UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CONTOUR MAPS OF ANALYTICAL RESULTS FOR STREAM SEDIMENTS AND PANNED CONCENTRATES FROM STREAM SEDIMENTS, AND PLOTS OF THE MINERALOGY OF THE NONMAGNETIC, HEAVY-MINERAL CONCENTRATES FROM STREAM SEDIMENTS FROM THE GLACIER PEAK WILDERNESS STUDY AREA, WASHINGTON

By

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.

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STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geochemical survey of the Glacier Peak Wilderness and adjacent areas in the Mt. Baker-Snoqualmie, and Wenatchee National Forests, Chelan, Skagit, and Snohomish Counties, Washington. The Glacier Peak Wilderness (Forest Service number NF031) and adjacent areas (06031) were classified as proposed wilderness during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

INTRODUCTION

Analytical data and statistical summaries of the results from a stream sediment reconnaissance sampling program of the Glacier Peak Wilderness study area are given in two previous reports (Church and others, 1982a, 1982b). Analytical methods, detailed sample locality maps, and mineralogical data from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments are also summarized in these reports. Presented in this report are single-element contour maps of D.C.-arc emission spectrographic data and plots of the mineralogy of the nonmagnetic, heavy-mineral fraction of the panned concentrates from stream sediments. Presented in another report are the analytical results from an aqua-regia leach/Inductively Coupled Plasma (ICP) analysis of the stream sediment media and single-element contour plots of the leach data from the Glacier Peak study area (Church and others, 1983). An index map of the study area is shown in figure 1.

In figure 2, areas of known mineralization are shown schematically by hachured patterns. Geochemical signatures of these deposits and the deposit types are summarized in table 1. The base map and stream drainage base were compiled from the Concrete and Wenatchee 1:250,000 topographic maps. The density of the stream-sediment sampling of the study area is shown in figure 3.

Maps of the data presented in this report are grouped by sample type. Figures 4-13 present single-element plots of the D.C.-arc emission spectrometric (OES) results (Church and others, 1982a,b) from the minus-80-mesh stream-sediment medium. The density of the streams sampled for the panned-concentrate medium is shown in figure 14. Localities for which mineralogical identifications of the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments have been made are shown in figure 27. Contour maps of single-element data from panned concentrates from stream sediments are shown in figures 15 through 26, and plots of the mineralogical data are presented in figures 28 through 34.

Isopleths on all the maps were chosen to show the highs of the geochemical landscape, and are summarized in the figure captions. Comparisons of the isopleth values for the stream sediments and the panned concentrates from stream sediments can be made by comparison with the histograms given in Church and others, (1982b, table 6, p. 163-188 and table 9, p. 195-223).

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Grant, A. R., 1982, Summary of economic geology data for the Glacier Peak Wilderness, Chelan, Snohomish, and Skagit Counties, Washington: U.S. Geological Survey Open-File Report 82-408, 43 p.

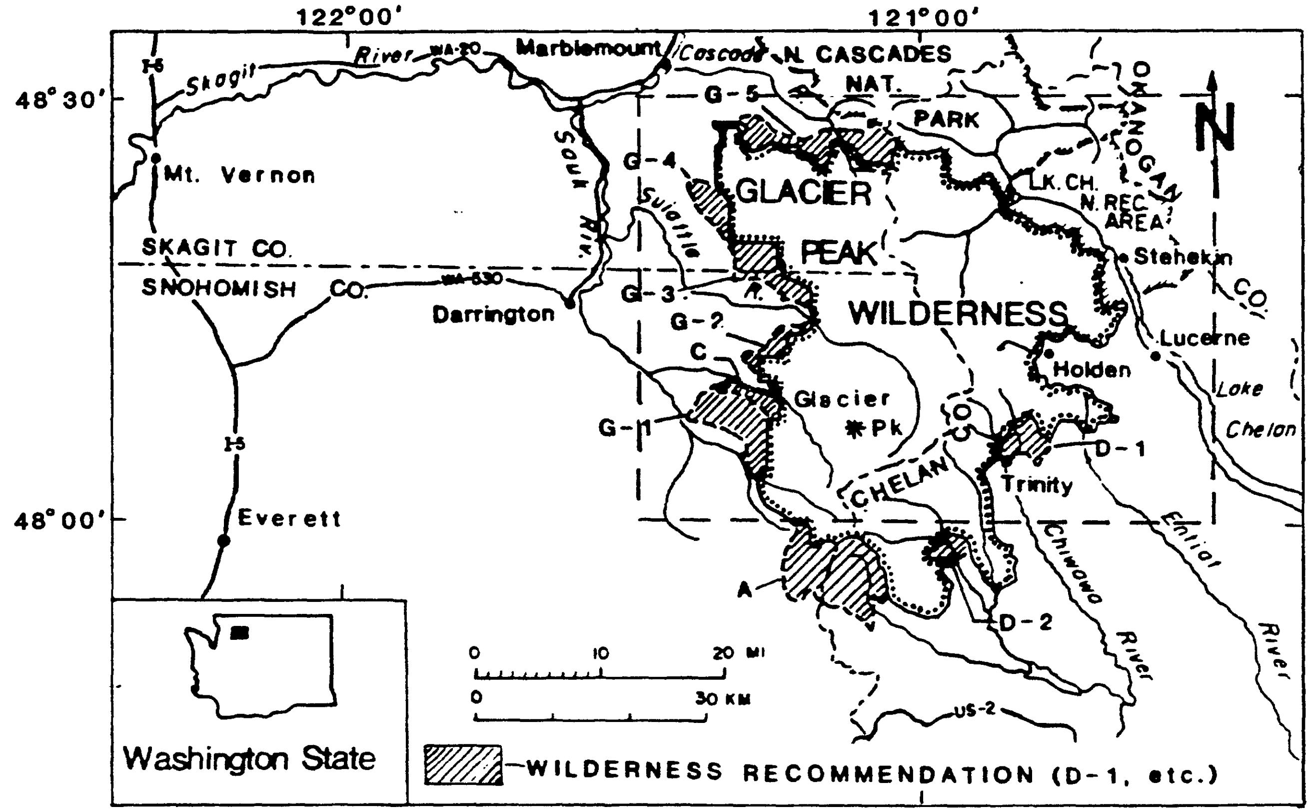


Figure 1. Index map showing the location of the Glacier Peak study area, Washington. Wilderness boundaries are indicated along with proposed wilderness additions. The actual boundaries of the study area extend south of the boundaries shown because of administrative changes in proposed wilderness additions.

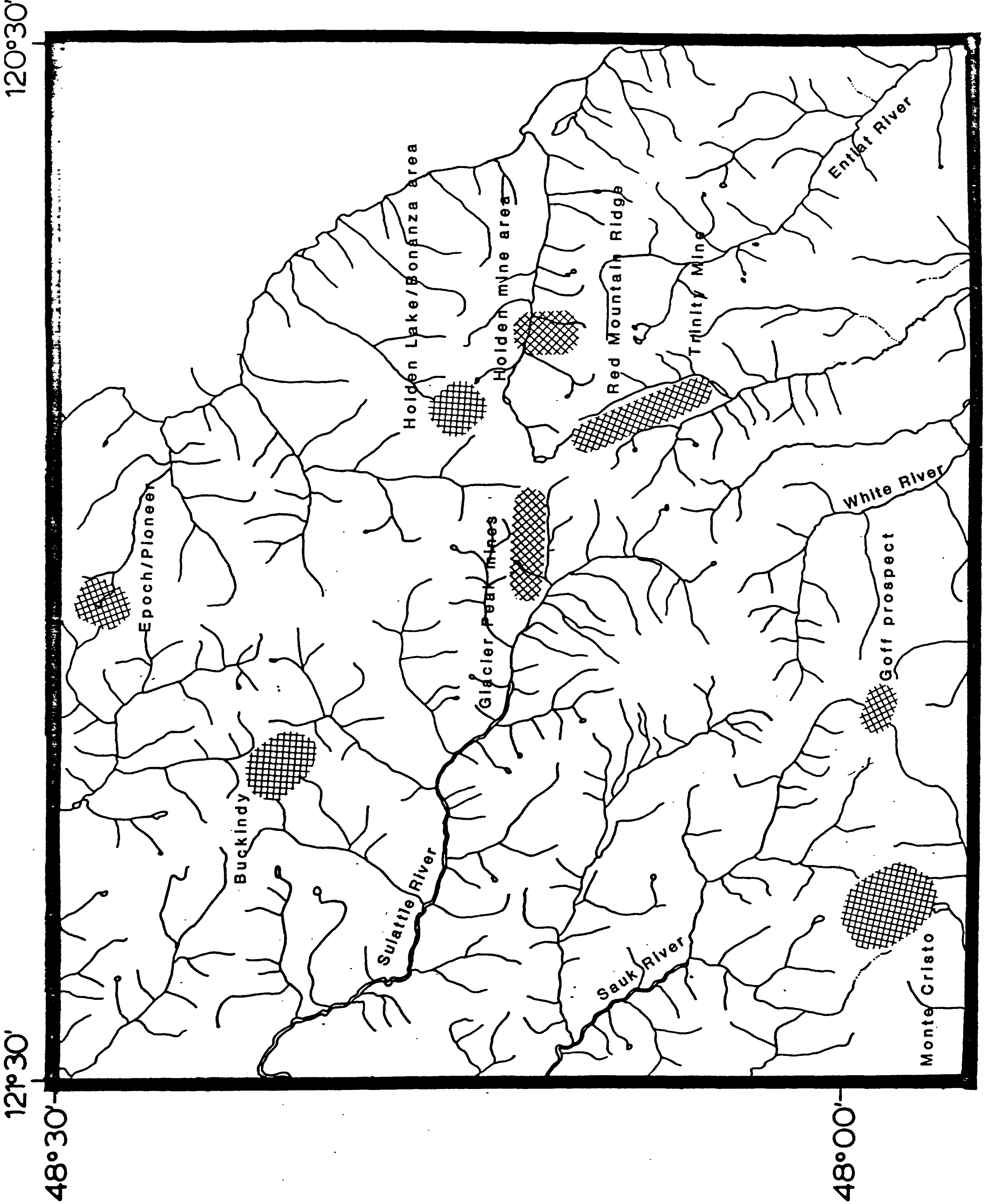


Figure 2. Stream drainage base of the Glacier Peak study area showing locations of major mineralized areas (hachured). Additional data on deposit types and geochemical anomalies are given in table 1.

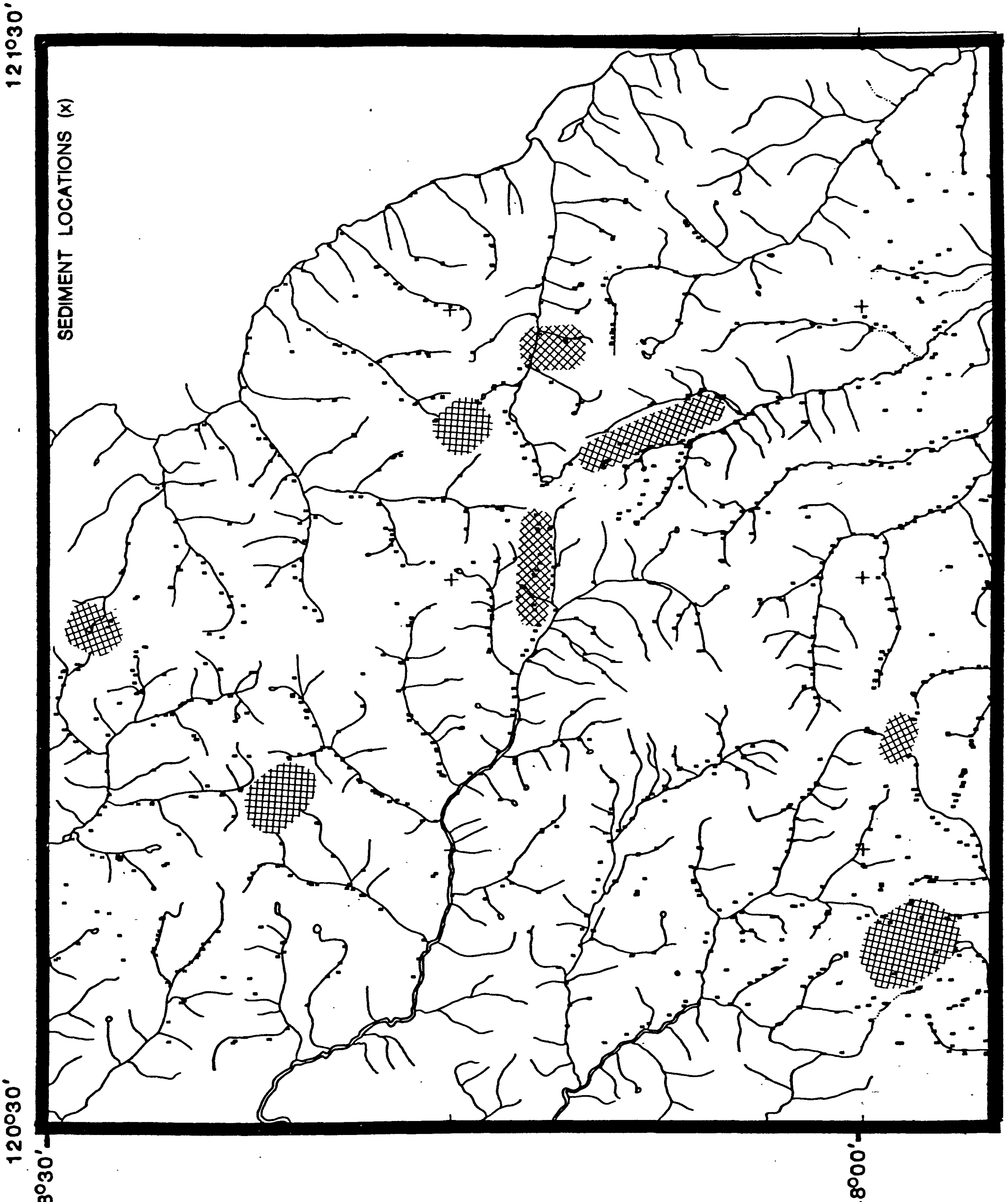


Figure 3. Localities of stream-sediment samples analyzed by D.C.-arc emission spectrometry (Church and others, 1982a, 1982b).

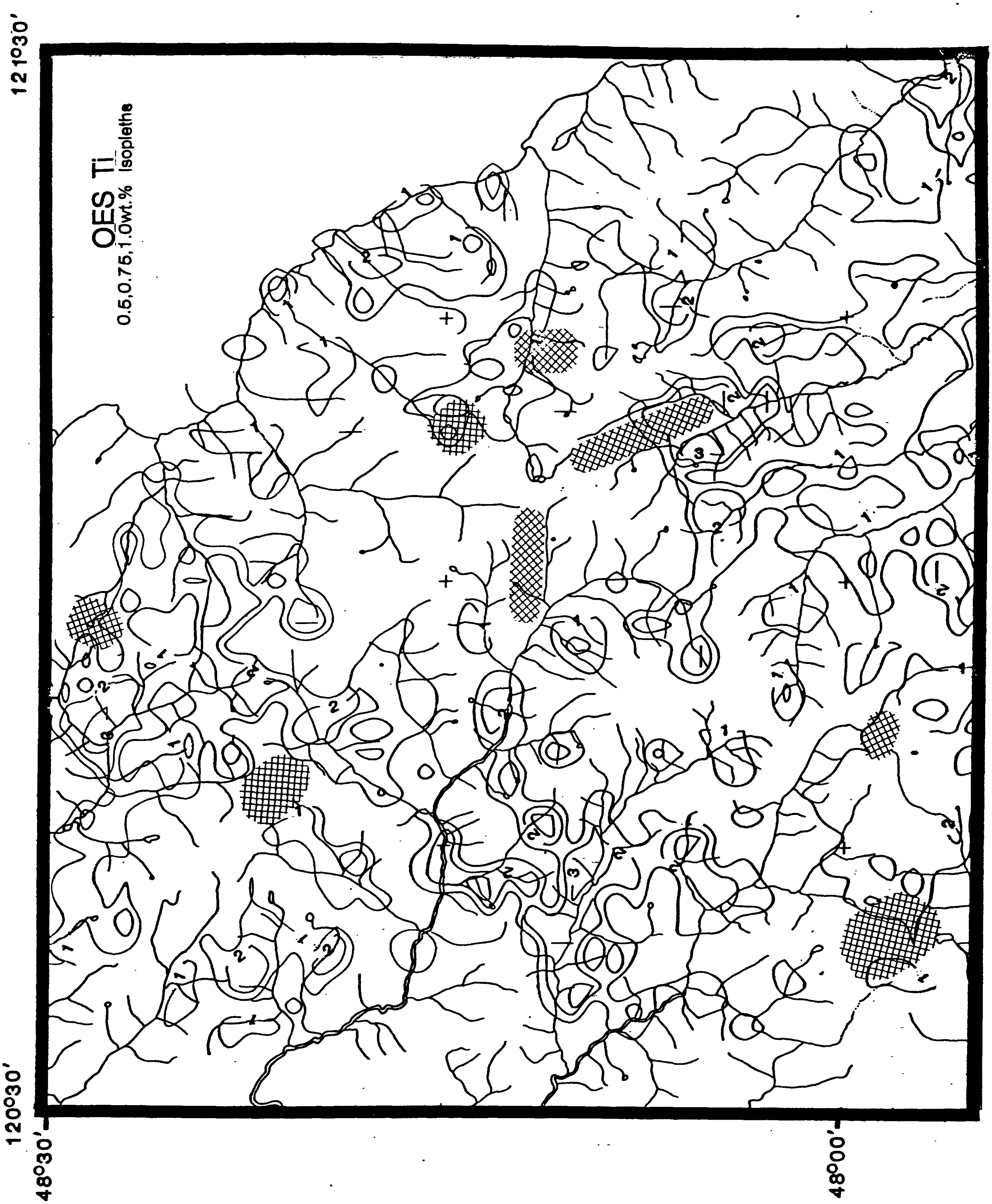


Figure 4. Plot of D.C.-arc emission spectrometric data for titanium (Ti) from stream sediments. Isopeths were chosen to approximate the 50th (1 = 0.5 wt. percent), 75th (2 = 0.75 wt. percent), and the 90th (3 = 1.0 wt. percent) percentiles.

