

U.S. DEPARTMENT OF THE INTERIOR
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ASSESSMENT OF UNDISCOVERED MINERAL RESOURCES
IN THE PACIFIC NORTHWEST:
A CONTRIBUTION TO THE INTERIOR COLUMBIA BASIN
ECOSYSTEM MANAGEMENT PROJECT

Edited by

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Executive Summary

This report is one in a series of digital maps, data files, and reports generated by the U.S. Geological Survey to provide geologic process and mineral resource information to a U.S. Forest Service and Bureau of Land Management interagency project, the Interior Columbia Basin Ecosystem Management Project (ICBEMP).

Short term predictions of future mineral-economic activity can be extrapolated from the existing resource base in discovered deposits (see Bookstrom and others, 1996). However, long term forecasts must also account for the future discovery of extensions of known mineral deposits (within a km of a known mineral deposit), as well as for the future discovery of presently undiscovered mineral deposits. In this report we provide quantitative estimates of the presently undiscovered mineral resources in the ICBEMP area.

Quantitative estimates of undiscovered metallic mineral resources in the ICBEMP area involved delineating 124 tracts or areas that are permissive for the occurrence of 30 different metallic mineral deposit types, delineating areas that are favorable for undiscovered mineralization (some indication that mineralization is present or mineralizing processes have occurred) within these permissive tracts, estimating probability distributions of the number of undiscovered deposits that may be present within each permissive tract for 25 of the mineral deposit types, and numerically simulating the amount of undiscovered in-situ metals. A mean of 87 undiscovered deposits of the 25 deposit types considered in this analysis are estimated to be present in the ICBEMP area. Results of the numerical estimation of the in-situ amount of undiscovered metallic mineral resources that lie within the ICBEMP area are given in Summary Table below. Results of the numerical simulation for individual tracts are summarized in Appendix A.

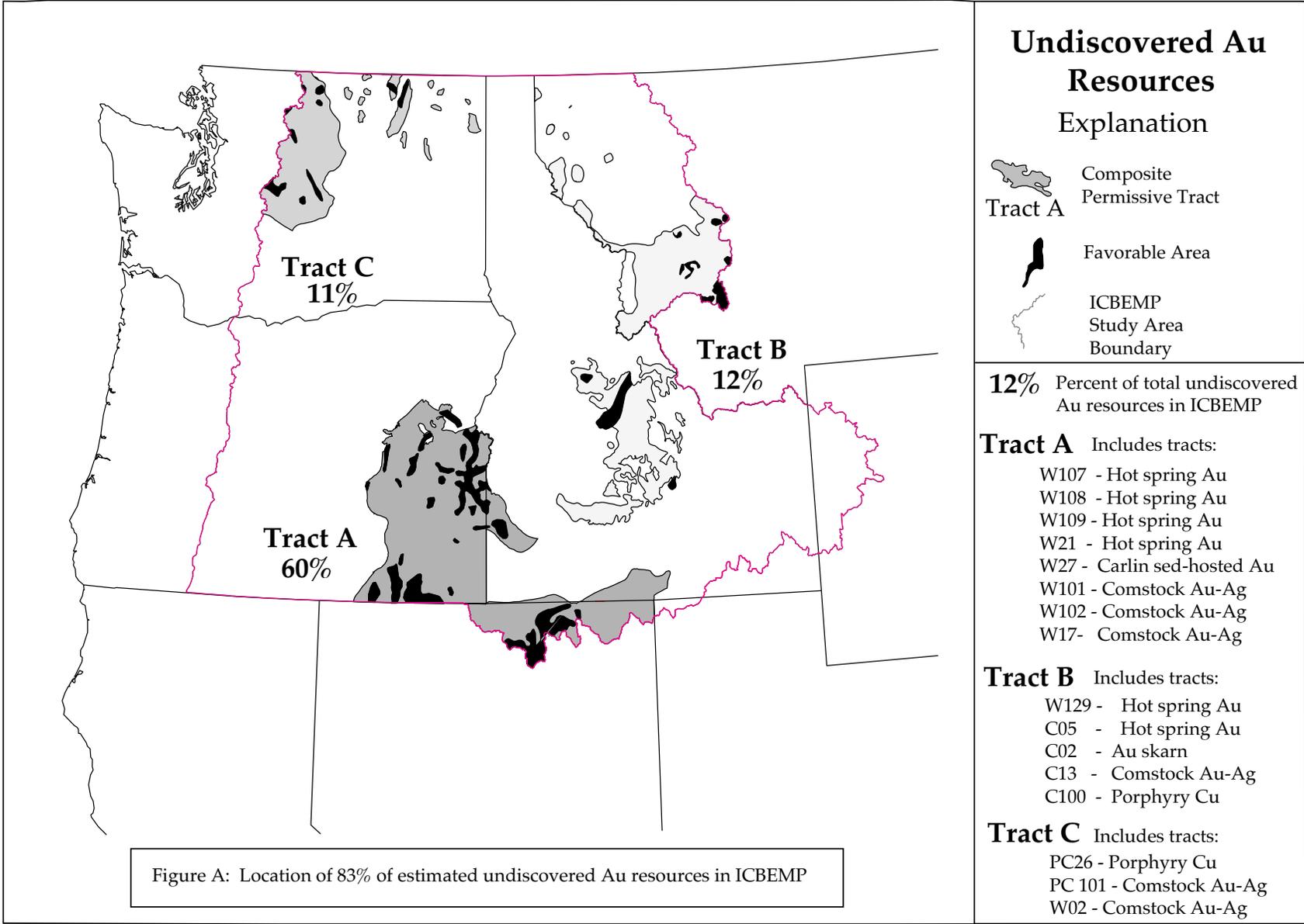
This analysis provides some constraints on the amount of in-situ resources that remain within the study area but does not address the economic potential of these deposits. The information in this report constitutes some of the information necessary to forecast the likelihood and general location of the potential supply of metals from undiscovered mineral resources in the ICBEMP study area.

