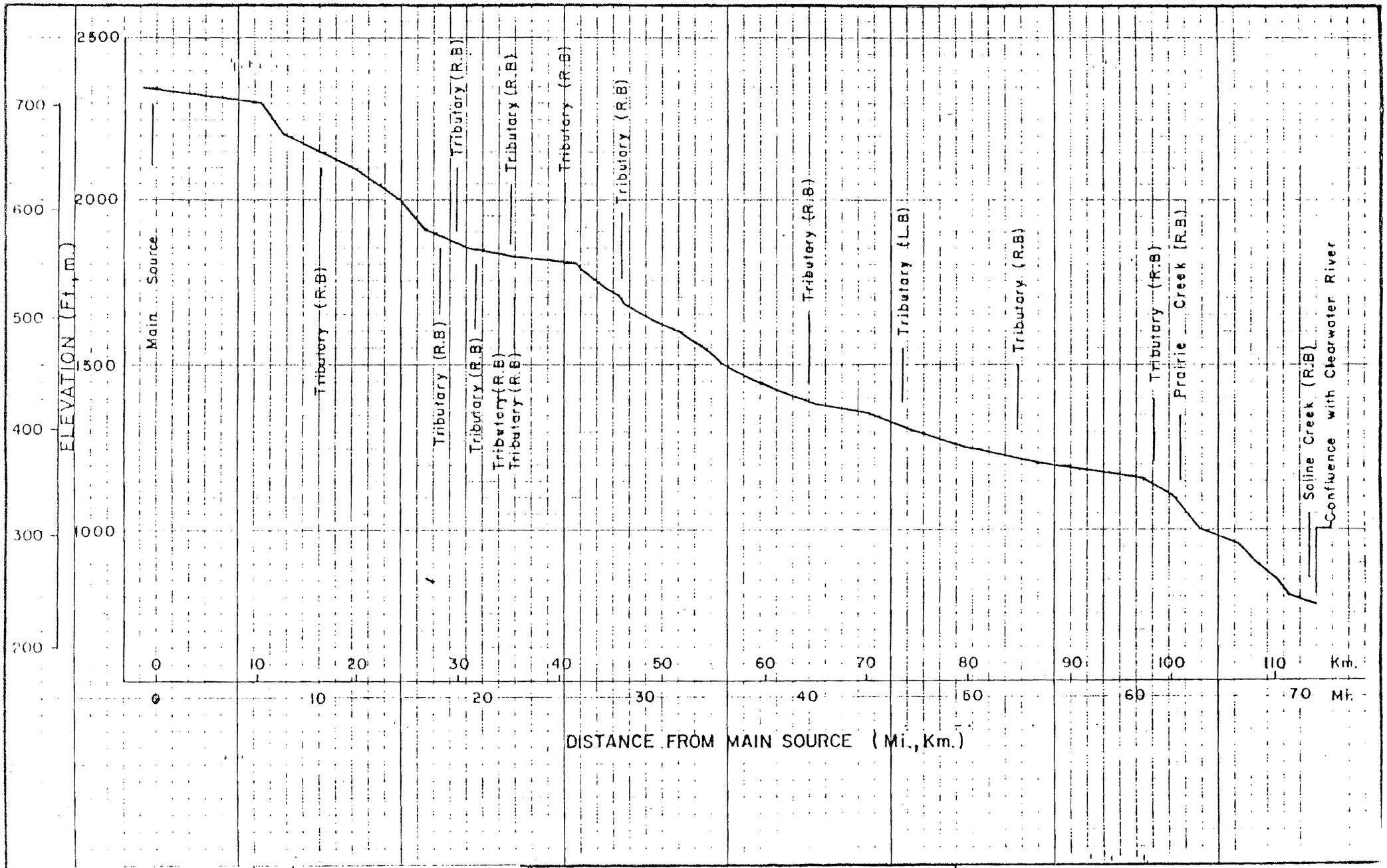
08



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PROFILE-HANGINGSTONE R. LOOKING D/S
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DATE MAR. 1977

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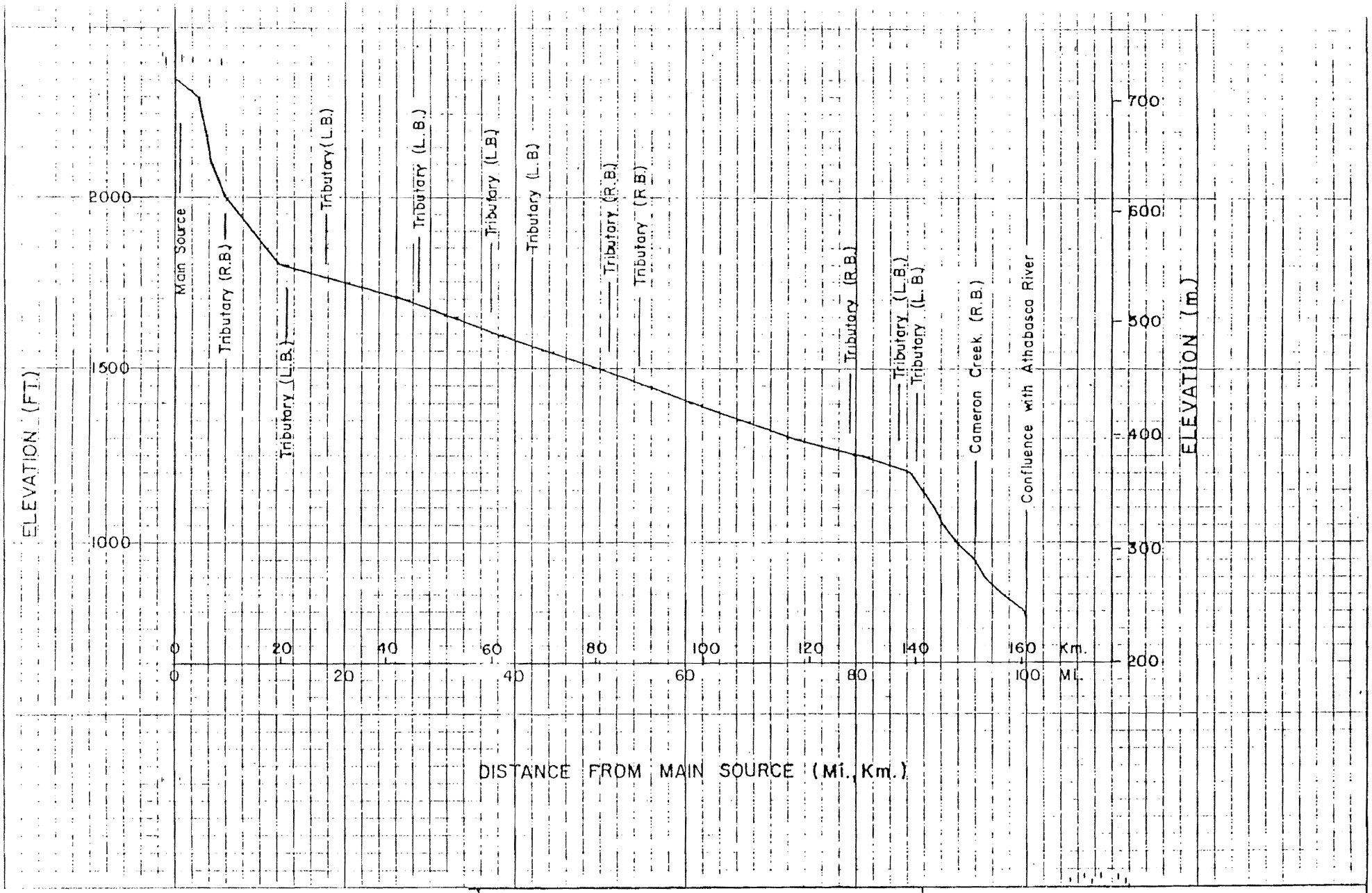

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PROFILE - HORSE RIVER LOOKING D/S PLOTTED FROM TOPOGRAPHIC MAP

SCALE

DATE MAR. 1977

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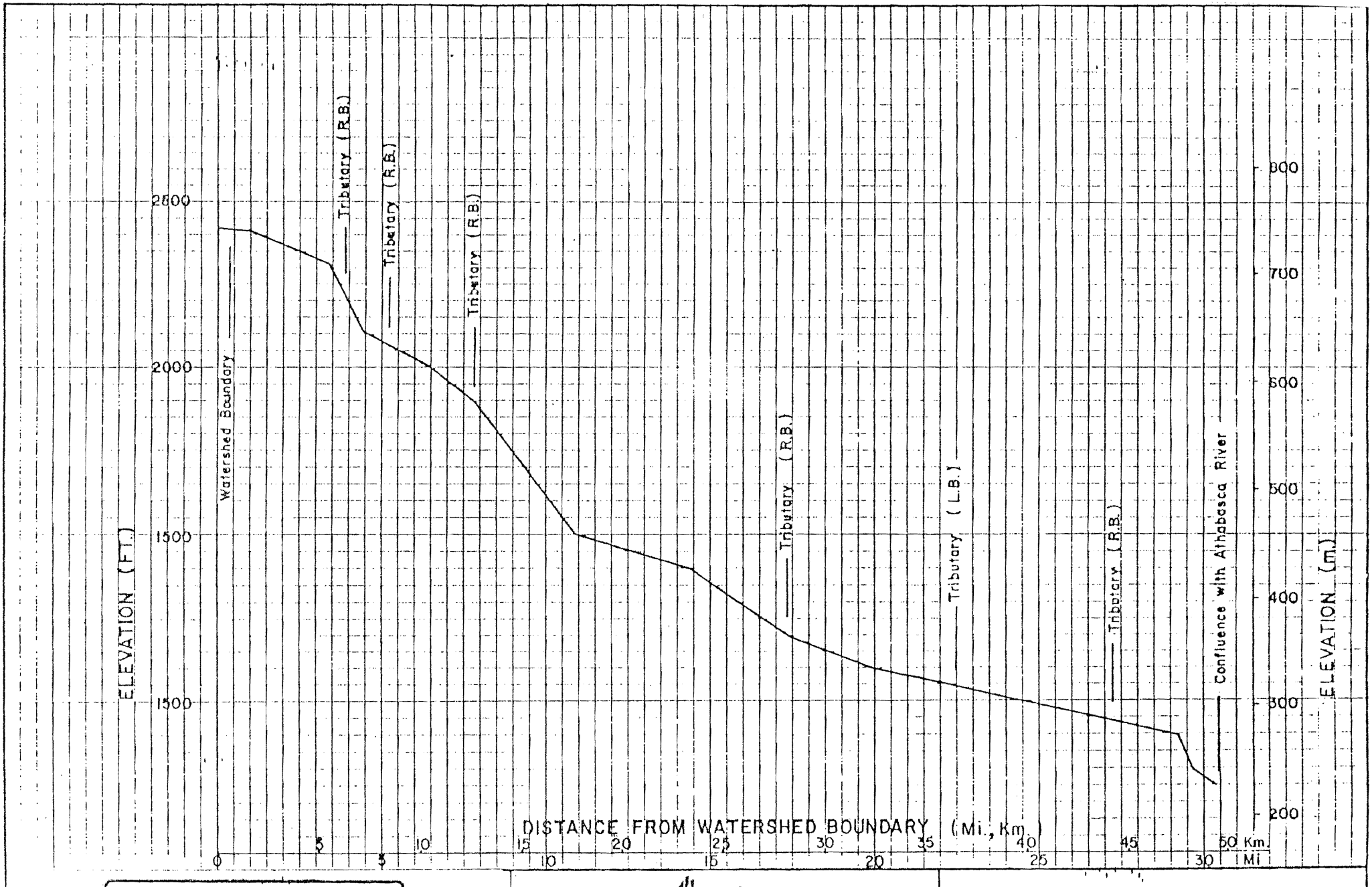