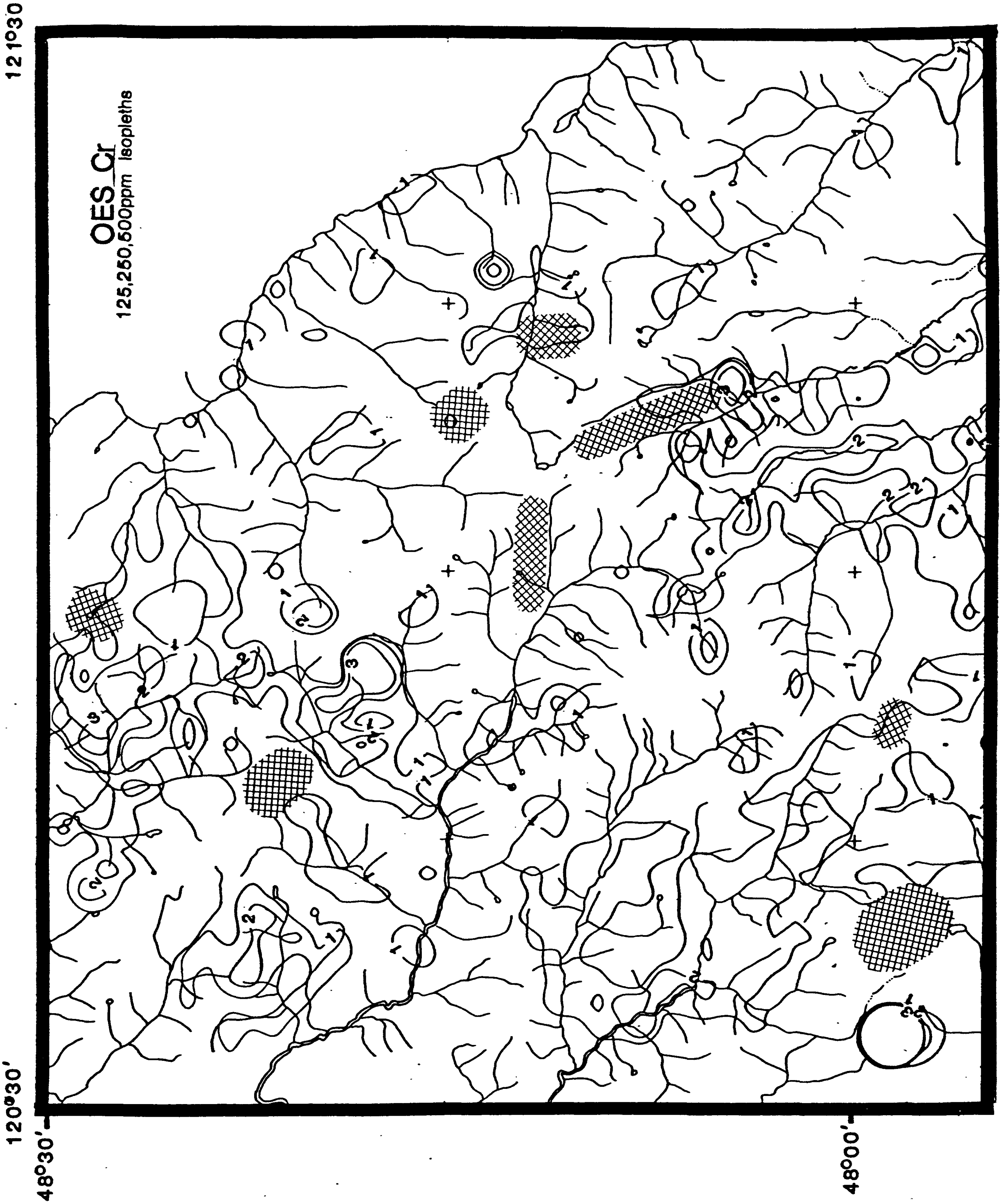


Figure 5. Plot of D.C.-arc emission spectrometric data for chromium (Cr) from stream sediments. Isopleths were chosen to approximate the 60th (1 = 125 ppm), 90th (2 = 250 ppm), and 97th (3 = 500 ppm) percentiles.

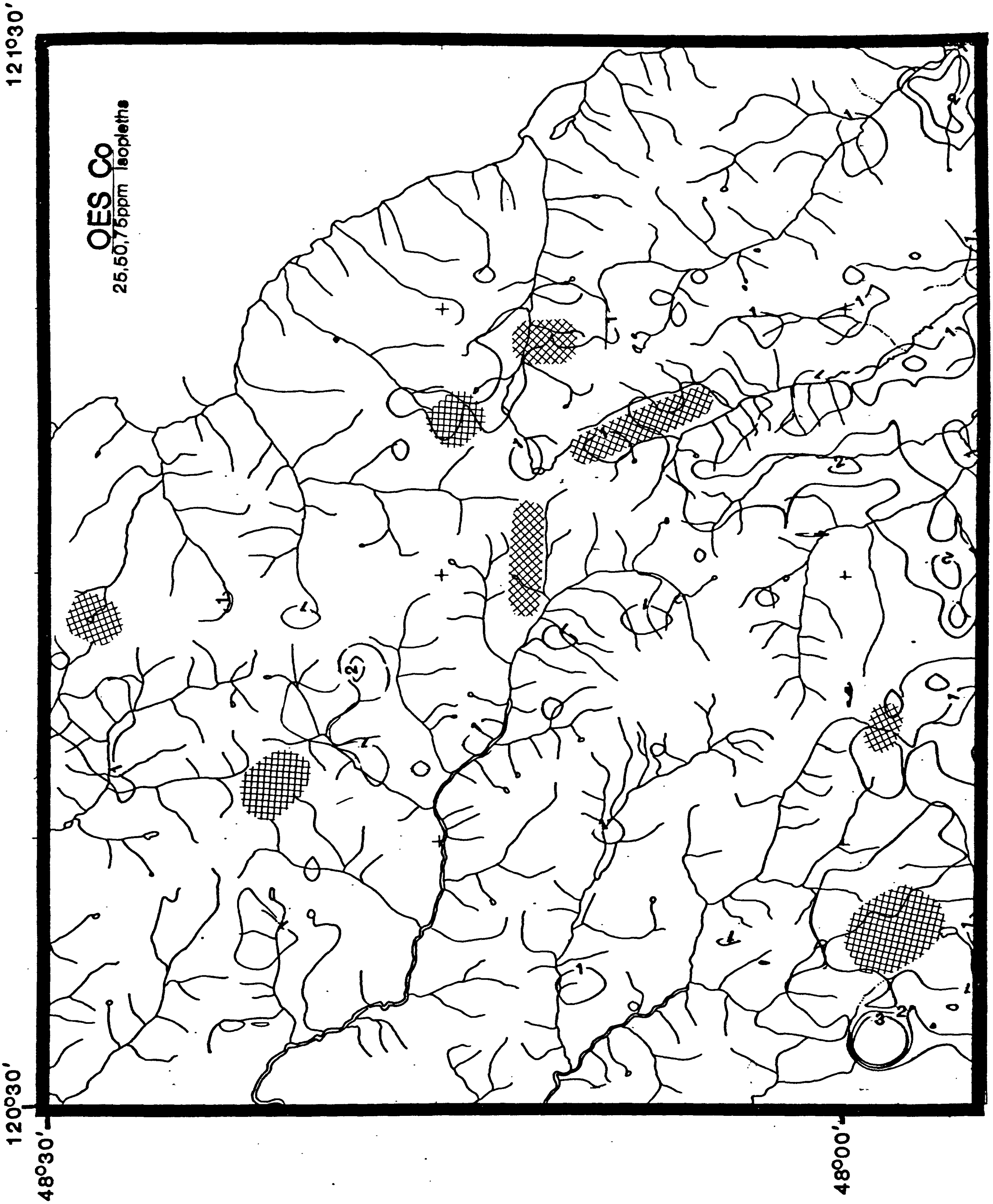


Figure 6. Plot of D.C.–arc emission spectrometric data for cobalt (Co) from stream sediments. Isopleths were chosen to approximate the 60th (1 = 25 ppm), 95th (2 = 50 ppm), and 99th (3 = 75 ppm) percentiles.

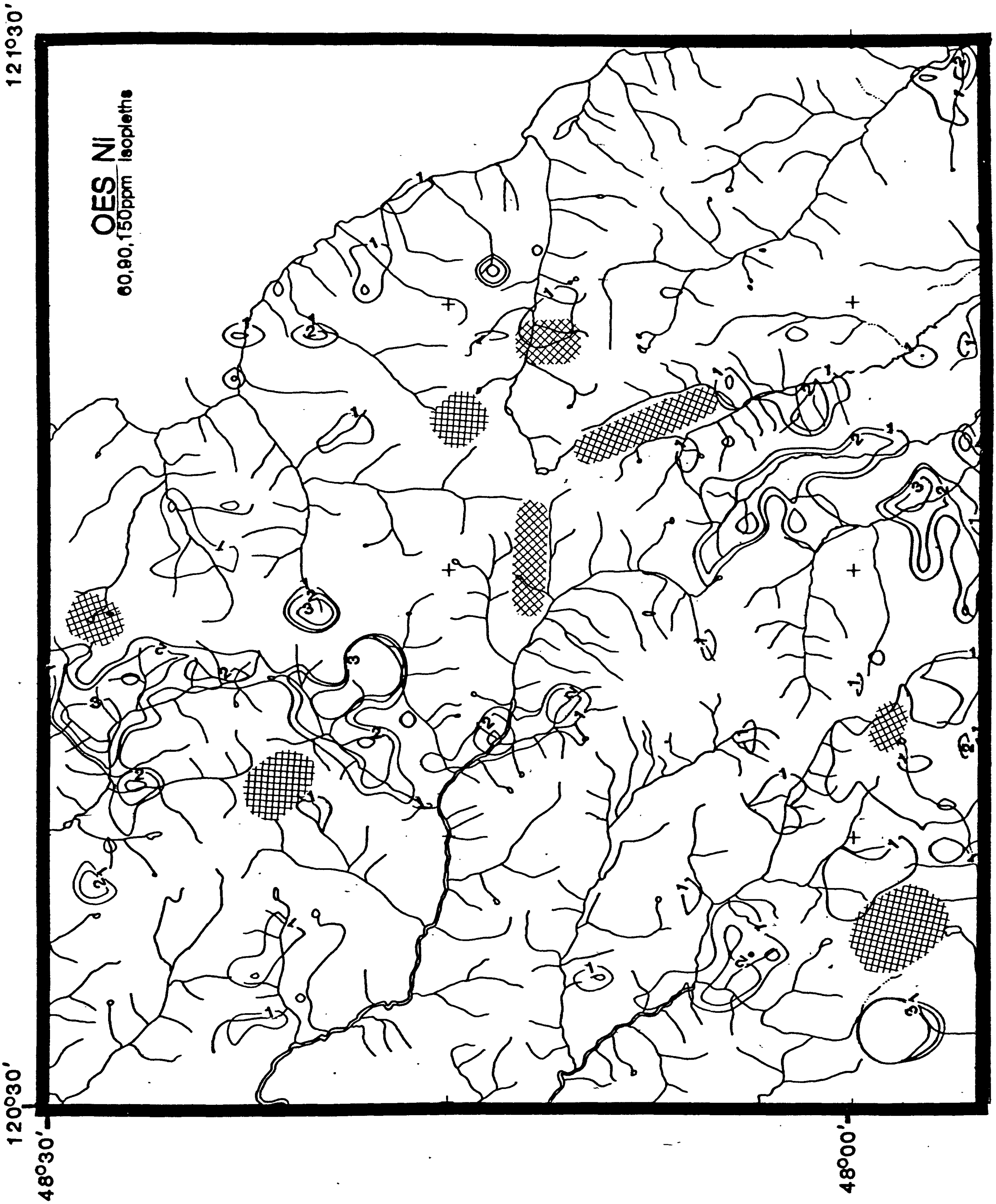


Figure 7. Plot of D.C.–arc emission spectrometric data for nickel (Ni) from stream sediments. Isopleths were chosen to approximate the 60th (1 = 60 ppm), 90th (2 = 90 ppm), and 95th (3 = 150 ppm) percentiles.

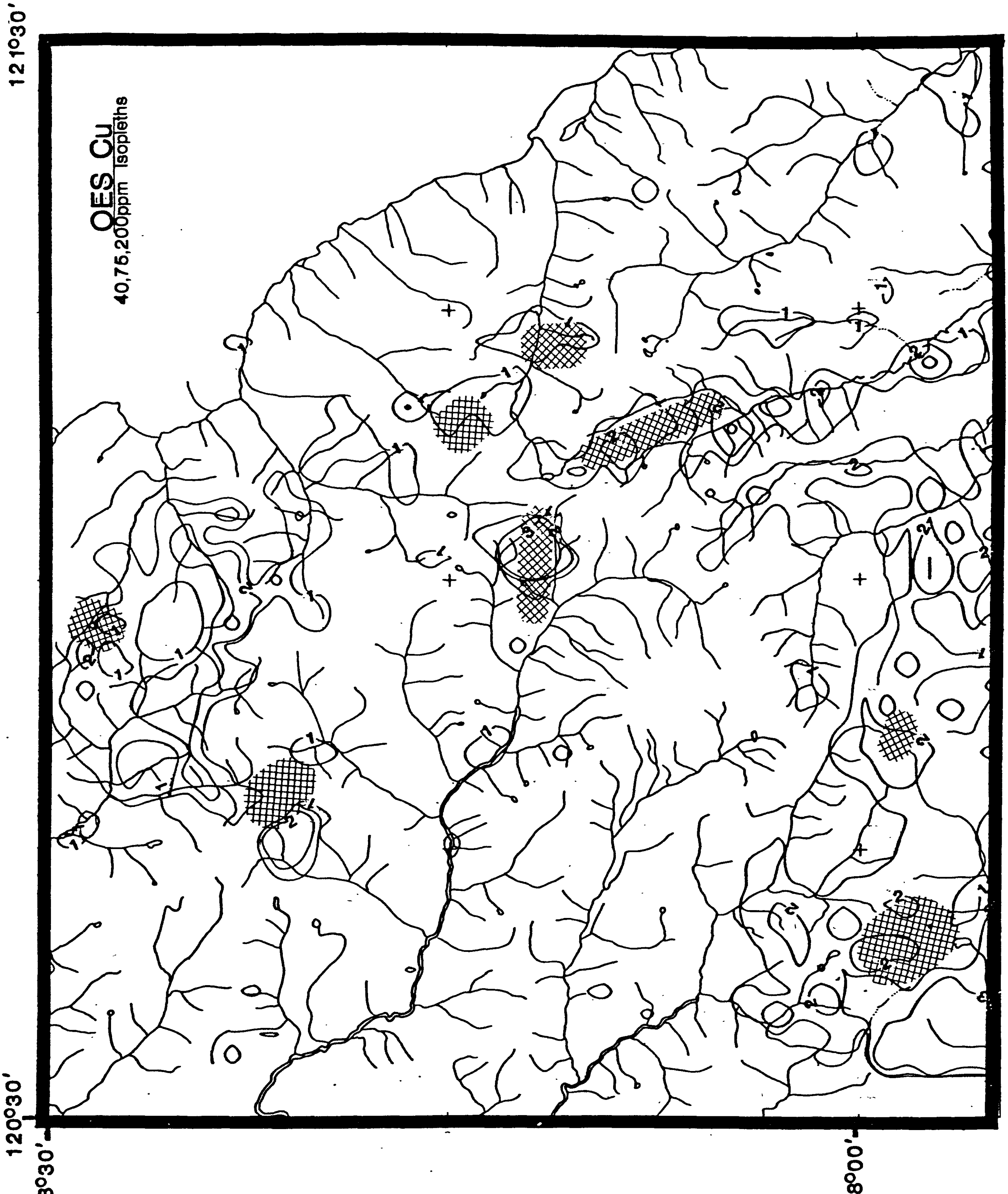


Figure 8. Plot of D.C.-arc emission spectrometric data for copper (Cu) from stream sediments. Isopleths were chosen to approximate the 60th (1 = 40 ppm), 85th (2 = 75 ppm), and 97th (3 = 200 ppm) percentiles.

