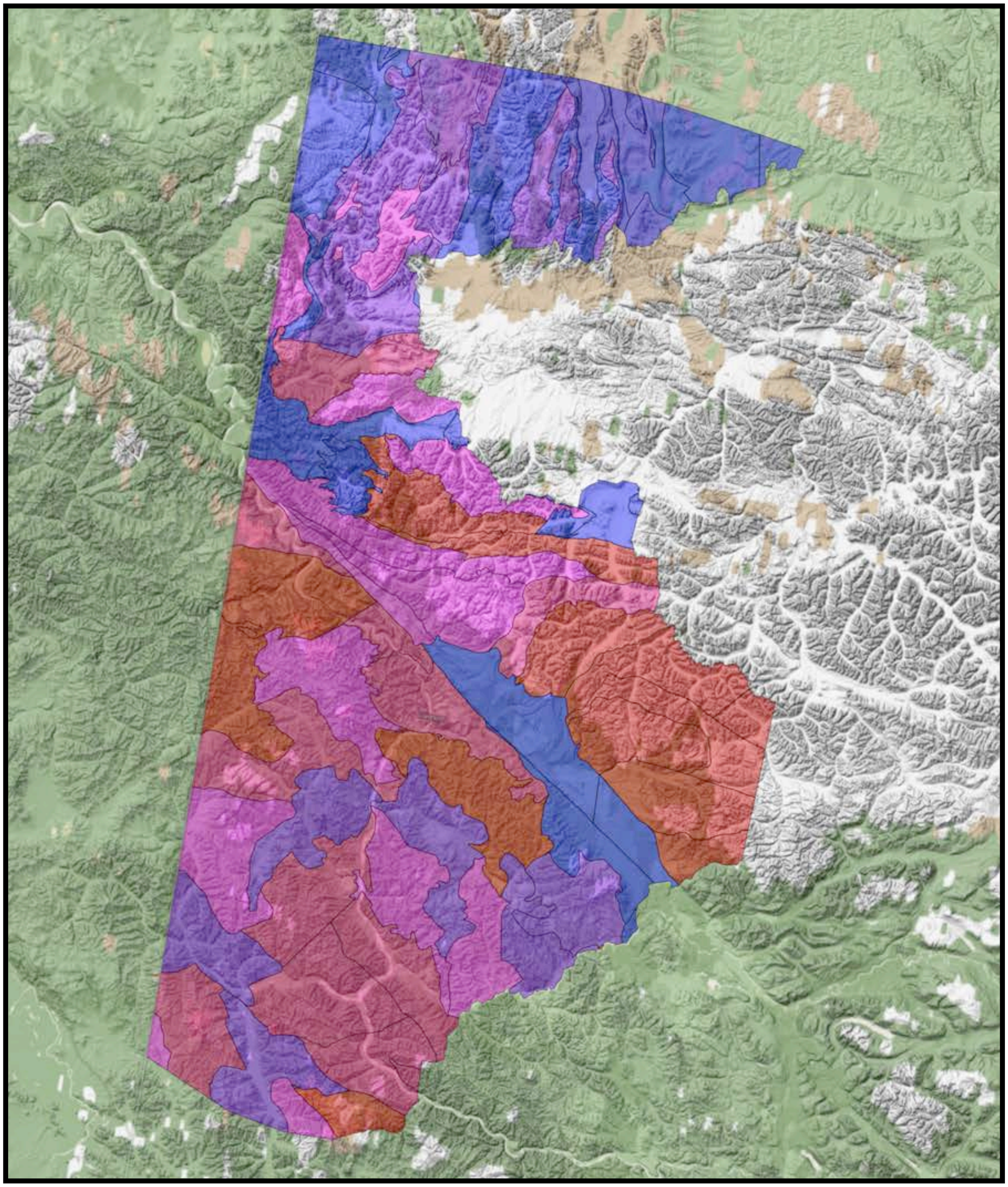
Dawson Land Use Planning
Mineral Potential Assessment



Prepared for:
Yukon Geological Survey

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Cover: Expert estimator's confidence ranking. High confidences in reds and lower confidences in blues.

EXECUTIVE SUMMARY

The Dawson Land Use Planning Mineral Potential Assessment was performed to meet the requirements of the Dawson land use planning process. The Dawson planning area includes a large part of west central Yukon. Four previous mineral potential assessments were completed for areas that are partially included in the Dawson planning area. The information collected during these previous assessments was levelled and combined to provide a single Dawson Area specific mineral potential assessment to meet the current information requirement.

The four previous studies were carried out between 2000 and 2005. All these studies used the same analysis procedure that was adapted from the methodology used by the British Columbia Geological Survey and based on the work of the United States Geological Survey three-part quantitative assessment of undiscovered mineral resource methodology. This methodology is based on the use of the Mark3B Monte Carlo Resource Simulator combining the probabilistic estimates of experts with the characteristics of deposit types expected to be found in the Dawson area. The current assessment went back to the original expert estimates and standardized deposit information to calculate a new assessment.

The sixty-seven tracts contained in the Dawson area are the complete or partial portions of tracts contained in the original four assessments that fell within the boundaries of the Dawson Assessment area. Thirty-six deposit types were evaluated by five experts, resulting in 1665 unique estimates. The 333 combinations of deposit type and tract contained 22 mineral commodities. In addition to the originally used deposit types a newly discovered deposit type, White Gold, was evaluated by three experts for 28 tracts as part of this assessment. The results of this new assessment were combined with the earlier results to form the current assessment.

The primary data from expert estimates and grade and tonnage characteristics of the deposit types being estimated were processed through the Mark3B simulator. Output from the simulator was the amount of commodity associated with each deposit type in each tract at five probability levels and the mean value. The dollar values of the 22 mineral commodities were used to determine a single commodity value for each tract that could be used for comparison purposes. The dollar values of commodities fluctuate over time in response to market supply and demand pressures. To evaluate the effect of price fluctuations on the ranking results three pricing scenarios based on ten years in the 1980's, ten years in the 1990's and the last three years were examined. A number of methods of calculating a single ranking parameter based on the simulator output were tested. The final ranking calculations included both the output from the simulator, undiscovered resources, and the discovered resources. The ranking scheme that provided the best product for the land use planning process is believed to be the unbiased weighting scheme including both discovered and undiscovered commodities using the current market values for these commodities.

The confidence that can be placed in the calculated values for each tract should vary with the amount of information available for the tract and deposit types being estimated. In addition the knowledge of the expert estimators relative to the tract and deposit types being estimated would be expected to affect the confidence. A number of data types were analyzed to evaluate their effectiveness in predicting a useful confidence value. The estimators also recorded their feeling of confidence related to each tract-deposit type combination. The estimator's confidence values proved to be the most useful for this analysis.

A variety of display options were tested to evaluate how best to represent the results of the analysis so that it conveyed the meaning of the analysis in a readily understandable and accessible format. To meet the varied potential audience a combination of digital GIS files, traditional map displays and web viewing tools proved to best meet these goals. An important factor related to communicating the results of the mineral potential analysis is the simple naming of tract classes. The most meaningful terms are a gradation of classes from lowest to highest mineral potential. No tract in the Dawson area can be considered to have no mineral potential and the use of a term such as low often makes this implication to non-specialists.

The result of the Dawson Land Use Planning Mineral Potential Assessment is a product that describes the relative mineral potential of the whole area in a way that allows the end consumer to investigate the various components of the analysis to understand their impact on the final results. The products are delivered in formats that can be readily integrated with other information to assist land use planners make informed decisions. The product may also be easily disseminated to the general public on web-based viewers such as Google Earth and World Wind to promote an understanding of the Yukon's mineral wealth.

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INTRODUCTION

Mineral potential maps summarize the potential for mineral resource development based on the natural endowment of an area. A variety of methods, both qualitative and quantitative have been used to construct these forward looking evaluations. Since 1996 the Yukon Geology Program (precursor to the Yukon Geological Survey) has been creating quantitative mineral potential products based on the USGS Three Part Mineral Assessment Methodology that has been utilized around the world to evaluate the resource potential associated with virtually all types of geological resources. This methodology utilizes experts to estimate the number of undiscovered deposits that could exist within a given area. The probabilities of undiscovered deposits are used to simulate the amount of mineral commodities that potentially exist by using a Monte Carlo simulator to sample the grades and tonnages of known deposits. The gross in-place value (GIPV) of the estimated quantities of commodities is then used to rank the land base. The procedure employed in the Yukon assessments is a slight modification of the USGS methodology adopted from the BC Geological Survey. The current procedure also includes the value of discovered but undeveloped resources.

The Dawson Land Use Planning process requires a mineral potential assessment as part of its deliberations. The whole Dawson area has previously been covered by regional mineral potential assessments but these were from four independent studies in different portions of the land use planning area. The purpose of this project is to utilize these historic mineral potential assessments to create a new evaluation relevant to just the Dawson area. The four original assessments were carried out between 2000 and 2005. They utilized identical analysis techniques but the individuals and some of the basic information differed. This project audited this historic information and produced a standardized set of input information that could be applied uniformly across the whole Dawson area making a single mineral potential product where all segments of the land base could be compared.

The initial objective of the project was to reconcile the basic information from the four historic assessments into a single standardized database. The major components that required standardization and review were;

- the expert estimates,
- the mineral potential tracts,
- the digital deposit models, and
- the commodity prices.

This reconciliation process resulted in 67 topologically correct mineral potential tracts that covered the Dawson assessment area. There were 333 estimates of potential deposits in these tracts based on the input of five experts (1665 unique estimates). A total of 36 deposit types were used in the estimation processes and they contained 22 mineral commodities.

Since the original four assessments were performed a potentially new deposit type has been discovered in the southern portion of the Dawson area. The White Gold deposit type has not been formally described but it was considered important that this potential resource be included in the new assessment as it was not considered by the original estimators. This potential new deposit type was included by creating a digital deposit modelthat is believed to represent the grade and tonnage characteristics of the White Gold type. This model was then used in a new estimation exercise that involved three experts making estimates for 28 tracts.

The new standardized Dawson specific data was used as input to the Mark3B Monte Carlo Mineral Resource Simulator to calculate the mass of commodity that could potentially be located in each tract at five different probability levels. The output from the Mark3B simulation along with the number of deposits estimated by the experts were used to generate maps showing the distribution of all the considered deposit types and all of their contained commodities across the Dawson area.

The GIPV of all the discovered and undiscovered commodities in the 67 assessment tracts were used to rank the tract's relative mineral potential value. A number of ranking formulae and pricing combinations were used to examine their effect on the ranking results. The resulting ranking results, though slightly different, were quite consistent which adds confidence to the final ranking values.

The project also examined various methods of determining a relative confidence value that could be associated with each tract. Each tract had a different amount of information associated with it, a different exploration history and a different level of knowledge on the part of the expert estimators. The level of information and estimator exposure to the tract along with their knowledge of the deposit types being estimated would all be expected to contribute to the quality of the estimates. A confidence value for each tract was calculated based on the estimators input that was a part of each of their original estimates.

Finally, communication of the analysis results in a form that is understandable, interesting and easy to disseminate was also a goal of the project. Traditionally the results of such a study was the production of a paper map display. Later with the advent of GIS digital data describing the mineral potential could be distributed to entities with GIS capability. The advantage of GIS datasets was that the information could be integrated with other data sets to produce uniform displays and facilitate easy access to the information by the planning group. However, the resulting displays generated by third parties often lacked the oversight required to properly convey the meaning of the analysis. The simple mislabeling of a classification group as LOW rather than LOWEST has led non-specialists to think that some areas have no mineral potential. This problem can only be solved through constant oversight of the representation of the mineral potential maps. More recently the near ubiquitous availability of internet access and popular spatial data viewers such as Google Earth have provided the means of easily creating very informative displays that can be widely distributed and easily viewed. By broadly communicating the results of the mineral potential results in such a format it should be possible to increase the understanding of the mineral potential of the Dawson area and also present the information in a form that is interesting to a wide audience and encourages their further investigation of the subject.

COMPILATION

Tracts

Tracts are the basic unit areas for which all analysis related to the mineral potential evaluation are made. Tracts are defined primarily on the basis of having similar geological characteristics. There is also an effort to make the tracts approximately the same size. This size constraint sometimes results in a large tract being arbitrarily split to conform more closely to the average tract size. Occasionally a tract boundary will be defined by non-geological features such as political boundaries or assessment area boundaries but these will be the outer boundaries of the whole assessment area and not the internal boundaries between individual tracts.

In this project the tracts from the four previous mineral potential assessments were combined into a single set of unique tracts for the Dawson Assessment area. Figure 1 illustrates the distribution of the tracts in the original assessment areas and their spatial relationship to the Dawson Assessment area boundary. To combine the fours sets of tracts a number of steps were required;

- identify the correct set of tract boundaries,
- audit the boundaries for spatial integrity,
- identify and rationalize any tract overlaps between the assessment areas.

Initially the identification of the proper set of tract boundaries was undertaken. Some areas such as the North Assessment area had a number of digital files describing different tract shapes. Also there were a number of tract boundary files that were combinations of the different assessment areas made at various times for a variety of reasons. It was essential to work through the different versions of tract boundaries and identify the boundaries that corresponded to the ones that were used by the expert estimators during the estimation workshops. Figure 2 illustrates just one of the possible tract grouping scenarios. This tract index map was produced in 2002 and shows the North and Peel Assessment areas as a single grouping. The vintage of the tracts noted on the figure are significantly different than the timing of the estimation workshops in the case of the North and Peel assessments. Figure 2 accurately represents the tracts for the South and Selwyn assessment areas. The actual workshop dates that generated the estimates used in this compilation were; North (Feb. 28 - Mar. 2, 2004), Peel (April 16-18, 2005), Selwyn (Dec. 11-16, 2000) and South (Dec. 11-13, 2001). The process of confirming the tract identifications was achieved by comparing the tracts used by the estimators as determined by reviewing the original estimation coding sheets that were available in scanned PDF form from all the estimation workshops. In addition the calculation files used to determine the tract rankings in the original studies were used to confirm tract designations. This was done by comparing features such as contained surface area and number of MINIFLE occurrences along with other features that helped confirm the tract names.

The digital files defining the tract boundaries that were eventually selected occasionally were not topologically accurate. The primary problem with the topology was mismatching boundaries between tracts. These slivers caused by boundary gaps or overlaps were identified and corrected. All work was performed in GIS software using the Yukon Albers projection (see Appendix). This projection is an equal area projection that is best for any area based calculations which are common in the mineral potential analysis process. In the compiled version of the assessment tracts each tract is designated by its original tract number plus a prefix related to the original assessment (N=North, P=Peel, S=South and B=Selwyn). There were 398 tracts in the original four assessments (N= 108, P= 83, B= 131 and S= 76).

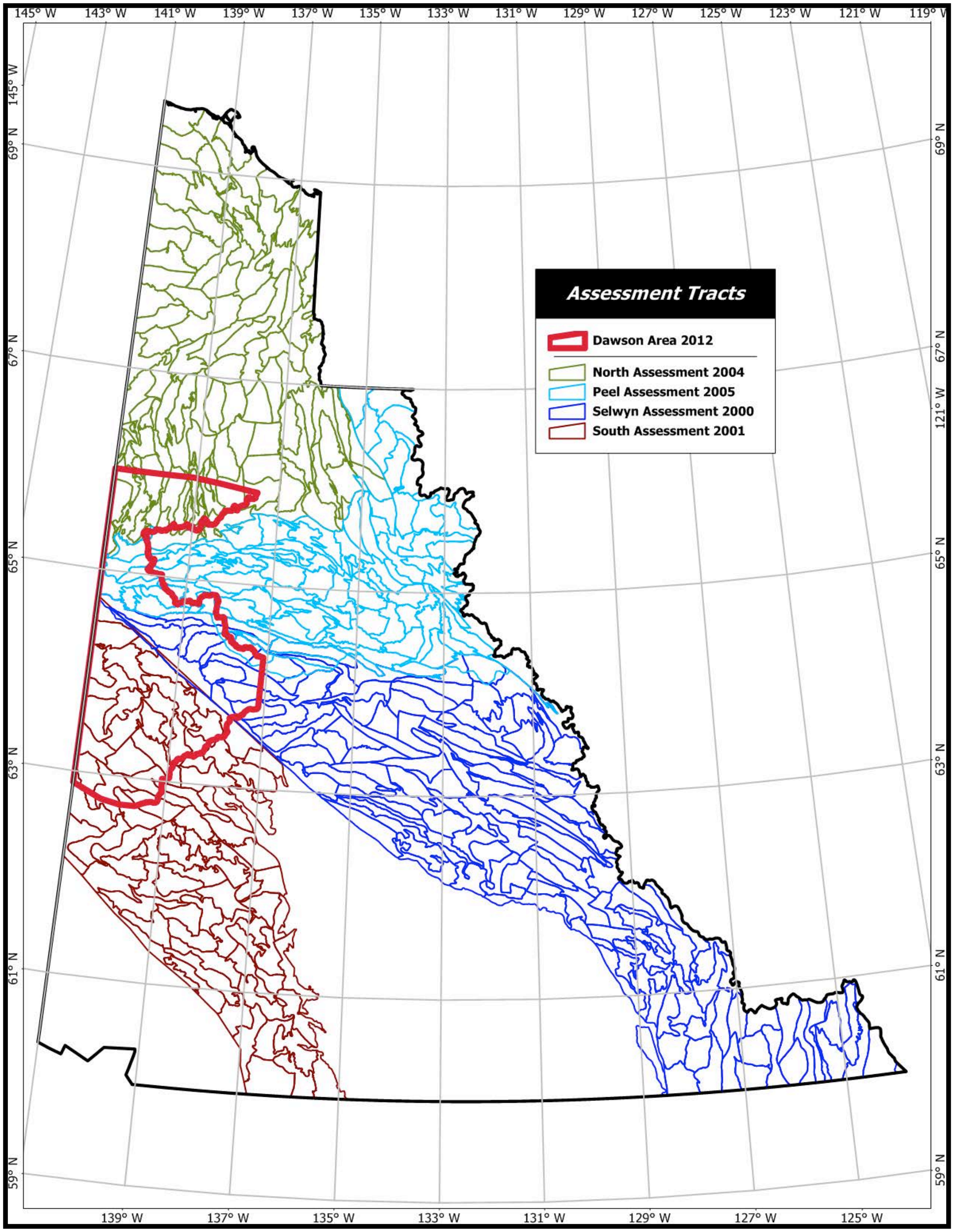


Figure 1. Tracts from the four original mineral potential assessments used in this compilation. Bold red outline is the Dawson assessment area.