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PROFILE OF JOSLYN CK. LOOKING D/S PLOTTED FROM TOPOGRAPHIC MAP

SCALE

DATE AUGUST, 1977

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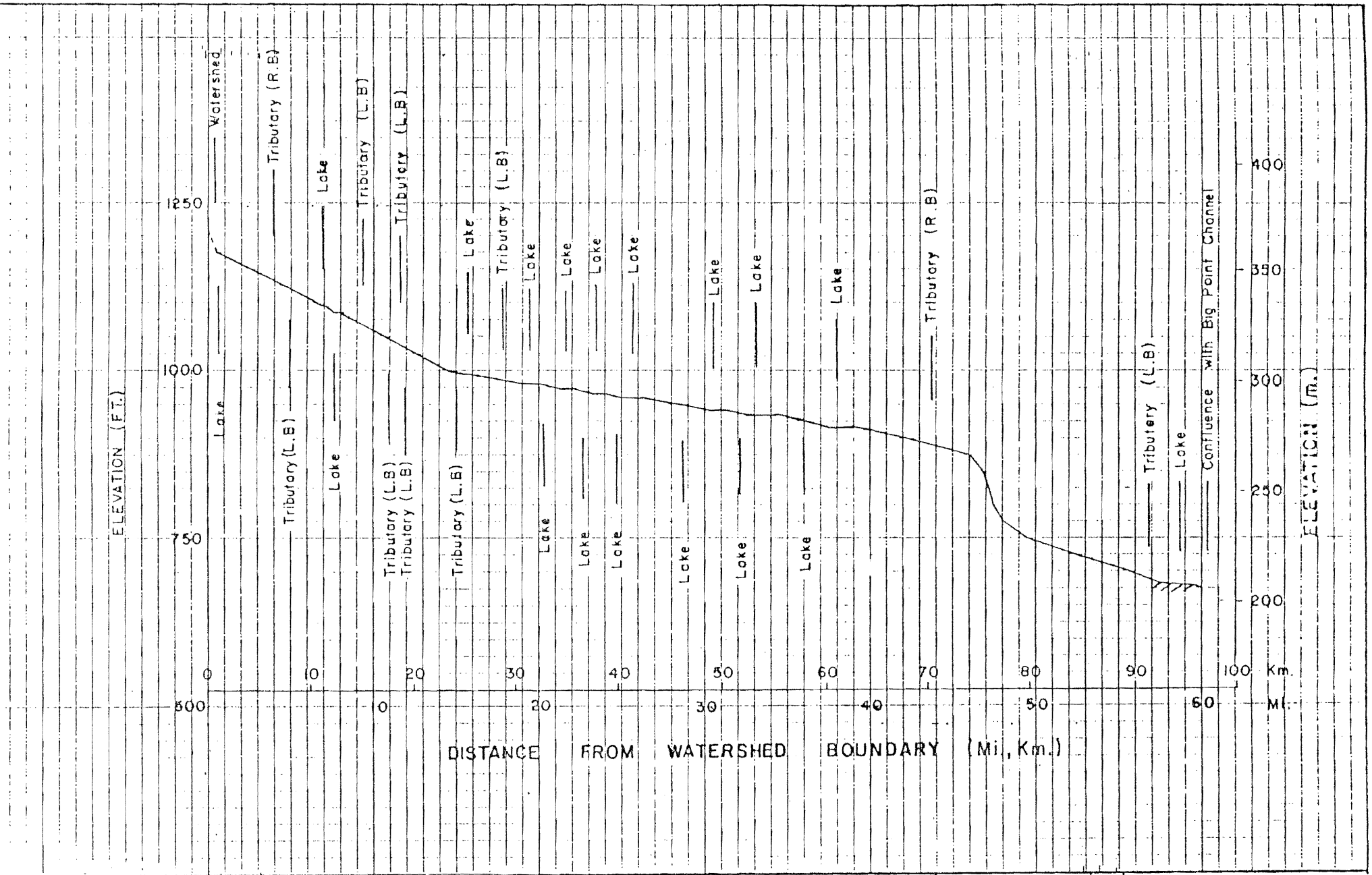

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PROFILE - KEANE CK. LOOKING D/S
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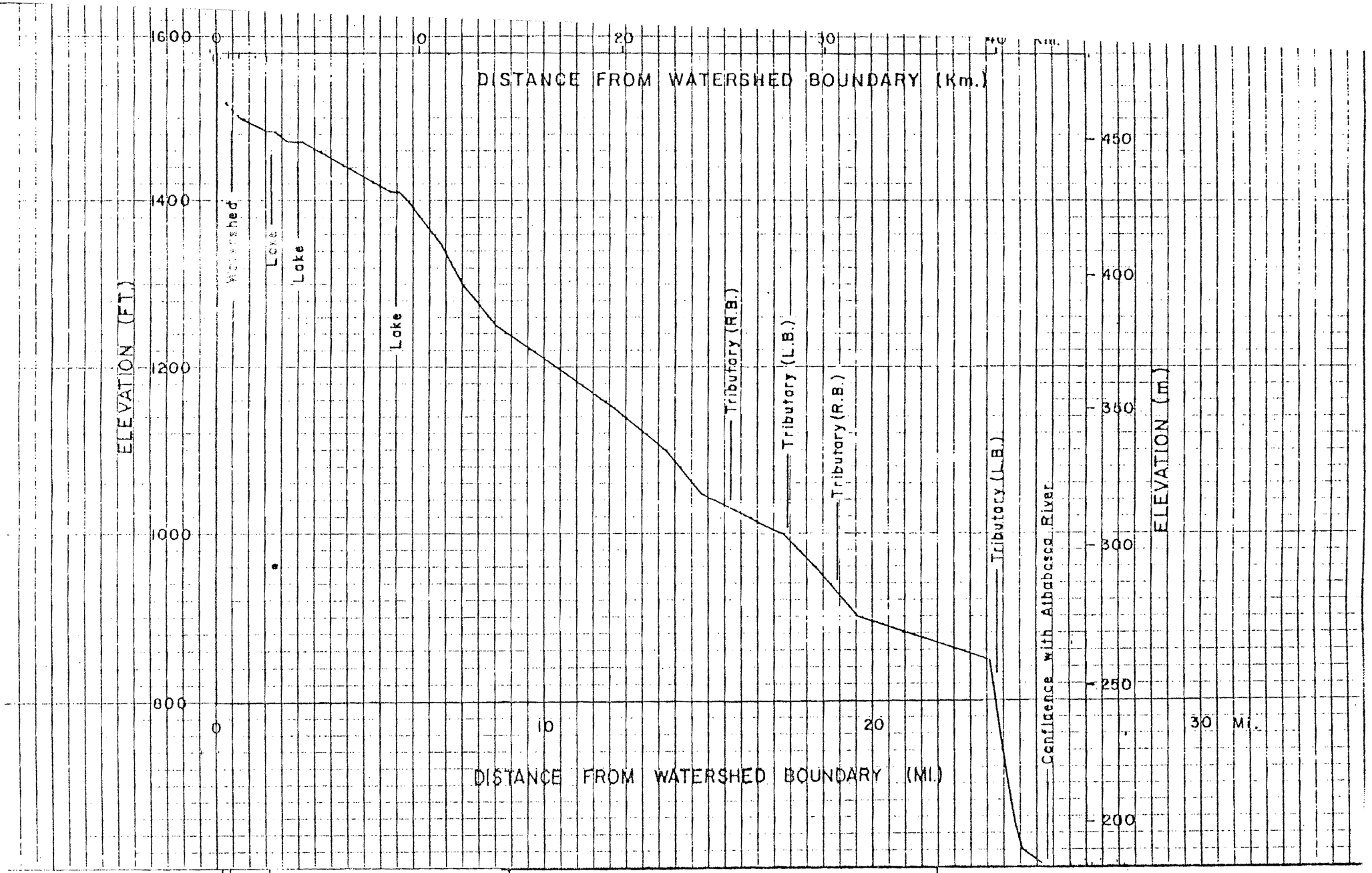

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PROFILE-LITTLE FISHERY R. LOOKING D/S
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DATE MAR. 1977

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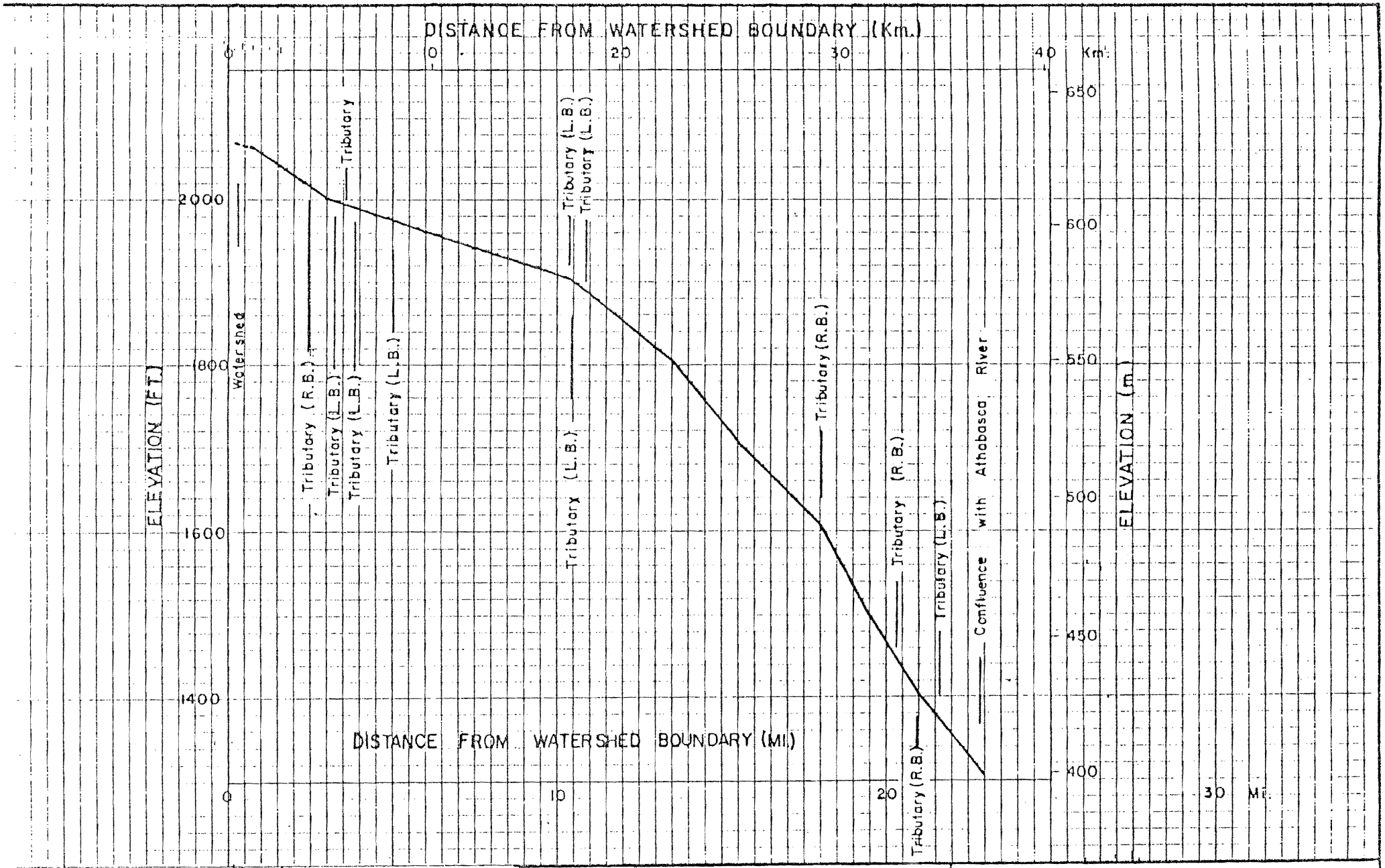
85



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PROFILE–LIVOCK R. LOOKING D/S
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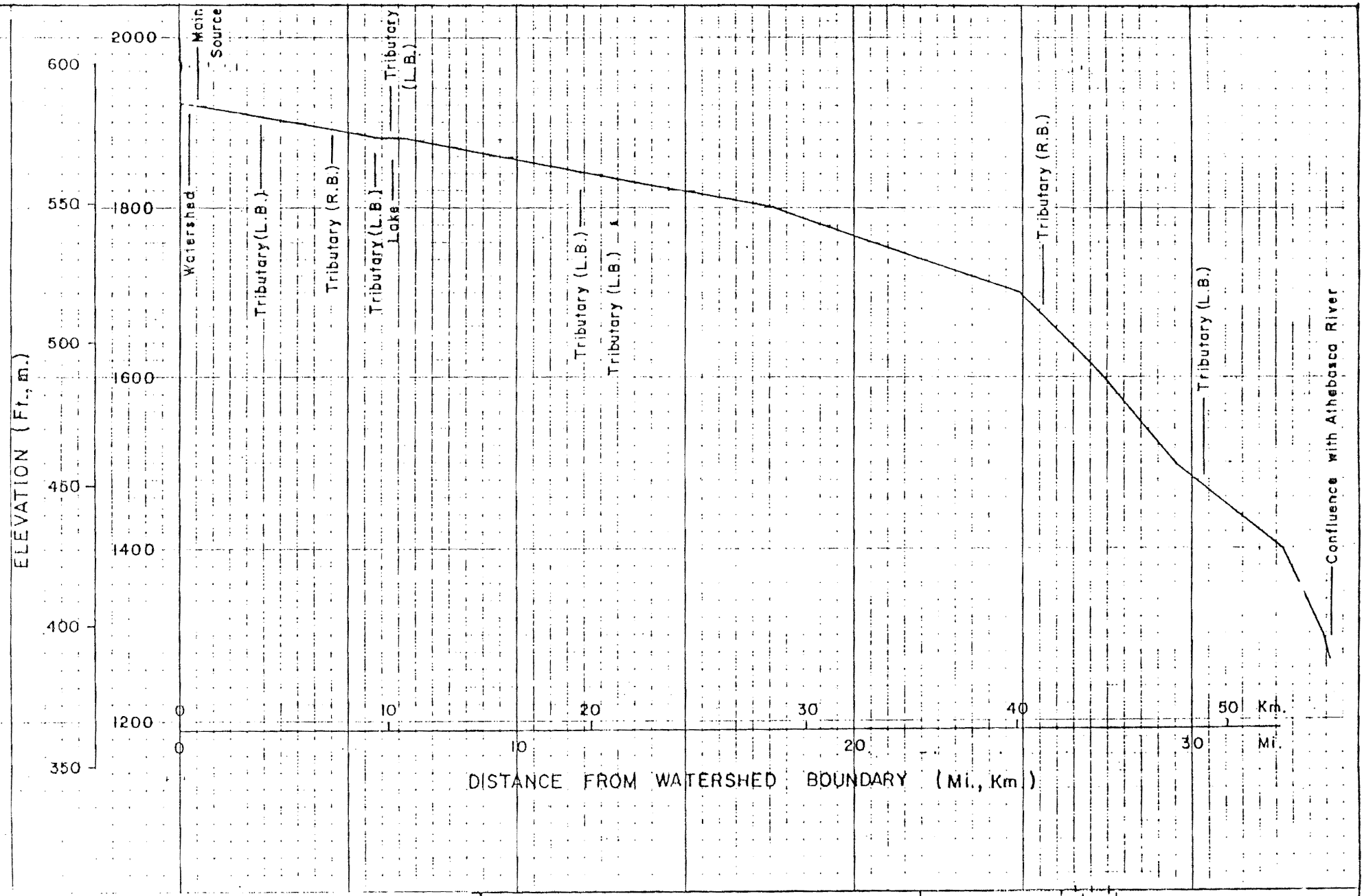