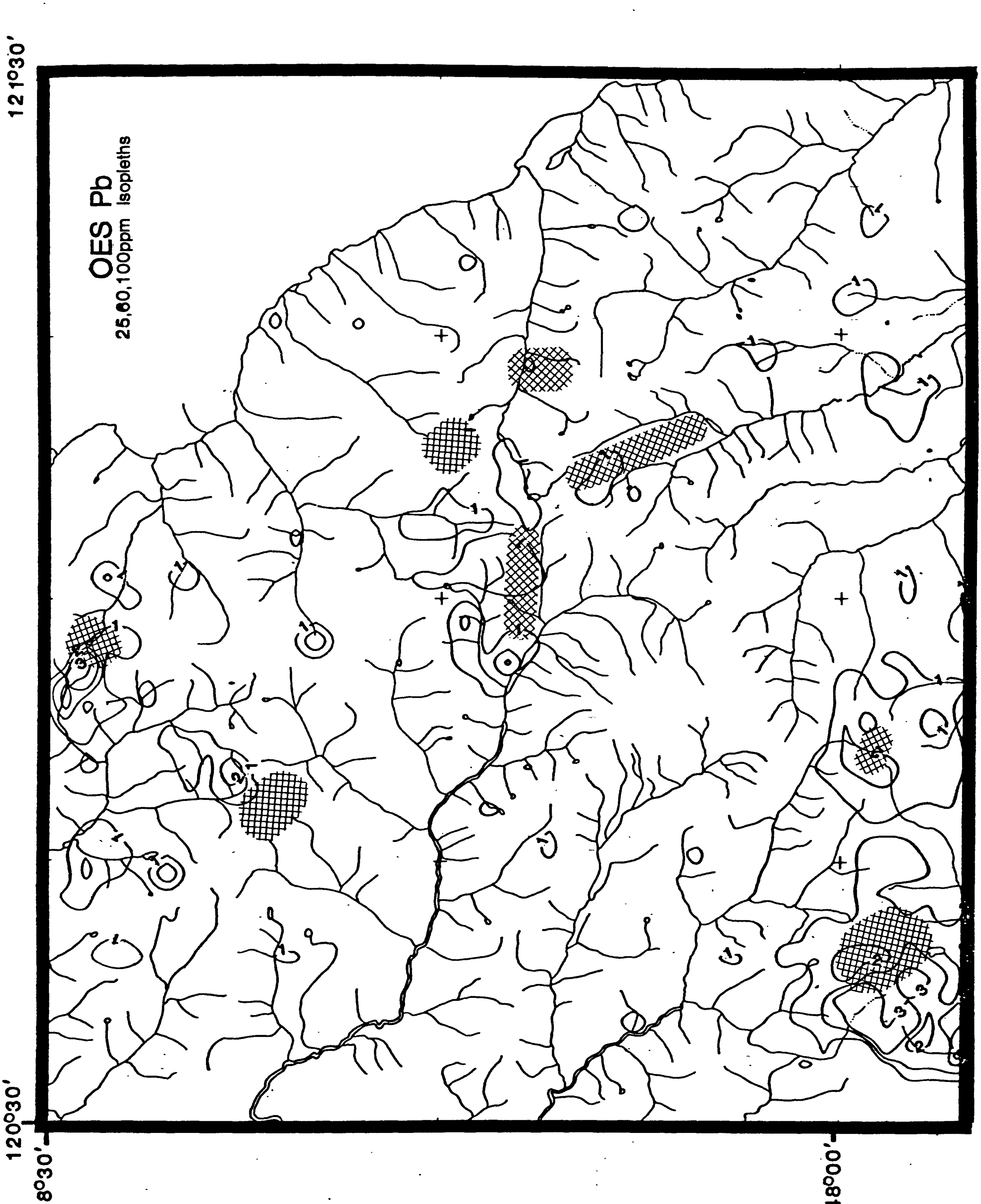


Figure 9. Plot of D.C.-arc emission spectrometric data for lead (Pb) from stream sediments. Isopleths were chosen to approximate the 75th (1 = 20 ppm), 90th (2 = 60 ppm), and 98th (3 = 100 ppm) percentiles.

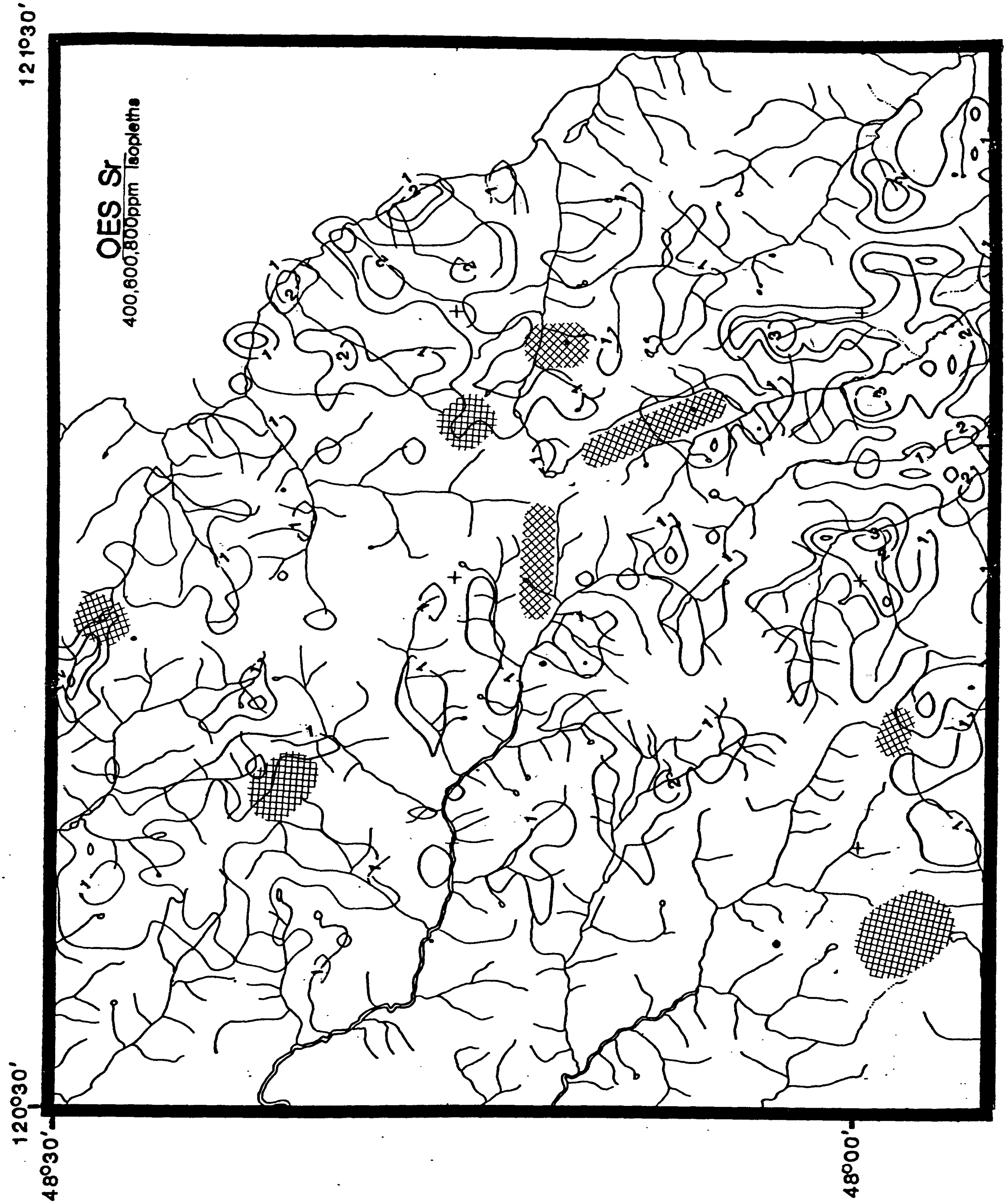
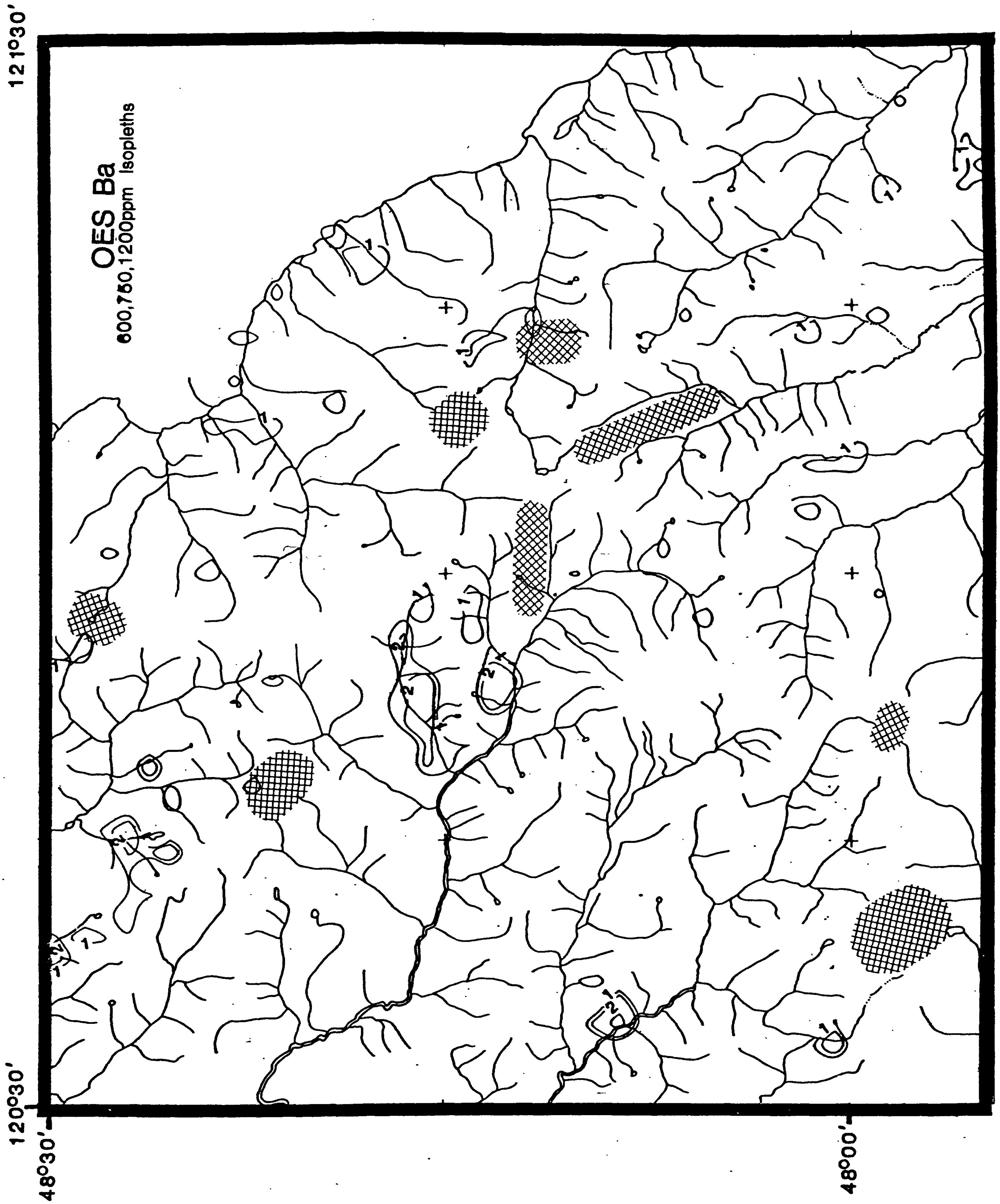


Figure 10. Plot of D.C.–arc emission spectrometric data for strontium (Sr) from stream sediments. Isopleths were chosen to approximate the 60th (1 = 400 ppm), 90th (2 = 600 ppm), and 97th (3 = 800 ppm) percentiles.



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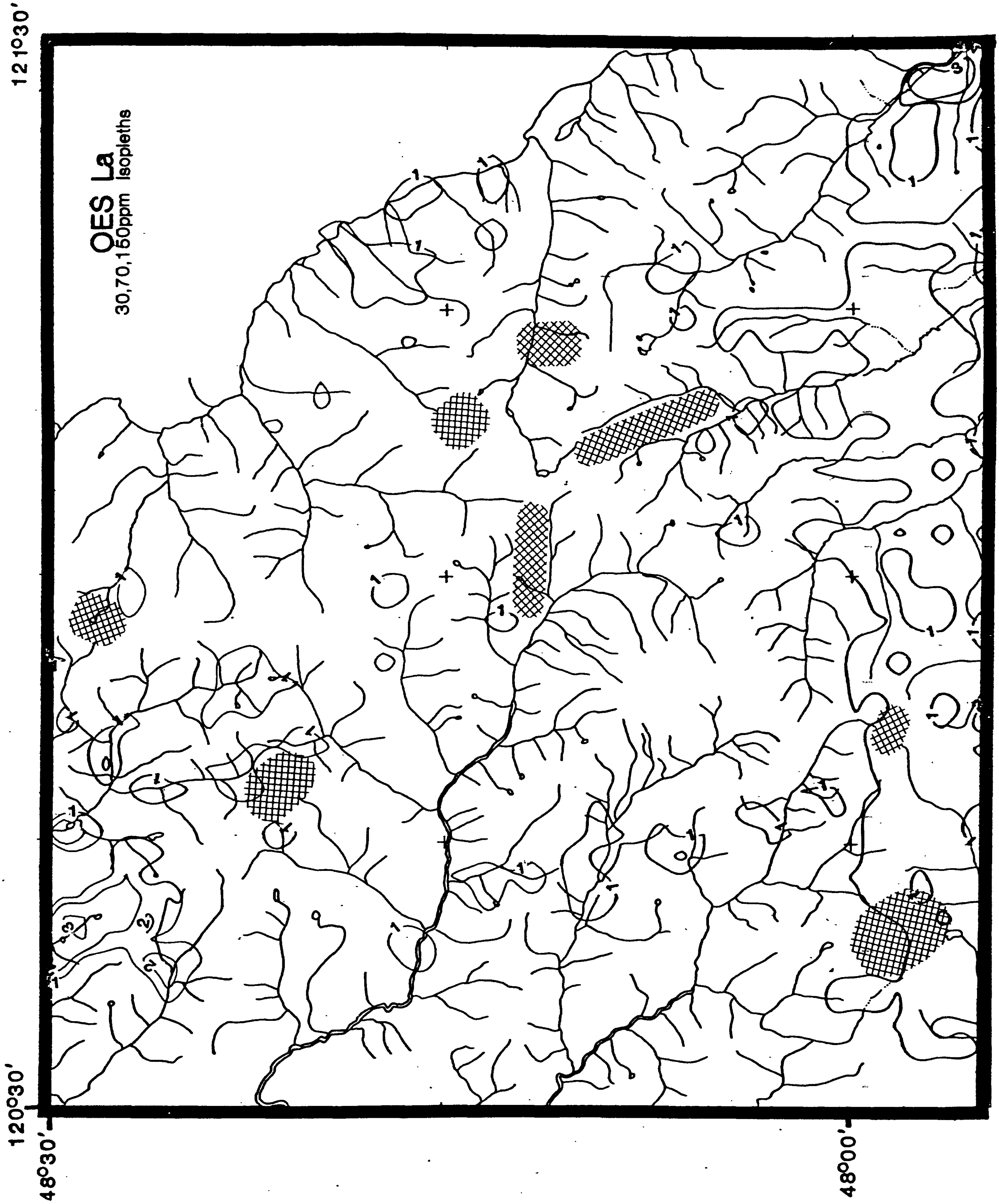

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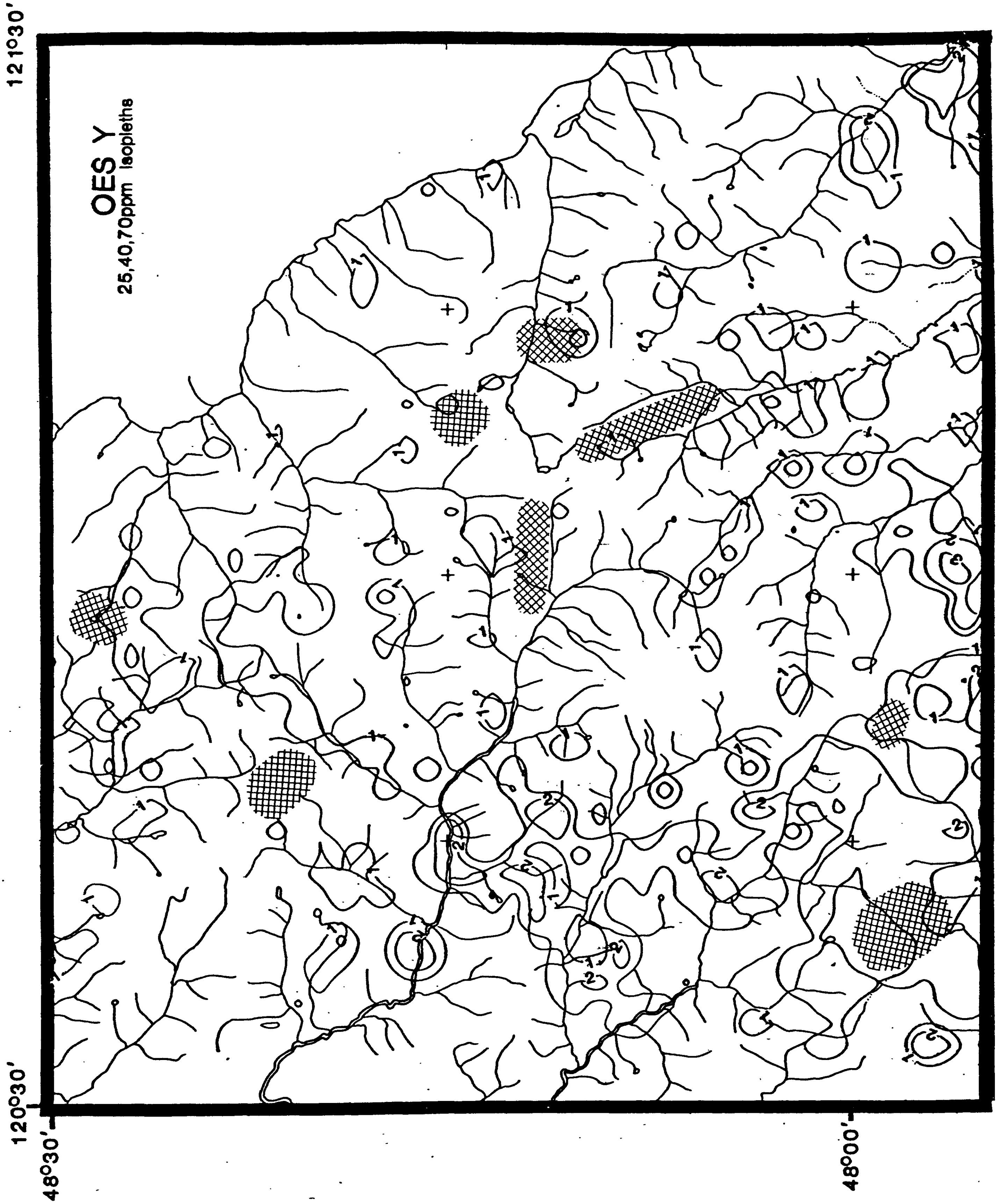

Figure 13. Plot of D.C.-arc emission spectrometric data for yttrium (Y) from stream sediments. Isopleths were chosen to approximate the 60th (1 = 25 ppm), 90th (2 = 40 ppm), and 97th (3 = 70 ppm) percentiles.