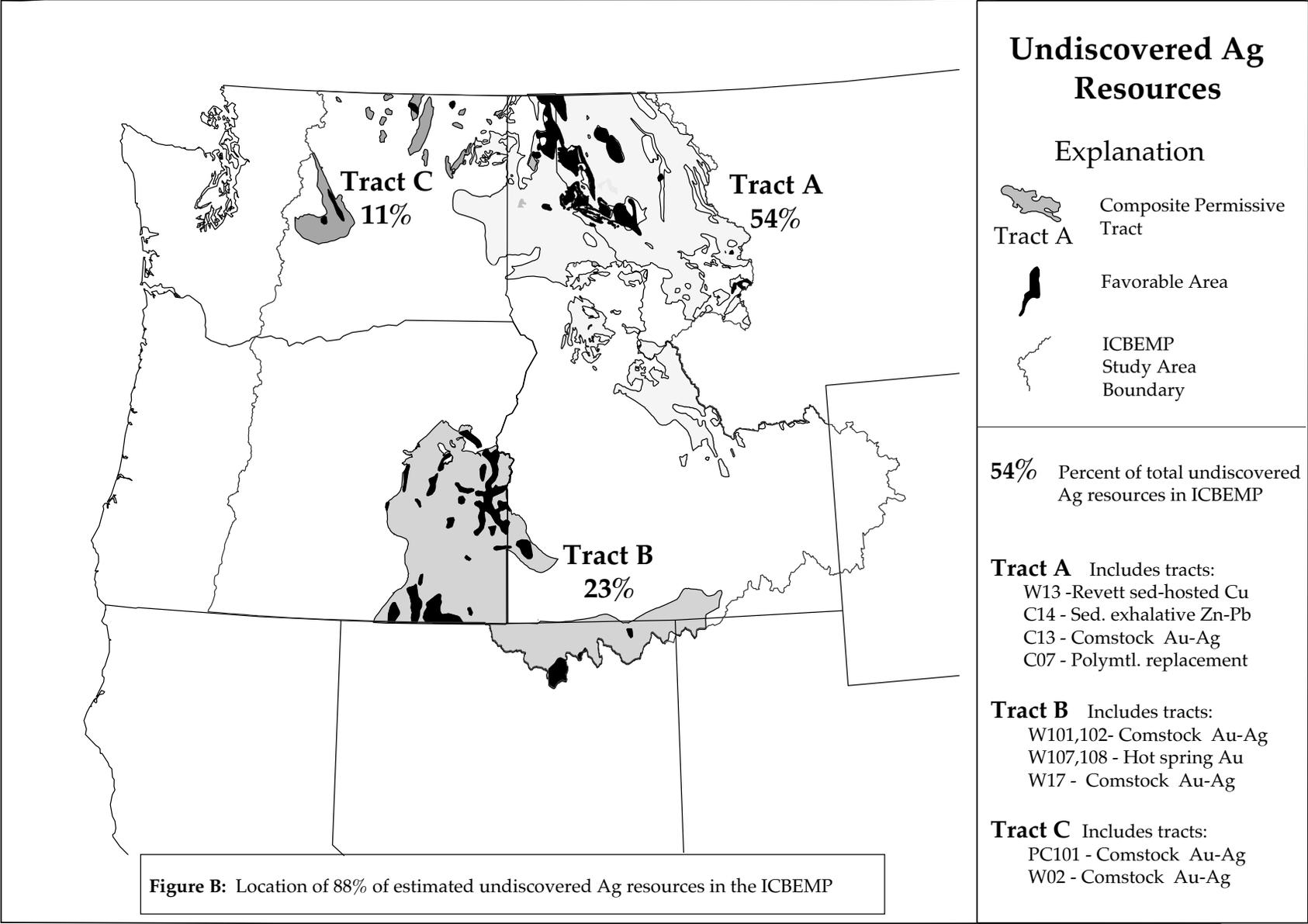
Summary Table: Summary statistics of the probabilistic estimate of undiscovered, in-situ resources of precious and base metals (metric tonnes of metal) in ICBEMP study area. Summary includes all deposit types and tracts that occur within the study area.