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PROFILE - LOON CREEK LOOKING D/S
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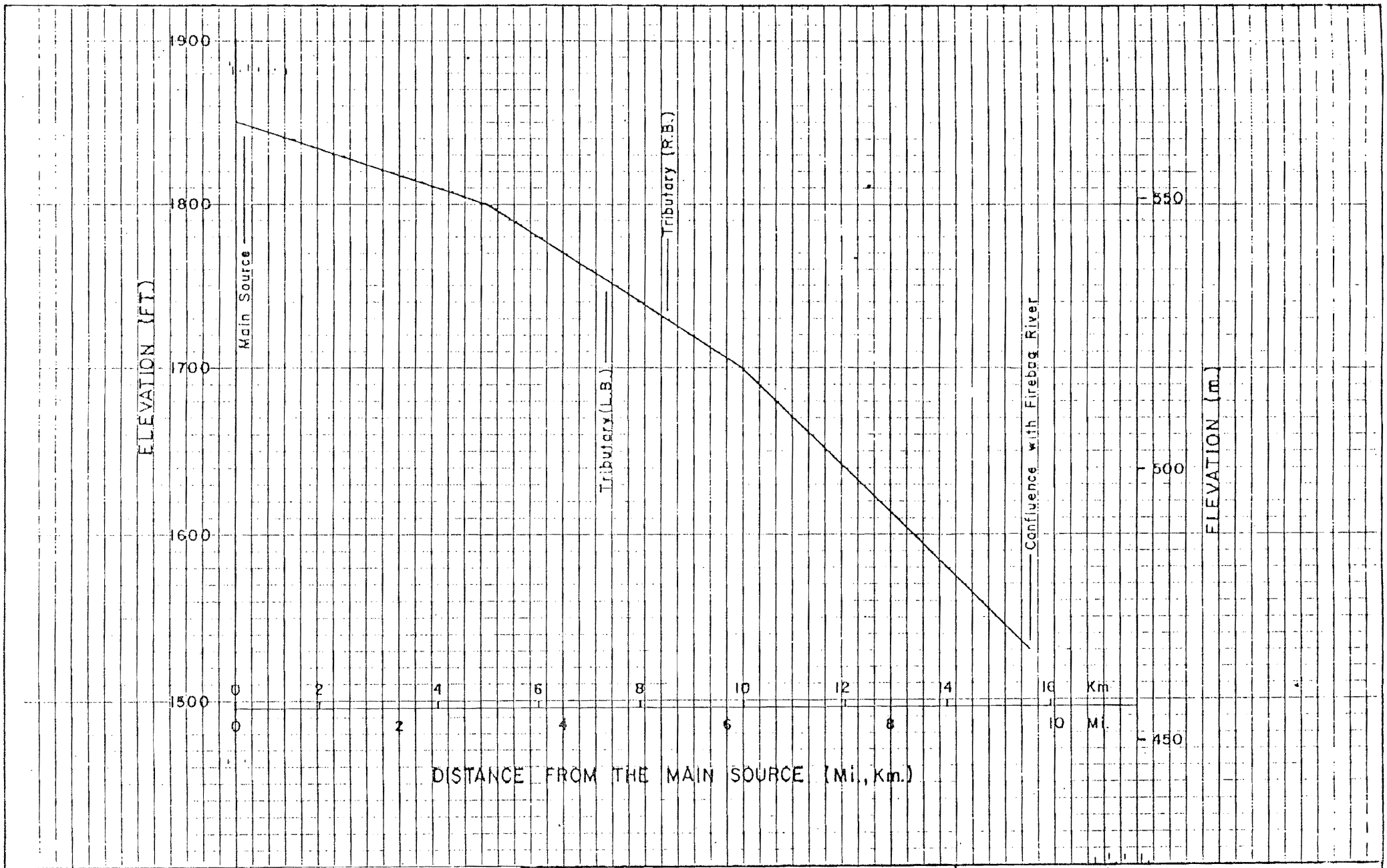

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PROFILE - LOST CREEK LOOKING D/S
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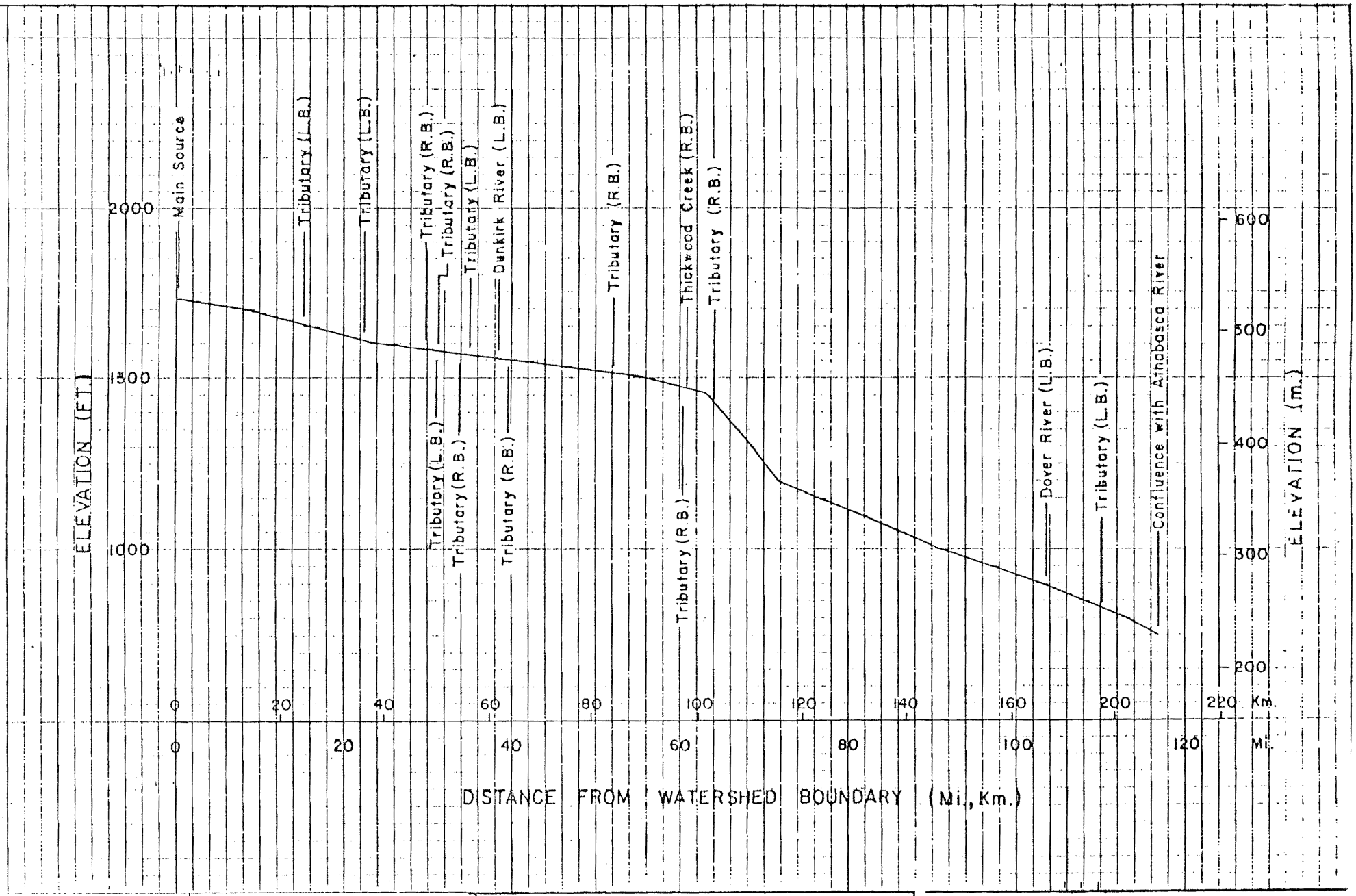

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PROFILE-MACKAY RIVER LOOKING D/S
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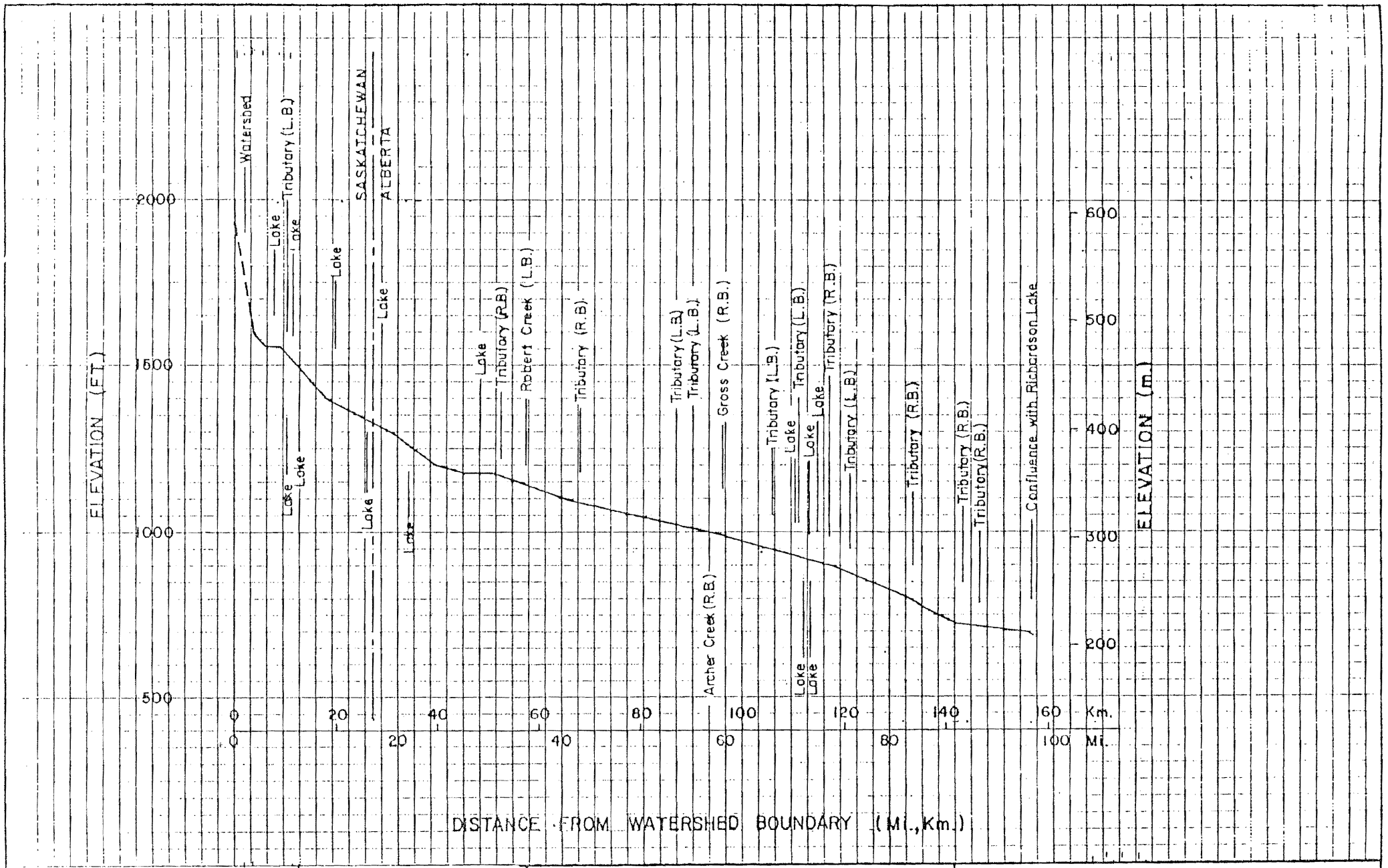