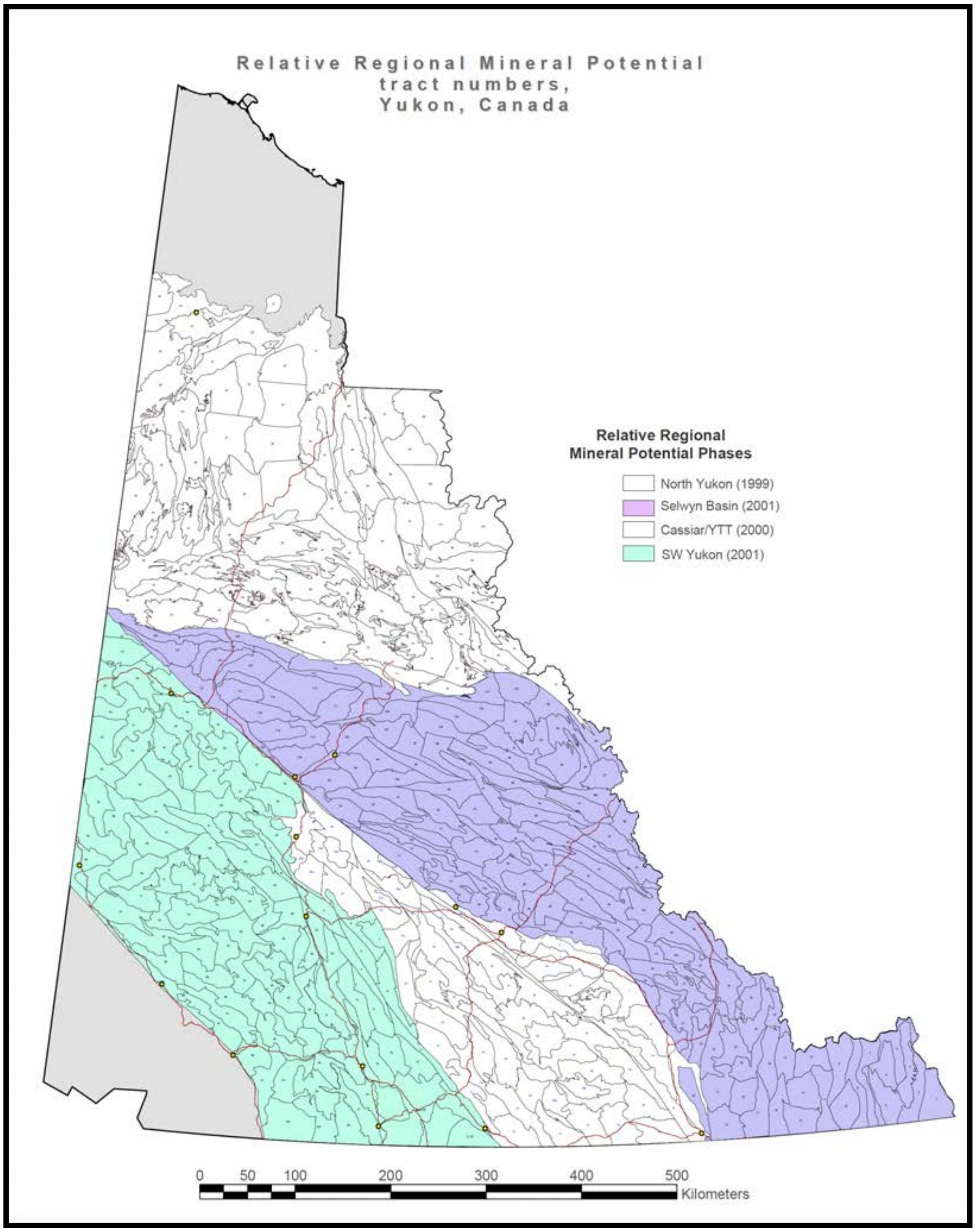


Figure 2. A historic display of early mineral potential tracts from several previous assessments. Some of these tracts are different in designation and shape from the tracts used in the present study.

All tracts from the original assessments that were wholly or partially included within the Dawson Assessment area were selected and retained for subsequent review. Figure 3 illustrates the tracts that met this criteria. This selection of tracts yielded 71 tracts from the four original assessment areas (N= 15, P= 15,B= 13 and S= 28).

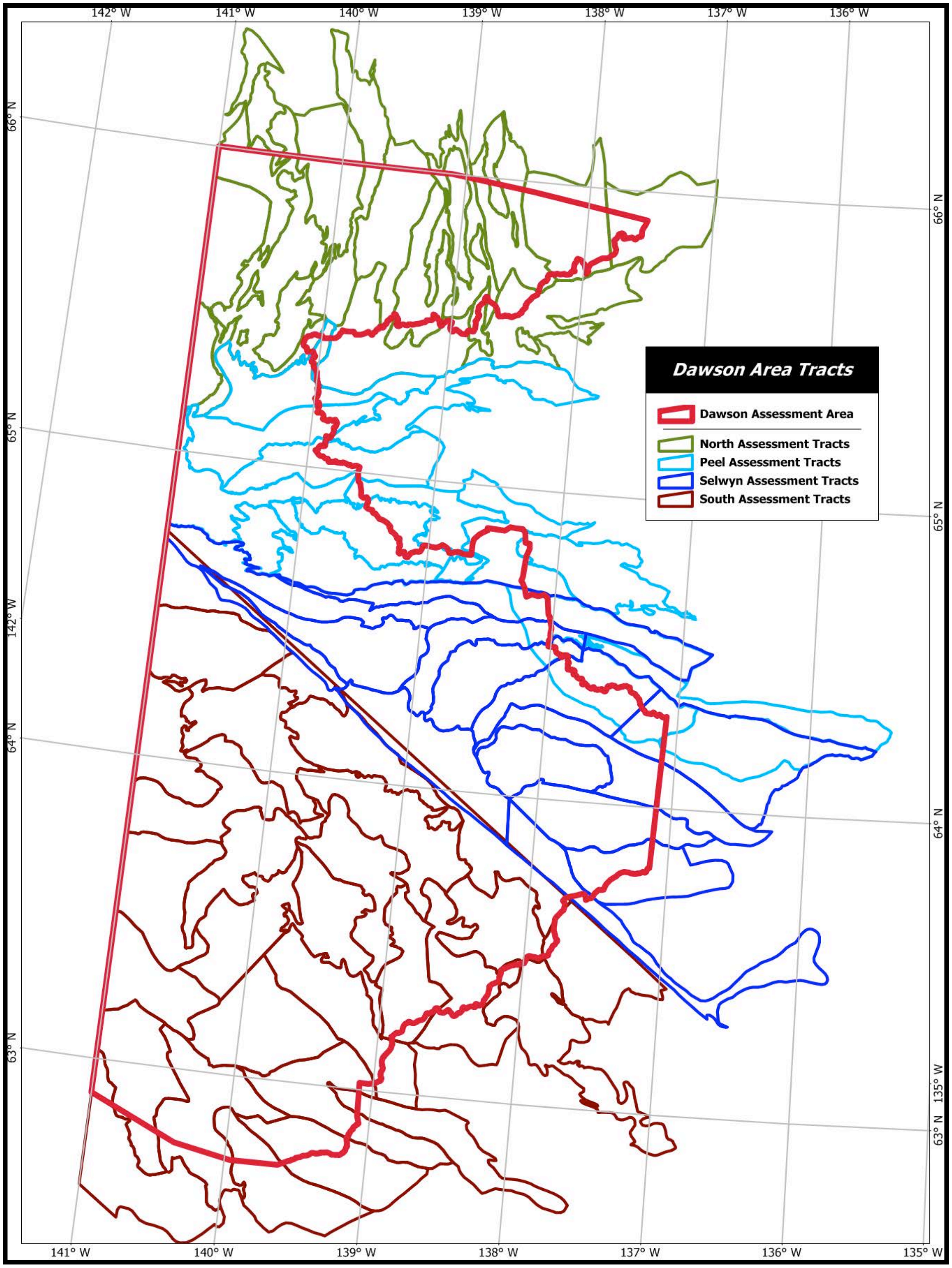


Figure 3. Display of the tracts wholly or partially included in the Dawson area.

Tract overlaps were present between the Peel-Selwyn and Selwyn-South assessment areas (Figure 3). In the case of the Selwyn-South boundary the overlap was minor. The boundary was likely intended to coincide with the Tintina Fault. Tract selection for each of these assessments occurred about one year apart with the result that the actual location of this common bounding line did not fall in exactly the same position. In this case the original boundaries for the Selwyn tracts were used as the boundary and the affected South tract boundaries were adjusted to coincide with the Selwyn tract boundaries. The Selwyn tract boundaries were selected primarily because they were more related to geological features than the very straight South boundary.

The overlap between the Peel and Selwyn assessment areas was considerably more complicated. The Peel estimates were made in 2005 and were newer than the Selwyn estimates that were made in 2000. There are 3 Selwyn tracts affected by Peel overlaps (B115, B122, B123). The overlaying Peel tracts are (P34, P35 and P53). P59 also overlays some Selwyn tracts but there were no estimates made for this tract so it has been disregarded (Figure 4).

Within the Dawson assessment area the Selwyn tract shapes are retained and any influence from the Peel assessments are combined with the Selwyn tract values to form composite values for the Selwyn tracts. The proportions of the Selwyn and overlapping Peel tract that occur within the Dawson assessment portion of the three Selwyn tracts are;

B115 = B115*.60800981 +P35*.36063008 +P34*.0313601
B122 = B122*.715221346 +P35*.2847786539
B123 = B123*.94031794 +P53*.059682057

These proportions are used to arrive at the final values for these Selwyn tracts in any calculations performed during the subsequent analyses.

There is only one tract combination where the same deposit type was estimated in both the Peel and Selwyn assessments. Polymetallic Veins were estimated in both B123 and P53. The Peel estimates were for fewer deposits in the tracts and the original tract sizes were similar with the result that the Selwyn estimates provided a slightly higher estimate for the Polymetallic Vein deposit type. As a result the Peel influence for this deposit type was not combined with the Selwyn values to avoid double counting; for this tract the more optimistic Selwyn values were retained.

For the other two Selwyn tracts combinations (B115 and B122) and all the other deposit types estimated for the overlapping Peel tracts, the Peel values were added to the appropriate Selwyn tracts in the designated proportions indicated in the above equations.

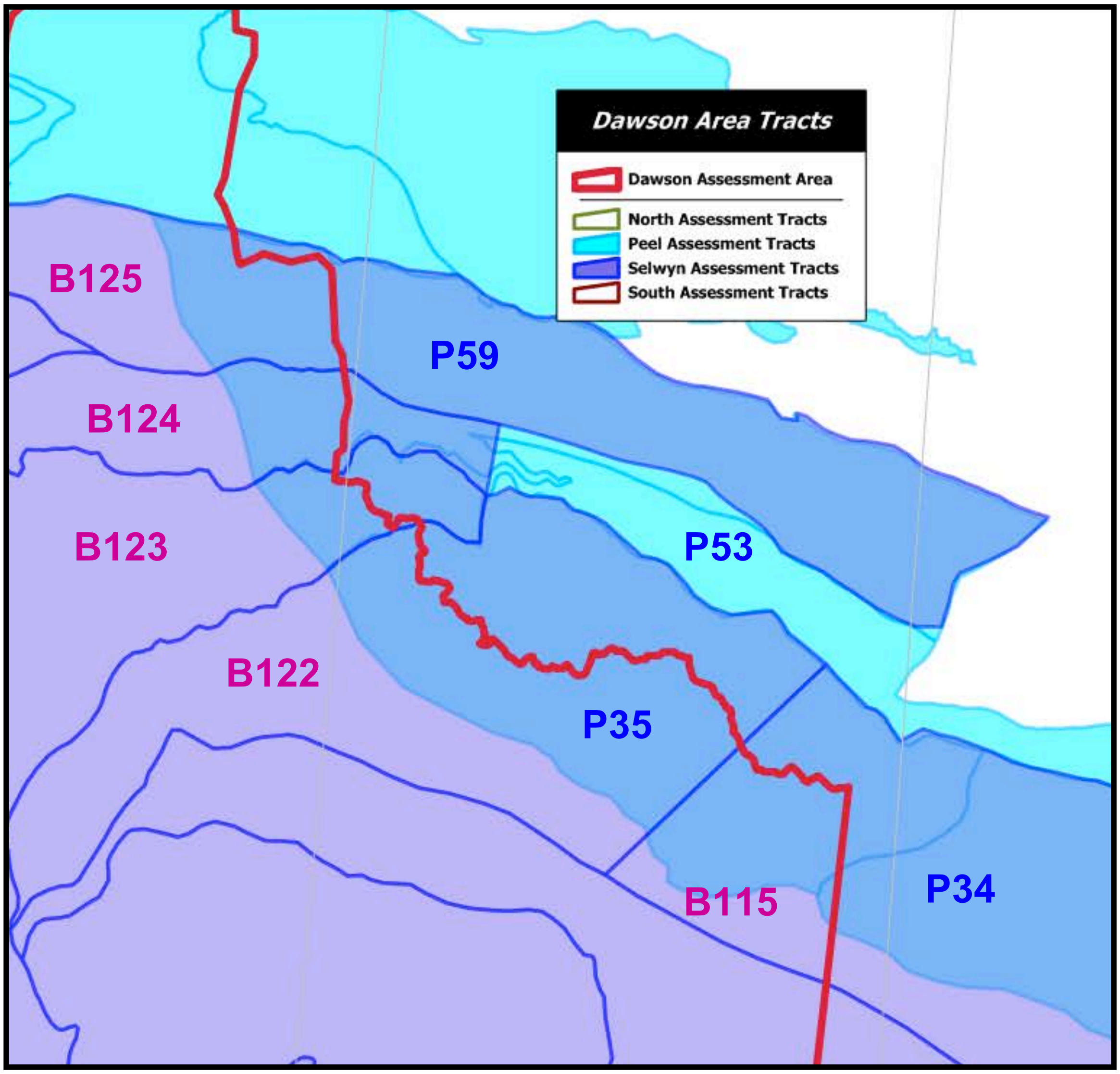


Figure 4. Display of the significant overlap that is present between the Peel and Selwyn assessment areas.

The result of reconciling all the overlaps between the original assessment areas and trimming the tracts to the Dawson Assessment boundary is displayed in Figure 5. There are several slightly different versions of the Dawson Assessment area outline. The one used in this analysis was dated 2011. There are 67 tracts in this final set that form the basis for the Dawson mineral potential assessment presented in this compilation. The tract names and their areas in square kilometres are shown in Figure 6. The digital version of this dataset forms the basis for all the digital maps which are available in the Digital Appendix (Shapefile section).

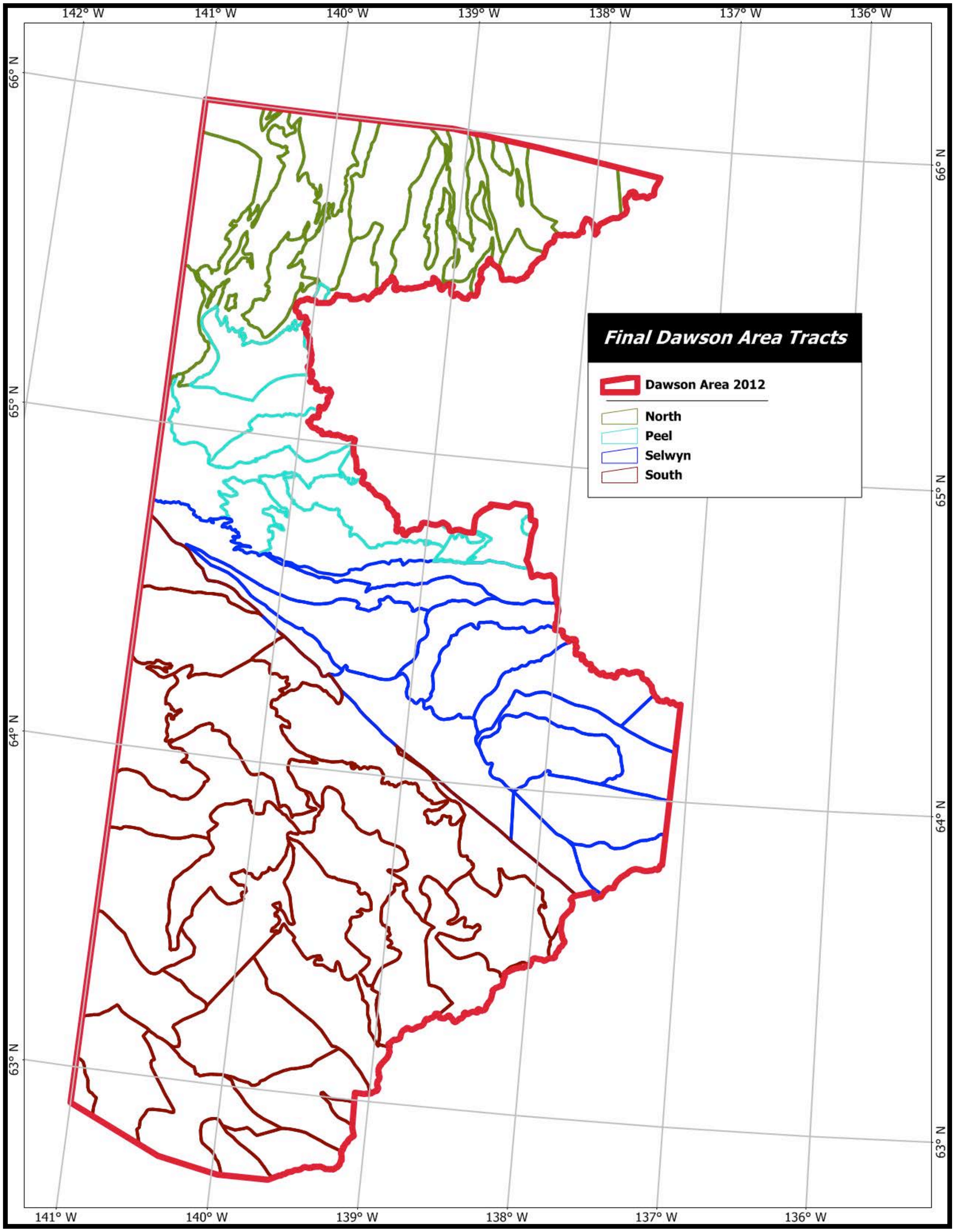


Figure 5. Display of the trimmed and topologically corrected tracts that comprise the Dawson mineral potential area.

TRACT	Tract Area		TRACT	Tract Area
B115	233.47		P54	345.48
B116	699.62		P62	22.67
B117	847.31		P63	876.63
B118	884.58		P64	337.32
B119	353.97		P65	156.74
B120	395.57		S27	1.27
B121	1199.07		S31	32.35
B122	810.42		S32	851.61
B123	859.55		S33	649.80
B124	610.79		S34	1241.92
B125	635.97		S35	988.47
B126	1346.80		S36	684.19
B127	1041.88		S37	1127.96
N1	733.15		S38	796.87
N10	489.75		S39	1208.39
N11	535.47		S40	1169.47
N13	21.79		S41	918.54
N2	930.93		S42	1146.67
N23	763.96		S43	875.72
N24	711.49		S44	891.22
N25	144.81		S45	971.98
N29	116.61		S46	763.66
N3	1144.39		S47	645.75
N4	455.76		S48	1036.13
N5	309.68		S51	54.21
N6	858.92		S52	949.77
N7	663.45		S53	1306.77
N8	598.12		S54	821.44
P3	690.30		S55	902.18
P37	842.26		S56	971.95
P38	620.12		S57	391.47
P40	490.95		S58	243.54
P41	769.50		S59	94.01
P42	0.24			

Figure 6. Tract names and their areas in square kilometres. The small areas associated with some tracts is due to them only partially being included in the assessment area.