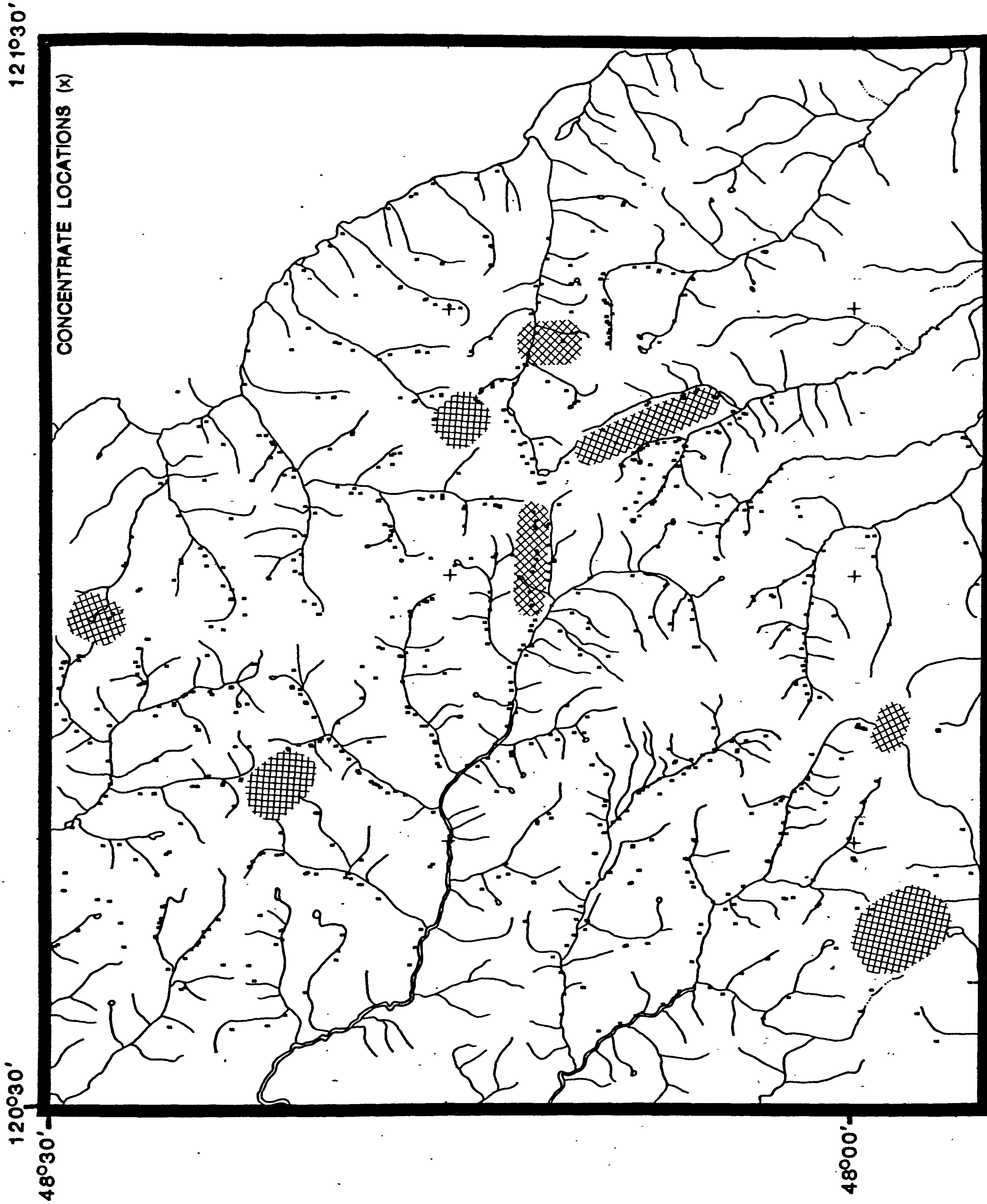

Figure 14. Localities of panned concentrates from stream-sediment samples analyzed by D.C.-arc emission spectrometry (Church and others, 1982a, 1982b).

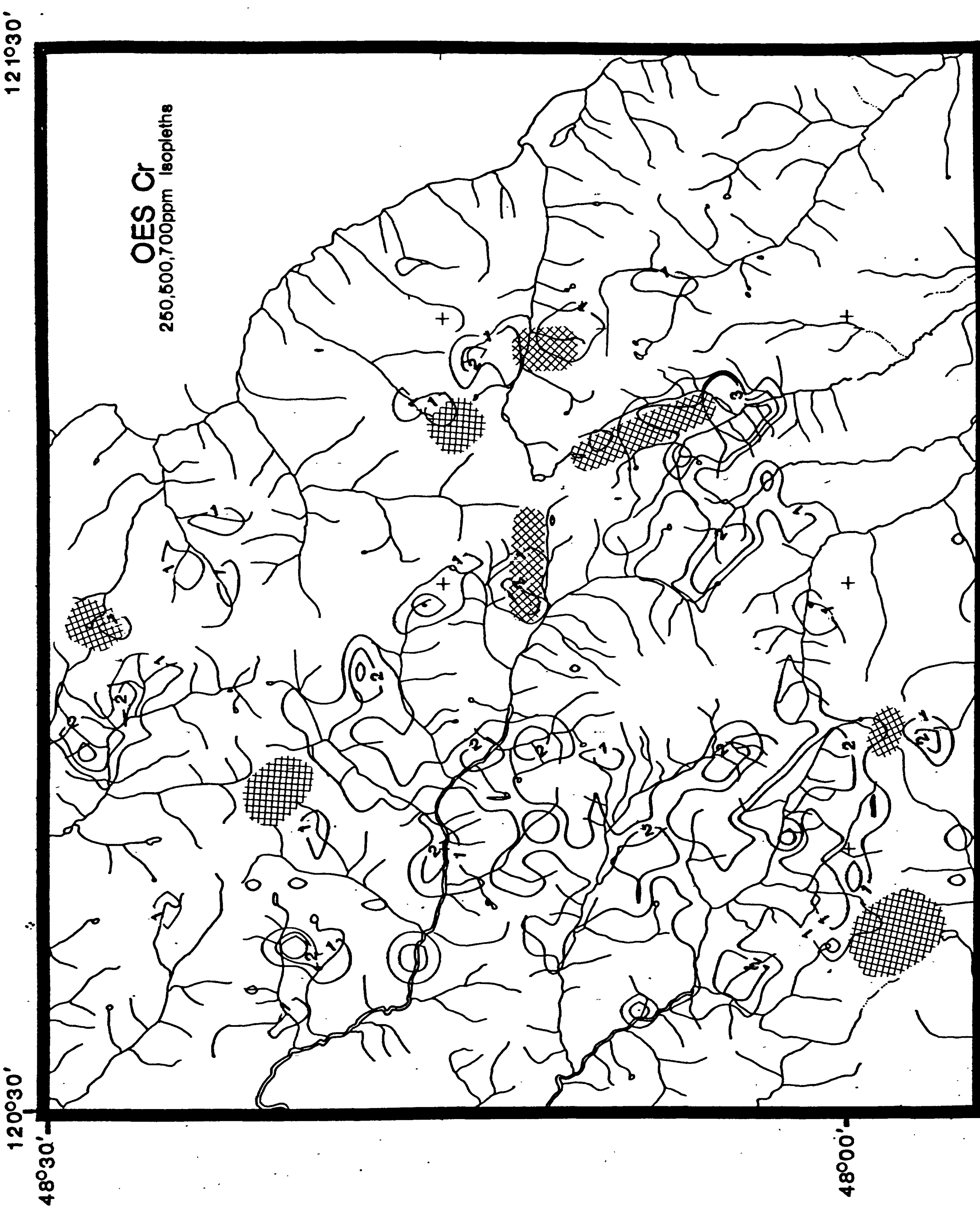

Figure 15. Plot of D.C.-arc emission spectrometric data for chromium (Cr) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 60th (1 = 250 ppm), 85th (2 = 500 ppm), and 95th (3 = 700 ppm) percentiles.

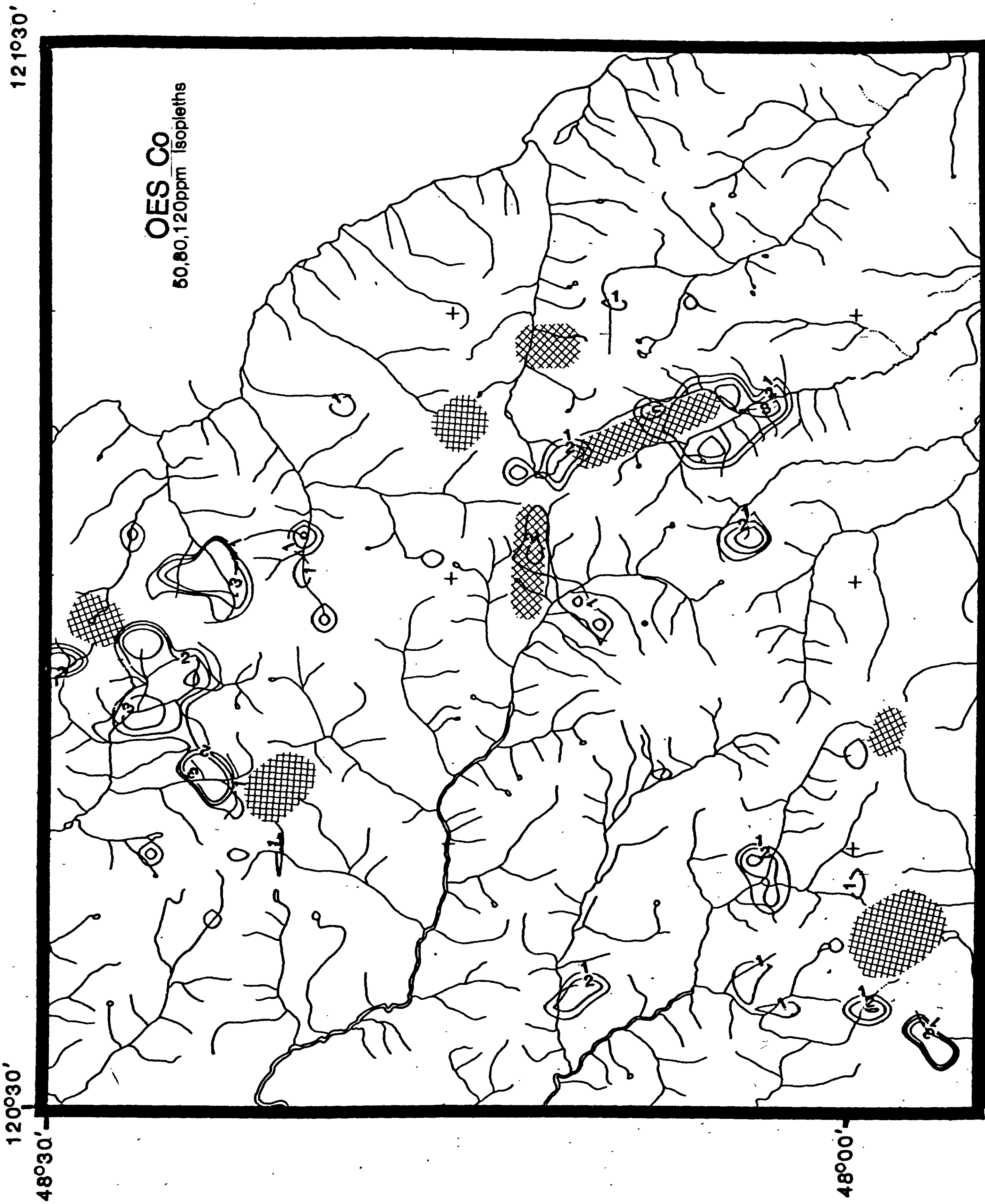

Figure 16. Plot of D.C.–arc emission spectrometric data for cobalt (Co) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 80th (1 = 50 ppm), 92th (2 = 80 ppm), and 97th (3 = 150 ppm) percentiles.

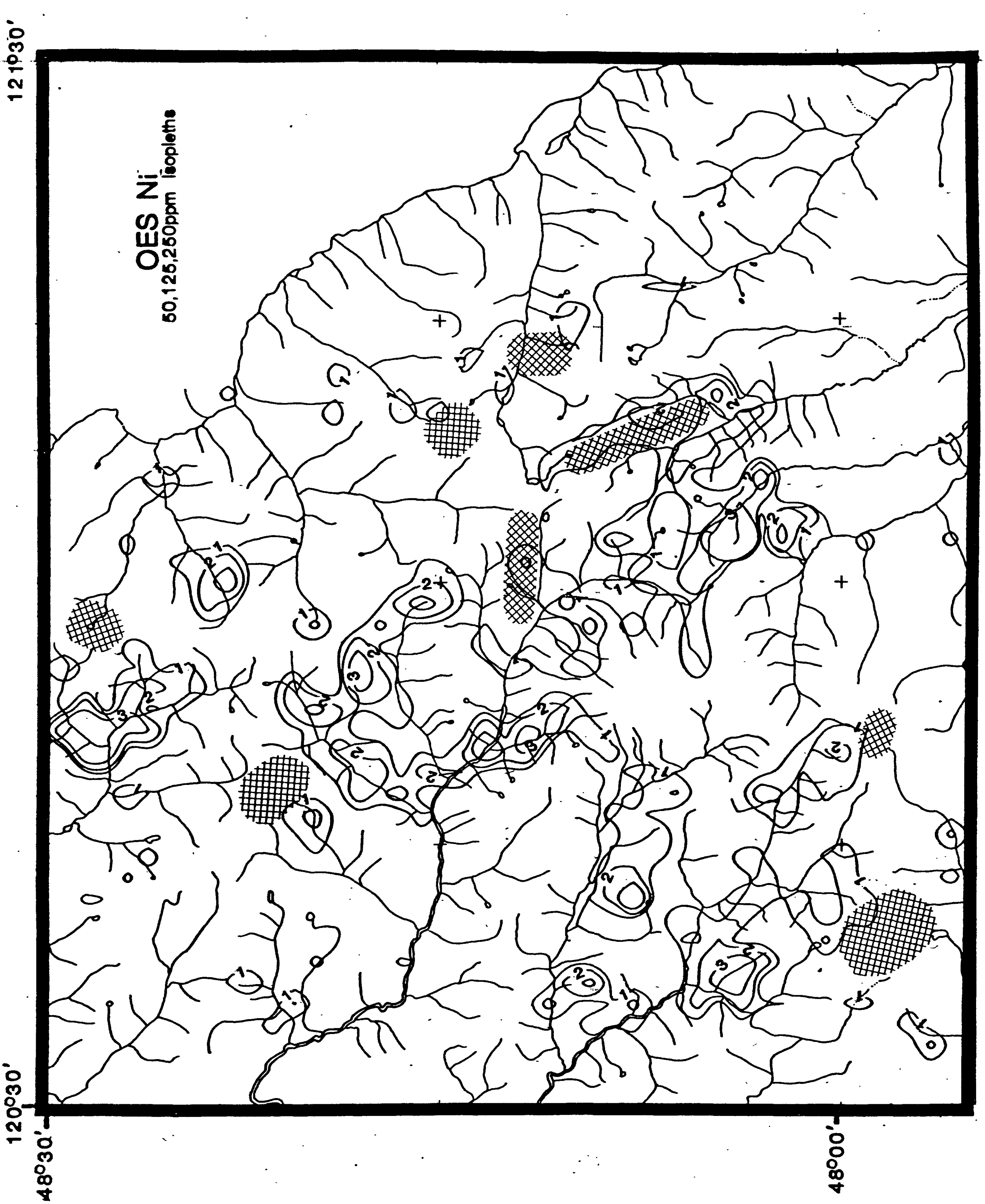

Figure 17. Plot of D.C.-arc emission spectrometric data for nickel (Ni) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 60th (1 = 50 ppm), 90th (2 = 125 ppm), and 97th (3 = 250 ppm) percentiles.