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PROFILE - MAYBELLE RIVER LOOKING D/S
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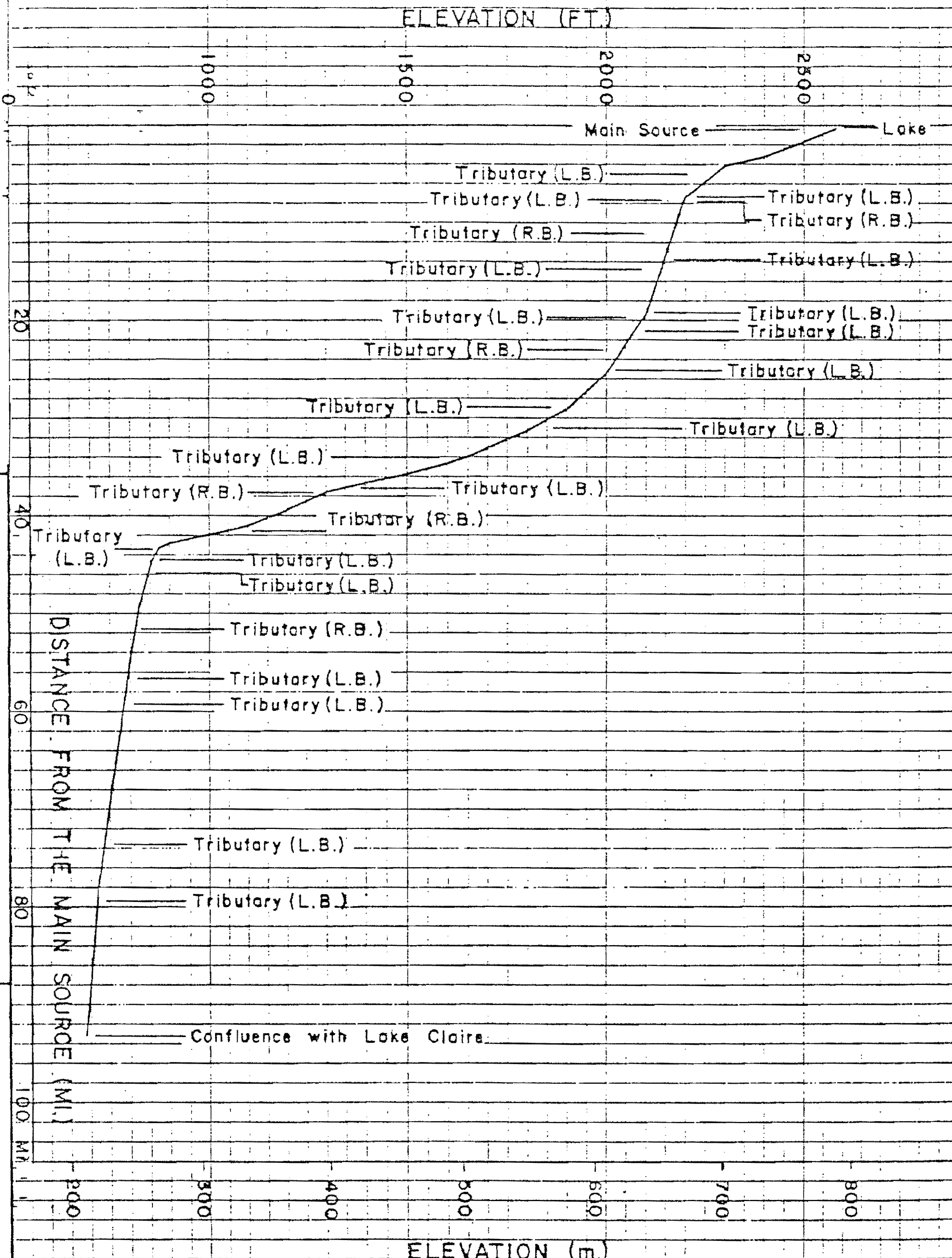

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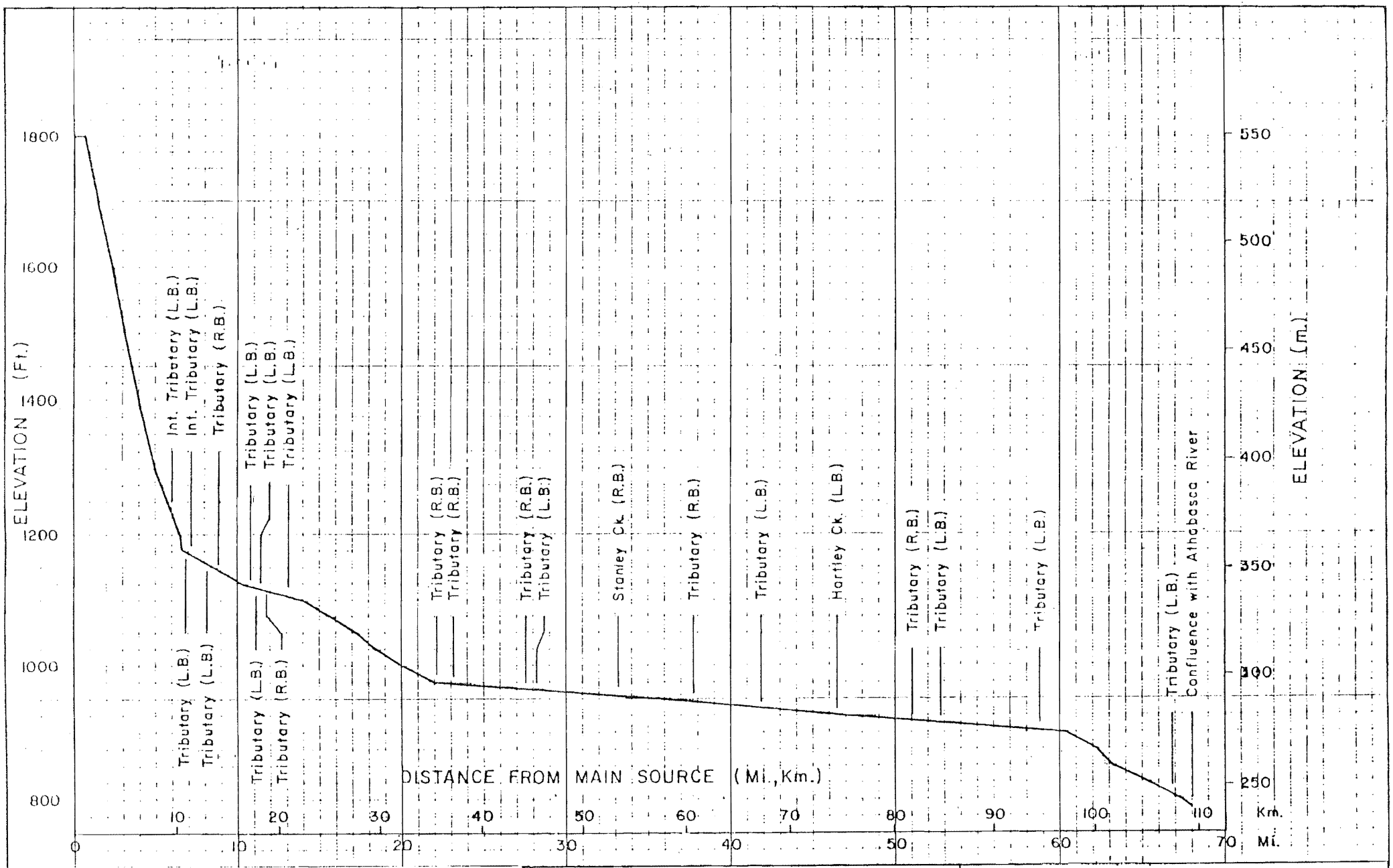

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PROFILE - MUSKEG R. LOOKING D/S
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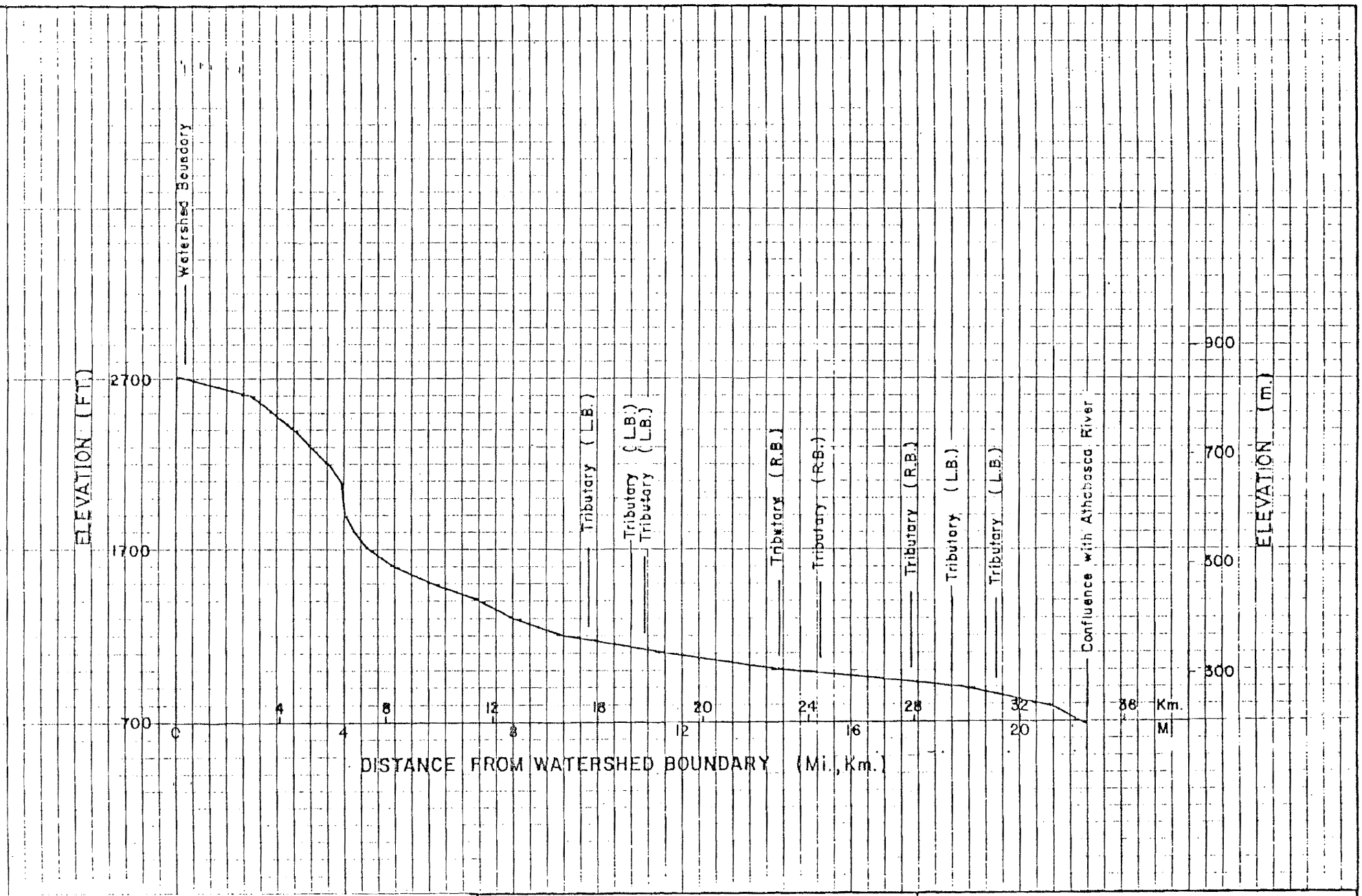