Deposit Models

Deposit models or profiles are descriptions of classes of mineral deposits with similar characteristics. Deposit models are typically classified by the processes believed to be involved in the development of the deposit along with the actual physical characteristics of the deposit. Deposit models allow references to be made to a whole suite of deposits with a range of grades and tonnages but with a common metallogenetic origin and history. With respect to mineral potential analysis the deposit models provide a standardized set of potential deposit types which can be used by experts to form the basis for their estimates. Deposit models used in this process have a descriptive segment that documents the many attributes associated with the deposit type and a digital component that contains the grade and tonnage of known deposits that are part of the deposit model class. The digital deposit models were combined in the Mark 3B Monte Carlo Simulator with the expert estimator's opinion of the number of deposits yet to be found to calculate the mass of various commodities potentially to be discovered. Deposit models used in the Yukon Mineral Potential Assessments were obtained from a variety of sources, including Cox and Singer, 1986; Lefebure and Ray, 1995; Lefebure and Hoy, 1996; and Fonseca and Bradshaw, 2005.

There were thirty-five deposit types estimated in the original four mineral potential assessments that make up this compilation. In addition, one new deposit model that described the recently discovered White Gold deposit type was added. Some deposit models were used in multiple assessments but had slightly different digital components. For this compilation project it was essential to reconcile the deposit models from the four assessments so that they accurately represented what the expert estimators were considering during the expert estimation workshop.

The expert estimators are requested to only consider the median tonnage associated with each deposit model when making their estimates of the number of undiscovered deposits. Often a digital deposit model was adopted from one of the cited references above and then modified to provide a range of deposit sizes believed to be more appropriate for the particular assessment area being considered. This modification was usually done by removing deposits from the original model until the median deposit size was in an acceptable range. This process will reduce the potential size of an estimated deposit type from what has been discovered on a world wide basis. As part of the digital deposit model reconciliation process the median tonnages used in each of the four regional estimation workshops were compared to the median tonnages for the same deposit models used in the other three estimation workshops.

Occasionally the median tonnages noted in the historic files for the estimation workshops or in other notes did not correspond between assessment areas. However in some of these cases examination of the digital deposit models actually used in the Mark3B simulation process showed that the same digital deposit model was used in both assessments. It is difficult to reconstruct the complete history of the calculations and assumptions that were made during each of these earlier assessments. By examining the actual files used in their final calculations the results of earlier deliberations related to which model to use can be determined. All the models were examined in detail and if the median tonnage generated by the digital deposit model was similar to that proposed for the workshops they were considered equivalent for the reprocessing involved in the compilation.

DUMMY digital deposit models were created occasionally when no digital model was available from any other source for a deposit type under consideration. Sometimes the existing digital deposit models provided very different median values than desired for the Yukon so the DUMMY model was constructed to constrain the range of possible values generated by the Mark3B simulator. In some cases the actual digital data for a published model was not available but a chart of the grade and tonnage values was presented. These charts were then used to create a DUMMY model that roughly corresponded to the original information that the chart represented.

The actual data input files used in the original simulations were also examined. In some cases these files were found to be incorrect and were repaired for the reprocessing associated with this assessment. The fact that some of the original files were incorrect does not necessarily mean that the original assessments were inaccurate. It is very possible that any file errors discovered in this review were in fact discovered and corrected during the original assessments but that these corrected files have not been discovered during this review.

The thirty-five digital deposit models were reviewed and corrected where required. New Mark3B input files were calculated from these reviewed models using the Phase1.EXE program included with the Mark3B simulator. The basic digital deposit models are contained in the Digital Deposit Model section of the Digital Appendix. Each digital deposit model consists of two files a *.DEF and a *.DAT file. The *.DEF file is a text file that contains the model number, its name and a coded list of the commodities associated with the model. The *.DAT file is a tabular text file containing a list of all the known deposits that make up the digital deposit model. The deposits' tonnage and grade of each commodity are recorded in this file. Figure 7 shows examples of the *.DEF and *.DAT files for the MVT (Mississippi Valley Type) deposit model. This deposit's identification number is 5. The *.DEF file contains, in row order, the name of the associated *.DAT file, the associated *.BEM file, the model name and the number of commodities described in the model; the following rows contain the simulator commodity codes for deposit tonnage, grade of zinc, grade of lead and grade of silver. The *.DAT listing contains the information for each included deposit on each row. In column order the values are; abbreviated deposit name, tonnage of the deposit, grade of zinc, grade of lead and grade of silver. The BEM file is an intermediate file containing the relationships between the deposit size and commodity grades. It is used by the Mark3B simulator and is generated by the Phase1.BAS program from the *.DEF and *.DAT files.

To provide an understanding of the size and value of what a single deposit of each type would be the digital deposit models were processed through the Mark3B simulator with estimation values that created very close to a single deposit at 100% probability. These results were used to verify that the correct deposit model *.DAT and *.DEF files were being used and to provide an understanding of the size and value each deposit type. Figure 8 contains a listing of the deposit models used in the assessment. Included in the figure are the deposit name, deposit model number, expected mean tonnage from the simulator, median tonnage for use in the estimation process and the value of the deposit using the current pricing scenario (recent commodity prices). Figure 9 displays the type and amount of each commodity that would be expected from each of the deposit models. The commodity amounts are in tonnes of material and are the expected mean values generated by the Mark3B simulator.

***.DEF**

```
"5.DAT"
"5.BEM"
"mvt"
3
19
7
9
8
0
0
0
0
0
0
0
0
0
0
0
0
```

***.DAT**

```
MISS,1000000,0.600,2.000,0.000
OZAR,1090000,2.000,0.120,0.000
MONA,1490000,5.100,4.670,0.003
NEWF,4900000,7.700,0.000,0.000
ROBB,5500000,5.000,2.300,0.000
NANI,6400000,11.500,1.200,0.000
```

Figure 7. Display showing the format and contents of the basic digital deposit model files for deposit model #5 MVT (Mississippi Valley Type).

Model	Model Name	Mean Tonnes	Median Tonnes	Deposit Value
1	Carlin	13250280	6650000	$1,558,882,938
2	White Gold	50709560	17844000	$4,690,300,978
4	AltoFeYT	145136500	45000000	$3,730,297,350
5	MVT	3391531	3195000	$668,639,642
6	NICK	2750985	2500000	$6,370,818,897
7	Plutonic Au	53726490	16500000	$4,968,105,424
8	Polymetallic Manto	1810076	700000	$517,550,661
9	Polymetallic Vein	354603	160987	$177,547,935
10	Uranium Vein	1966350	700000	$325,193,836
11	Vein Barite	443544	110000	$52,698,590
12	SEDEX	59516750	14100000	$11,964,660,452
13	Copper Skarn	3532218	323514	$5,685,534,148
14	Stratiform Barite	11037410	1220000	$1,519,752,990
15	Tungsten Skarn	16568980	6000000	$251,244,382
16	PB/ZN Skarn	1918732	1261953	$781,251,007
17	Tin Vein	1641198	144306	$442,006,849
18	VMS Cyprus-Besshi	4522449	1500000	$938,265,129
19	Wernecke Bx	27430150	3450000	$4,508,759,490
21	Porphyry Mo	119827800	76750000	$3,945,899,523
22	Au Quartz Vein	978694	290751	$440,588,959
23	Podiform Chromite	126678	20000	$8,451
24	Redbed Copper	29500430	10000000	$4,509,668,456
25	Au Skarn	2427681	117526	$622,820,515
26	Tin Skarn	14158390	4000000	$755,647,100
27	Gabbro Ni-Cu	26049010	13800000	$6,653,075,024
28	Chromite Minor**	2166	105	$1,078
32	Porphyry Cu Mo	198288600	115000000	$7,659,695,273
33	Porphyry U	39784830	40250000	$16,358,278,140
35	Stibnite Veins	46872	4900	$19,659,334
36	Tin Manto and Stkwrk	10922460	5200000	$1,493,654,790
42	Carbonatite	18248990	16000000	$2,881,680,550
43	Copper-Gold Vein	2730970	500000	$18,543,170,116
51	VMS Kuroko	1104181	260000	$147,353,540
52	VMS Marg	3615245	2490000	$1,681,656,649
53	Blende Ag-PB-Zn	4086206	1300000	$5,102,541,781
54	Low S Epithermal	5520849	1080000	$3,045,015,393
55	High S Epithermal	2030599	368343	$618,937,984

Figure 8. Listing of all the deposit models showing their deposit number, name, expected mean tonnage, median tonnage and expected value using the Current price list. **Model #28 include in figure for discussion purposes only.

Model	Chromium	Copper	Molybdenum	Gold	Iron	Tungsten	Zinc	Silver	Lead	Nickel	Barite	Platinum	Tin	REOxide	Antimony	Uranium	Palladium	Niobium	Iridium	Rhodium	Ruthenium
1	0	0	0	25.99591	0	0	0	425.0235	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	103.369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	57389190.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	250723.2	6.664426	48416.49	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	106887.7	1.802389	0	0	52472.43	132.5829	0	105846	0	0.752374	0	0	0	0	1.021353	0	0.75779	0	0
7	0	0	0	109.4915	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	352.4543	0	2.180667	0	0	87790.59	115.4318	52472.84	0	0	0	0	0	0	0	0	0	0	0	0
9	0	492.2144	0	0.688817	0	0	10183.5	109.4969	9728.104	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4916.848	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	339990.9	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	3047954	1472.202	1731197	0	0	0	0	0	0	0	0	0	0	0	0
13	0	43372.58	0	0	0	0	0	5972.835	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	9804858	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	87663.47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	1361.878	0	0	0	0	240606	112.8332	61196.71	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	20049.09	0	0	0	0	0	0	0	0
18	0	82221.86	0	3.850446	0	0	21350.96	49.27478	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	362506.2	0	34.0229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	115472.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	205.0296	0	9.583429	0	0	11.82462	4.455987	29.54531	0	0	0	0	0	0	0	0	0	0	0	0
23	51568.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.08E-04	0	8.90E-04
24	0	486096.1	0	0	0	0	0	598.1095	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	1962.64	0	12.64577	0	0	0	36.94571	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0	34275.57	0	0	0	0	0	0	0	0
27	0	22169.98	0	0	0	0	0	0	0	288614.1	0	1.719905	0	0	0	0	2.332017	0	0	0	0
28	751.5021	0	0	0	0	0	0	0	0	0	0	1.78E-06	0	0	0	0	2.89E-05	0	1.05E-06	5.26E-06	7.07E-05
32	0	662473.6	23710.77	28.72928	0	0	0	142.7621	0	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247333	0	0	0	0	0
35	0	0	0	1.03E-02	0	0	0	0.168875	0	0	0	0	0	0	1464.738	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	67751.03	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0	0	129878.2	0	0	0	82333.73	0	0	0
43	0	164.5148	0	13.15098	0	0	764.8087	228.6568	0	0	0	0	0	0	0	0	2207.021	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2227.948	0	0	0	0	0
52	0	32367.15	0	4.050915	0	0	251952.7	580.9849	70074.13	0	0	0	0	0	0	0	0	0	0	0	0
53	0	7025.09	0	3.169688	0	0	269090.9	4219.146	238866.8	0	0	0	0	0	0	0	0	0	0	0	0
54	0	4282.385	0	22.02934	0	0	58379.69	2024.651	32899.39	0	0	0	0	0	0	0	0	0	0	0	0
55	0	104.0128	0	10.23082	0	0	474.3963	167.7146	1382.149	0	0	0	0	0	0	0	0	0	0	0	0

Figure 9. Listing of the deposit models and the expected mass of commodity associated with a single deposit of each type.

Most of the digital deposit models found in the existing files matched very well with the lists of median tonnage that were provided to the original assessment workshops. In a few cases there were discrepancies between the suggested median tonnage values likely used in the workshops and the median tonnage values generated by the deposit models found in the historic files. The following section discusses the most significant of these discrepancies and the resolution used in this study.

Tin veins were described by two models in the historic files, Sn Veins and Sn-Ag Veins. The digital deposit model for Sn-Ag Veins contained no silver values. The median tonnage provided in the Selwyn estimation workshop for the Sn-Ag Vein model matched the Sn Vein model that was used in the South estimation workshop. As a result the estimates for the Sn-Ag model were converted to Sn Vein estimates.

The historic Podiform Chromite digital deposit model was incomplete and did not contain any of the secondary commodities associated with this deposit type. A new digital deposit model was located in the USGS (2000) release of the Mark3 simulator and it was used in place of the original Podiform Chromite model. The USGS model provided smaller commodity values but examination of Figure 8 shows that the value of a single deposit would only differ by about $7000. When this value is normalized by the tract area the difference would be insignificant. Further, the model was only estimated for one tract and would therefore have no impact on the tract rankings.

The Wernecke Breccia model was estimated in the North and Peel assessment areas. In both cases the median tonnage provided to the expert estimators at these workshops was 8 million tonnes. The digital deposit models found in the historic files provided a median tonnage of 3.45 million tonnes. The expected mean tonnage that this digital model generated was 27.4 million tonnes (Figure 8). This suggests that even though the median values were different the resulting simulator output was in line with the typical mean to median relationship found in most models.

The Gabbroic Ni-Cu digital deposit models found in the historic files generated a significantly larger median tonnage than what appears to have been used by the expert estimators in the South estimation workshop. The median list that appears to have been used during the estimation workshop documents a median deposit size of 700 000 tonnes; in contrast the digital deposit model has a median tonnage value of 13.8 million tonnes. The value of a single deposit of this size is about $6.6 billion. The fact that the Gabbroic Ni-Cu digital model is a modified version of the USGS Dunitic Ni-Cu model (Cox and Singer, 1986) that had a median tonnage of 29 million tonnes suggests that the digital deposit model that was found in the historic files and used in this compilation were in fact the model that was used in the original assessment workshops.

A new digital deposit model was created for the White Gold deposit type. This recently discovered deposit type does not have an established deposit model as yet. It was desired to include this new deposit type in this compilation and a digital deposit model was required to perform the expert estimation and Mark3B simulation. Grade and tonnage data was only available for one deposit, the White Gold deposit. The published grades and tonnages for this deposit were very close to the median tonnage and grade of the existing Plutonic Au deposit type. The White Gold values were added to the Plutonic Au values to create the new White Gold digital deposit model. The new White Gold model generated slightly smaller values than the Plutonic Au model (Figure 8). The White Gold model was used in the White Gold estimation workshop held in 2012.

Estimation Process

An essential part of the mineral potential evaluation process is the collection of expert opinion on the future discoverability of mineral deposits throughout the assessment area. It is desirable to have multiple experts providing input on each deposit type in each tract. It is also desirable to have the experts share their knowledge and insight relative to the deposit types and specific areas being examined. The most efficient method to achieve these goals is through estimation workshops. Typically a workshop involves a group of industry and government experts exchanging ideas about a specific deposit type and the tract they are examining. They would be supplied with all pertinent information that an exploration geologist would utilize in the search for mineral deposits. The expert estimators also bring to the table their collective knowledge that will include information not in the public domain. After they have exhausted their discussion on the feasibility of there being undiscovered deposits of the specific type in question existing within the tract in question, they independently each make their estimate of the number and likelihood of undiscovered deposits of a particular type existing in that tract.

Each estimator fills out an estimation coding sheet (Figure 10), in confidence. For each tract-deposit type each estimator fills out one coding sheet. Initially the estimators will fill in the general information such as their name or initials, the date and time, the tract being estimated and the deposit type being considered. The three other sections of the coding sheet are filled out in whatever order is most convenient to the estimator.

The Estimate Scale portion of the sheet is where each estimator records an estimation of the number of deposits of the specific type that could exist within the tract being evaluated. A structured procedure is followed to arrive at this estimation. Each estimator mentally envisages a deposit of the type being evaluated with a size equal to the median deposit size for that model. The first question to be answered is "how confident am I that there is at least one deposit of the median size to be found in the tract". The estimator would then put a mark on the Estimate Scale somewhere between 100% and 0% with a number above the mark representing the number of deposits the mark represents. It is acceptable to have more than one deposit in the initial position but usually it will be one. Each estimator is reminded not to think of actual percentages but rather just to place a tick mark between the two limits based on their feeling of the probability. It has been found that more accurate information is obtained using ungraduated scales such as this rather than having a scale with the percentages marked off along its length (Acquired Intelligence Inc., 1993). Next each estimator would ask themselves "how confident am I that there are at least two deposits yet to be found in the tract". The appropriate mark would then be placed along the scale and with the designated number of deposits associated with that mark. This process continues until each estimator has reached the maximum number of deposits that could possibly exist within the tract. Finally the estimator may designate a probability beyond which it is considered that there are zero deposits existing within the tract. This mark would be designated with a zero. This zero deposit mark is not required but may be included to constrain the possibility of a deposit being considered beyond a given probability.

The central input area is used to provide input on each estimator's confidence in the other expert estimators involved in the estimation process. These confidence scores are only for the tract-deposit type combination being coded. This allows for feedback on each estimators knowledge related to the tract and deposit type in question. The sum of the points distributed between the other estimators should equal 100. This information is used to weight the estimates for each tract-deposit type combination when averaging all the estimators values. Each coding sheet will have weighting points totaling 200,one hundred for the estimator and a total of 100 spread out over the other 4 estimators.

The lowest input area of the coding sheet is used to collect the estimator's confidence about the estimate they have just made. The confidence will vary with their familiarity with the deposit type and the tract as well as the information available on the tract. It is recorded with a simple mark along the scale.

Figure 11 is an example of a coding form completed during the South Assessment in 2001 by Rob Carne. Even though the number of deposits are not noted above the estimation tick marks it can be assumed that they represent at least one deposit at about 85% probability, at least 2 deposits at 60% probability and at least 3 deposits at about 45% probability. From the estimator weightings he has coded it is apparent that for this deposit type and tract he felt Al Doherty had a greater knowledge than the other estimators. His confidence in his estimate for this tract-deposit type was about 1/3 the way along the scale. These confidences only have meaning when considered relative to all the other confidence scores the estimator makes. Until the whole population of confidence values is examined the actual relative confidence of the estimator for this coding sheet cannot be considered high or low.

When all the estimators have completed filling in the coding sheets for a given tract-deposit type combination they are filed together for later digital coding, and the estimation process moves on to the next tract-deposit type combination where the process is repeated.