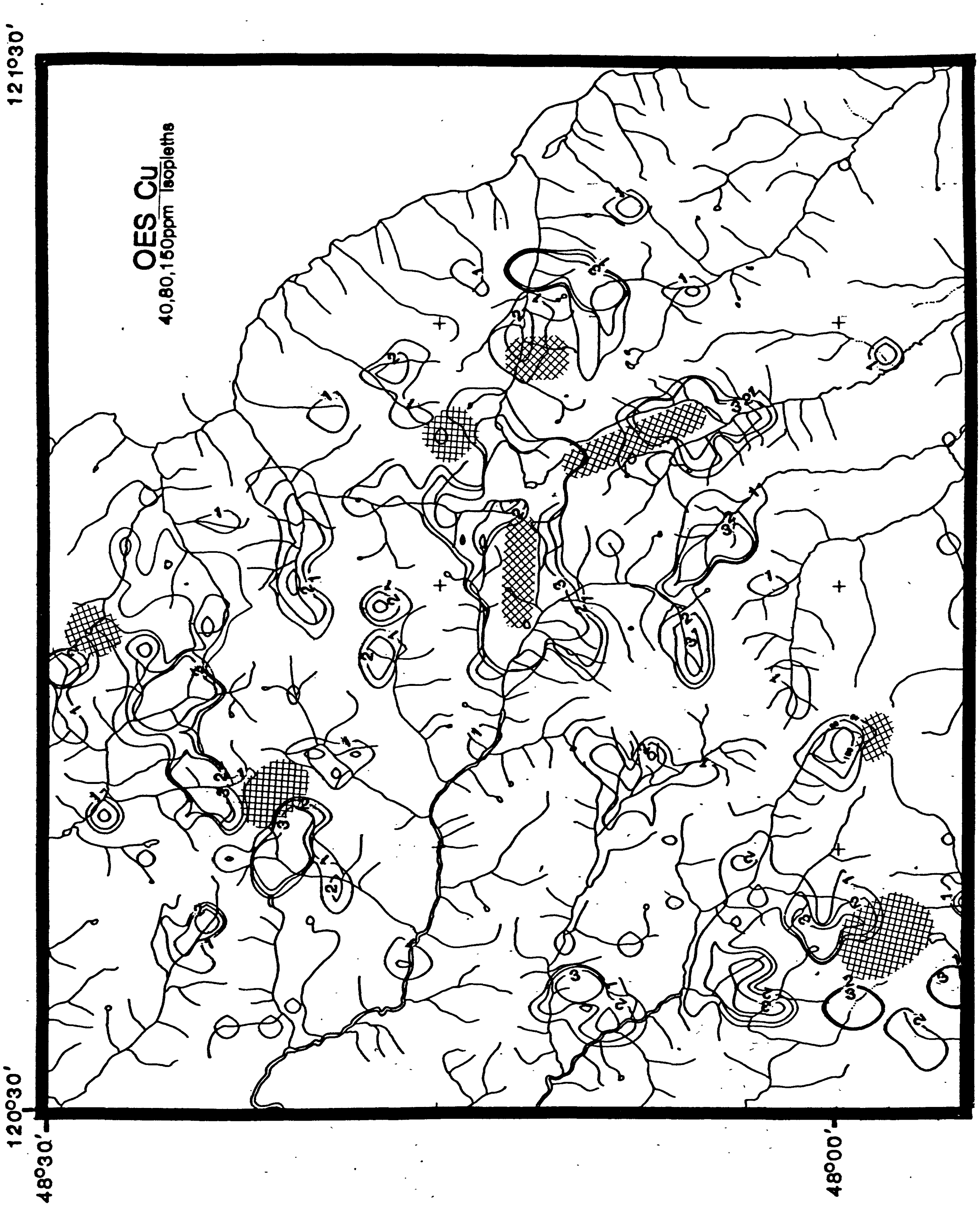

Figure 18. Plot of D.C.-arc emission spectrometric data for copper (Cu) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 60th (1 = 40 ppm), 75th (2 = 80 ppm), and 90th (3 = 150 ppm) percentiles.

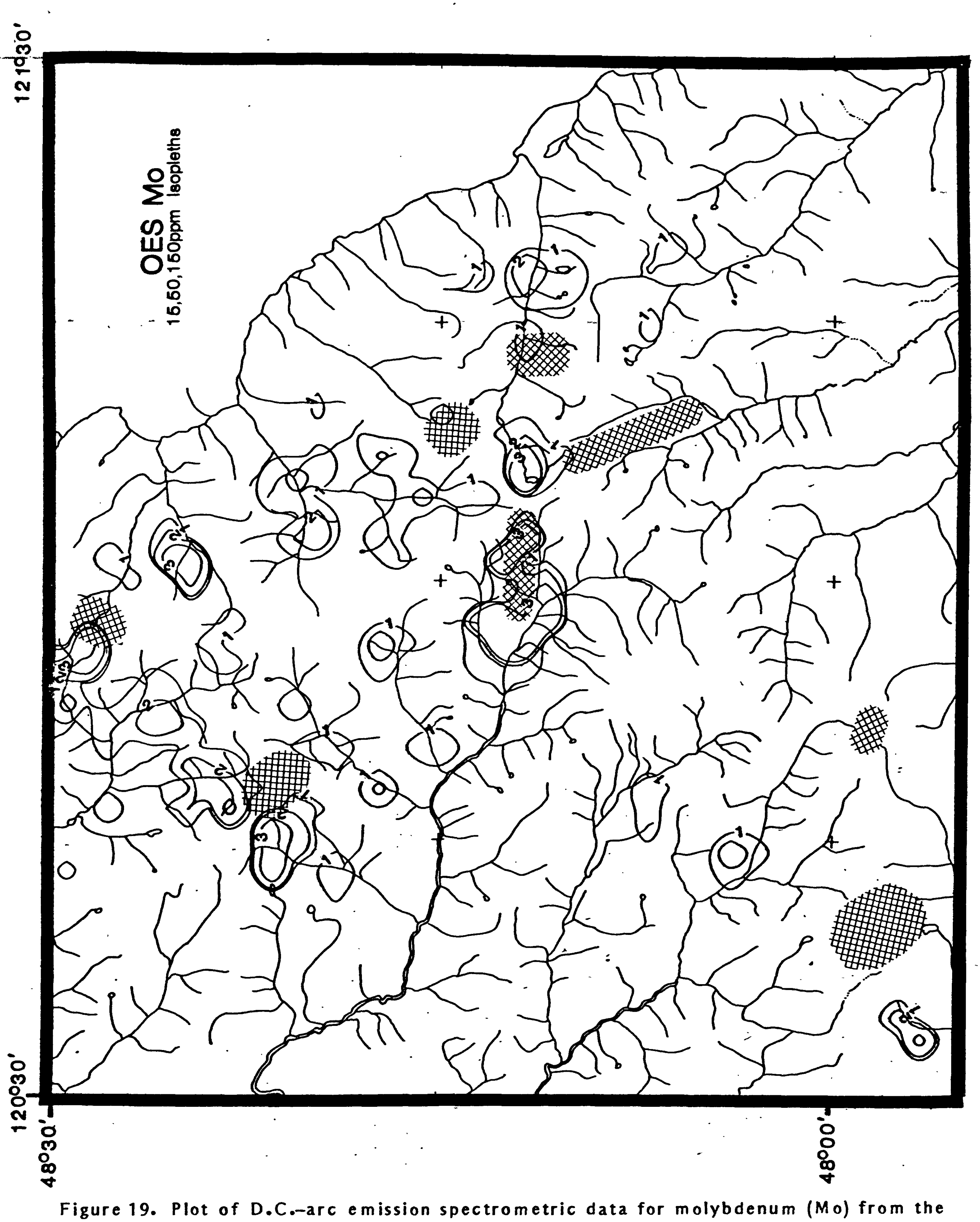

Figure 19. Plot of D.C.–arc emission spectrometric data for molybdenum (Mo) from the nonmagnetic, heavy–mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 85th (1 = 15 ppm), 92th (2 = 50 ppm), and 98th (3 = 150 ppm) percentiles.

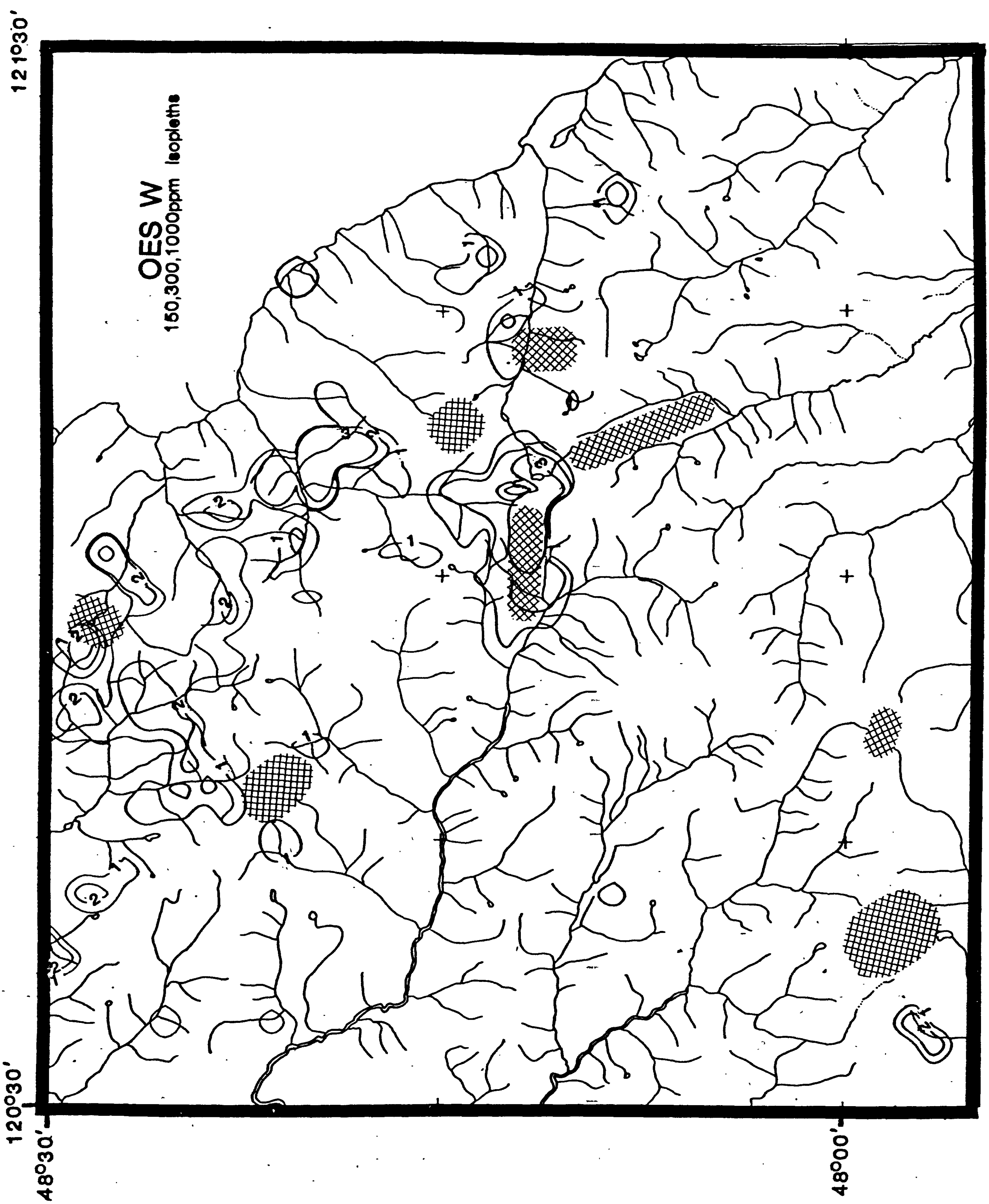

Figure 20. Plot of D.C.-arc emission spectrometric data for tungsten (W) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 85th (1 = 150 ppm), 92th (2 = 300 ppm), and 97th (3 = 1,000 ppm) percentiles.

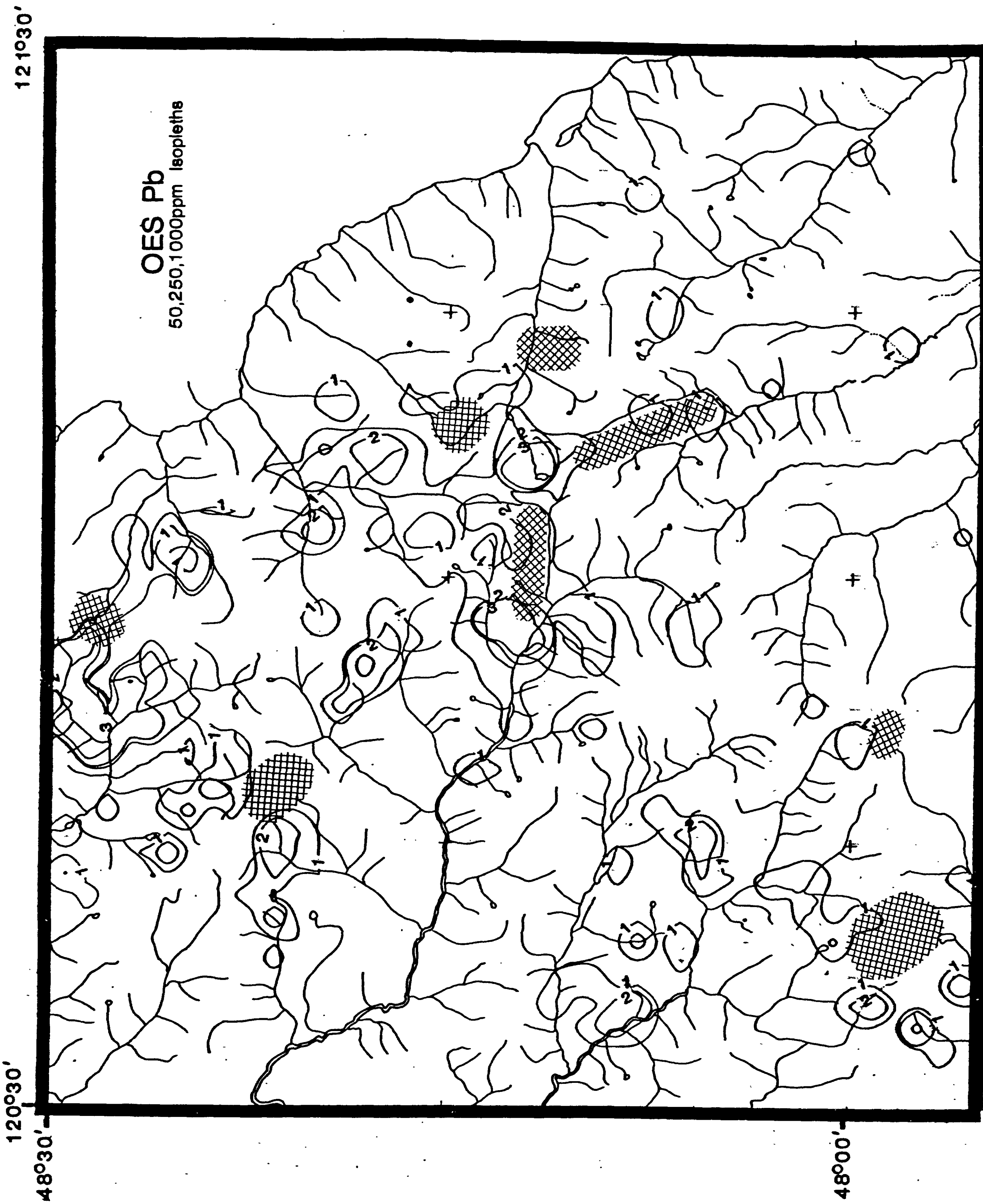

Figure 21. Plot of D.C.-arc emission spectrometric data for lead (Pb) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 75th (1 = 50 ppm), 92th (2 = 250 ppm), and 97th (3 = 1,000 ppm) percentiles.