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PROFILE OF PIERRE RIVER LOOKING D/S PLOTTED FROM TOPOGRAPHIC MAP

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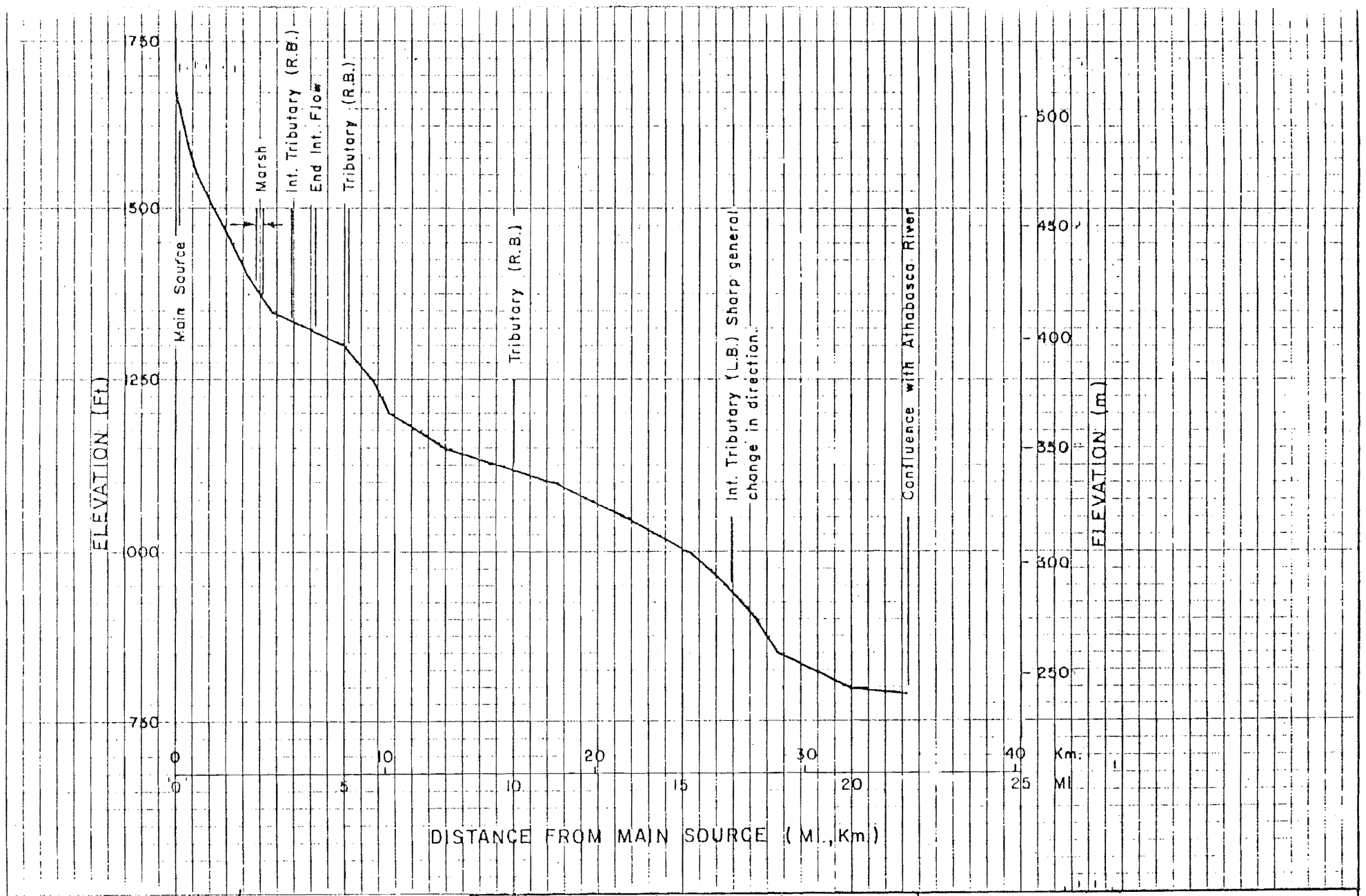

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PROFILE-POPLAR CR. LOOKING D/S
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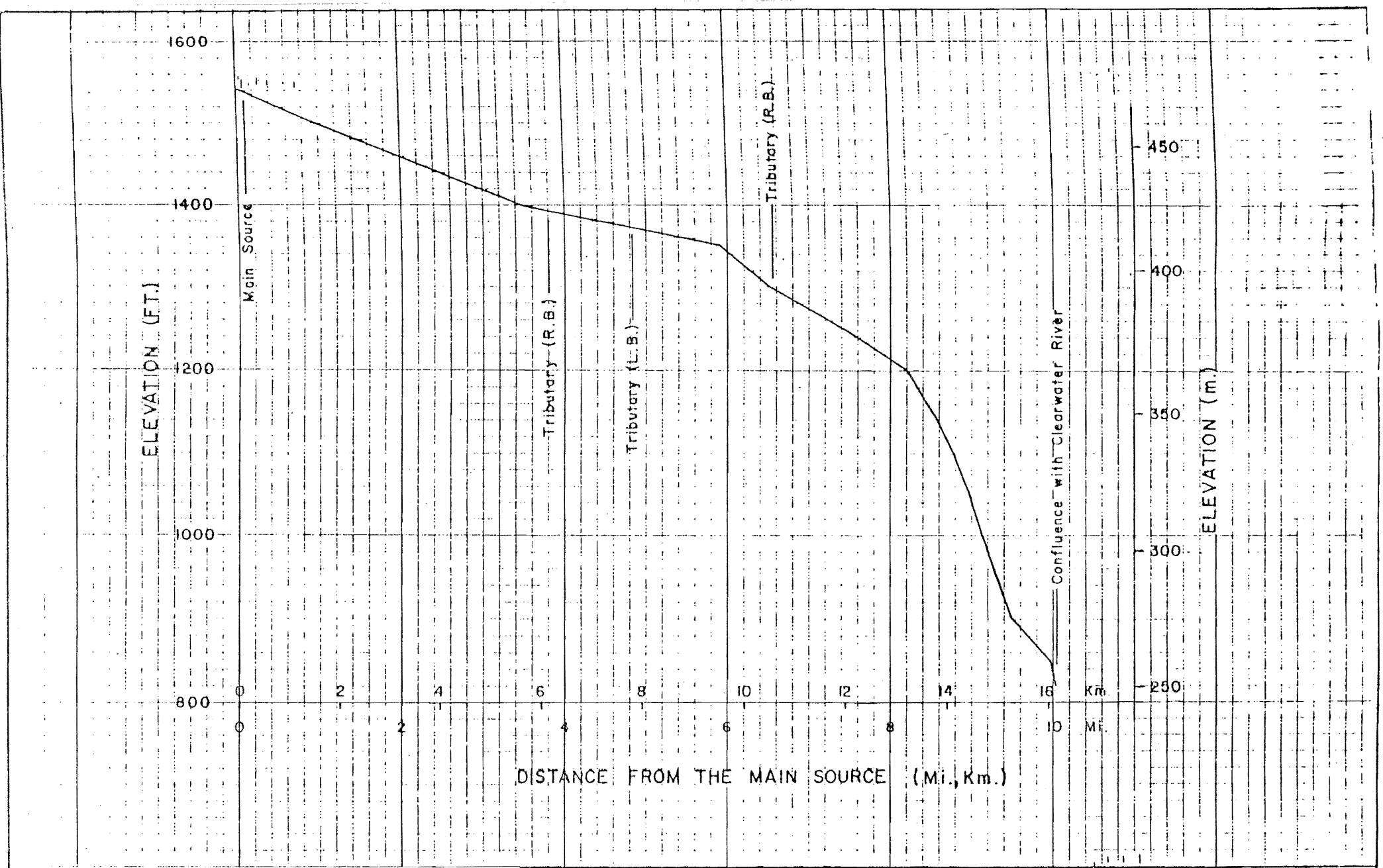

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PROFILE-RAINBOW CREEK LOOKING D/S
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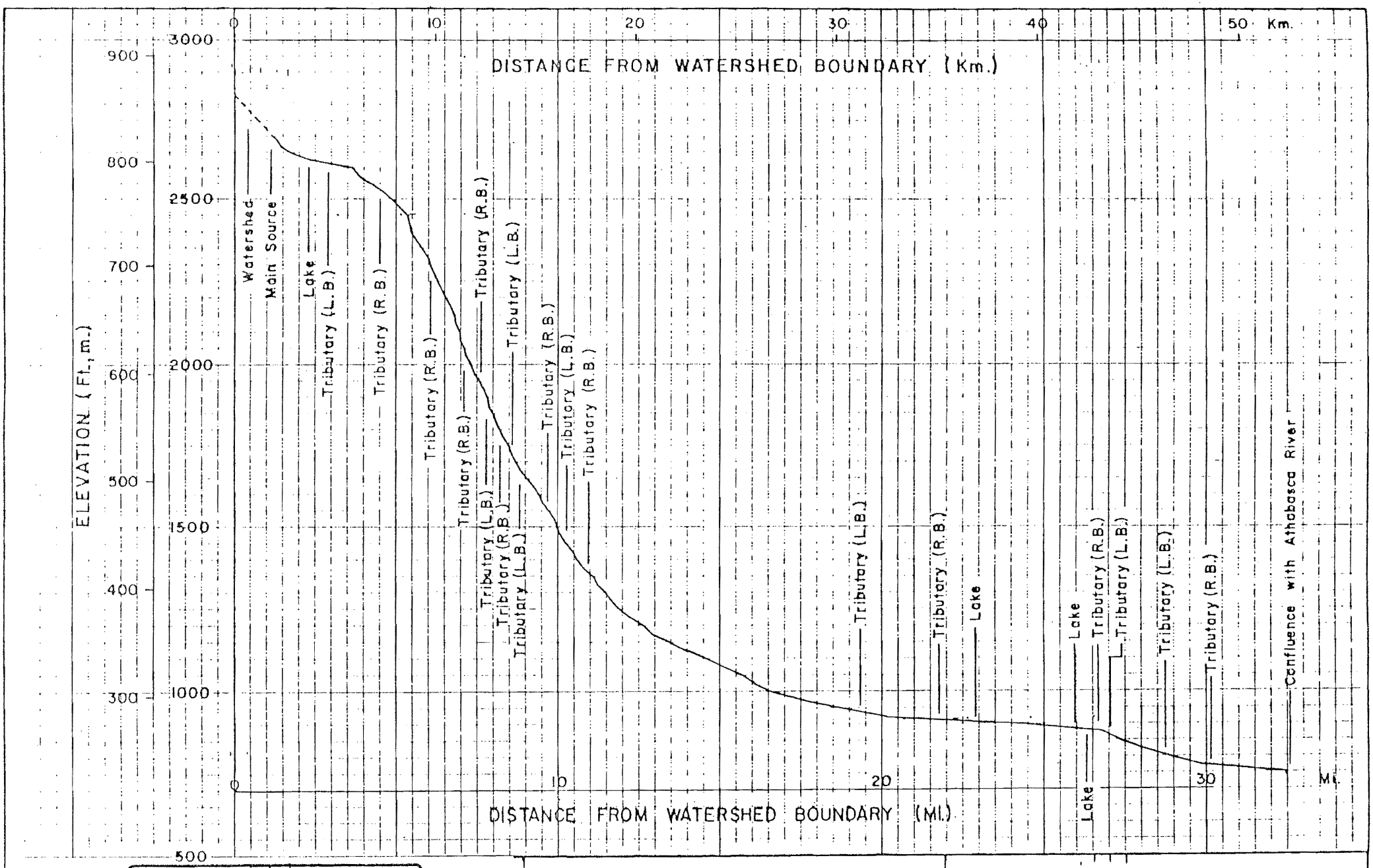

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PROFILE-REDCLAY CREEK LOOKING D/S
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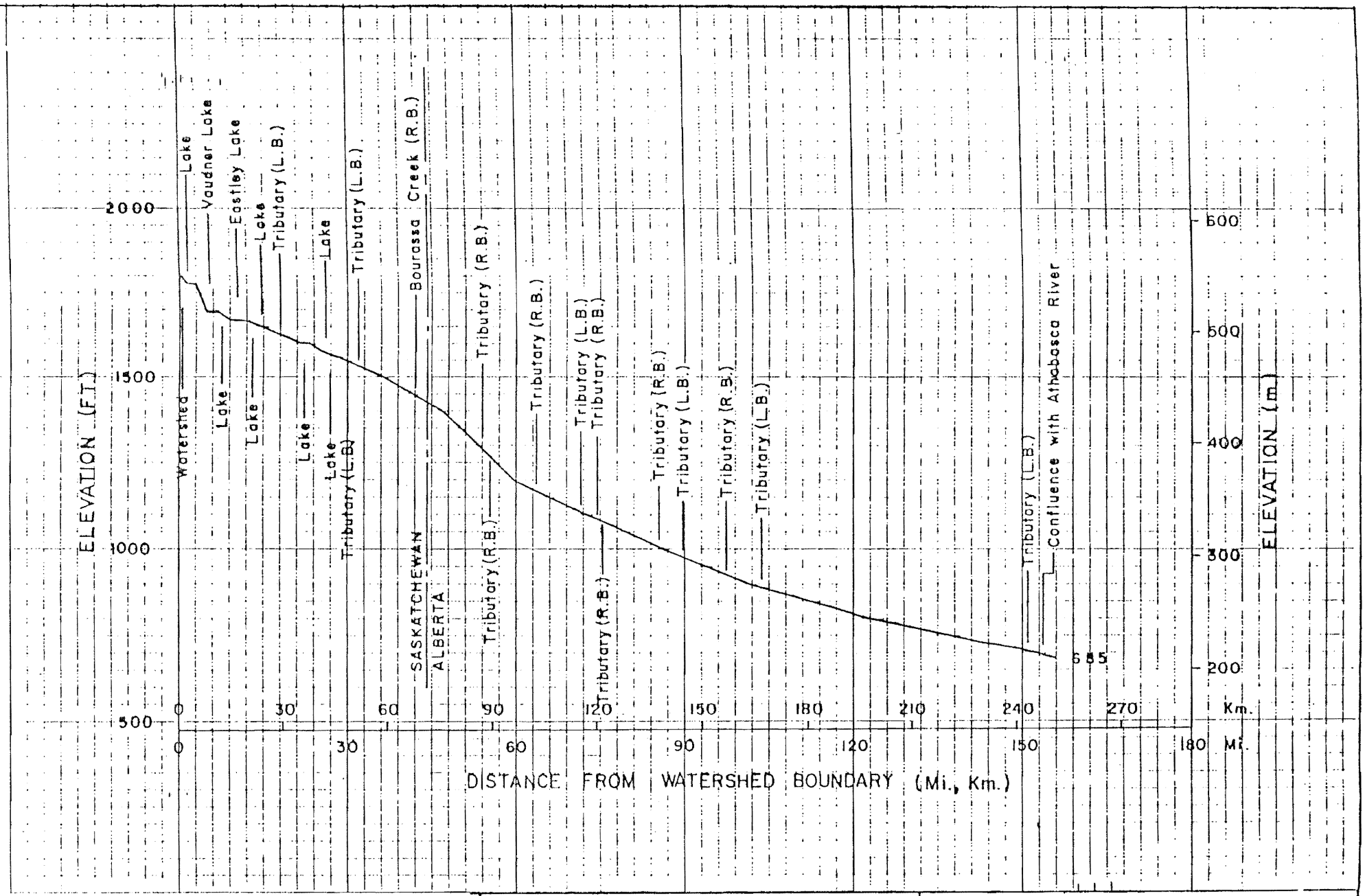