Estimation workshops were held for each of the four original assessment areas at different times and with different combinations of expert estimators. In these original four estimation workshops there were five estimators making estimates for each tract-deposit type combination. Through this process it can be seen that a great deal of expertise is applied to the estimate of each deposit type for all the tract in an assessment area. The White Gold estimation workshop involved three estimators.

The workshop for the North Assessment area was held between February 28th and March 2nd, 2004. Twelve of the tracts from the whole North Assessment area were wholly or partially included within the Dawson Assessment area and were included in this composite assessment.

The workshop for the Peel Assessment area was held between April 16 and 19, 2005. Fifteen of the Peel tracts were included within the Dawson Assessment area and are included in this study.

The Selwyn Expert Estimation workshop was held between December 11 and 16, 2000. There were five estimators involved for each tract - deposit type but one estimator was only present for one day and he was replaced with a different estimator for the rest of the workshop. Twenty-seven of the Selwyn tracts are involved in the Dawson composite assessment.

The South Expert Estimation workshop was held between December 11 and 15, 2001. Twenty-eight of the South tracts are included in the Dawson composite assessment.

On February 12th, 2012 a special estimation workshop was held to collect estimates for the White Gold deposit type. Three estimators were involved in this workshop and estimates were made for twenty-eight of the tracts used in the South Assessment.

Estimate Form - Peel River Assessment

Estimator Name:____________________ Date: April___ 2005 Time:______

Tract #:______ Deposit Type________________________

Estimate Scale

1.0 100% — 0.0 0%

Weight for yourself	100	Name:______________
	+	
Weight for Associate Estimator		Name:______________
	+	
Weight for Associate Estimator		Name:______________
	+	
Weight for Associate Estimator		Name:______________
	+	
Weight for Associate Estimator		Name:______________

Tract Confidence

1.0 100% — 0.0 0%

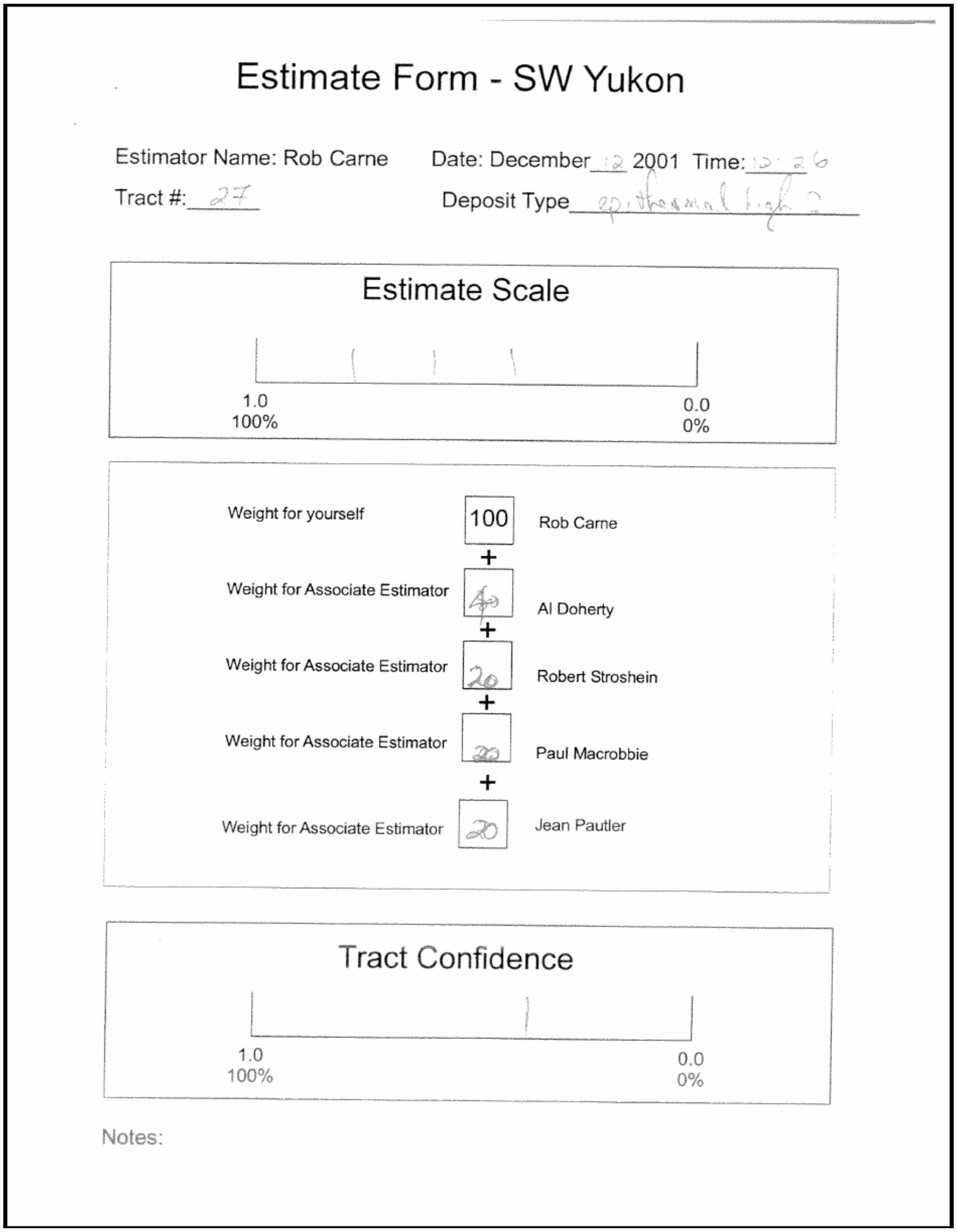
Notes:

Figure 10. An example of an estimation workshop coding form.

PROCESSING

Estimate Processing

The estimator's coding sheet are digitized and compiled into a standardized data text file format. A single record in this file contains all the pertinent information from the workshop coding form. Figure 11 is an example of a completed coding form. All the coding forms related to the Dawson assessment are contained as PDF files in the "Coding Sheets" portion of the Digital Appendix.



Estimate Form - SW Yukon

Estimator Name: Rob Carne   Date: December 12 2001 Time: 12:26

Tract #: 27   Deposit Type epithermal high ?

Estimate Scale

1.0
100%

0.0
0%

Weight for yourself	100	Rob Carne
+		
Weight for Associate Estimator	40	Al Doherty
+		
Weight for Associate Estimator	20	Robert Stroshein
+		
Weight for Associate Estimator	20	Paul Macrobbie
+		
Weight for Associate Estimator	20	Jean Pautler

Tract Confidence

1.0
100%

0.0
0%

Notes:

Figure 11. Coding form for a single deposit type for a single tract completed by one estimator.

Figure 12 illustrates a portion of the tabulation of all the estimation results from a workshop. The file format contains the tract id (column 3) followed by the deposit model code and the deposit model name. The estimator's initials and overall tract confidence follows. The following columns record the date of the estimate and the weights the estimator associates with each of the other estimators involved in the estimate. Following this are the estimated number of undiscovered deposits and corresponding probabilities.

The digital files containing the raw digitized coding from information for all the workshops are provided in the Digital Appendix in the Estimation Files section.

```
0,0,27,54,Low-S epithermal,AD,67.5369,12-Dec,am,25,RS,25,PM,25,JP,25,RC,0,,2,0,100,1,42.1299
0,0,27,54,Low-S epithermal,RS,46.9292,12-Dec,am,25,PM,25,JP,25,RC,25,AD,0,,2,0,100,1,4.7757
0,0,27,54,Low-S epithermal,RC,37.0883,12-Dec,am,40,AD,20,RS,20,PM,20,JP,0,,4,0,100,1,75.3286,2,61.9686,3,43.0711
0,0,27,54,Low-S epithermal,PM,63.4742,12-Dec,am,25,JP,25,RC,25,AD,25,RS,0,,3,0,100,1,49.5048,2,16.0893
0,0,27,54,Low-S epithermal,JP,83.7304,12-Dec,am,25,RC,25,AD,25,RS,25,PM,0,,2,0,100,1,19.5742
0,0,27,55,High-S epithermal,AD,78.7241,12-Dec,am,25,RS,25,PM,25,JP,25,RC,0,,3,0,100,1,80.4408,2,59.9273
0,0,27,55,High-S epithermal,RS,53.3458,12-Dec,am,25,PM,25,JP,25,RC,25,AD,0,,4,0,100,1,31.9778,2,14.4694,3,3.9404
0,0,27,55,High-S epithermal,RC,37.503,12-Dec,am,40,AD,20,RS,20,PM,20,JP,0,,4,0,100,1,77.3766,2,59.9516,3,41.4687
0,0,27,55,High-S epithermal,PM,64.5582,12-Dec,am,25,JP,25,RC,25,AD,25,RS,0,,6,0,100,1,69.6547,2,50.864,3,40.154,4,26,5,11.1368
0,0,27,55,High-S epithermal,JP,83.4659,12-Dec,am,25,RC,25,AD,25,RS,25,PM,0,,4,0,100,1,84.5077,2,19.4457,3,2.2737
0,0,31,7,Plutonic-related Au,AD,9.6791,14-Dec,am,25,RS,25,PM,25,JP,25,RC,0,,2,0,100,1,23.7555
0,0,31,7,Plutonic-related Au,RS,30.8821,14-Dec,am,25,PM,25,JP,25,RC,25,AD,0,,3,0,100,1,5.2061,2,0.7328
0,0,31,7,Plutonic-related Au,RC,2.4514,14-Dec,am,25,AD,25,RS,25,PM,25,JP,0,,2,0,100,1,3.5128
0,0,31,7,Plutonic-related Au,PM,28.9108,14-Dec,am,25,JP,25,RC,25,AD,25,RS,0,,2,0,100,1,7.0761
0,0,31,7,Plutonic-related Au,JP,29.7955,14-Dec,am,25,RC,25,AD,25,RS,25,PM,0,,4,0,100,1,54.1827,2,21.784,3,2.4515
0,0,31,9,Polymetallic veins,AD,16.4519,14-Dec,am,25,RS,25,PM,25,JP,25,RC,0,,2,0,100,1,19.8384
0,0,31,9,Polymetallic veins,RS,22.492,14-Dec,am,25,PM,25,JP,25,RC,25,AD,0,,2,0,100,1,3.0832
0,0,31,9,Polymetallic veins,RC,2.5777,14-Dec,am,25,AD,25,RS,25,PM,25,JP,0,,2,0,100,1,7.6573
0,0,31,9,Polymetallic veins,PM,21.127,14-Dec,am,25,JP,25,RC,25,AD,25,RS,0,,2,0,100,1,10.6899
0,0,31,9,Polymetallic veins,JP,32.3728,14-Dec,am,25,RC,25,AD,25,RS,25,PM,0,,3,0,100,1,67.9048,2,7.4552
```

Figure 12. Partial listing of the digital representation of the estimator's coding form. Each record (line) corresponds to a single coding sheet. The highlighted record corresponds to the coding sheet in Figure 11.

The digitized coding sheet information was processed by a BASIC program named "Raw2Mark.bas". This program generated two output files. One of the files was the input file for the Mark3B simulator. The second file was a compiled estimate of the number of deposits expected at five confidence intervals (90%, 50%, 10%, 5%, 1%) for each deposit within each tract. The combined estimation uses a weighting process based on the weighting values coded by each estimator during the workshop. The calculations involved in the Raw2Mark program are described in Kilby, 2004. Figure 13 illustrates a portion of the deposit type probability file. It contains the tract id, the deposit type name and the number of potential deposits to be found in the tract at the five confidence levels of 90%, 50%, 10% 5% and 1%. The four records shown in the Figure 13 correspond to all the records shown in Figure 12.

```
27,Low-S epithermal, .2017108 , 1.129895 , 1.582726 , 1.592878 , 1.593333
27,High-S epithermal, .4178095 , 1.787932 , 2.968413 , 3.116516 , 3.166667
31,Plutonic-related Au, .1332326 , .6737248 , 1.292054 , 1.379767 , 1.588054
31,Polymetallic veins, .1519528 , .7074298 , 1.172233 , 1.196044 , 1.2
```

Figure 13. The records in this combined deposit type estimate listing

Deposit Distribution

A BASIC program (DEPNUM.BAS) was written to take the estimates from records like those displayed in Figure 13 and calculate the weighted average number of deposits the five confidence level values represent. The weighted average values was determined using the following formula that weighed estimated number of deposits at each probability level by the associated probability. These weighted values were then summed and normalized to a maximum value of one by dividing by 1.56, the sum of the pobabilities.

Depnum=(90%value.9+50%value*.5+10%value*.1+5%value*.05+1%value*.01)/1.56*

Division by 1.56 is required to result in a value of 1 when there is an estimate of at least one deposit at all five probability levels.

Figure 14 illustrates the output from this program and the records correspond to those shown in Figure 13.

```
S27,Low-S epithermal, .6412417
S27,High-S epithermal, 1.12457
S31,Plutonic-related Au, .4300295
S31,Polymetallic veins, .4355756
```

Figure 14. Output from the DEPNUM program that calculates the weighted number of deposits expected from the estimator's assessment for each tract.

The calculated number of deposits of each type in each tract were used to map the distribution of each deposit type within the Dawson Assessment Area. The actual values are provided in a GIS format (Shapefile) in the Digital Appendix, Shapefiles section (Deposits_by_Tract). Figure 15 is an example of the deposit type distribution maps, in this case for the Low Sulphidation Epithermal deposit type. The map displays for each deposit type similar to that in Figure 15 show the relative ranking of the tracks by the number of deposits of each type per unit area.

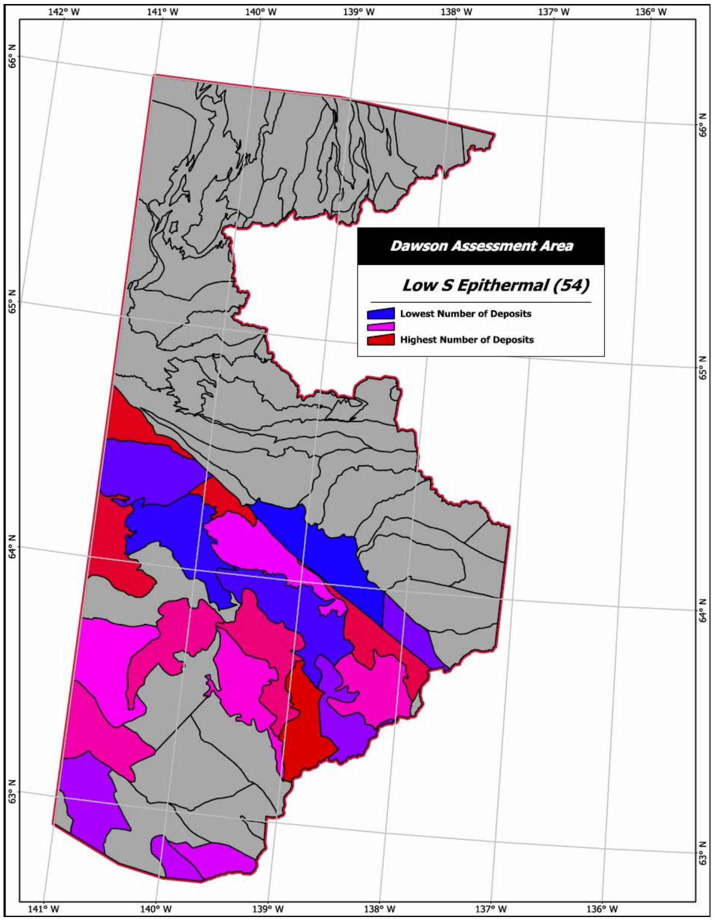


Figure 15. Distribution of the low sulphidation epithermal deposit type within the Dawson area. Colours represent the relative number of deposits per unit area. Gray tracts have no deposits of this type estimated.

Similar maps for all the deposit types are provided as PDF files in the Appendix: Deposit Distribution Maps. In addition to a map for each of the deposit types there is one for the total number of deposits of all types estimated.

Mark3B Simulation

The MARK3 Monte Carlo Mineral Resource Simulator has been utilized in a wide range of resource evaluation projects including metallic and industrial minerals, sand and gravel and oil and gas. The results have been used for a variety of purposes including land use planning, strategic commodity assessment and global resource calculations. The Mark3B simulator used in this study and the previous four mineral potential assessments is a Microsoft QuickBasic version created prior to 1990 by the USGS and publicly described by Root, et al, 1992. The program used in the previous assessments and this assessment was obtained from the BC Geological Survey which in turn received it from Root. Since this QuickBasic version was created versions that run on Macintosh (Root, et al., 1998) computers and more recently the Microsoft Windows operating systems (USGS, 2000) have been released. The early MARK3B version was used in this study to maintain continuity with the previous regional assessment studies. However, this version only runs on 32 bit operating systems and adheres to MS DOS naming conventions. During this study this program was run under a NT Virtual Machine to overcome these constraints. Any future assessments should strongly consider moving to the Windows version of the software (USGS, 2000).

The Raw2Mark.BAS program described above created an input file for the Mark3B simulator from the original file containing the estimation information from the estimation workshops. This input file allows the Mark3B to be run in a single batch operation rather than inputting the information for each tract-deposit type combination manually.