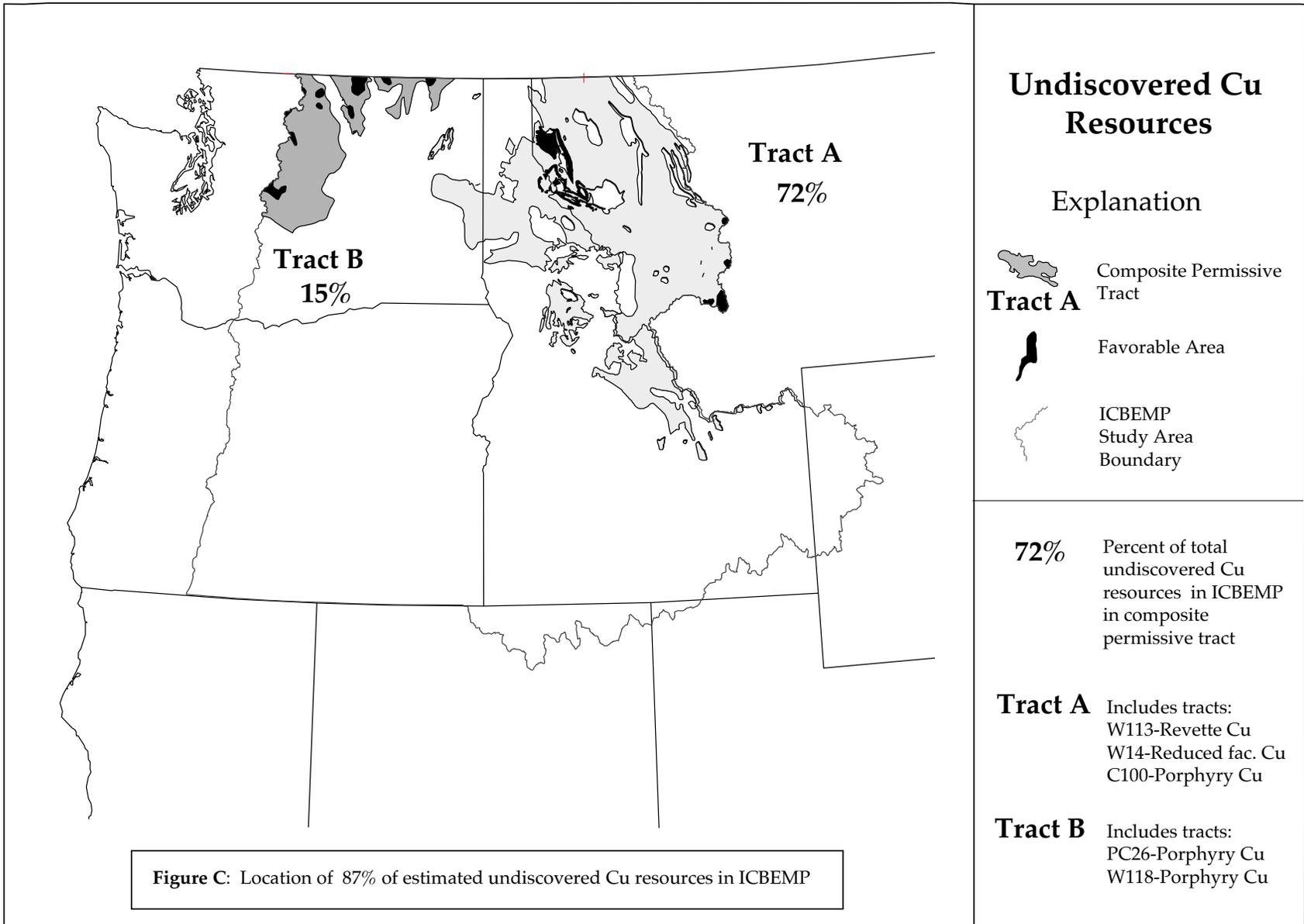
	Au	Ag	Cu	Pb	Zn	Mo
0.95 quantile	1,094	24,866	5,260,400	91,457	331,960	22,703
0.90 quantile	1,248	31,590	6,697,700	195,080	645,390	51,977
0.50 quantile	2,082	70,776	14,589,000	1,951,800	4,005,100	363,880
0.10 quantile	3,261	150,640	31,743,000	11,657,000	18,560,000	1,427,800
0.05 quantile	3,741	183,590	39,579,000	17,022,000	26,485,000	1,953,800
Mean	2,198	83,717	17,433,900	4,259,720	7,497,460	590,080