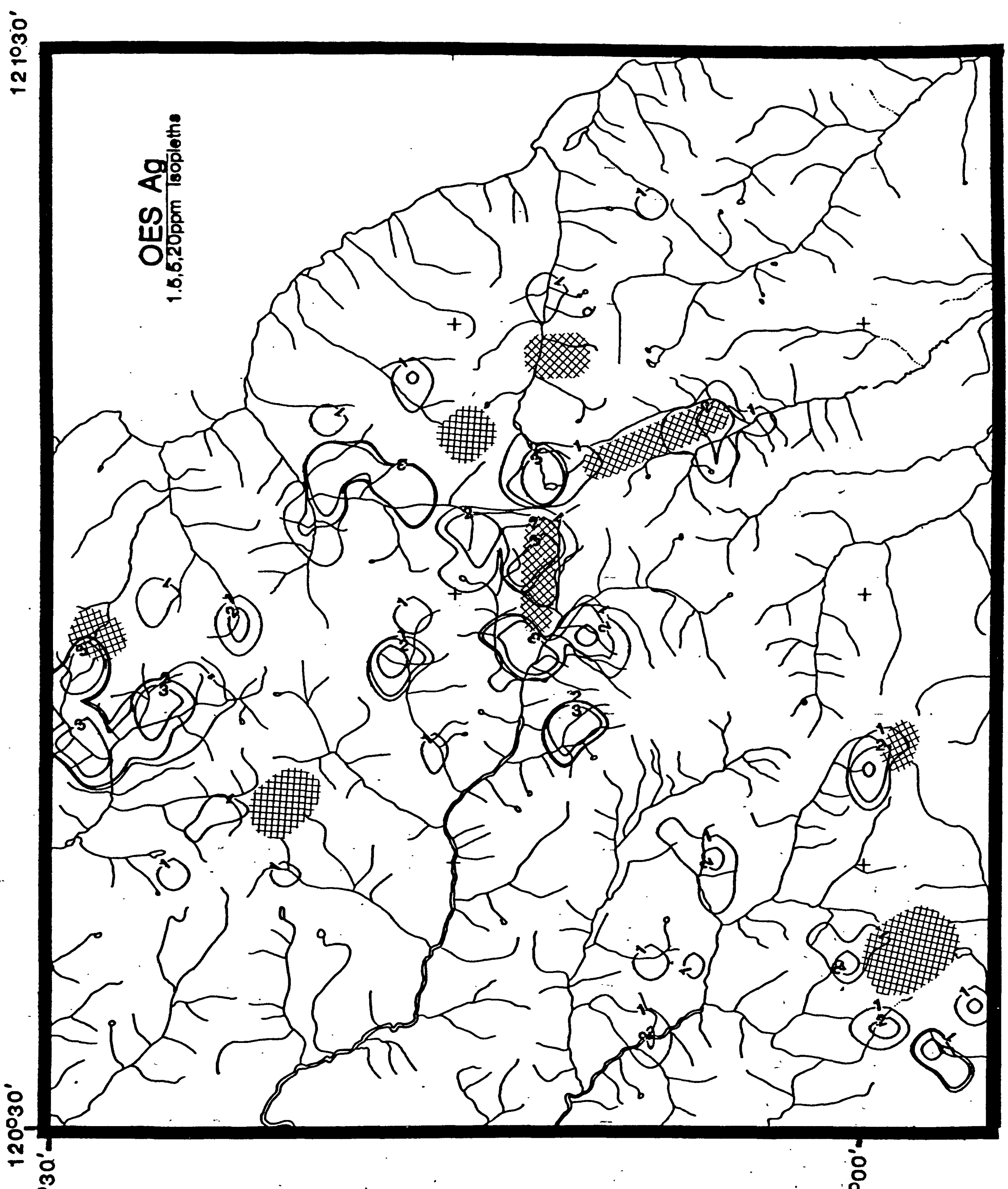

Figure 22. Plot of D.C.-arc emission spectrometric data for silver (Ag) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 85th (1 = 1.5 ppm), 92th (2 = 5 ppm), and 97th (3 = 20 ppm) percentiles.

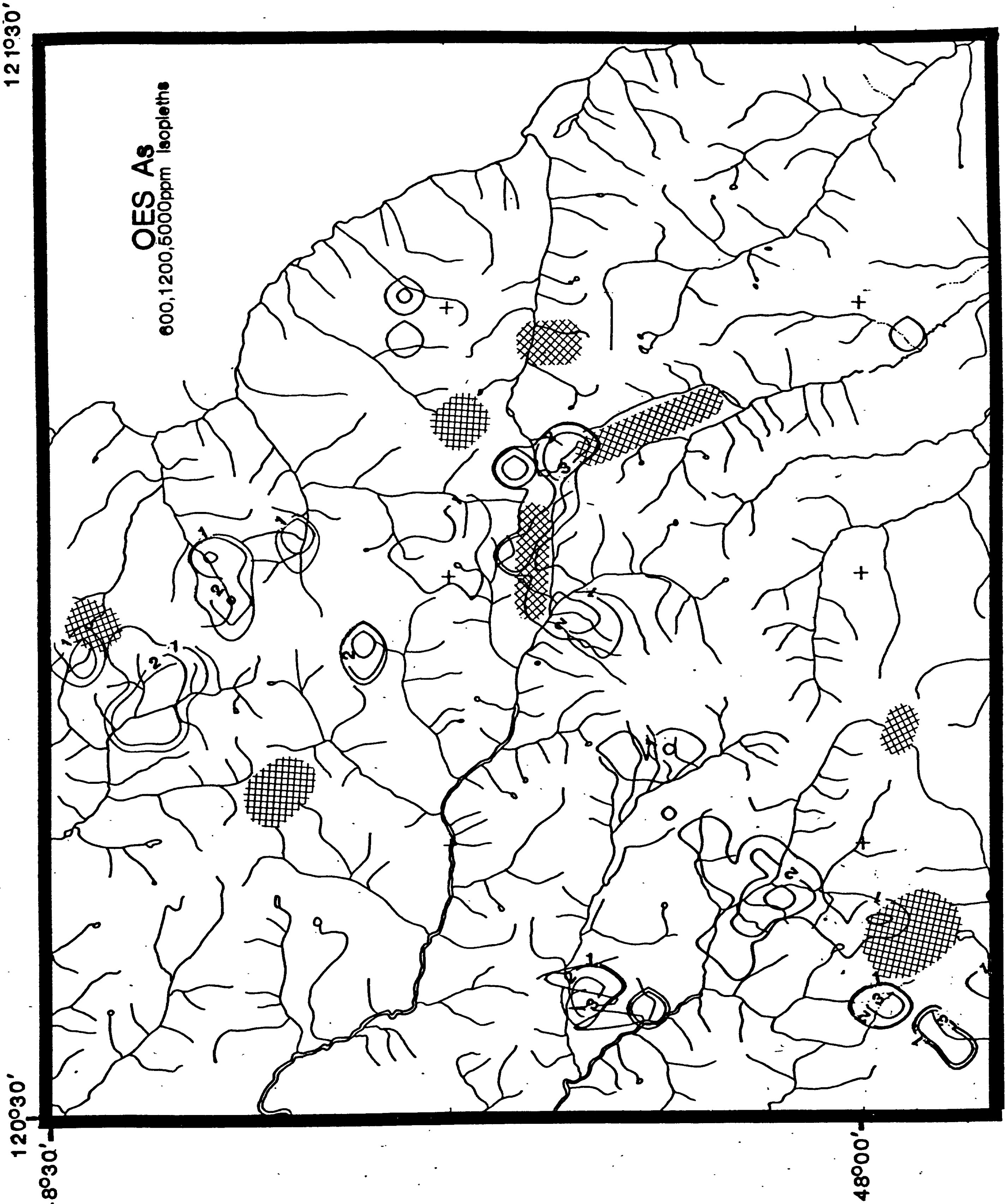

Figure 23. Plot of D.C.-arc emission spectrometric data for arsenic (As) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 90th (1 = 600 ppm), 97th (2 = 1,200 ppm), and 99th (3 = 5,000 ppm) percentiles.

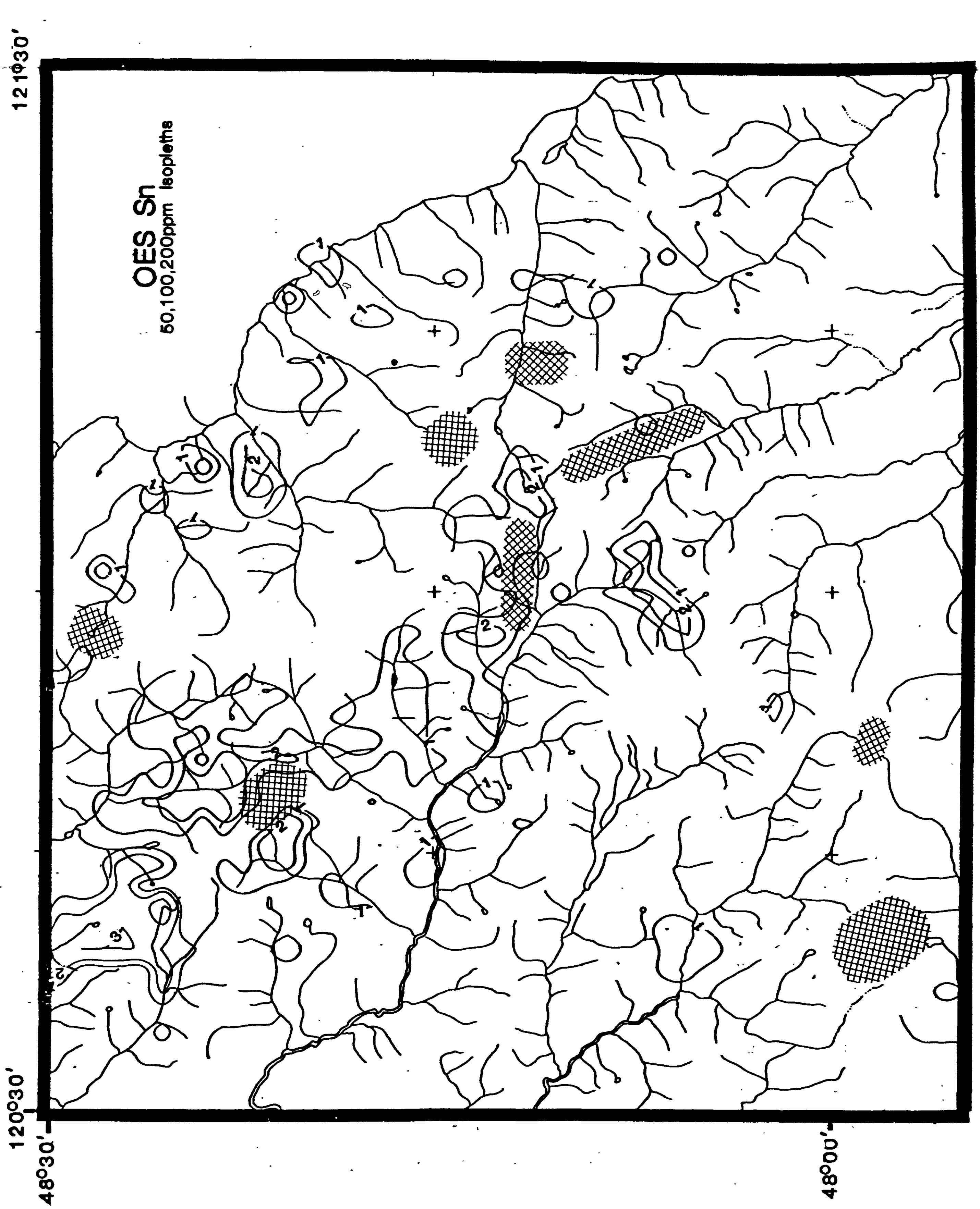

Figure 24. Plot of D.C.-arc emission spectrometric data for tin (Sn) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 80th (1 = 50 ppm), 95th (2 = 100 ppm), and 99th (3 = 200 ppm) percentiles.

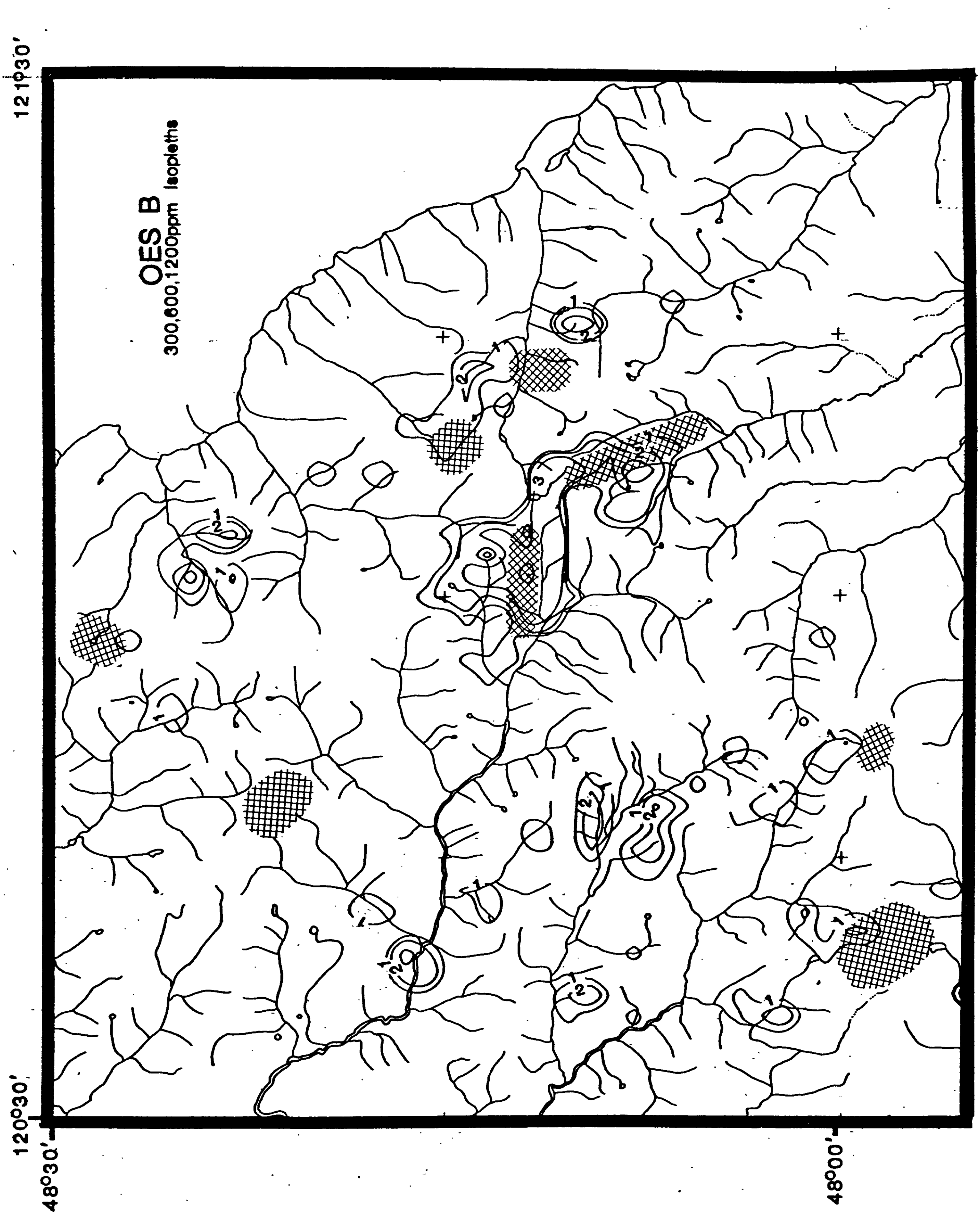

Figure 25. Plot of D.C.-arc emission spectrometric data for boron (B) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 80th (1 = 300 ppm), 90th (2 = 600 ppm), and 97th (3 = 1,200 ppm) percentiles.