Simulation Results

Output from the Mark3B Mineral Potential Simulator is a tabulation of the commodity amounts associated with each deposit type in each tract. The tabulation includes the average amount of each commodity plus the amount of commodity expected at the 5 probability levels of 90%, 50%, 10% 5% and 1%. The tonnage of material containing the economic commodities is also included. This tabulation file is output from the simulator with the name "SIMTOT.ALL". Figure 16 is a partial listing of one such file.

```
27,7,GOLD, 125.7032 , 14.12791 , 73.95529 , 271.9983 , 374.8987 , 822.2108
27,7,TONNES, 6.154638E+07 , 5635727 , 2.475563E+07 , 1.585246E+08 , 2.043167E+08 , 2.433254E+08
27,13,COPPER, 46054.04 , 788.9232 , 5505.529 , 135602.3 , 253316.2 , 538486.6
27,13,SILVER, 6035.695 , 0 , 0 , 6393.91 , 33640.11 , 148260.9
27,13,TONNES, 3670155 , 48383.86 , 345282.1 , 1.011328E+07 , 2.429504E+07 , 3.899917E+07
27,17,TIN, 20222.64 , 248.7372 , 2401.177 , 61801.92 , 90370.75 , 166214
27,17,TONNES, 1690055 , 21930.93 , 171220.6 , 5496031 , 7101947 , 1.185759E+07
27,22,COPPER, 351.2049 , 0 , 0 , 170.6467 , 1868.486 , 7485.296
27,22,GOLD, 13.29482 , .8266994 , 4.488104 , 31.7134 , 58.61279 , 143.792
27,22,ZINC, 15.76723 , 0 , 0 , 54.3241 , 95.91898 , 206.4498
27,22,SILVER, 6.231028 , 0 , 1.510417 , 11.21201 , 24.55064 , 102.856
27,22,LEAD, 42.91769 , 0 , 0 , 116.6961 , 190.7811 , 687.0623
27,22,TONNES, 1430628 , 95998.19 , 498240 , 3271188 , 7624939 , 1.487634E+07
27,27,COPPER, 23255.96 , 0 , 1624.073 , 75743.68 , 133384.9 , 259677.8
27,27,NICKEL, 296079.6 , 17857.03 , 146176.9 , 800720.5 , 1139644 , 1853123
27,27,PLATINUM, 1.857668 , 0 , 0 , 0 , 19.47058 , 39.18702
27,27,TONNES, 2.633742E+07 , 1835883 , 1.444163E+07 , 7.06967E+07 , 8.650515E+07 , 1.085454E+08
27,27,PALLADIUM, 2.547297 , 0 , 0 , 11.02258 , 18.1764 , 29.8621
27,32,COPPER, 637083.5 , 46910.51 , 303696.1 , 1535773 , 2862341 , 5204210
27,32,MOLYBDENUM, 23096.24 , 0 , 3756.917 , 64177.49 , 110588 , 265652
27,32,GOLD, 30.05822 , 0 , 0 , 71.24353 , 120.2872 , 489.4889
27,32,SILVER, 129.8782 , 0 , 0 , 264.2289 , 723.3212 , 2110.84
27,32,TONNES, 1.972389E+08 , 1.586523E+07 , 9.812781E+07 , 5.338523E+08 , 1.008848E+09 , 1.463223E+09
27,35,GOLD, 1.846416E-02 , 0 , 2.996423E-04 , 5.599488E-02 , 7.961394E-02 , .1595048
27,35,SILVER, .294695 , 0 , 3.35338E-03 , .9711879 , 1.280238 , 2.119483
27,35,TONNES, 83408.28 , 253.3013 , 78925.61 , 190127.3 , 239652.3 , 302418.4
27,35,ANTIMONY, 2684.13 , 85.79432 , 1922.607 , 7182.146 , 8858.32 , 12222.57
```

Figure 16. Partial listing of the output from the Mark3B simulator (SIMTOT.all file). This listing shows the results for tract #27 and included deposit types 7, 13, 17, 22, 27, 32 and 35.

The first column contains the tract id, the second the deposit model number, the third the commodity name, the fourth the average expected mass of the commodity followed by the 90%, 50%, 10%, 5% and 1% mass of the commodity. The mass of commodities is in tonnes.

Commodity by Tract

The BASIC program "COMSUM.BAS" was written to sum the amounts of each commodity in each tract. This summation process produced two output files, one based on the average expected mass of commodity and the other based on a weighted summation of the commodity from the five confidence levels.

The weighted confidence level calculation was based on the following equation; *MASS= (90% value*.9+50%value*.5+10%value*.1+5%value*.05+1%value*.01)/1.56.* The total mass of each commodity for each tract was then normalized for comparative purposes by dividing by the area of the original workshop tract. The resulting value of tonnes per square kilometre was then mapped against tracts within the Dawson Assessment Area. In the few cases where there were discovered deposits within the tract the amount of commodity associated with these discoveries was added to the estimated totals as an additional calculation. To normalize the discovered commodity masses they were divided by the area of the tract contained within the Dawson Assessment Area. Figure 17 contains the relative distribution of gold within the Dawson Assessment area. Similar maps were constructed for all the commodities possible from all the deposit types. These maps are provided in the Appendix: Commodity Distribution Maps section of this report. The digital file containing the actual amounts of the commodities in a GIS format is contained in the Commodity_by_Tract shapefile in the Shapefile section of the Digital Appendix.

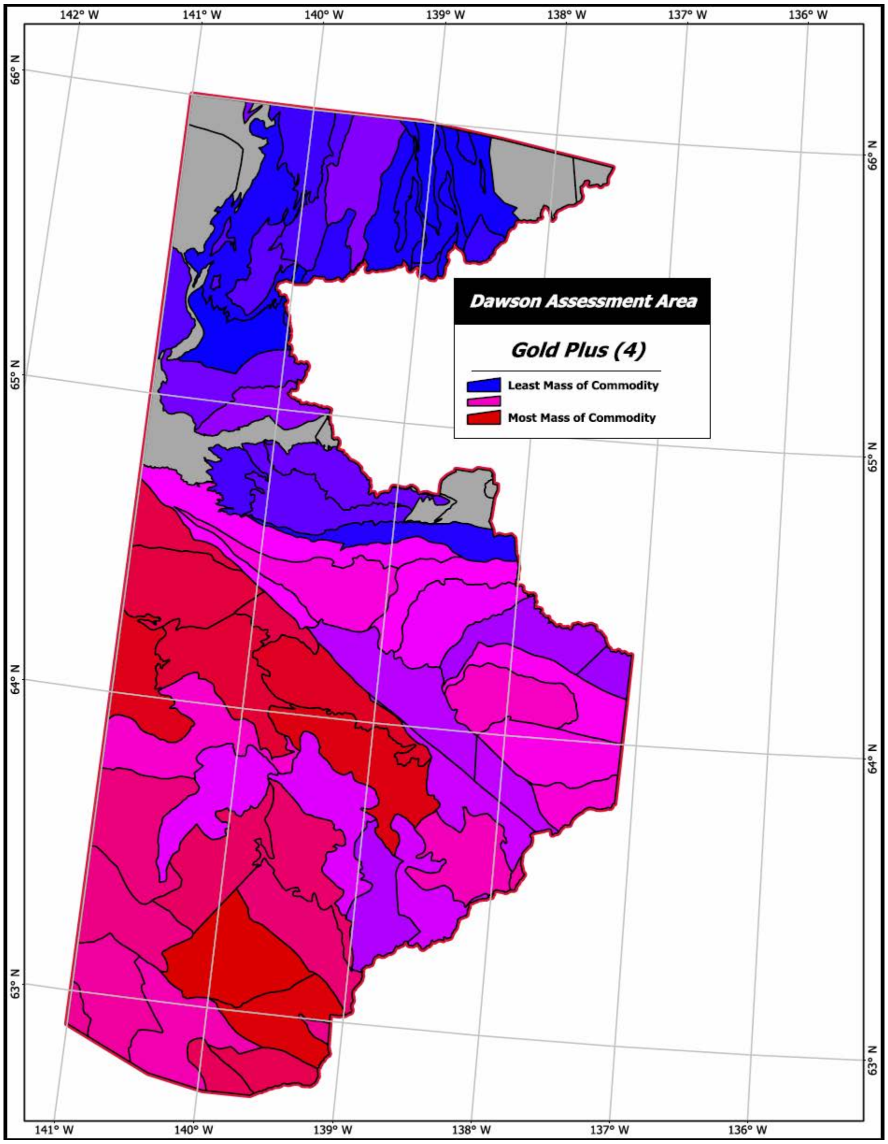


Figure 17. Relative distribution of Gold within the assessment area. The Plus designation indicates that this map includes the estimated plus known commodity amounts. Grey tracts contain no estimates.

Maps such as these are useful in identifying areas that are prospective for a given commodity.

GIPV by Tract

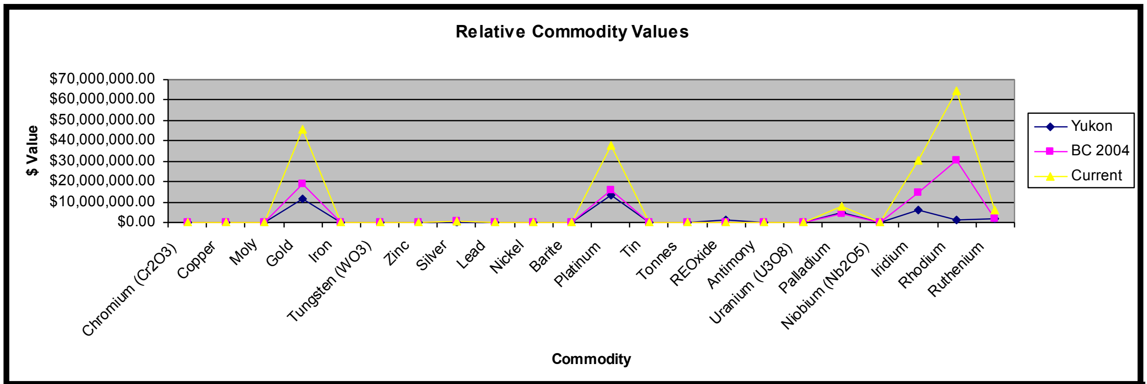
The estimation workshops generate the number of deposits of each deposit type that are expected to occur within each tract. When these estimates are processed through the Mark3B Mineral Potential Simulator the result is the expected mass of each commodity expected to occur within each tract. The combined dollar value of all of the commodities in each tract is used to establish a single gross in-place value for each tract (GIPV).

The market value of commodities constantly changes over time as a result of the changing supply and demand of these commodities. In the previous four mineral potential assessments a ten-year average value of each commodity was used to achieve a relatively stable relationship between the values of the commodities. The ten-year prices between 1988 to 1998 were used in calculating the prices for most of the commodities on the Yukon commodity price list. Uranium and Barium Sulphate were the two exceptions to this date range. Uranium price was calculated over the years 1989 to 1999 and BaSO4 was calculated from the yearly prices between 1995 and 1999. It is unclear if the annual commodity prices in this list were adjusted to a single year to compensate for inflation. In this study it is assumed that they were normalized to 1994 dollars based on the Canadian Consumer Price Index as was done in Kilby, 2004. The relatively low prices for the commodities on the Yukon price list are due to the general slump in commodity prices in the early to mid 1990s. In addition, the British Columbia commodity price list was available from Kilby, 2004. It was calculated over the years 1981 to 1990 and expressed in 1986 dollars. A current commodity price list was also created to examine the price variability in the recent past. Most of the values in this recent price list were for three years (2008 to 2010) (J. Lewis, personal communication, 2012). For a few of the commodities in this current list no 3-year value was available so the current price as of January, 2012 was uses. The values in this list are considered to be in 2011 dollars. Figure 18 contains the dollar values in these three commodity price lists. The three lists of prices are expressed in different dollar values. To adjust the commodity prices to current dollars by adjusting for inflation based on the Canadian Consumer Price Index would require the BC 2004 values to be multiplied by 1.828 and the Yukon values to be multiplied by 1.399.

Figure 19 compares the values of commodities between the three price lists. The upper portion of the figure shows the relative values in dollars and the lower portion displays the same information but with the logs of the dollar values so the ranges between all the commodities can be compared. These figures show that even though the values of the commodities have changed significantly over time the values relative to the other commodities have in most cases remained remarkably consistent. The major differences are found with Rare Earth Oxides and Rhodium. This is not surprising when considering world supply and demand for these elements and the rise of technologies dependent on these elements in the last 20 years.

Commodity	Code	Yukon	BC 2004	Current
Chromium	1	$75.20	$91.81	$350.00
Copper	2	$2,338.50	$2,489.07	$8,179.15
Molybdenum	3	$8,480.30	$13,222.02	$34,171.65
Gold	4	$11,612,408	$19,154,003	$45,374,348
Iron	5	$49.00	$35.00	$65.00
Tungsten	6	$7,544.90	$8,134.00	$2,866.01
Zinc	7	$1,195.50	$1,175.88	$2,204.62
Silver	8	$156,761.70	$415,463.50	$892,504.70
Lead	9	$609.40	$654.64	$2,270.76
Nickel	10	$6,685.30	$8,825.77	$22,134.41
Barite	13	$31.69	$31.69	$155.00
Platinum	15	$13,136,840	$16,070,651	$37,616,373
Tin	18	$4,955.40	$14,482.85	$22,046.23
Tonnes	19	$1.00	$1.00	$1.00
REOxide	21	$1,307,000.	$2,310.00	$129,000.00
Antimony	23	$2,506.20	$5,285.76	$13,000.00
Uranium	24	$23,355.50	$44,092.00	$66,138.68
Palladium	25	$4,643,301.	$4,125,382.	$8,037,687.
Niobium	35	$6,472.80	$5,777.00	$35,000.00
Iridium	36	$6,221,160.	$14,708,809	$30,543,209
Rhodium	40	$1,269,953.	$30,223,723	$64,301,492
Ruthenium	41	$1,875,031.	$1,758,905.	$5,787,134.

Figure 18. Listing of the commodities found in the deposit models used in this assessment. The commodity code in noted along with the dollar value of each commodity in each of the three price lists.



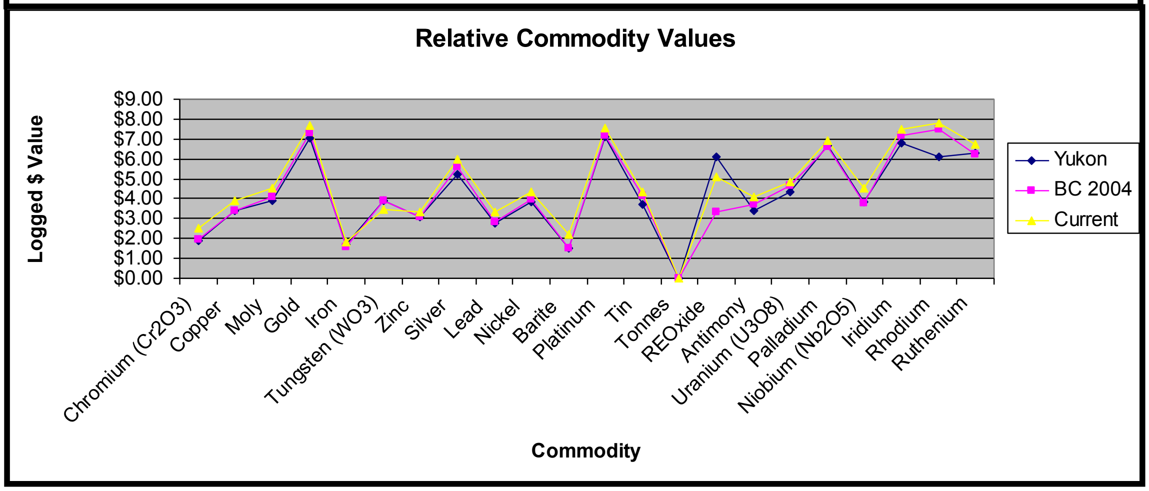


Figure 19. Graphs showing the relationships between the relative value of the commodities based on the three price lists. The lower graph is in logged dollar values.

A critical issue with regard to this mineral potential analysis is effect of these various commodity prices on the relative ranking of the tracts within the Dawson Assessment area. Figure 20 illustrates relative rankings of the 67 tracts based on the three pricing lists. The tracts were ordered based on increased value per unit area using the Yukon price list. Departure of the lines representing the BC 2004 and Current price lists from a continually increasing value from top to bottom highlights variations in the expected tract rankings. Figure 21 displays the distribution of tracts in the Dawson Assessment area ranked by the expected average gross in-place value (GIPV) of all the commodities contained in each tract under the three pricing scenarios. The distribution of high commodity value tracts and low commodity value tracts are fairly similar but there are some discrepancies.

The question then is which pricing scheme would be the best to use for calculating the relative values of the different commodities and thus the relative ranking of the land base with in the Dawson Assessment area. This is a subjective choice but since the mineral potential assessment is supposed to be a snap shot in time (current time) the Current price list has been used for the main ranking. However, ranking scenarios based on all three price lists have been calculated and are available in the digital files in the appendix.

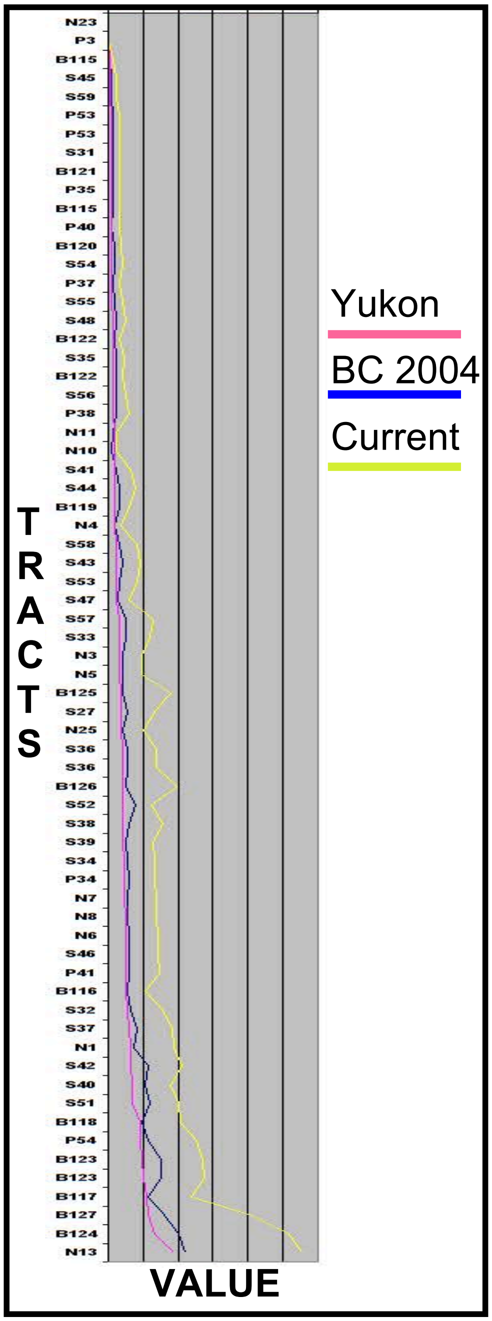


Figure 20. Graph showing the relative values of all commodities in each tract using the three different price lists. Each increment along the VALUE scale is $10,000,000.

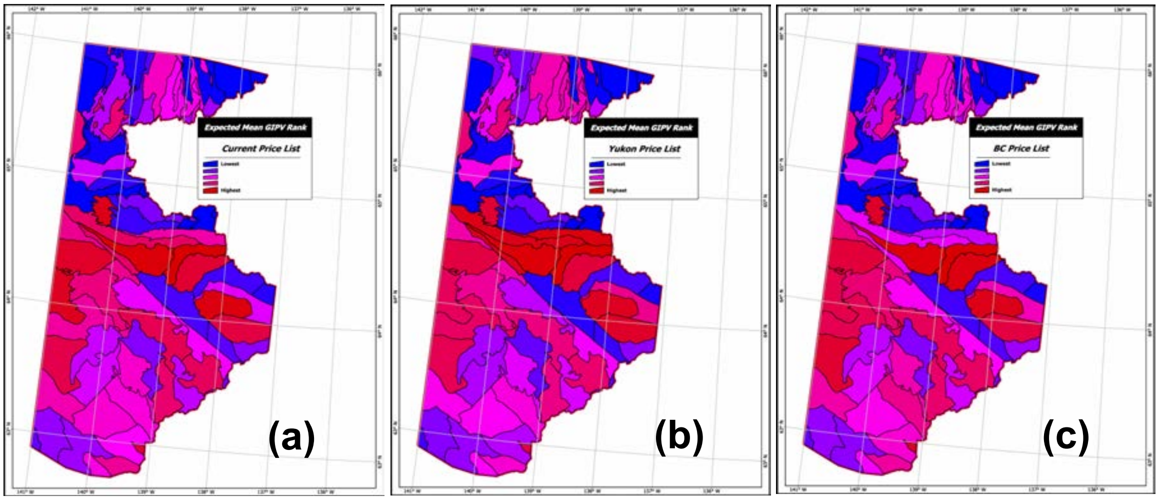


Figure 21. Maps showing the relative rank order of tracts based on the value of the expected mean amount of commodity using the three price lists.