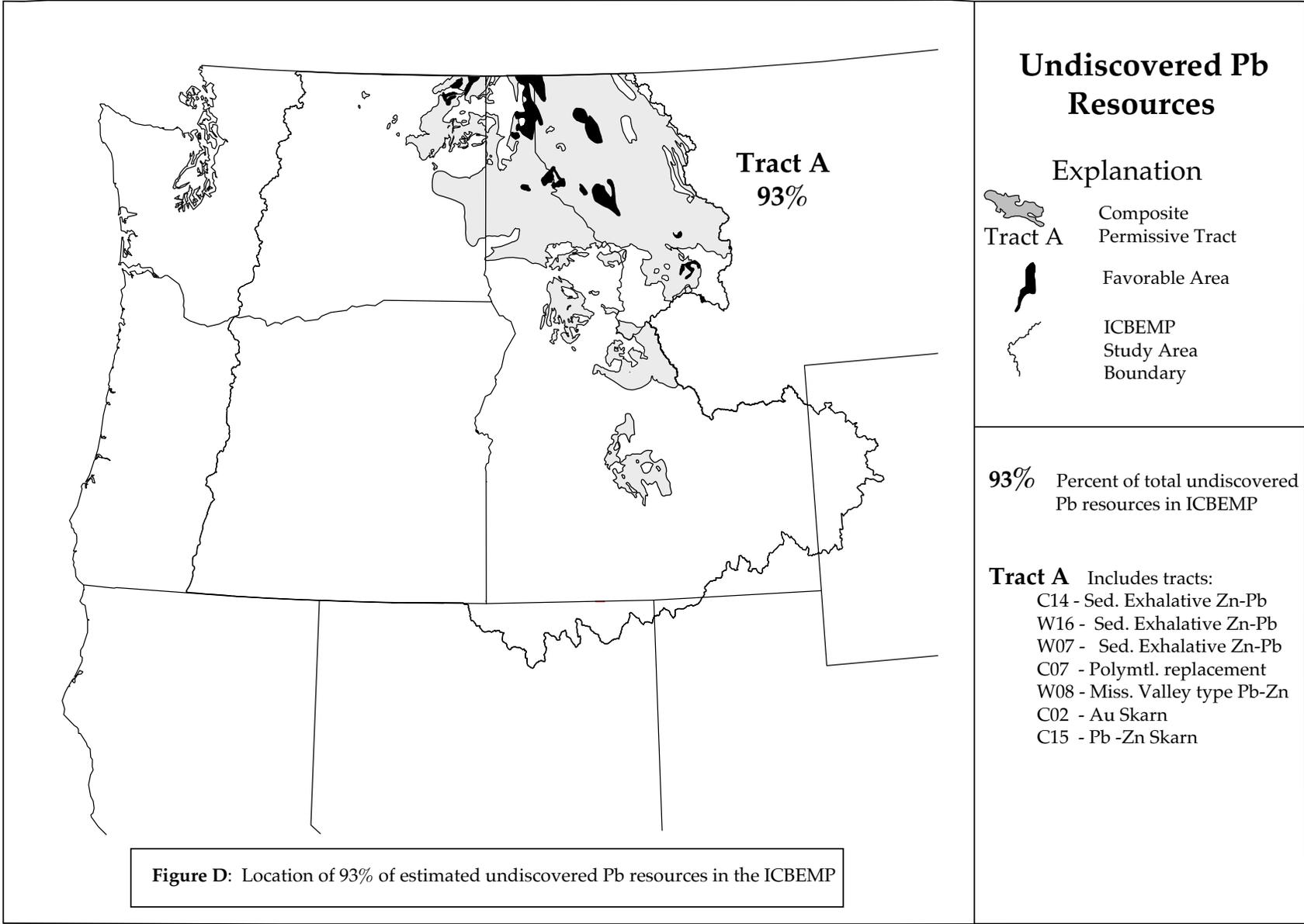
Some generalizations can be made about the likely areal distribution of undiscovered deposits in the ICBEMP area, and these are illustrated in the following summary figures (figs. A to F). For each of the economic elements in the Summary Table, more than 50% of the estimated mean undiscovered resource in the ICBEMP study area is estimated to occur in a limited contiguous area. 58% of the estimated mean undiscovered Au resources are estimated to occur in a contiguous area of southeastern Oregon, southwestern Idaho, and northeastern Nevada, predominantly in shallowly deposited vein and hot springs deposits (fig. A). 54% of the estimated mean undiscovered Ag resources are estimated to occur in the Belt Basin of northwestern Montana, northern Idaho, and easternmost Washington (fig. B). A nearly identical area in Montana, Idaho and Washington accounts for 72% of the estimated mean undiscovered resource (fig. C). A broadly overlapping but slightly different area in northwestern Montana, northern Idaho and northeastern Washington accounts for 93% of the estimated mean undiscovered Pb resource (fig. D) and 87% of the estimated mean undiscovered Zn resource (fig. E). Finally an arcuate area extending from southwestern Idaho to northwestern Montana is estimated to contain 59% of the estimated mean undiscovered molybdenum resource (fig. F).