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PROFILE-RICHARDSON R. LOOKING D/S
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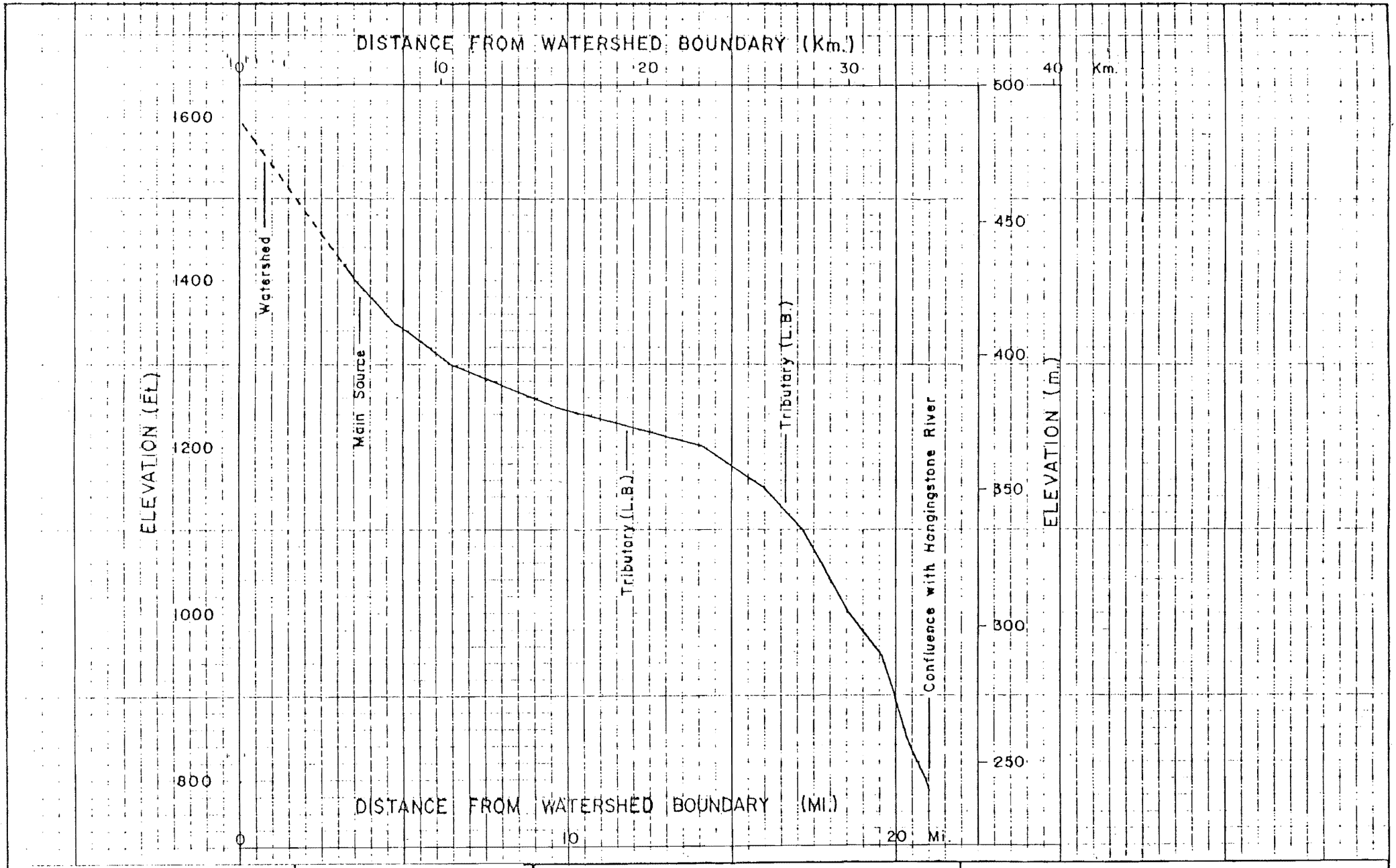

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PROFILE-SALINE CREEK LOOKING D/S
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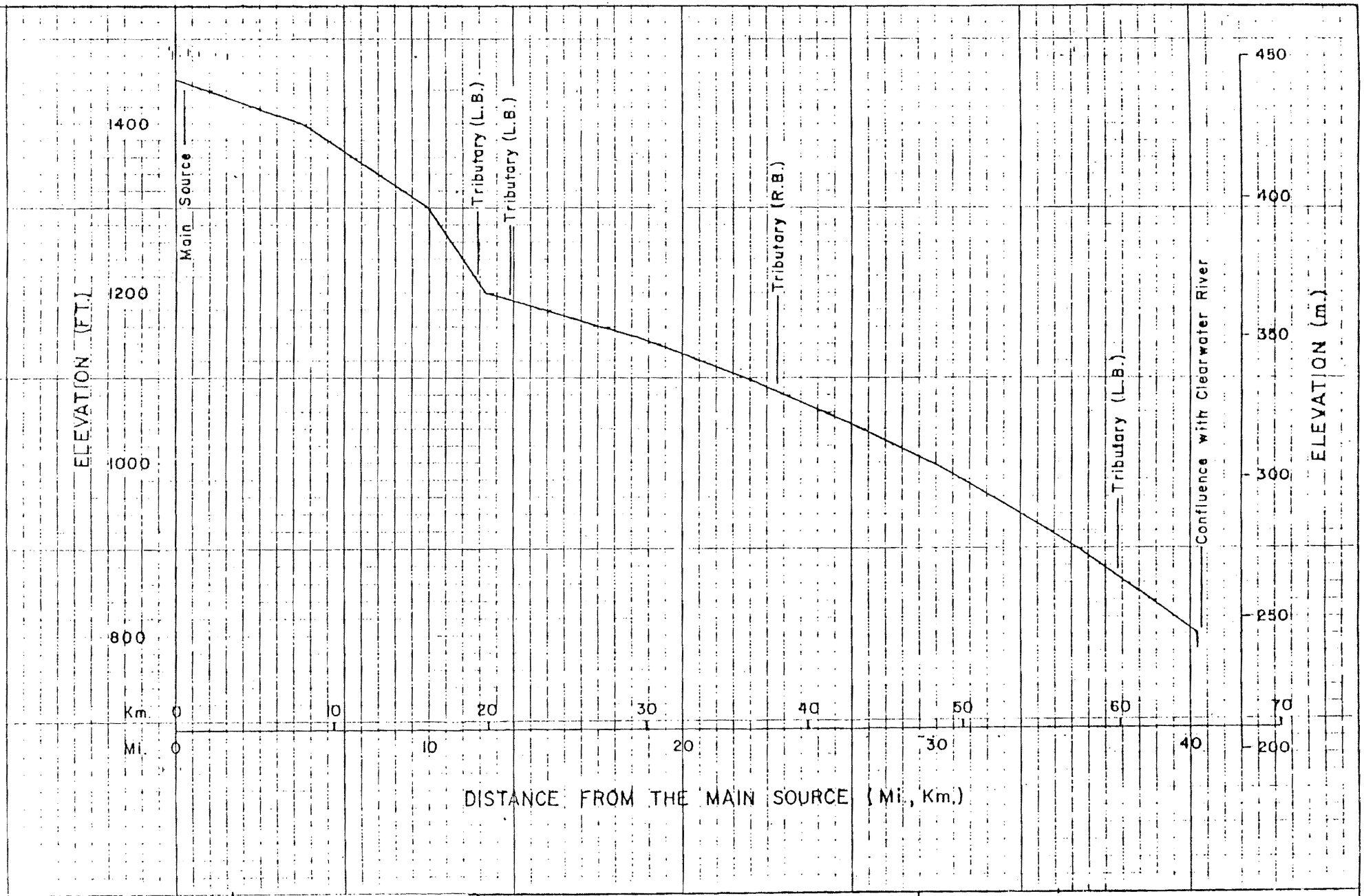

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PROFILE-SAPRAE CREEK LOOKING D/S
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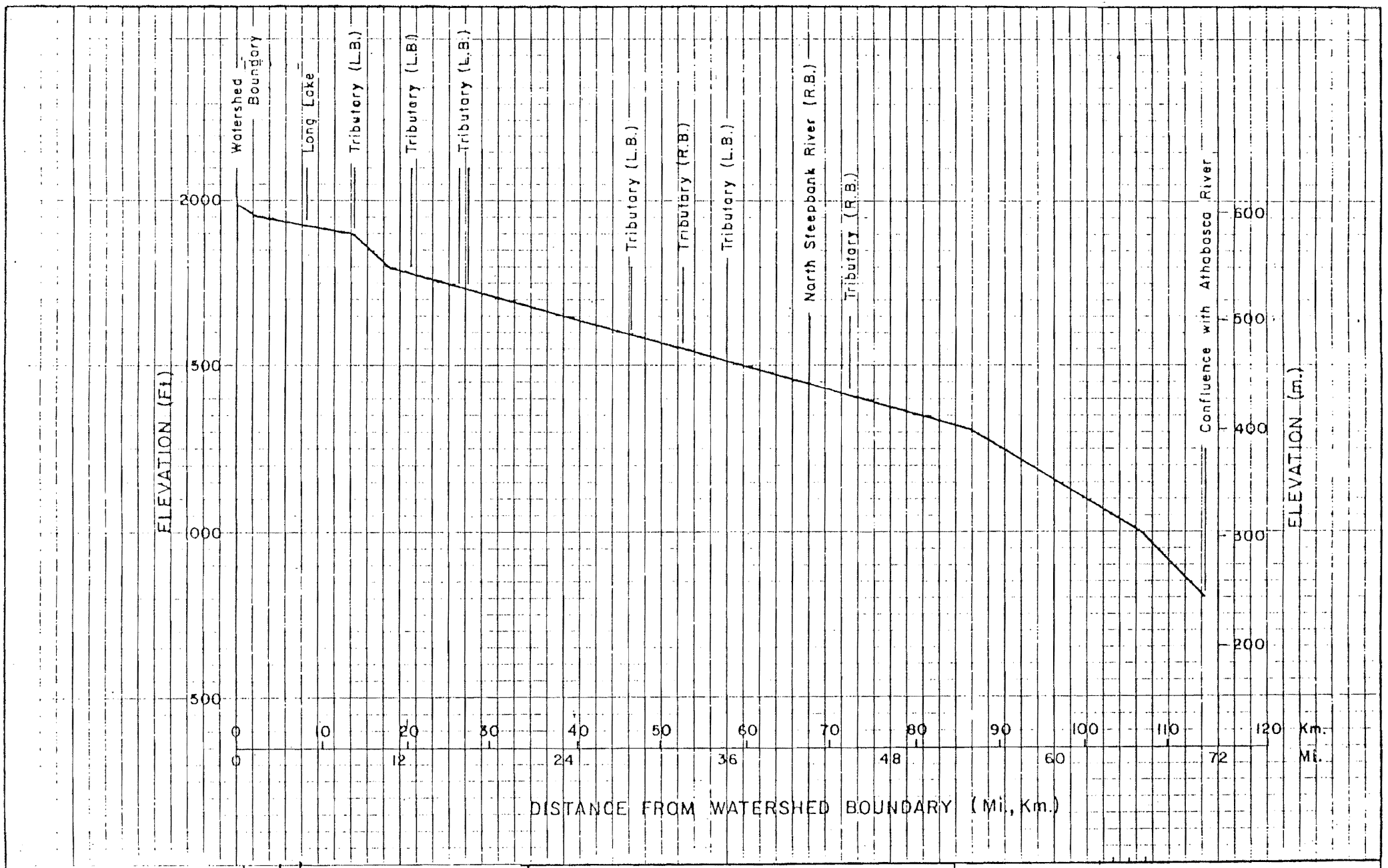