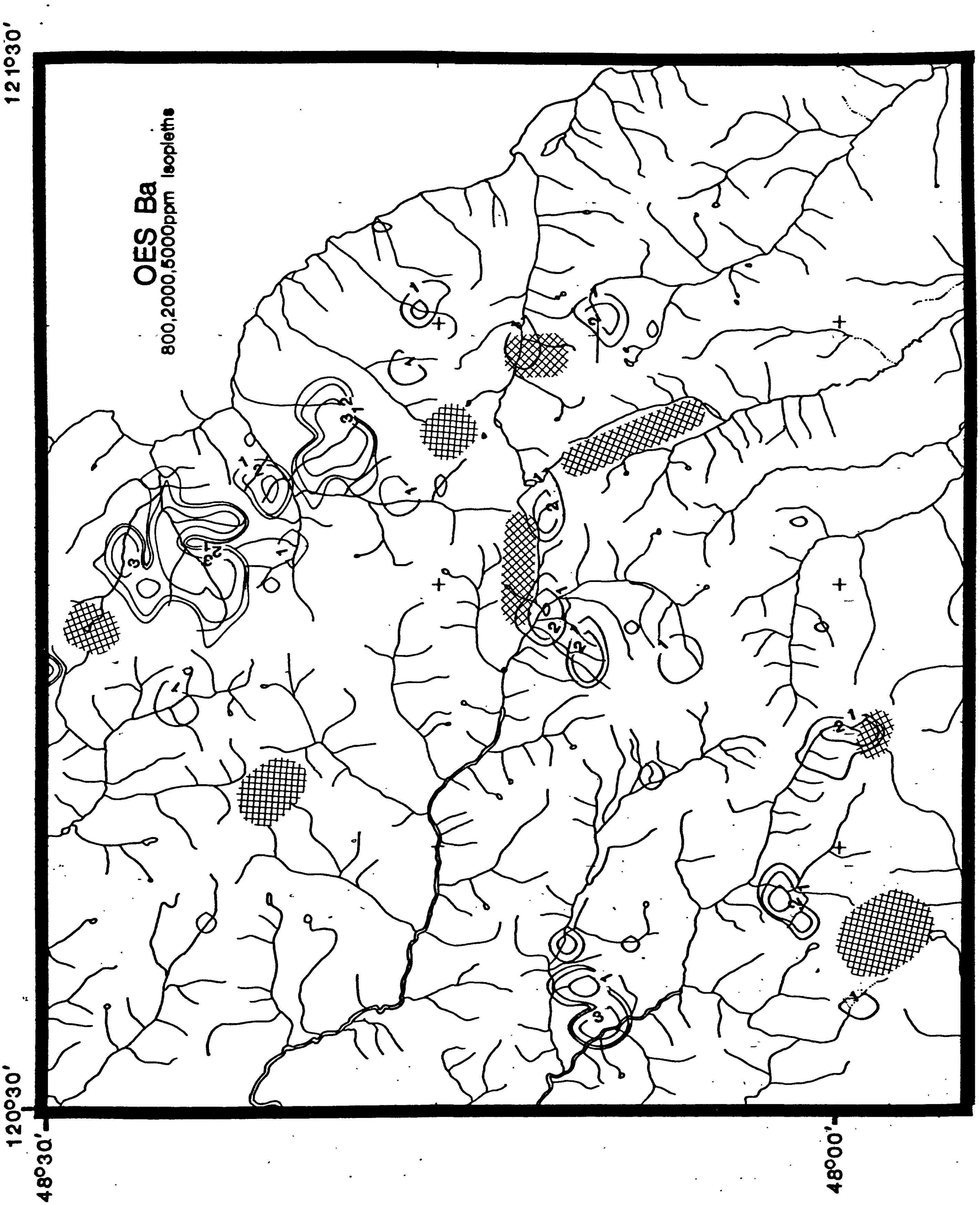

Figure 26. Plot of D.C.-arc emission spectrometric data for barium (Ba) from the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments. Isopleths were chosen to approximate the 85th (1 = 800 ppm), 95th (2 = 2,000 ppm), and 98th (3 = 5,000 ppm) percentiles.

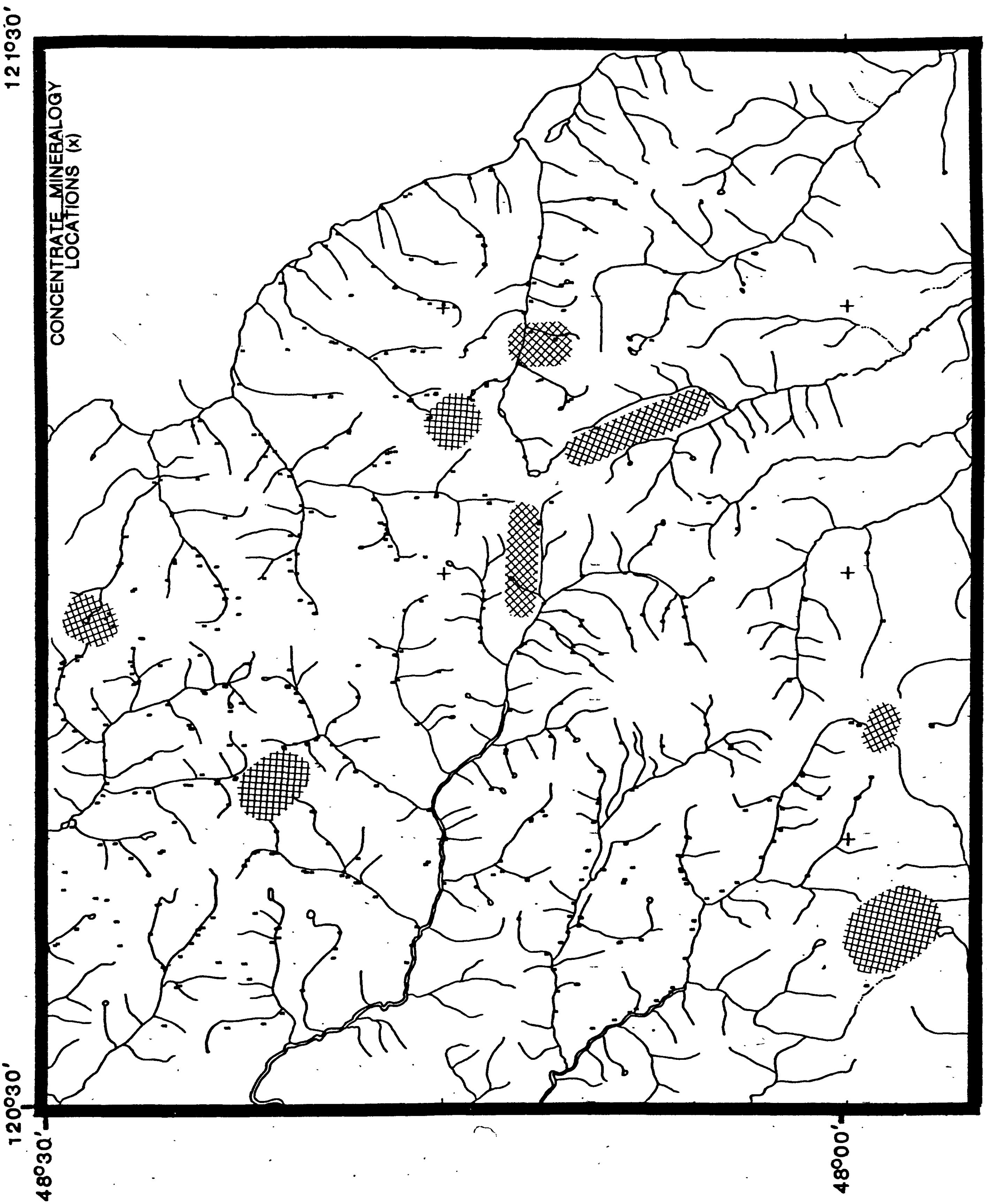

Figure 27. Localities of panned concentrates from stream-sediment samples for which mineralogical data exist (Church and others, 1982a, 1982b).

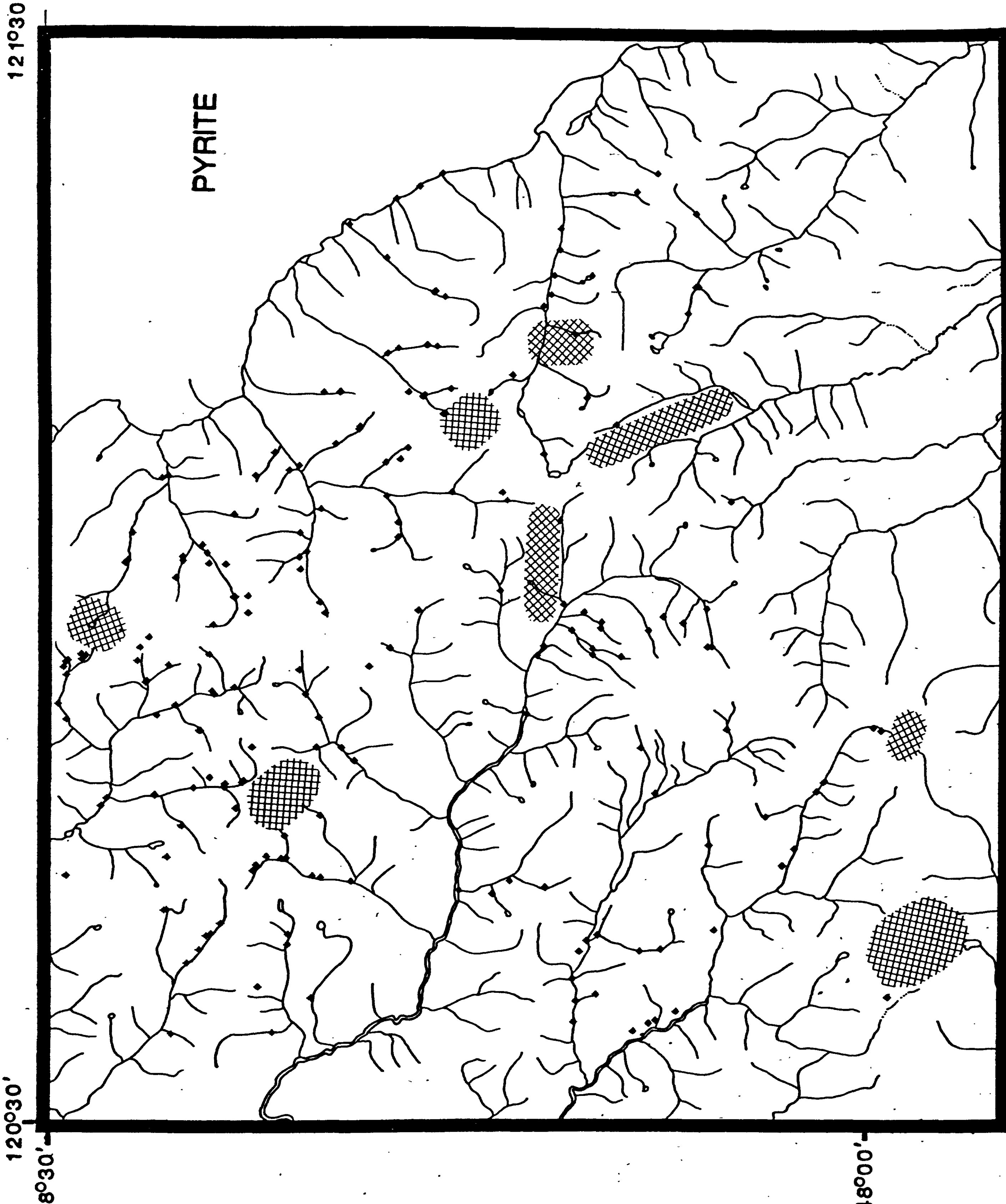

Figure 28. Localities having identifiable pyrite or chalcopyrite in the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments (data from Church and others, 1982a, 1982b).

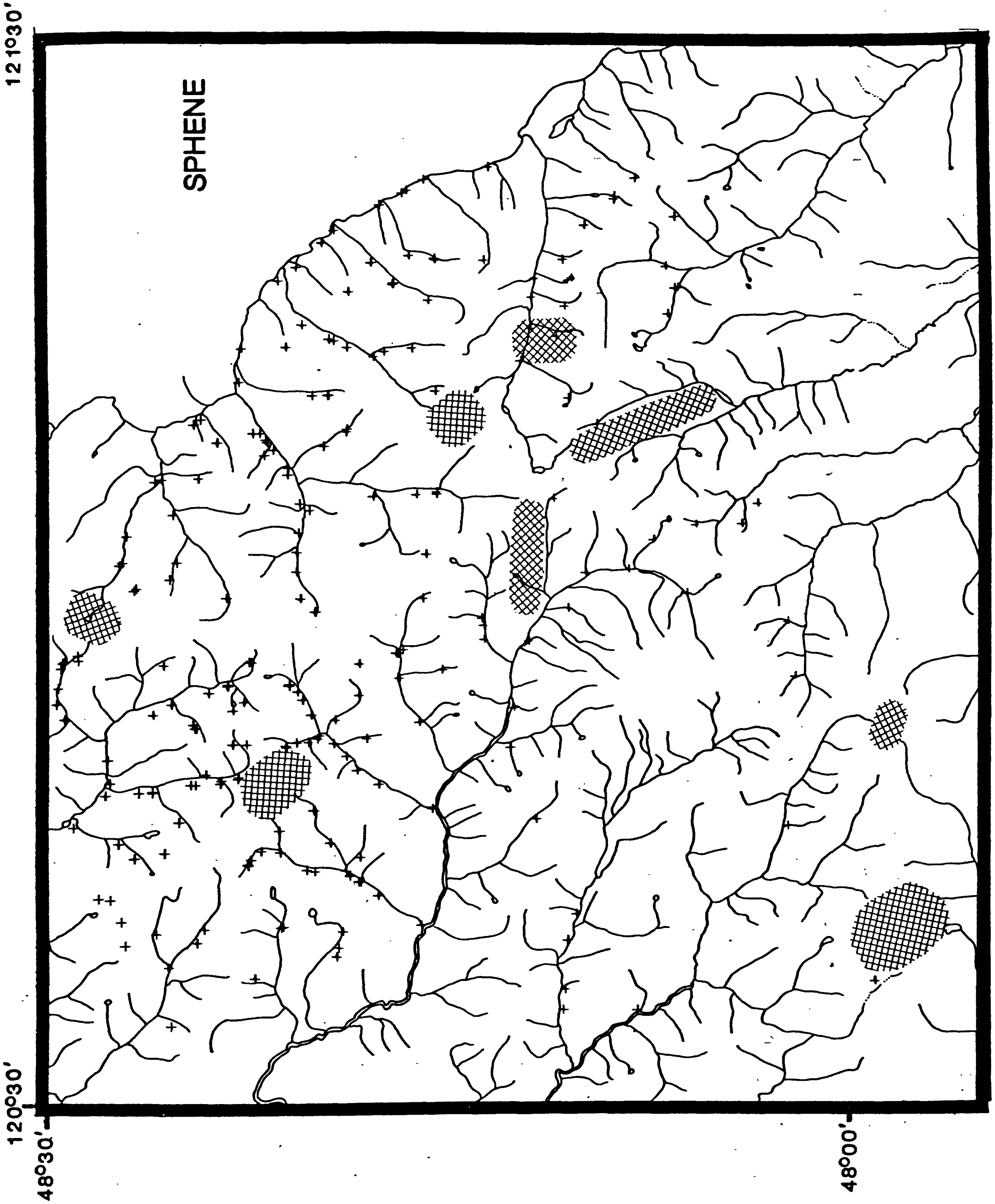

Figure 29. Localities showing identifiable sphene in the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments (data from Church and others, 1982a, 1982b).

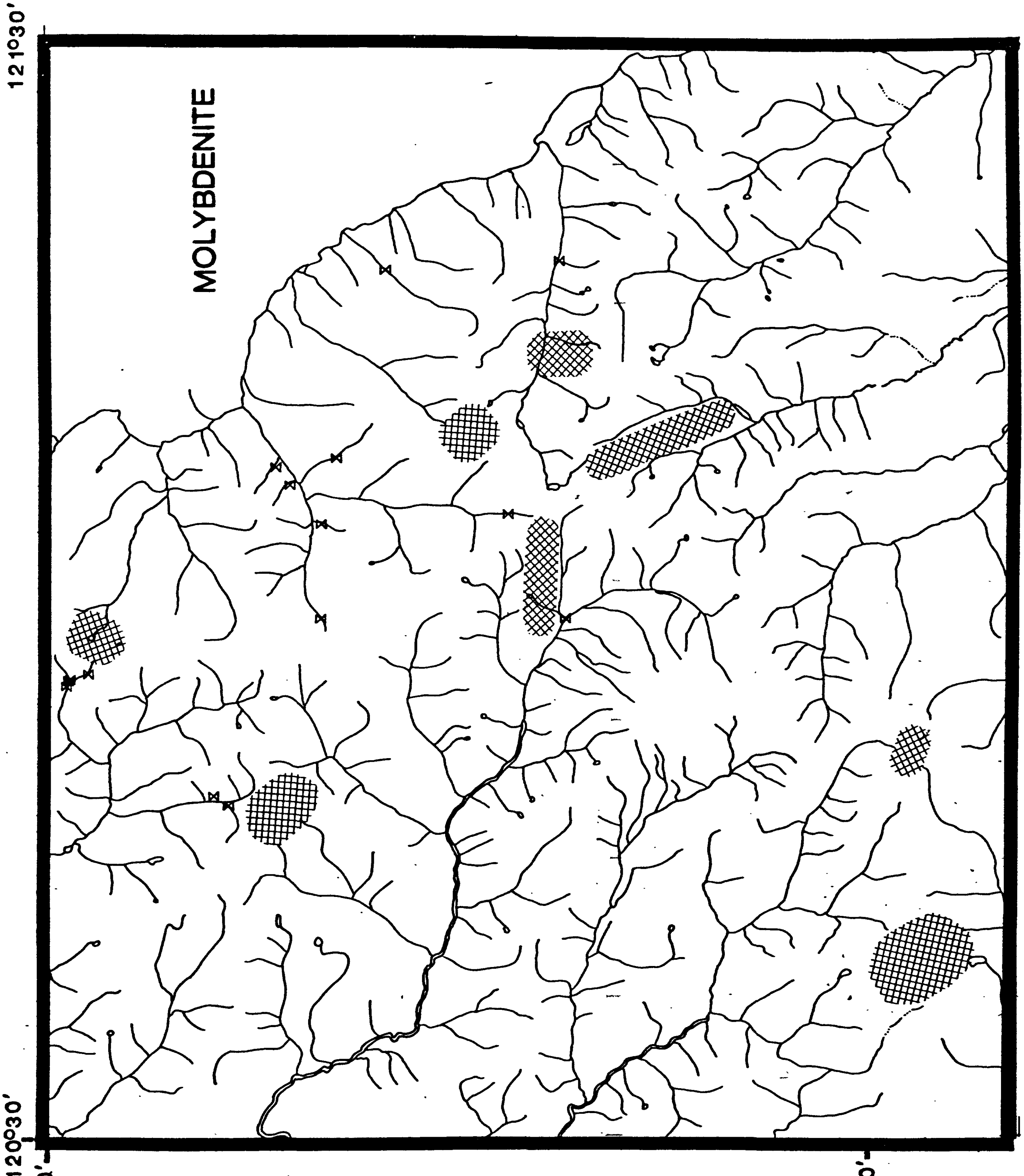

Figure 30. Localities having identifiable molybdenite in the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments (data from Church and others, 1982a, 1982b).