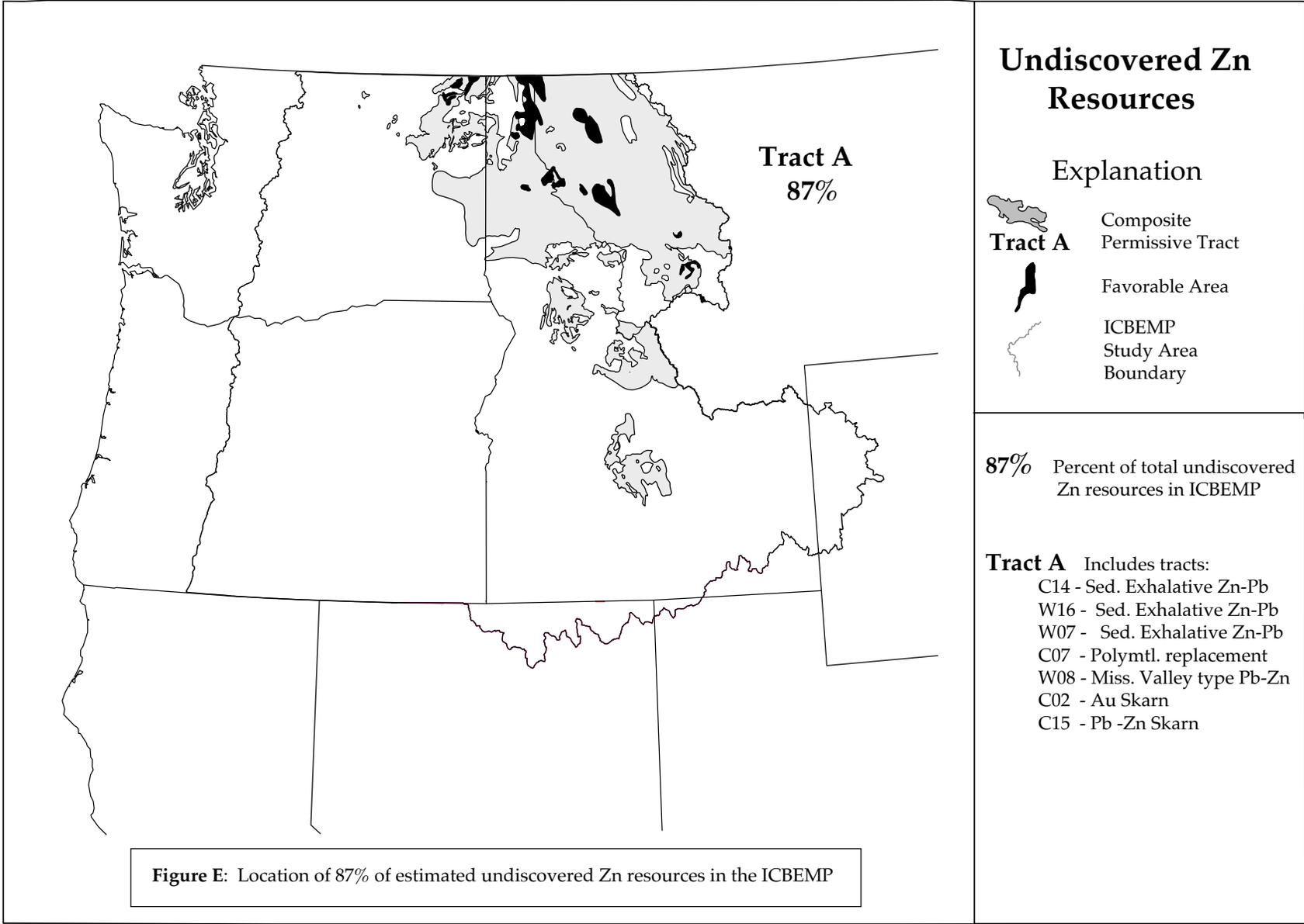
Comparison can be made (fig. G) between the past production, known but unmined resources (both from Bookstrom and others, 1996), and estimated undiscovered resources (from this report) for the entire ICBEMP study area. For Au, Ag, Cu, Pb, Zn, and Mo, the estimated undiscovered resources account for 54%, 46%, 29%, 34%, 45%, and 16%, respectively, of the total resources (past production + known resources + estimated undiscovered resources) for the ICBEMP study area. For the same elements, the estimated undiscovered resources account for the following percentages of the total unmined resources (known resources + estimated undiscovered resources): 67%, 70%, 36%, 91%, 80%, and 16%, respectively. By implication, the specific sites which account for most of the resource of unmined copper and molybdenum are known. However, the specific sites of most of the unmined resources of gold, silver, lead, and zinc are not known, although the general regions in which they are most likely to occur are known.