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PROFILE-STEEPBANK R. LOOKING D/S
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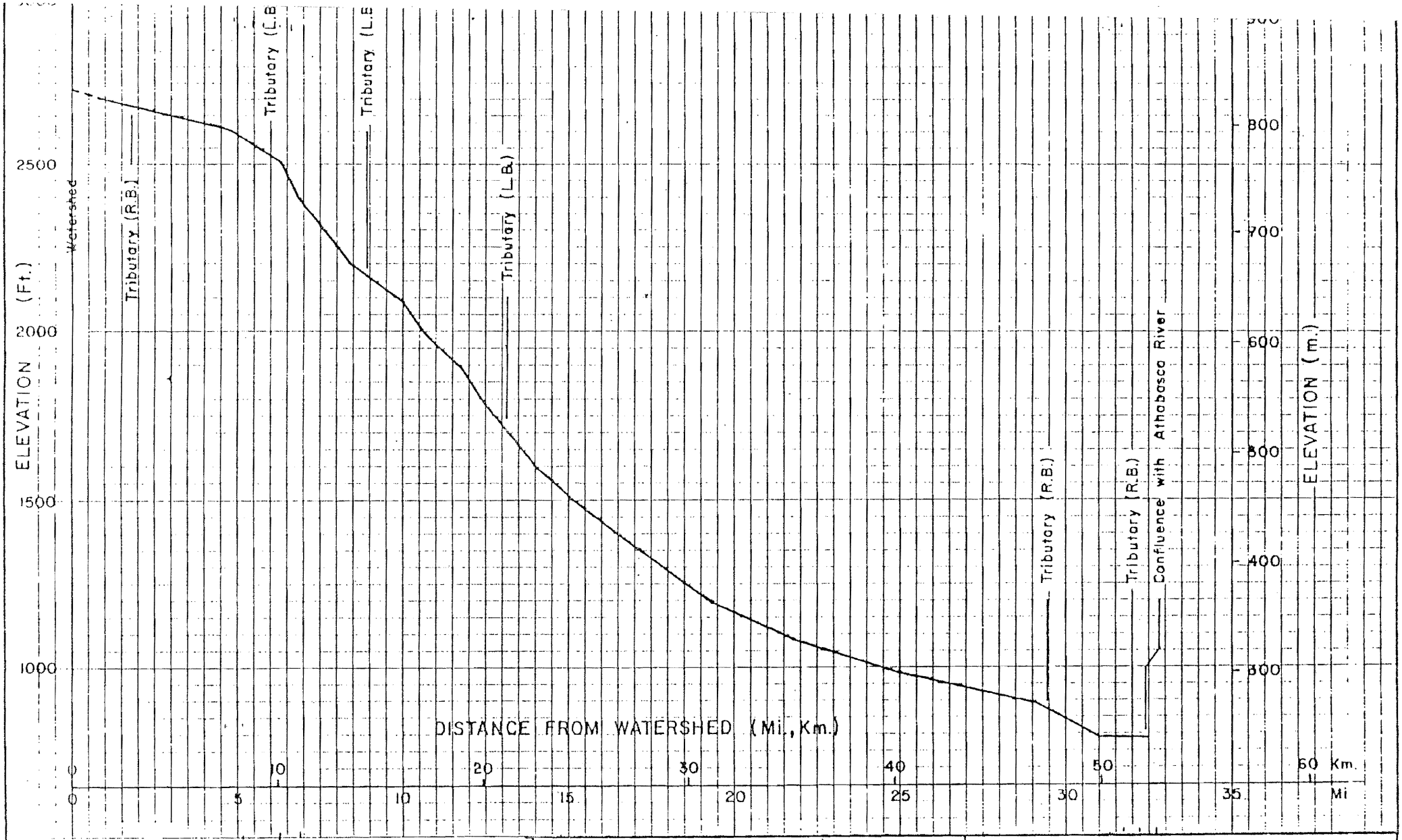

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PROFILE - TAR RIVER LOOKING D/S
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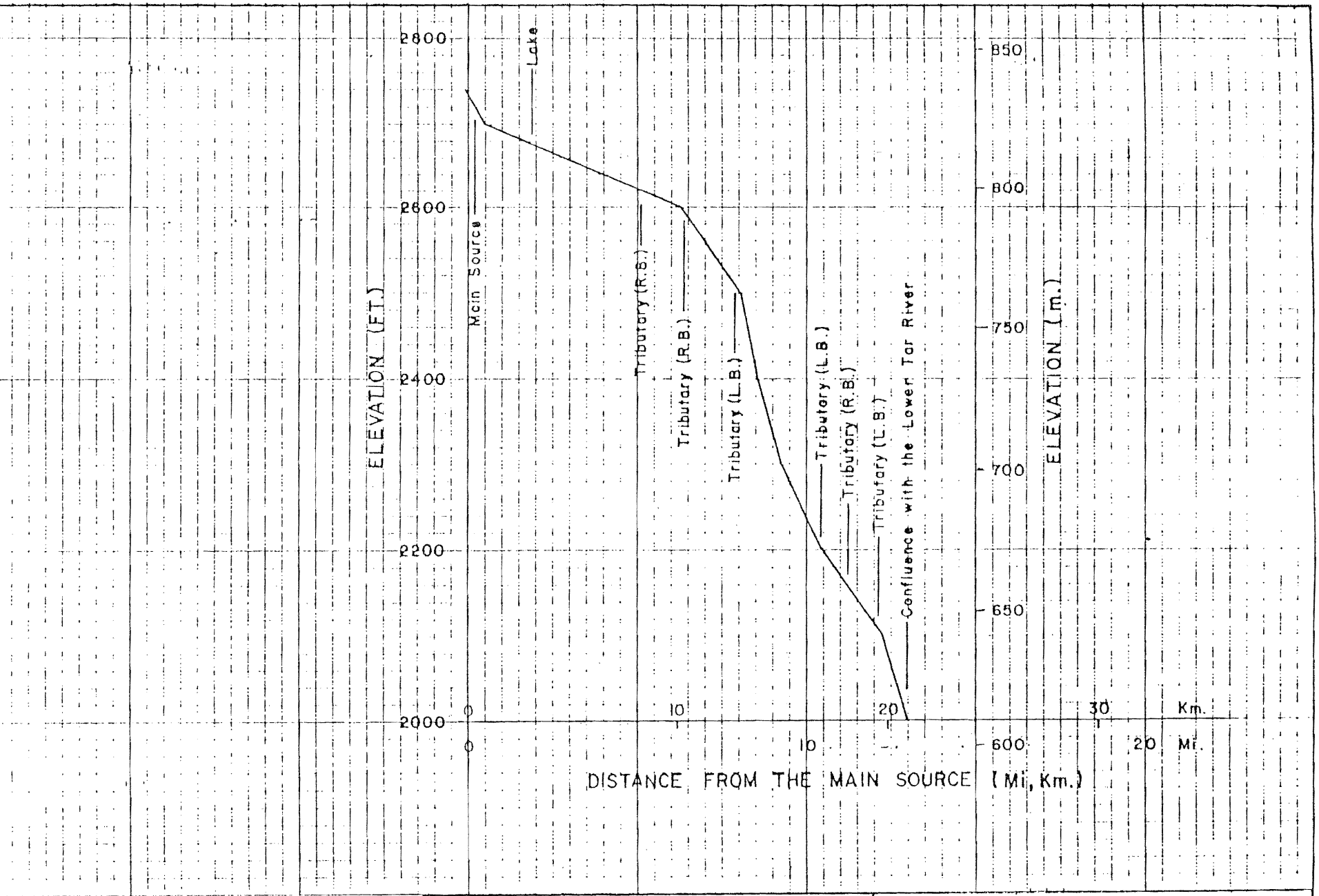

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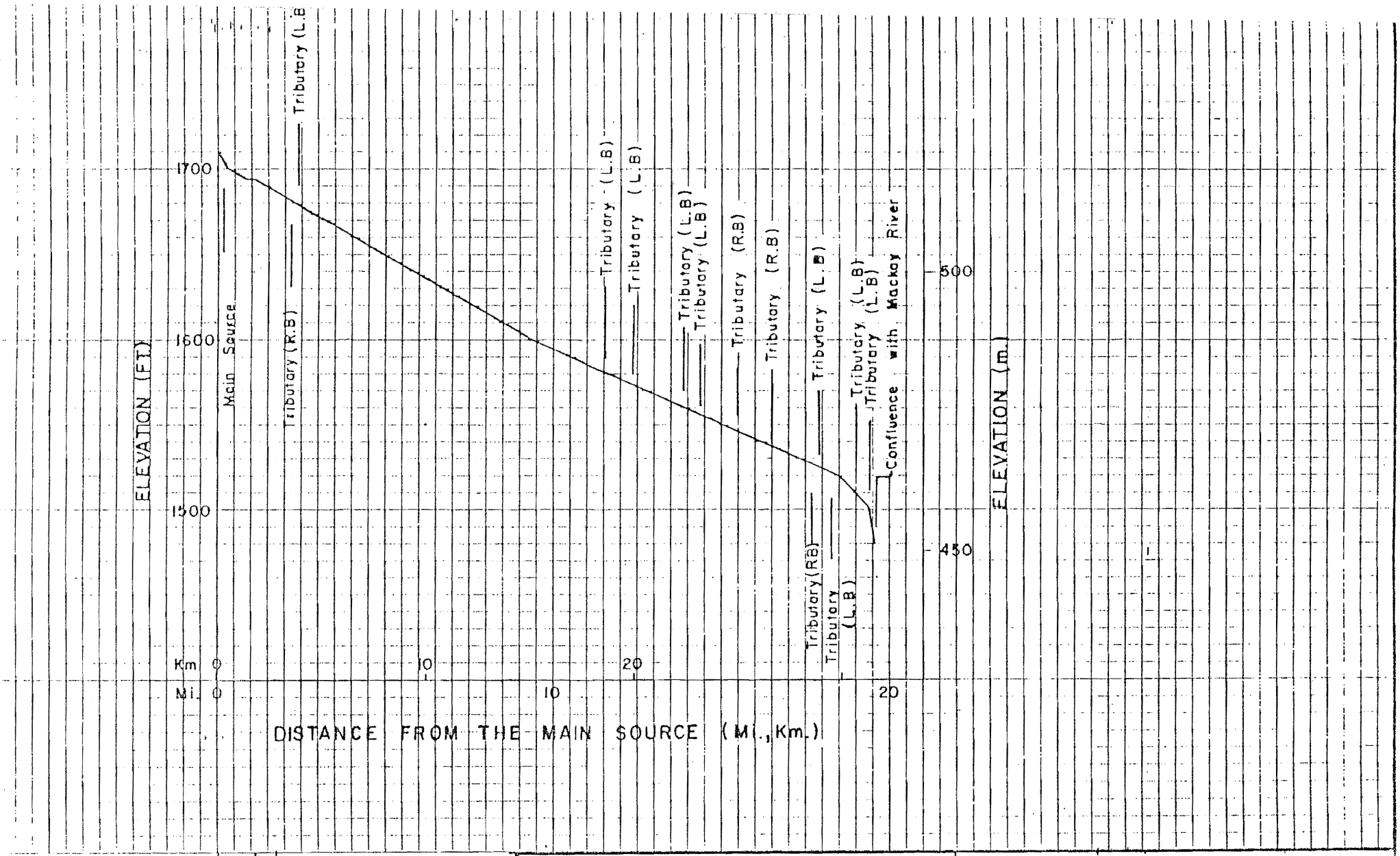