RANKING BY GIPV

The gross in-place value of all the commodities in each tract is used to rank the tracts within the Dawson Assessment area relative to each other. The actual dollar values represented by these calculations are useful primarily for comparative purposes. Any use of the actual values must be made with a number of significant caveats including;
- the amounts of commodities estimated do not imply they would be economically extractable if discovered,
- the dollar values for each commodity will vary with time and the relative values of commodities will also vary,
- the amount of commodity actually recoverable may be significantly different from the in-situ estimated amount.

That being said the dollar value is still the best way to include all the commodities into a single value with which to compare the potential relative importance of each tract.

The Mark 3B simulation results can be examined in a number of different ways to evaluate the relative rankings of the tracts. The GIPV of all the commodities in each tract are available based on the following calculation methods;
- the expected average commodity value for each tract,
- the confidence weighted value for each tract,
- the commodity value for each tract at the 100%, 90%, 50%, 10%, 5% and 1% confidence levels and
- the unBiased rank calculation methodology of Kilby, 2004.

A comparison of the Expected Average GIPV ranking results using the three pricing scenarios is provided in Figure 21. This value is simply the value of all the commodities reported by the Mark3B simulator as the Expected Mean mass. Figure 22 provides a comparison of the three pricing scenarios using the Weighted Confidence Value calculation. This calculation weights each of the 5 GIPV values by their probability level and the sum of the five values is divided by 1.56. If any known commodities (100% probability) are present they are added to this total as shown in the following formula.

GIPV= 100%GIPV*1.0+(90%GIPV*.9+50%GIPV*.5+10%GIPV*.1+5%GIPV*.05+1%GIPV*.01)/1.56.

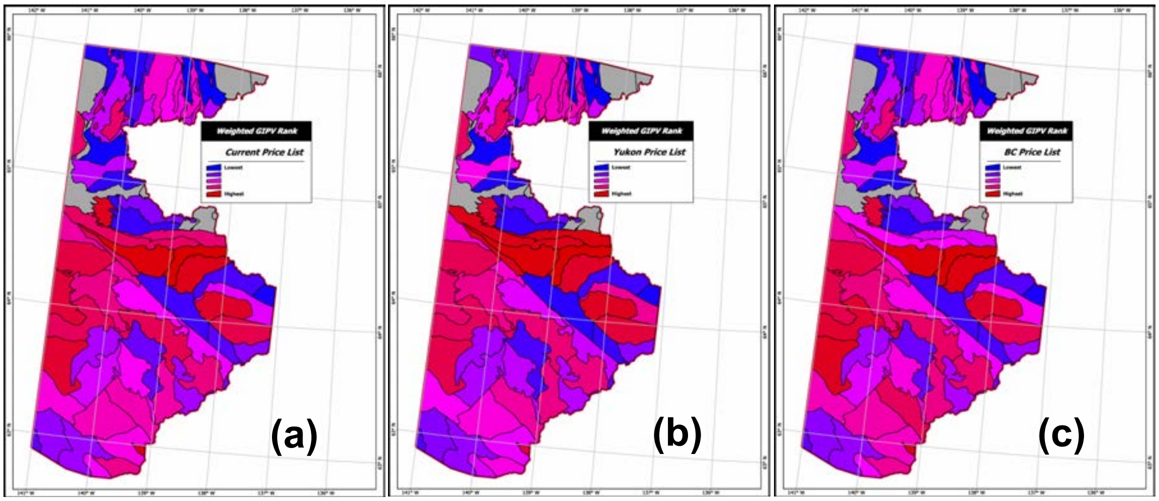


Figure 22. Relative ranking of the tracts based on the weighted GIPV of all commodities in the tracts using the three price lists.

The discovered commodities (100% probability) were found in 6 deposits contained within 5 tracts. To be considered a discovered deposit, grade and tonnage data for the deposit must have been published. The values used in this study were updated to present values by Yukon Geological Survey staff. Tracts B117, B118, B124, S34 and S53 had discovered resource values. Figure 23 lists the discovered deposits, the tracts where they are located and the tonnes of their contained commodities.

Deposit	TRACT	GOLD	SILVER	COPPER	BARITE	TUNGSTEN
White Gold	S53	49.18924				
MARN	B124	1.941374	3.882748	2267.96		226.796
Brewery CR	B117	9.0124				
Zeba	B118		54.80273			
Omega	B118		20.217		26400	
Lone Star	S34	2.17728				

Figure 23. Listing of the deposits with discovered resources located in the Dawson area. The listing also notes the tracts in which the deposits are located and the tonnes of commodity that has been discovered at each deposit.

An additional way of examining the relative importance of each tract is to look at the GIPV at each of the probability levels. In this way one can see the variation in tract ranking as the probability of deposits existing is lowered from 100% confidence to 1% confidence. Figure 24 illustrates the relative ranking of the tracts based on the six possible confidence levels using the Current price list to value the commodities.

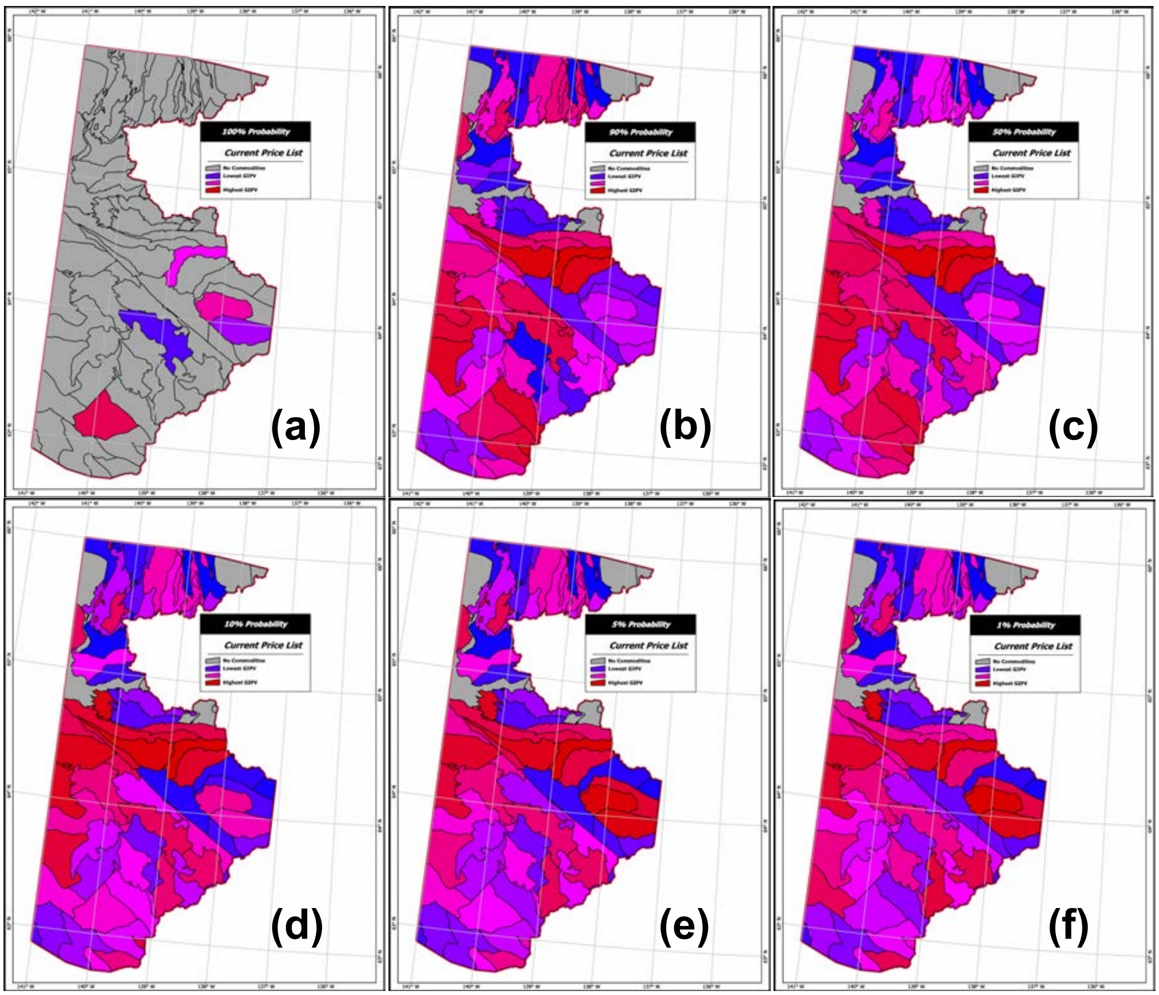


Figure 24. A series of maps showing the relative ranking of tracts based on the GIPV at six probability levels using the Current price list. The probability levels are (a) 100%, (b) 90%, (c) 50%, (d) 10%, (e) 5% and (f) 1%. Grey tracts have no resource values.

The tracts can be ranked by these various GIPV values if they are normalized by the tract areas. In this study the GIPV values are expressed as dollars per square kilometre. These dollar per square kilometre values can be used to rank the tracts relative to each other. In addition to using the different dollar values noted above a ranking parameter has been used in the past (Kilby, 2004; previous four Yukon assessments) to overcome any bias associated with very large estimated amounts of commodities at low probabilities completely overpowering the value of high probability low mass estimates of commodities. This ranking methodology independently ranks each of the six possible probability GIPV values. The ranking score (1 to total tracts with 1 being the low score) is used in place of the dollar value and then the individual ranking scores are weighted following the same formula as discussed above. This procedure places the tract ranking value on an ordinal scale, linearizing the difference between tracts. This calculation technique tends to reduce the influence of large masses of commodity in favour of the probability of a commodity existing. Figure 25 illustrates this unBiased ranking parameter using the three price scenarios.

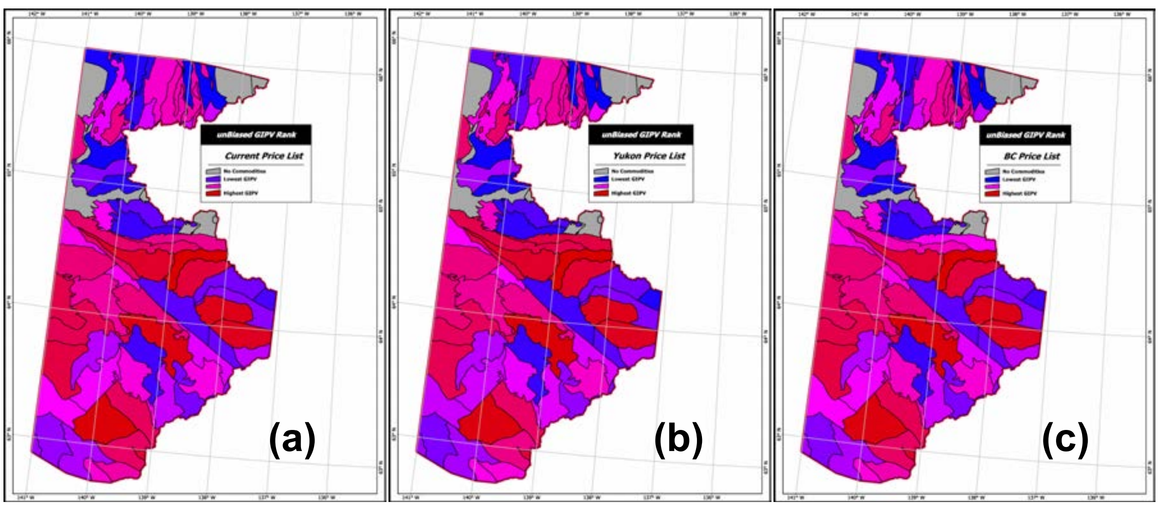


Figure 25. Display of the relative ranking of tracts using the unBiased calculation method. The results using the three different price lists are show, (a) Current, (b) Yukon and (c) BC.

Examination of the Figure 25 relative tract rankings shows that the different pricing scenarios do not significantly affect the distribution patterns. However, when the tract rankings are compared to the 100% confidence tracts in Figure 24(a) and the results of the other ranking schemes (figures 21 and 22) one can see that the importance of the tracts with known resources (100% probability) are not diminished by large estimated GIPV values at lower probability values.

The ranking values along with the associated GIPV in dollars per km^2 are contained in three GIS compatible Shapefiles, one for each pricing scheme, in the Digital Appendix, Shapefile section. Full scale versions of the maps represented in the various figures of this section are available in the Appendix as PDF files named with the same designation as the figures.

Typically mineral potential rankings are displayed in classes (or bins) rather than unique individual track rankings. Grouping the tracts into classes provides displays that are easier to visualize than ones such as those presented above that try to depict the relative ranking of each tract. Classifying the tracts into several groups tends to remove the noisy nature of the individual tract rank displays and consolidate the display into larger areas of similarly ranked tracts. The method used to create the tract classes depends largely on the use for which the mineral potential analysis is intended. In the British Columbia analysis (Kilby, 2004) the purpose of the analysis was to identify the areas of relative higher to lower mineral potential. The stated goal of the BC land use process was to identify 12% of the provincial land area for alienation from resource development. By providing a mineral potential ranking display based on cumulative area it was hoped the desired area of lowest potential mineral lands would be selected for alienation. The classes in the BC case were based on equal area percents. That is each class contained an equal geographic area portion of the study area. In some analyses the purpose is to identify the amount of a given commodity that could potentially be located in an assessment area. I that case the classes would be based on tonnage of commodity thresholds. In other cases the purpose of a study could be to determine the relative value of the in-situ resources. In that case the class thresholds would be based on GIPV thresholds. The Dawson Land Use Planning process, like most land use planning exercises tries to incorporate a variety of land values into a plan that provides for a balanced management that promotes economic activity while protecting significant environmental and societal values. The simplest method to display the overall ranking of the area is by equal percent area class groupings. The other mentioned display methods can be readily generated using the GIS data included in the Digital Appendix if desired.

In this compilation of four previous mineral potential assessments there are 67 tracts that have been ranked using three different calculated measures of their GIPV and using three different commodity value lists. There are some minor differences in the results from these different methods of tract ranking. But when the tracts are grouped into 5 classes of equal area the resulting displays are very similar with only minor discrepancies between the different pricing schemes or ranking methodology. Figure 26 shows the result of grouping the tracts in to classes containing 20% of the Dawson Assessment area using the Expected Mean GIPV of the undiscovered mineral resources. The Expected Mean GIPV methodology does not incorporate the value of the already discovered deposits. Examination of the three pricing scenarios in Figure 26 reveals only very minor variations and all of these differences are not more than one class. Generally the tracts that fall in different classes are just on one side or the other of the threshold between two classes.

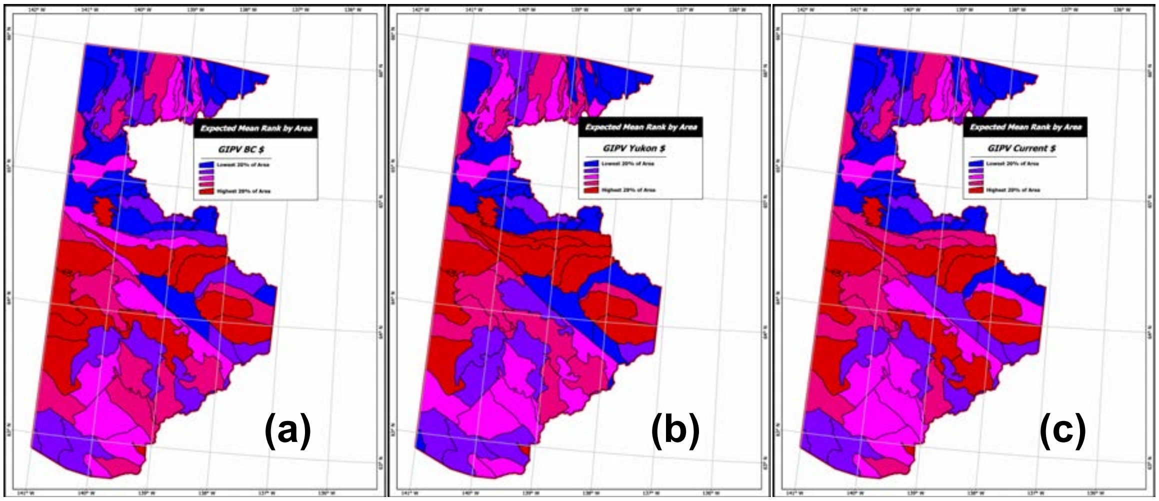


Figure 26. Display of the relative tract ranking based on the expected mean estimated GIPV of all commodities using the three price lists. Each class is 20% of the total Dawson area. This ranking includes only the estimated resources.

Figure 27 displays the area classes for the three pricing scenarios using the Value ranking methodology. This calculation includes the value of the discovered deposits, assigning them 100% probability of existence and using the values of the other 5 probability levels to generate a weighted total GIPV. The 5-part classification based on percent area shown in Figure 27 shows only minor differences between the three pricing scenarios and also very minor differences when compared with the corresponding pricing scheme results show in the Expected Mean maps in Figure 26.

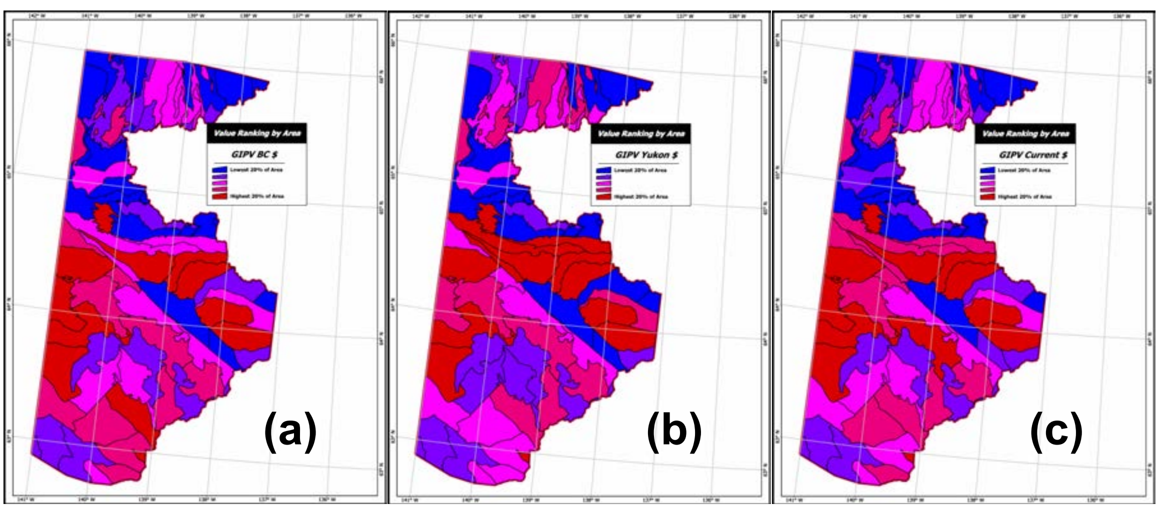


Figure 27. Tracts grouped in to five class each containing 20% of the land area. This figure shows the weighted value calculation results using the three price lists. It includes the discovered resources.