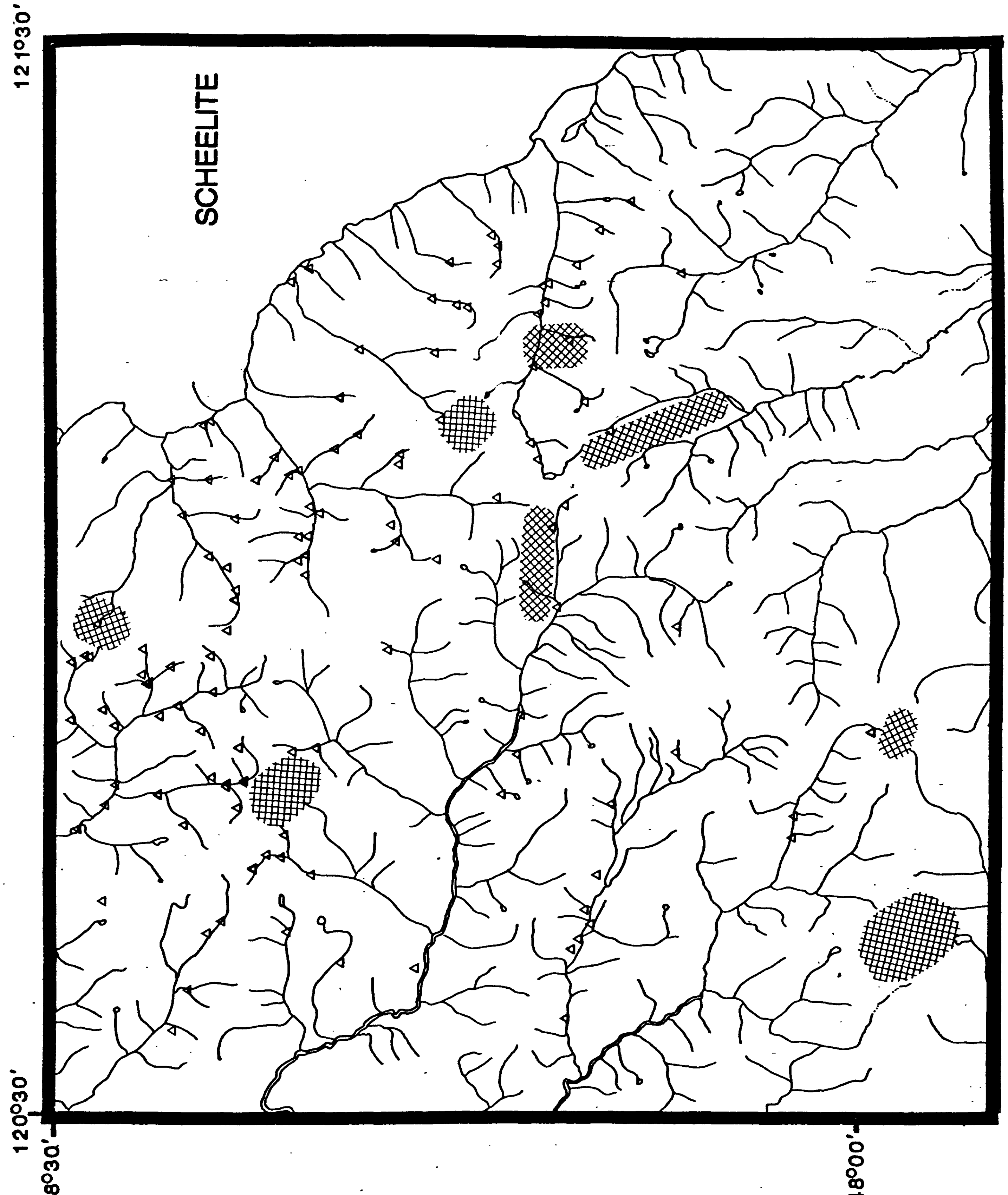

Figure 31. Localities having identifiable scheelite in the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments (data from Church and others, 1982a, 1982b).

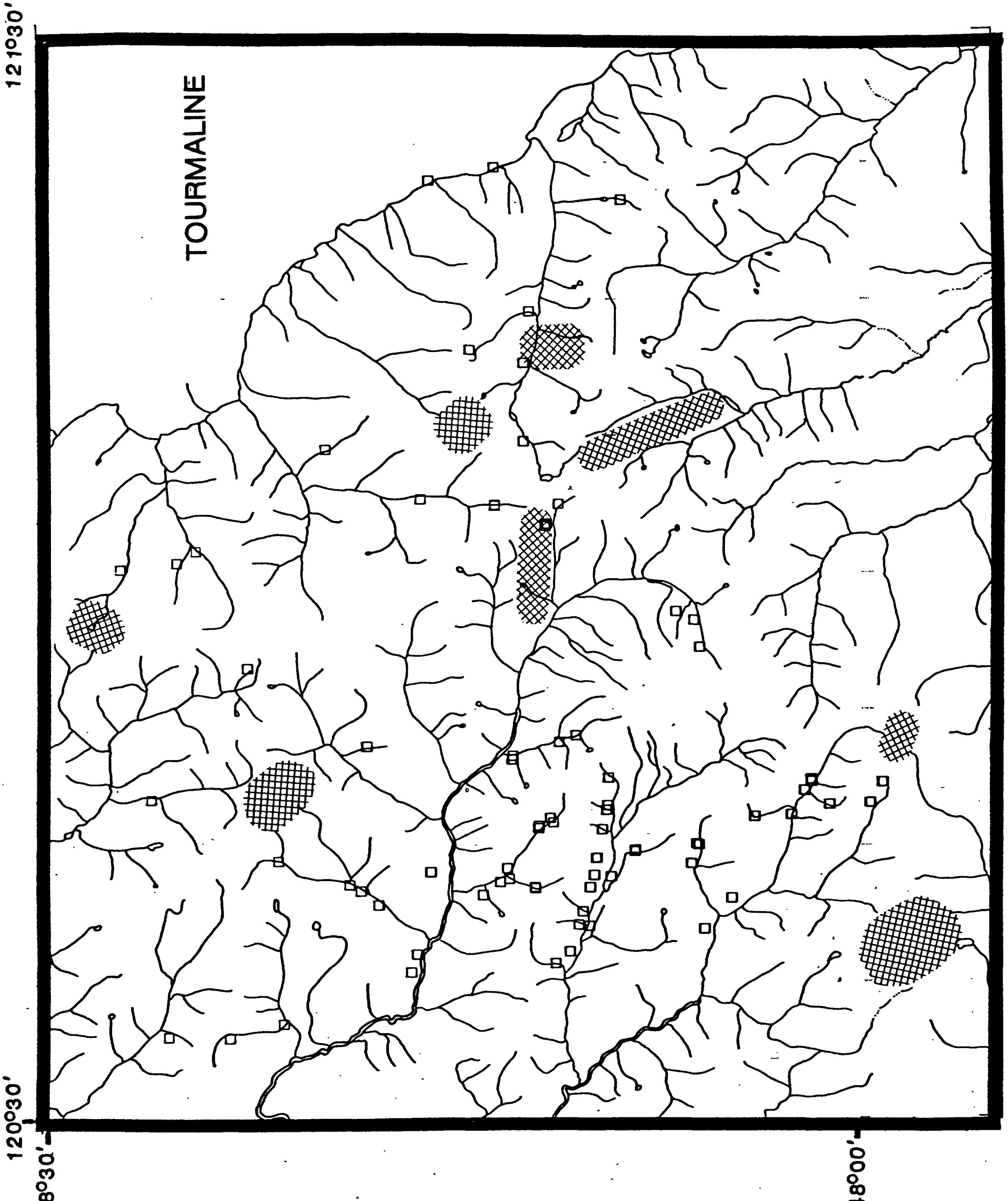

Figure 32. Localities having identifiable tourmaline in the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments (data from Church and others, 1982a, 1982b).

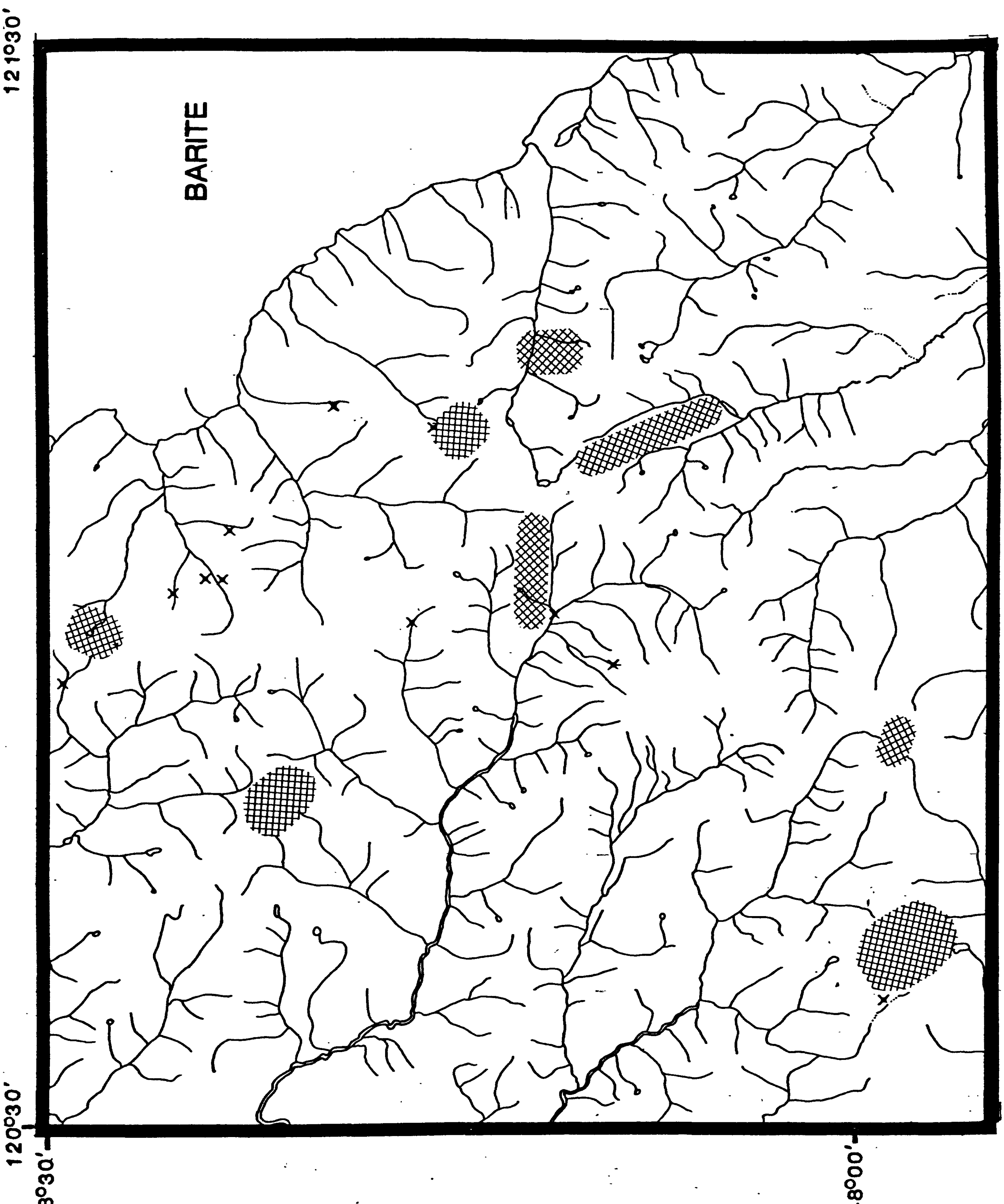

Figure 33. Localities having identifiable barite in the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments (data from Church and others, 1982a, 1982b).

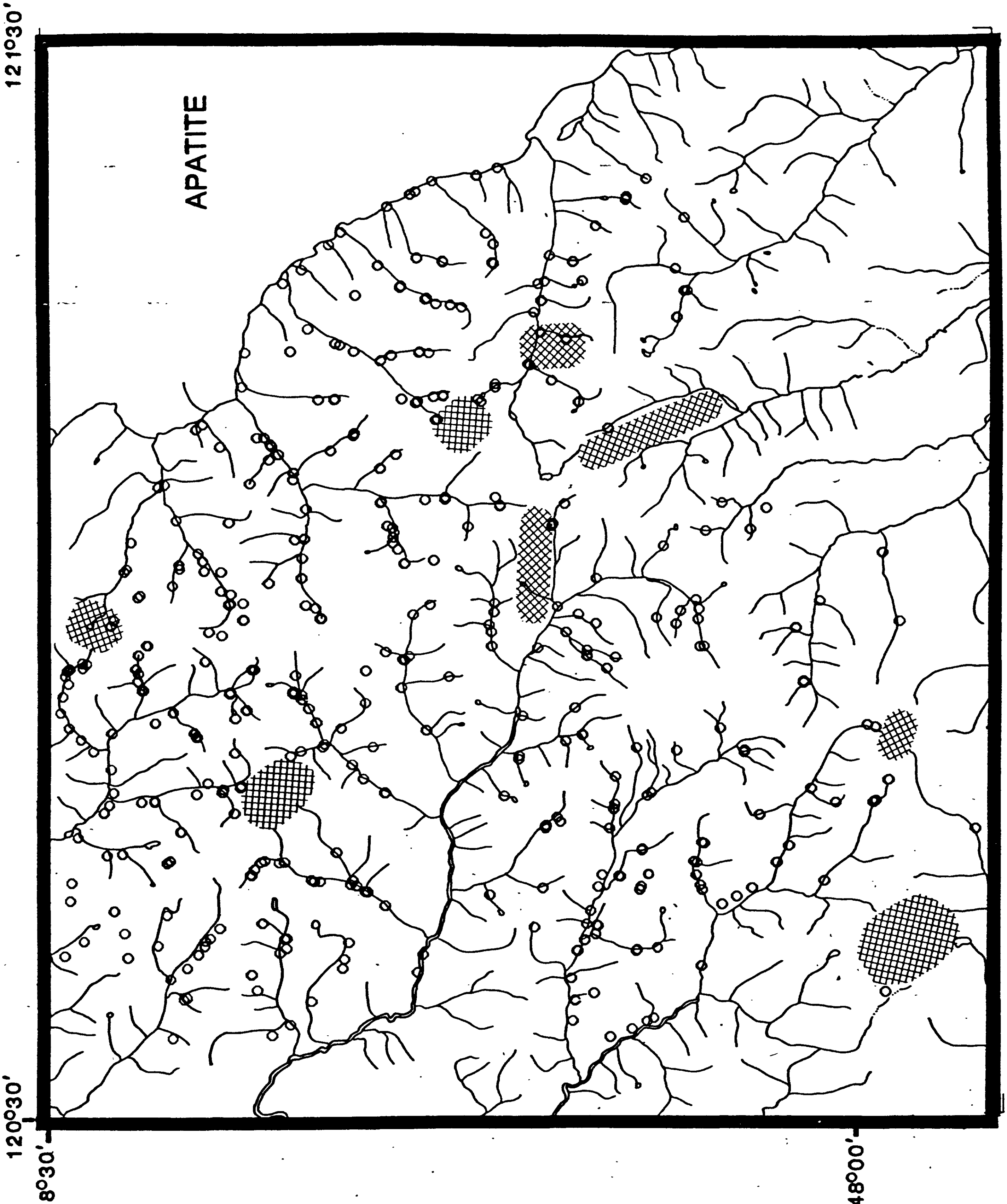

Figure 34. Localities having identifiable apatite in the nonmagnetic, heavy-mineral fraction from panned concentrates from stream sediments (data from Church and others, 1982a, 1982b).

Table 1.—Geochemical signatures of several known deposits in the Glacier Peak study area

Location	Deposit Type	Known Geochemical Signature	Reference
Buckindy Area	porphyry molybdenum	Cu, Mo, Au, Ag, W	Grant, 1982
Epoch/Pioneer	galena veins	Pb, Ag, Zn	Grant, 1982
Glacier Peak Mines	porphyry copper	Cu, Mo, W, Pb, Zn, Ag, As, Au, Bi, K, Rb, Ti, In	Grant, 1982
Holden Lake/ Bonanza Area	quartz veins	Pb, Ag, Cu	Grant, 1982
Holden Mine Area	metamorphosed copper lode	Cu, Ag, Zn	Grant, 1982
Red Mountain Ridge/Trinity Mine	breccia pipes	Cu, As, Pb, Mo	Grant, 1982
Goff Prospect	altered zone	Cu, Au, Ag	Grant, 1982
Monte Cristo	epithermal vein system	Sb, As, Cu, Pb, Zn, Au, Ag	Church and others, 1982a