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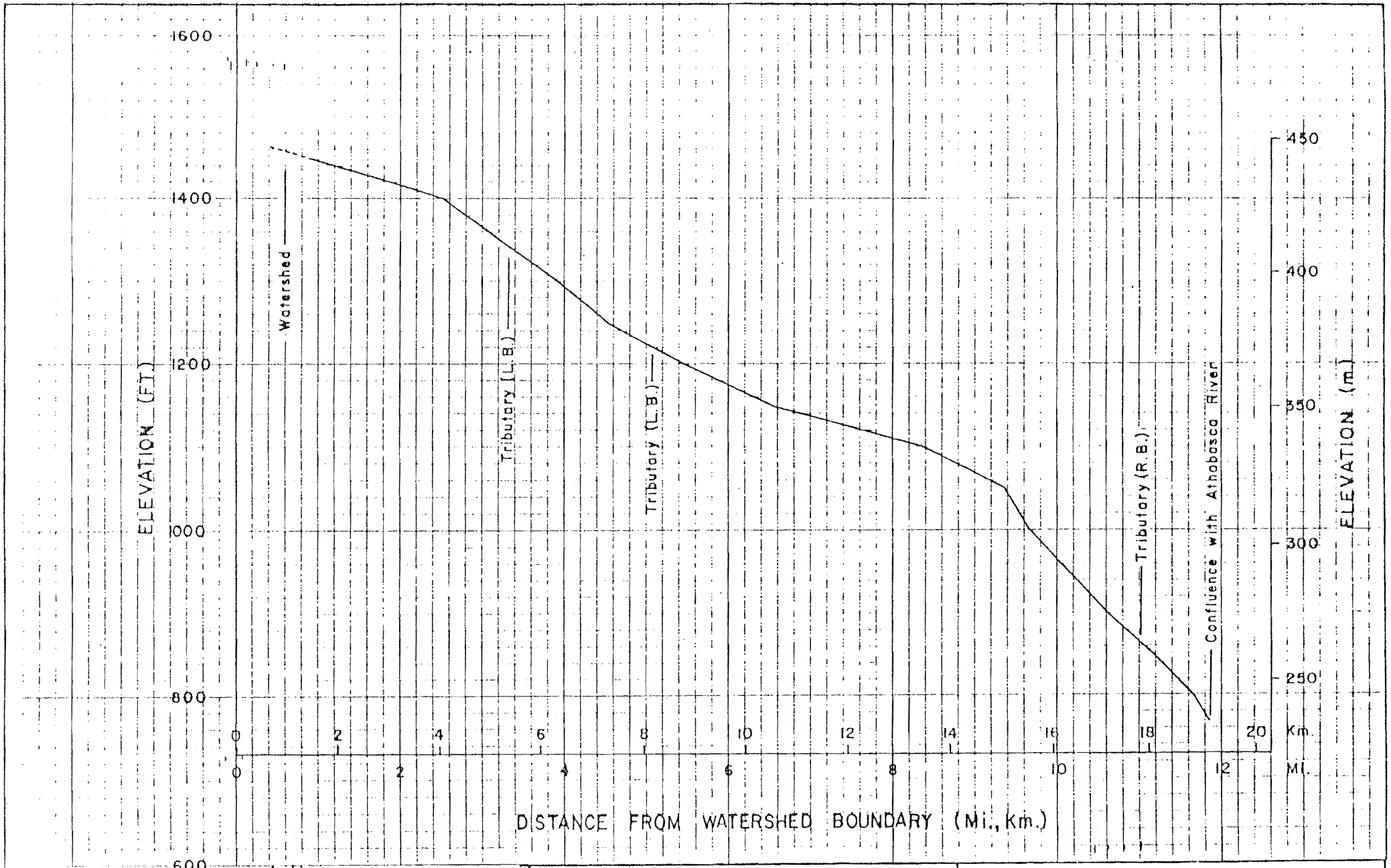

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7. AOSERP RESEARCH REPORTS

1.		AOSERP First Annual Report, 1975
2.	AF 4.1.1	Walleye and Goldeye Fisheries Investigations in the Peace-Athabasca Delta--1975
3.	HE 1.1.1	Structure of a Traditional Baseline Data System
4.	VE 2.2	A Preliminary Vegetation Survey of the Alberta Oil Sands Environmental Research Program Study Area
5.	HY 3.1	The Evaluation of Wastewaters from an Oil Sand Extraction Plant
6.		Housing for the North--The Stackwall System
7.	AF 3.1.1	A Synopsis of the Physical and Biological Limnology and Fisheries Programs whithin the Alberta Oil Sands Area
8.	AF 1.2.1	The Impact of Saline Waters upon Freshwater Biota (A Literature Review and Bibliography)
9.	ME 3.3	Preliminary Investigations into the Magnitude of Fog Occurrence and Associated Problems in the Oil Sands Area
10.	HE 2.1	Development of a Research Design Related to Archaeological Studies in the Athabasca Oil Sands Area
11.	AF 2.2.1	Life Cycles of Some Common Aquatic Insects of the Athabasca River, Alberta
12.	ME 1.7	Very High Resolution Meteorological Satellite Study of Oil Sands Weather: "A Feasibility Study"
13.	ME 2.3.1	Plume Dispersion Measurements from an Oil Sands Extraction Plant, March 1976
14.		
15.	ME 3.4	A Climatology of Low Level Air Trajectories in the Alberta Oil Sands Area
16.	ME 1.6	The Feasibility of a Weather Radar near Fort McMurray, Alberta
17.	AF 2.1.1	A Survey of Baseline Levels of Contaminants in Aquatic Biota of the AOSERP Study Area
18.	HY 1.1	Interim Compilation of Stream Gauging Data to December 1976 for the Alberta Oil Sands Environmental Research Program
19.	ME 4.1	Calculations of Annual Averaged Sulphur Dioxide Concentrations at Ground Level in the AOSERP Study Area
20.	HY 3.1.1	Characterization of Organic Constituents in Waters and Wastewaters of the Athabasca Oil Sands Mining Area
21.		AOSERP Second Annual Report, 1976-77
22.		Alberta Oil Sands Environmental Research Program Interim Report to 1978 covering the period April 1975 to November 1978
23.	AF 1.1.2	Acute Lethality of Mine Depressurization Water on Trout Perch and Rainbow Trout
24.	ME 1.5.2	Air System Winter Field Study in the AOSERP Study Area, February 1977.
25.	ME 3.5.1	Review of Pollutant Transformation Processes Relevant to the Alberta Oil Sands Area

26.	AF 4.5.1	Interim Report on an Intensive Study of the Fish Fauna of the Muskeg River Watershed of Northeastern Alberta
27.	ME 1.5.1	Meteorology and Air Quality Winter Field Study in the AOSERP Study Area, March 1976
28.	VE 2.1	Interim Report on a Soils Inventory in the Athabasca Oil Sands Area
29.	ME 2.2	An Inventory System for Atmospheric Emissions in the AOSERP Study Area
30.	ME 2.1	Ambient Air Quality in the AOSERP Study Area, 1977
31.	VE 2.3	Ecological Habitat Mapping of the AOSERP Study Area: Phase I
32.		AOSERP Third Annual Report, 1977-78
33.	TF 1.2	Relationships Between Habitats, Forages, and Carrying Capacity of Moose Range in northern Alberta. Part I: Moose Preferences for Habitat Strata and Forages.
34.	HY 2.4	Heavy Metals in Bottom Sediments of the Mainstem Athabasca River System in the AOSERP Study Area
35.	AF 4.9.1	The Effects of Sedimentation on the Aquatic Biota
36.	AF 4.8.1	Fall Fisheries Investigations in the Athabasca and Clearwater Rivers Upstream of Fort McMurray: Volume I
37.	HE 2.2.2	Community Studies: Fort McMurray, Anzac, Fort MacKay
38.	VE 7.1.1	Techniques for the Control of Small Mammals: A Review
39.	ME 1.0	The Climatology of the Alberta Oil Sands Environmental Research Program Study Area
40.	WS 3.3	Mixing Characteristics of the Athabasca River below Fort McMurray - Winter Conditions
41.	AF 3.5.1	Acute and Chronic Toxicity of Vanadium to Fish
42.	TF 1.1.4	Analysis of Fur Production Records for Registered Traplines in the AOSERP Study Area, 1970-75
43.	TF 6.1	A Socioeconomic Evaluation of the Recreational Fish and Wildlife Resources in Alberta, with Particular Reference to the AOSERP Study Area. Volume I: Summary and Conclusions
44.	VE 3.1	Interim Report on Symptomology and Threshold Levels of Air Pollutant Injury to Vegetation, 1975 to 1978
45.	VE 3.3	Interim Report on Physiology and Mechanisms of Air-Borne Pollutant Injury to Vegetation, 1975 to 1978
46.	VE 3.4	Interim Report on Ecological Benchmarking and Biomonitoring for Detection of Air-Borne Pollutant Effects on Vegetation and Soils, 1975 to 1978.
47.	TF 1.1.1	A Visibility Bias Model for Aerial Surveys for Moose on the AOSERP Study Area
48.	HG 1.1	Interim Report on a Hydrogeological Investigation of the Muskeg River Basin, Alberta
49.	WS 1.3.3	The Ecology of Macrobenthic Invertebrate Communities in Hartley Creek, Northeastern Alberta
50.	ME 3.6	Literature Review on Pollution Deposition Processes
51.	HY 1.3	Interim Compilation of 1976 Suspended Sediment Date in the AOSERP Study Area
52.	ME 2.3.2	Plume Dispersion Measurements from an Oil Sands Extraction Plan, June 1977

53.	HY 3.1.2	Baseline States of Organic Constituents in the Athabasca River System Upstream of Fort McMurray
54.	WS 2.3	A Preliminary Study of Chemical and Microbial Characteristics of the Athabasca River in the Athabasca Oil Sands Area of Northeastern Alberta
55.	HY 2.6	Microbial Populations in the Athabasca River
56.	AF 3.2.1	The Acute Toxicity of Saline Groundwater and of Vanadium to Fish and Aquatic Invertebrates
57.	LS 2.3.1	Ecological Habitat Mapping of the AOSERP Study Area (Supplement): Phase I
58.	AF 2.0.2	Interim Report on Ecological Studies on the Lower Trophic Levels of Muskeg Rivers Within the Alberta Oil Sands Environmental Research Program Study Area
59.	TF 3.1	Semi-Aquatic Mammals: Annotated Bibliography
60.	WS 1.1.1	Synthesis of Surface Water Hydrology
61.	AF 4.5.2	An Intensive Study of the Fish Fauna of the Steepbank River Watershed of Northeastern Alberta
62.	TF 5.1	Amphibians and Reptiles in the AOSERP Study Area
63.	ME 3.8.3	Analysis of AOSERP Plume Sigma Data
64.	LS 21.6.1	A Review of the Baseline Data Relevant to the Impacts of Oil Sands Development on Large Mammals in the AOSERP Study Area
65.	LS 21.6.2	A Review of the Baseline Data Relevant to the Impacts of Oil Sands Development on Black Bears in the AOSERP Study Area
66.	AS 4.3.2	An Assessment of the Models LIRAQ and ADPIC for Application to the Athabasca Oil Sands Area
67.	WS 1.3.2	Aquatic Biological Investigations of the Muskeg River Watershed
68.	AS 1.5.3 AS 3.5.2	Air System Summer Field Study in the AOSERP Study Area, June 1977
69.	HS 40.1	Native Employment Patterns in Alberta's Athabasca Oil Sands Region
70.	LS 28.1.2	An Interim Report on the Insectivorous Animals in the AOSERP Study Area
71.	HY 2.2	Lake Acidification Potential in the Alberta Oil Sands Environmental Research Program Study Area
72.	LS 7.1.2	The Ecology of Five Major Species of Small Mammals in the AOSERP Study Area: A Review
73.	LS 23.2	Distribution, Abundance and Habitat Associations of Beavers, Muskrats, Mink and River Otters in the AOSERP Study Area, Northeastern Alberta
74.	AS 4.5	Air Quality Modelling and User Needs
75.	WS 1.3.4	Interim Report on a Comparative Study of Benthic Algal Primary Productivity in the AOSERP Study Area
76.	AF 4.5.1	An Intensive Study of the Fish Fauna of the Muskeg River Watershed of Northeastern Alberta
77.	HS 20.1	Overview of Local Economic Development in the Athabasca Oil Sands Region Since 1961.
78.	LS 22.1.1	Habitat Relationships and Management of Terrestrial Birds in Northeastern Alberta

79.	AF 3.6.1	The Multiple Toxicity of Vanadium, Nickel, and Phenol to Fish.
80.	LS 22.3.1	Biology and Management of Peregrin Falcons (*Falco peregrinus anatum*) in Northeastern Alberta.
81.	LS 22.1.2	Species Distribution and Habitat Relationships of Waterfowl in Northeastern Alberta.
82.	LS 22.2	Breeding Distribution and Behaviour of the White Pelican in the Athabasca Oil Sands Area.
83.	LS 22.2	The Distribution, Foraging Behaviour, and Allied Activities of the White Pelican in the Athabasca Oil Sands Area.
84.	WS 1.6.1	Investigations of the Spring Spawning Fish Populations in the Athabasca and Clearwater Rivers Upstream from Fort McMurray; Volume I.
85.	HY 2.5	An intensive Surface Water Quality Study of the Muskeg River Watershed. Volume I: Water Chemistry.
86.	AS 3.7	An Observational Study of Fog in the AOSERP Study Area.
87.	WS 2.2	Hydrogeological Investigation of Muskeg River Basin, Alberta

These reports are not available upon request. For further information about availability and location of depositories, please contact:

Alberta Oil Sands Environmental Research Program
15th Floor, Oxbridge Place
9820 - 106 Street
Edmonton, Alberta
T5K 2J6