Applying the 5-part area classification scheme to the unBiased GIPV ranking results produces slight variations between the three pricing scenario maps (Figure 28). The unBiased classification methodology independently ranks each of the 5 estimation probability level results and the discovered values. As a result there is more weighting on the values with high probabilities of existence in the final tract rank. Again the 5-part area classification scheme provides remarkably consistent distribution patterns across the three pricing schemes and three ranking methodologies. All nine displays contained in the three figures (figures 26 to 28) describe slightly different characteristics of the mineral potential of the Dawson Assessment Area. While the classification patterns are similar the actual calculated GIPV associated with each pricing scenario are significantly different but the combination of the many commodities and the relative values of these commodities results in a very robust classification.

The requirement of the Dawson Land Use planning process to understand the distribution of overall mineral potential in the study area suggests that the unBiased ranking products would be most appropriate. This methodology shows areas with high probability discovered and undiscovered resources and protects them from being overshadowed by large masses of low probability estimates. The Current pricing scenario provides the current relationship between the value of commodities. Even though the ranking results are not significantly different from the BC pricing result and only marginally different from the Yukon pricing result it is preferable to use the most recent values as the overall mineral potential product is meant to provide a snapshot of current knowledge and mineral value.

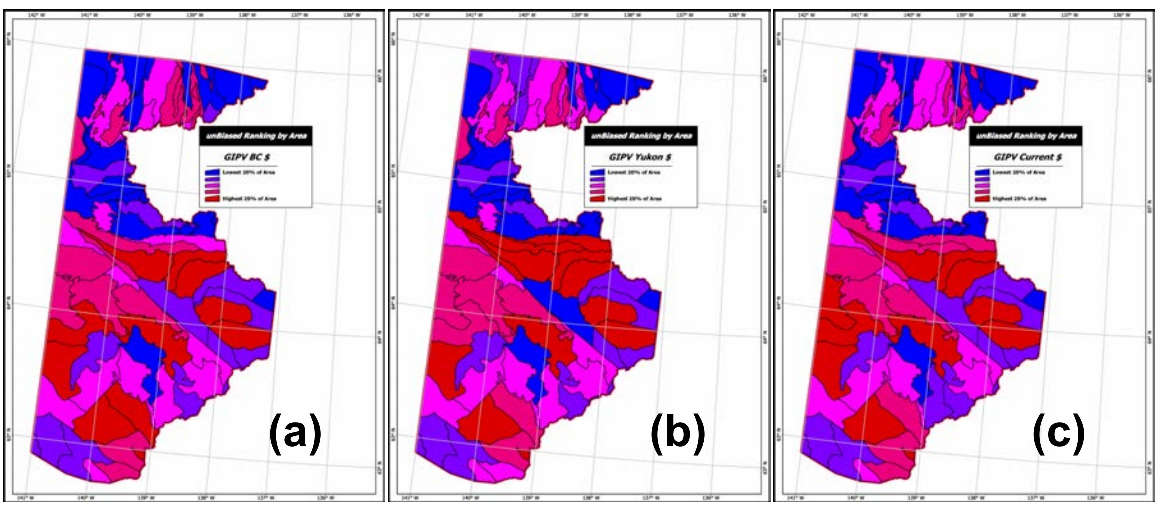


Figure 28. The results of the unBiased tract ranking calculation grouped into five equal area classes. The display compares the result of using the three different price lists.

ESTIMATOR CONFIDENCE ANALYSIS

Confidence in the results of a mineral potential analysis is a common question raised by users of this type of product. There are a number of different factors affecting the overall confidence that can be placed in the analysis results. Those factors that can influence the confidence the estimators have in their estimates include;
- the familiarity of the estimators with the deposits being estimated,
- the familiarity of the estimators with the geology of the tracts being estimated,
- the amount of available public and corporate knowledge and information on the tracts,
- the amount of rock exposure within the tract,
- the exploration history of the tract.

There is not an available absolute measure of confidence but a relative confidence value can be determined for many of the above factors. During the estimation process each estimator recorded a confidence value for their estimate. As a result, there are 1749 such values for the Dawson Assessment Area. These values have been used to examine the relative confidences associated with each tract-deposit type-estimator combination. In addition to the estimator's evaluation of their own confidences there are several physical parameters that can be used to try to estimate a confidence level that can be placed on the ranking of each tract. The physical parameters that were looked at in this project as potential proxies for indicating estimator confidence were the number of known mineral occurrences (MINFILE), the number of regional geochemistry samples and the amount of potential rock exposure in each tract.

The mineral occurrence measure is simply the number of MINFILE occurrences in a tract normalized with the tract's area. The geochemistry measure was calculated in the same manner as the mineral occurrence measure. The tract areas used were the original tract areas and not the areas used in the Dawson assessment as the full tracts were the areas examined by the expert estimators. The rock exposure measure was determined by examining the slope of the ground surface. The steeper the slope the more likely there will be good rock exposure. Areas of low slope will conversely likely be covered by water, fluvial and colluvial material. Areas of intermediate slope will likely be well vegetated with poor rock exposure.

The mineral occurrence value was determined by counting the number of MINFILE (Deklerk, et al, 2005) sites falling within each of the original tract outlines. No attempt was made to rank the importance of the occurrences as it was felt that the important factor was that the site had been investigated and therefore there was some knowledge of the area available to the estimators. Figure 29 shows the distribution of the MINFILE occurrences relative to the tracts used in the four original mineral potential assessments. In areas where there is significant tract overlap a single MINFILE occurrence could be counted in two tracts. The number of occurrences was then divided by the tract area in square kilometres.

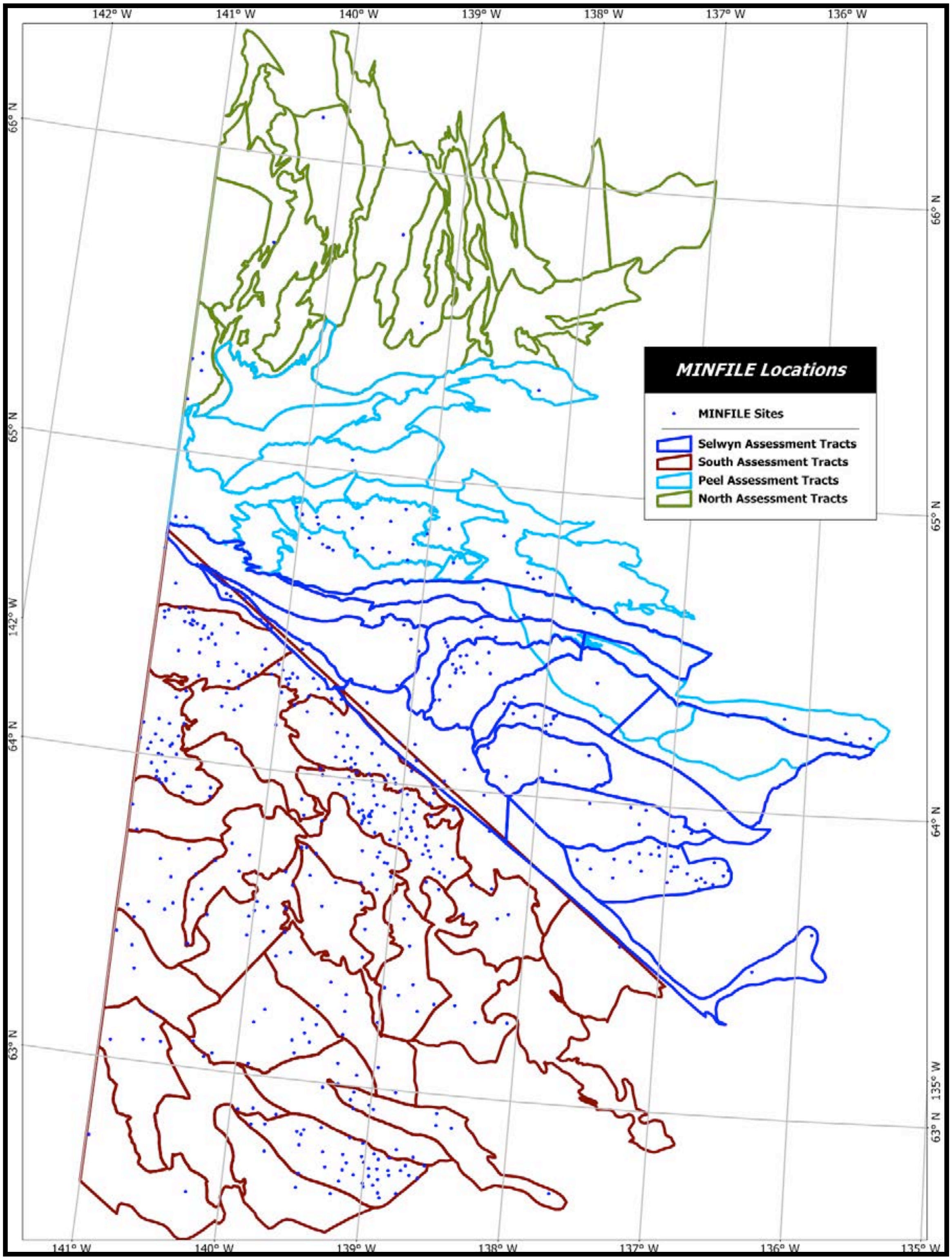


Figure 29. Distribution of MINFILE mineral occurrences relative to the original workshop tract shapes.

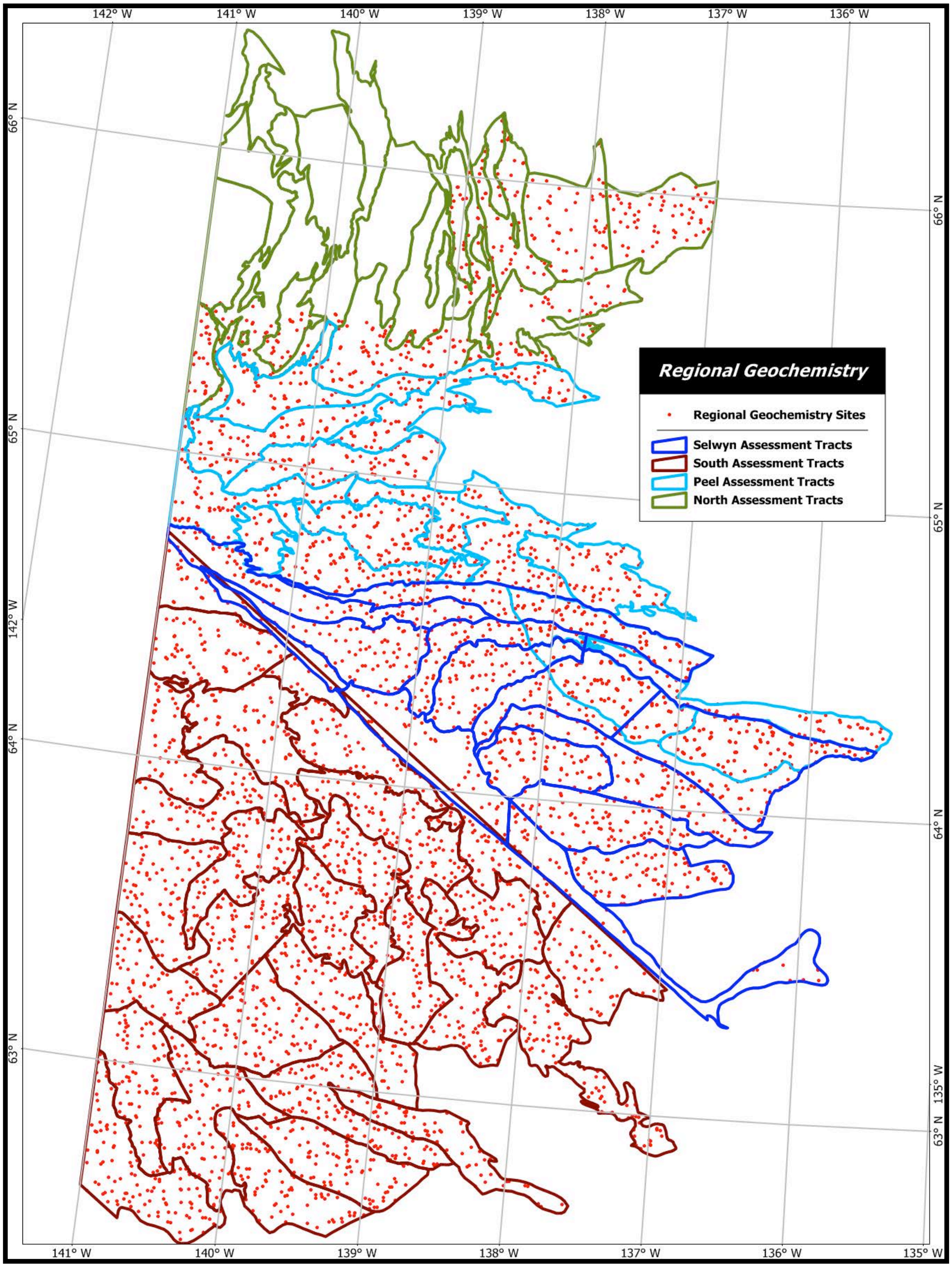


Figure 30. Distribution of regional geochemistry sample sites relative to the original workshop tract shapes.

The density of regional geochemistry samples (Héon, 2003) was determined by counting the number of sites falling within each of the original tract outlines. The metric associated with the geochemistry samples was the number of samples divided by the track area in square kilometres. Figure 30 shows the distribution of these sites. Note the lack of samples in the northern portion of the North assessment area.

The rock exposure metrics were determined by calculating the percentage of the tract area with slopes of greater than 60º, 45º- 60º, 30º - 45º and less than 30º. The slope was calculated on 30 metre centres using the digital elevation models (DEMs) provided on the Yukon ftp site (ftp://ftp.geomaticsyukon.ca/DEMs/30m). Twenty-one of these files were mosaiced into a single image and then used for the slope calculations. Figure 31 illustrates this slope image relative to the tract boundaries. The metric used for estimating the rock exposure was the percent of the tract area with a slope greater than 45º. Figure 32 shows the distribution of these high slope areas.

Initially one would expect that the greater the density of data and rock exposure the higher the expert's confidence in their estimates. An analysis was performed to test this hypothesis and determine a confidence parameter that could be used to qualify the quantitative tract rankings.

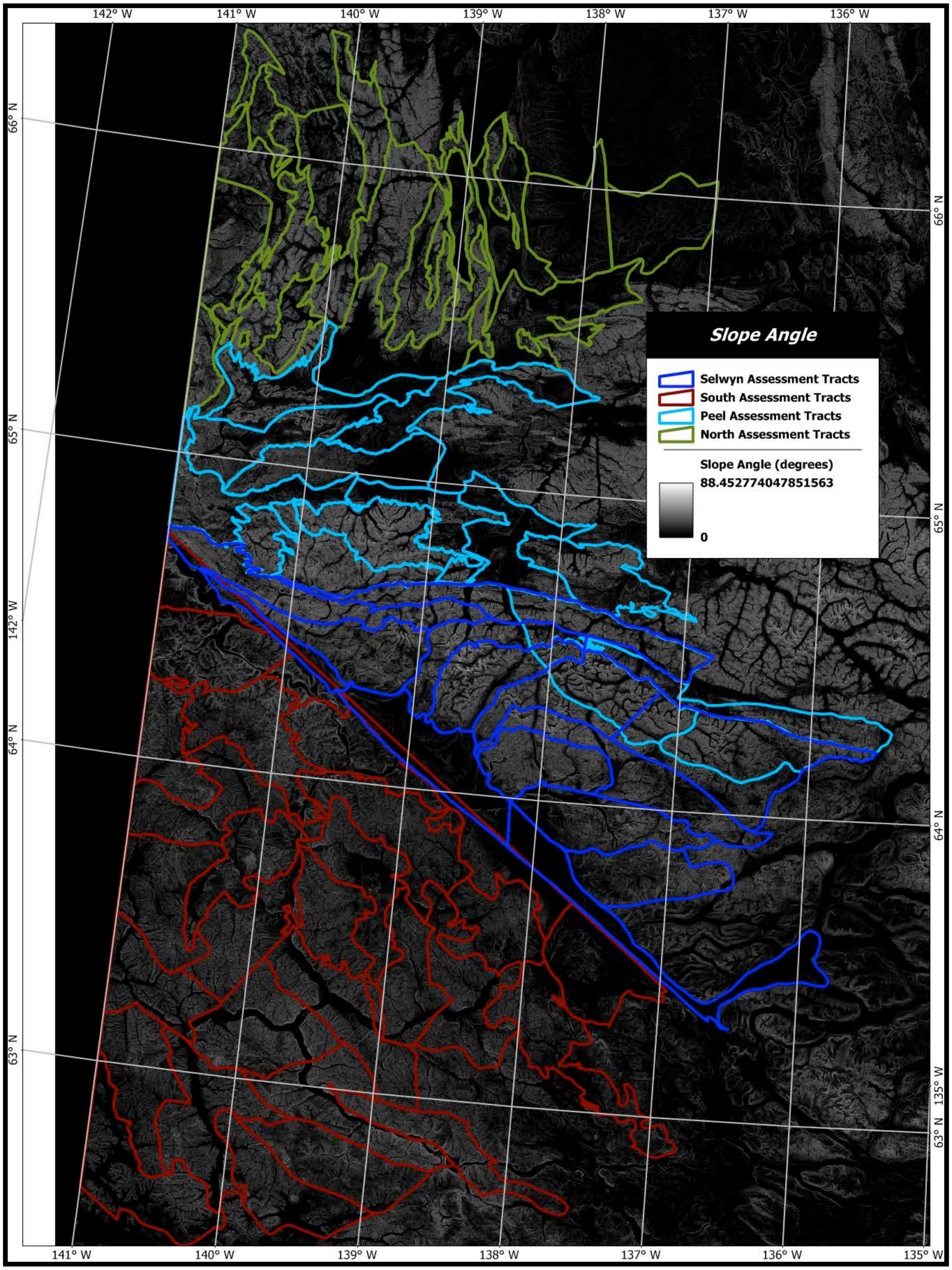


Figure 31. Display of the topographic slope on a 30 metre grid spacing. The lighter the pixel the steeper the slope.