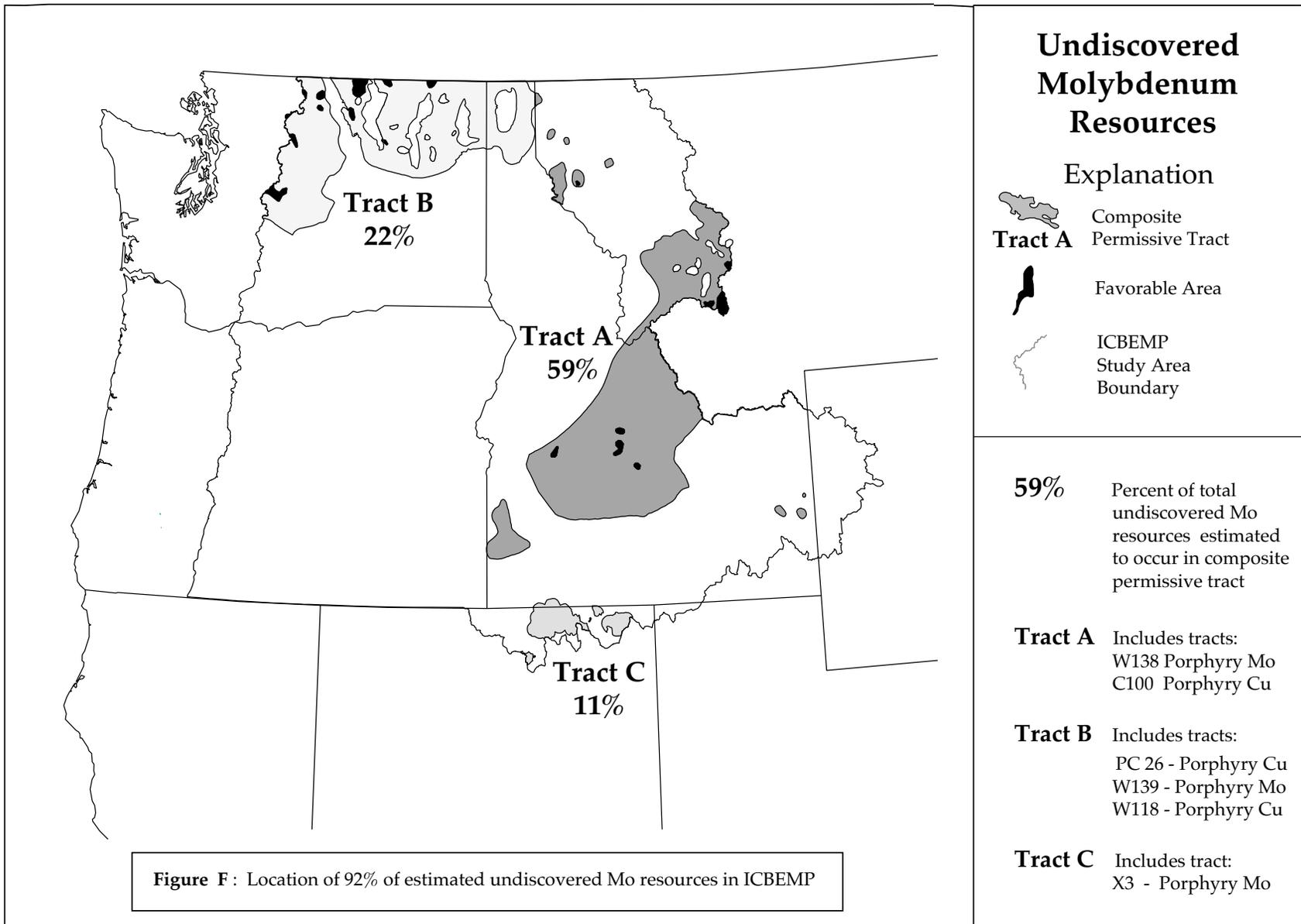
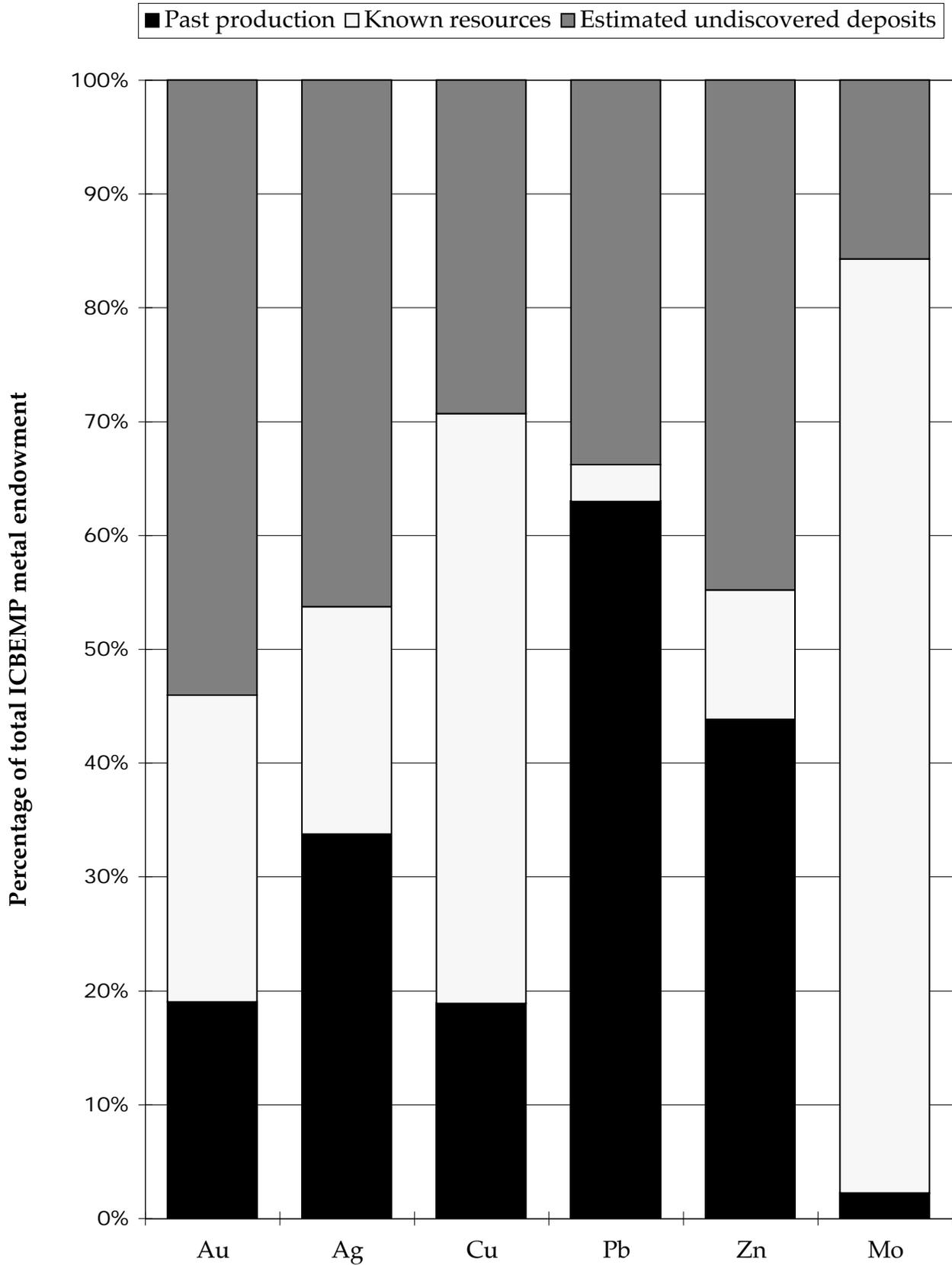


Figure G: Relative apportionment of total metal endowments of the Interior Columbia Basin between past production, known but unmined resources, and estimated undiscovered deposits.



References cited

Bookstrom, A. A., Zientek, M. L., Box, S. E., Derkey, P. D., Elliott, J. E., Frishman, David, Ashley, R.P., Evarts, R. C., Moyer, L. A., Cox, D. P., and Ludington, S. D., 1996, Status and metal content of significant metallic mineral deposits in the Pacific Northwest: a contribution to the Interior Columbia Basin Ecosystem Management Project: U.S. Geological Survey Open-File Report 95-688, 93 p.