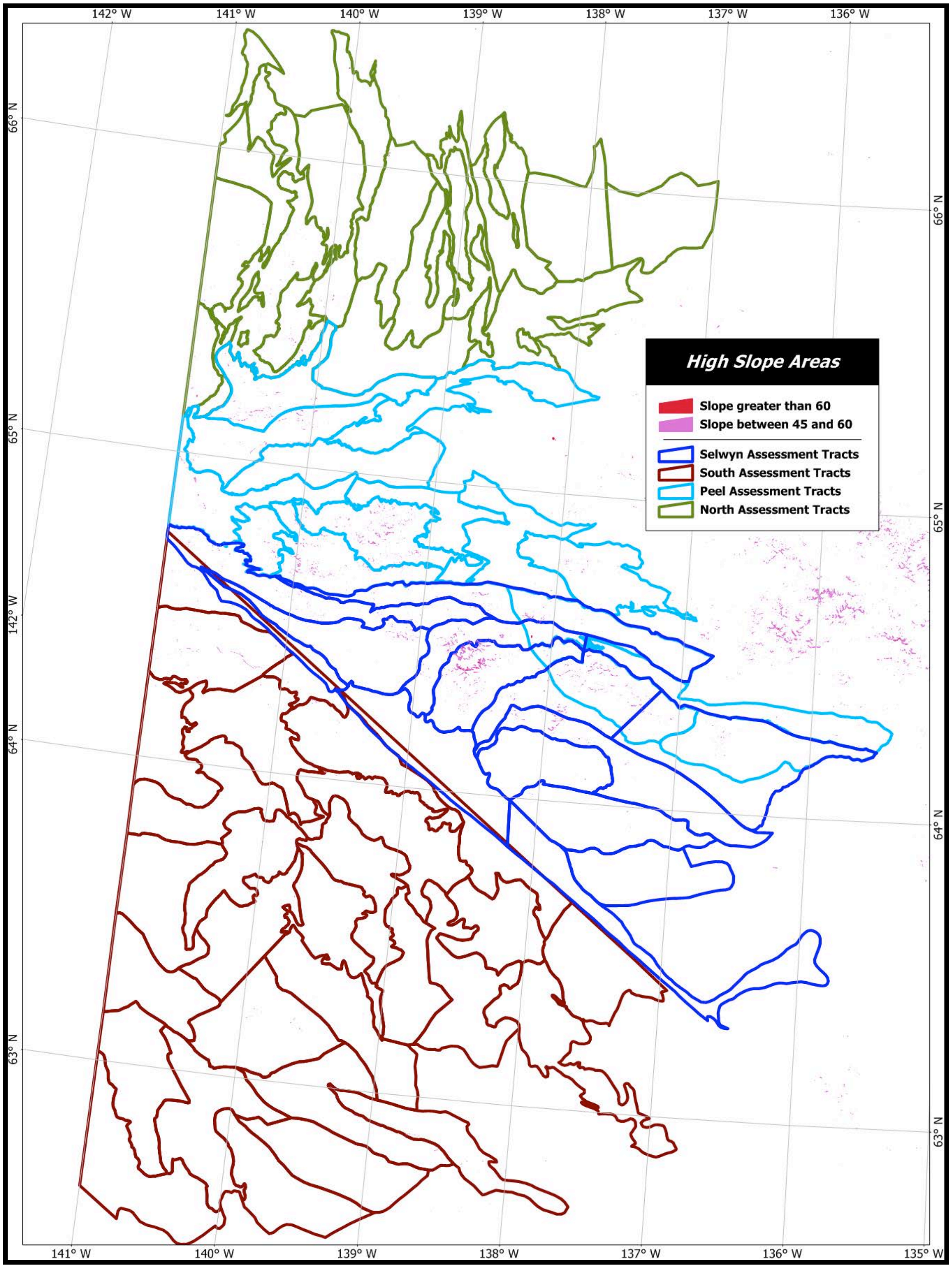


Figure 32. Areas with topographic slopes greater than 60º (red) and between 45º and 60º (pink) relative to the original workshop tract shapes.

Estimator confidence levels were recorded by the estimators as part of the estimate for each tract-deposit type combination. The resulting 1749 potential confidence values can be used to try to get at the relative confidences associated with each tract. Figure 33 illustrates the portion of the estimator coding sheet where the confidence value was recorded. As with the actual number of deposits the confidence value was recorded as a mark somewhere between 0 and 100% confidence in the estimate. These confidence values are for the actual estimate and therefore are controlled by all the possible factors that could impact on the estimator's confidence, as discussed above. To assess the various knowledge and data components contributing to each confidence value a series of statistical analyses were performed. The confidence values were grouped by deposit type, tract and estimator.

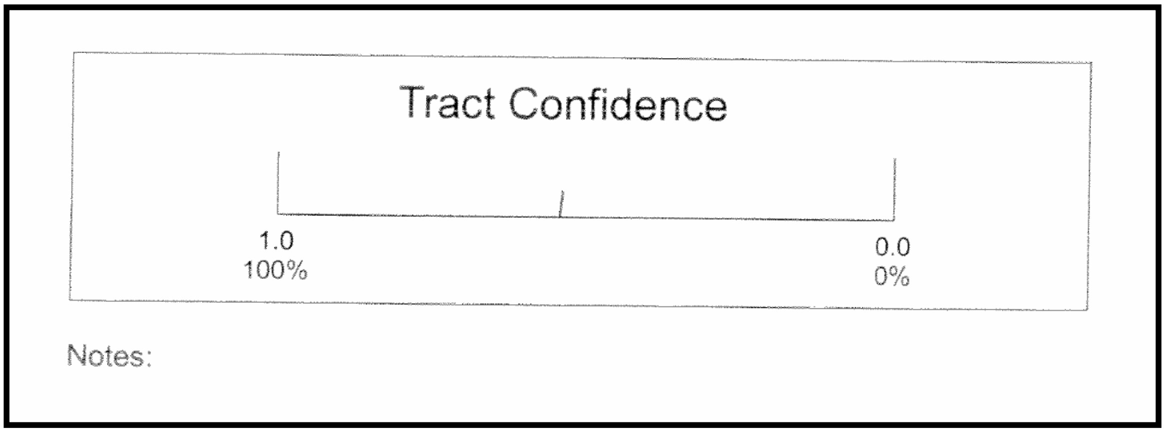


Figure 33. The section of the workshop coding sheet where the estimator indicates their feeling of confidence relative to their estimate.

There were fourteen estimators involved in the four original estimation workshops. The number of estimates made by these estimators ranged from a low of 28 to a high of 302. The average mean confidence value recorded for these estimators was 37.8 with a mean standard deviation of 14.4. The mean confidence values for the estimators ranged from a low of 13.9 to to a high of 50.2. There was no good correlation between the mean, standard deviation and number of estimates when these values were grouped by estimator. Figure 34 illustrates the range of these values by estimator. An important feature of this distribution is the fact that different estimators can have very different mean confidence scores even when the same tracts and deposit types have been assessed by each estimator. For example, estimator #12 and estimator #14 have both made 302 estimates. Estimator #12 has a mean confidence value of 13.9 and standard deviation of 19 while estimator #14 has a mean confidence of 44.6 and a standard deviation of 12.5. This suggests that the confidence scores must be normalized for each estimator before they can be combined to form an overall tract confidence score. Each estimator scored the confidence value relative to their own measure (feeling) as there no method to standardize feelings. The raw confidence scores were normalized by dividing each score by the mean confidence score value for the estimator. Figure 35 shows the mean and standard deviation of the confidence scores for each estimator after normalization. The normalized scores were used to evaluate the confidence differences related to tracts and deposit types so that the effect of estimator differences is removed as much as possible.

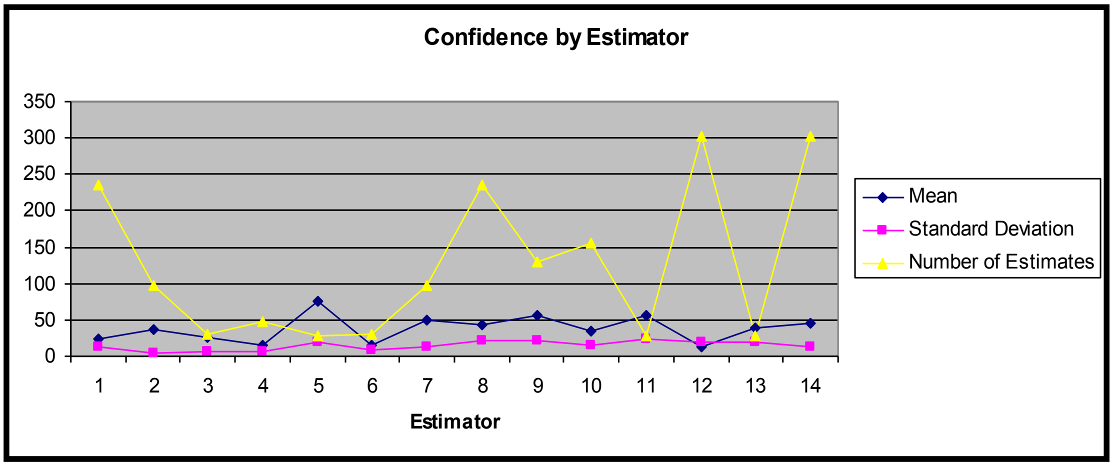


Figure 34. The raw estimator confidence values for the 14 estimators involved in the estimation workshops.

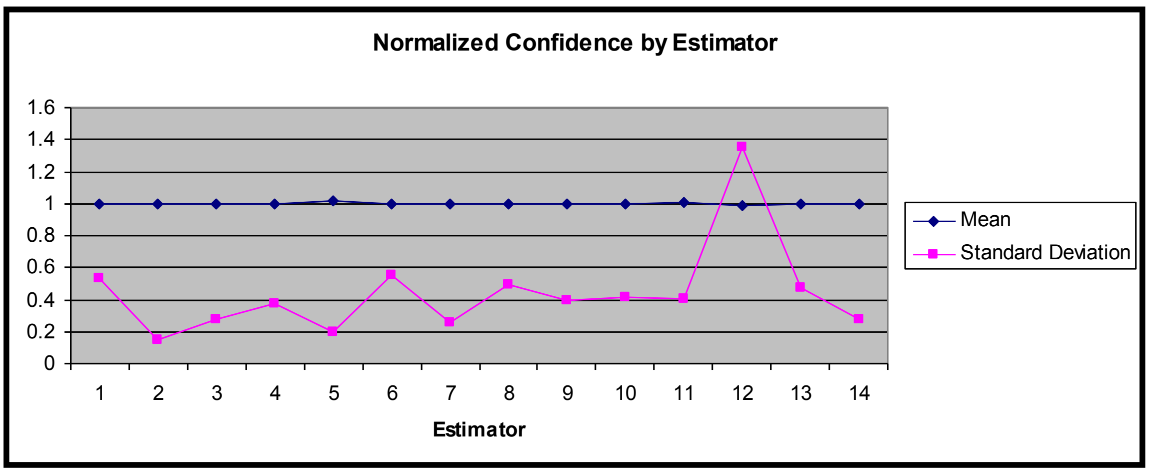


Figure 35. Display of the relative differences in estimator confidence standard deviation after the raw values have been normalized by dividing by the mean value for each estimator.

There were sixty-three tracts out of a possible seventy-one tracts with estimator confidence measures. For each tract the mean and standard deviation for all the confidence values were compiled. The average confidence value was 35.028 with an average standard deviation of 21.96. Figure 36 illustrates the relationship between the mean, standard deviation and number of estimates by assessment tract. Several obvious relationships are apparent from this graph. There is a strong correlation between the mean and standard deviation values (.893) and a good correlation between the number of samples and the mean (.5734). Also apparent from figure 36 is the different confidences associated the four original assessment areas. The average confidence levels by original assessment area are; North = 17.46, Peel = 22.63, Selwyn = 46.34 and South = 35.44. There are multiple reasons for this difference including the different timing of estimation workshops, experience of estimators in these four areas, amount of available information and past exploration history.

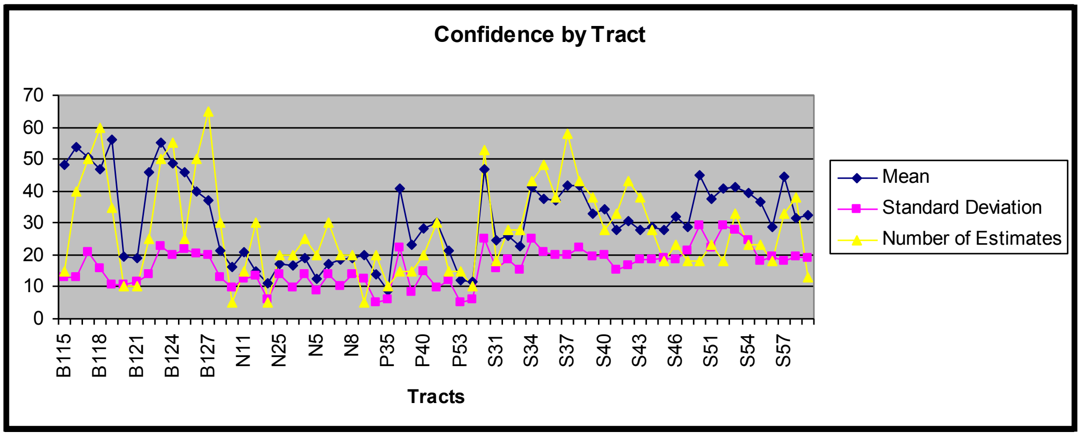


Figure 36. Graphical display of the combined raw estimator confidences for all the tracts.

When the normalized confidence values are used the general distribution pattern remains the same but there are subtle difference as displayed in figure 37. It is these normalized confidence values for each tract that are used to rank the relative estimator confidences of the tracts for the whole Dawson Assessment area.

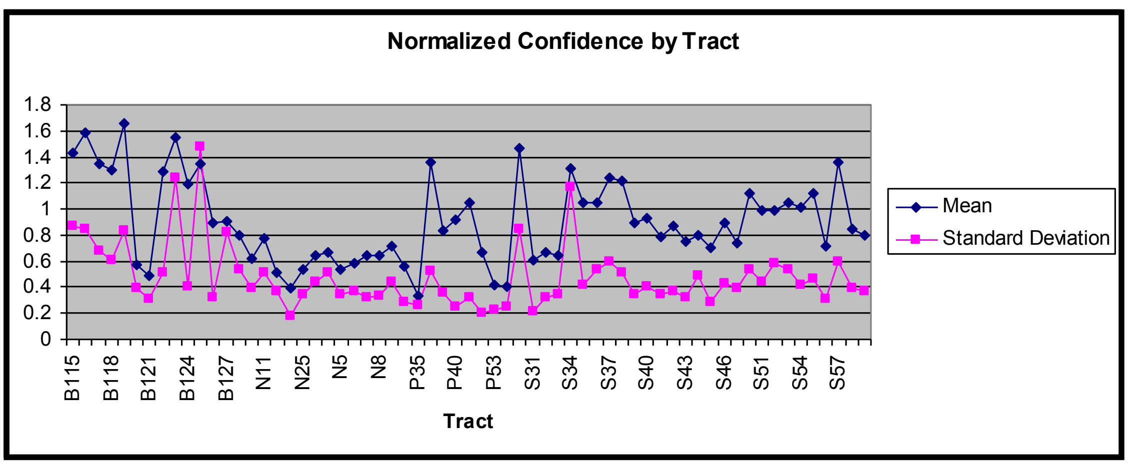


Figure 37. The mean and standard deviations of all estimator confidences in each tract. These values have been normalized to make comparing between estimator possible.

Of the 36 different deposit models that were used in the estimation processes only 34 models had valid confidence information. An analysis of the confidences associated with each deposit type was performed to evaluate any difference that may exist between deposit types. It would be expected that some deposit types were more familiar to the estimators than others and that there would be higher confidence values associated with these estimates. Figure 38 shows the distribution of the mean and standard deviations of the raw confidence values with respect to deposit type. Also shown on this figure is the number of estimates made for each deposit type. Figure 39 displays the normalized confidence values related to each deposit type. From these figures it can be seen that there is a significant difference in the estimation confidence between deposit types. These confidences range from a low of 16.2 for deposit type 53 (Blende) to a high of 57.5 for deposit type 2 (White Gold) based on the raw confidence values. But when the normalized confidence values are examined (Figure C-11) there are a number of different deposit types with high mean values. However, several of these high mean scores are the result of a low number of estimates. The White Gold deposit type was evaluated in a recent (2012) one-model estimation workshop as discussed previously. The high raw confidence values associated with this model highlight the fact that these estimates were made under different circumstances than all the others. When normalized the values for this deposit type become about average. In both cases deposit type 53 has the lowest confidences related to it and it has a moderate number of estimates (35).

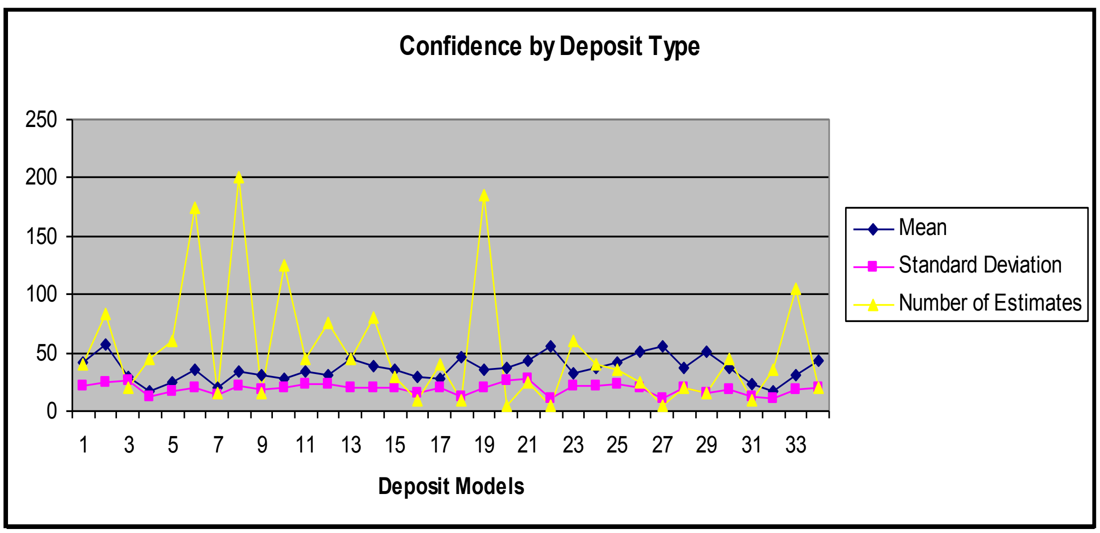


Figure 38. Display of raw estimator confidence statistics relative to the deposit types examined in the Dawson area.

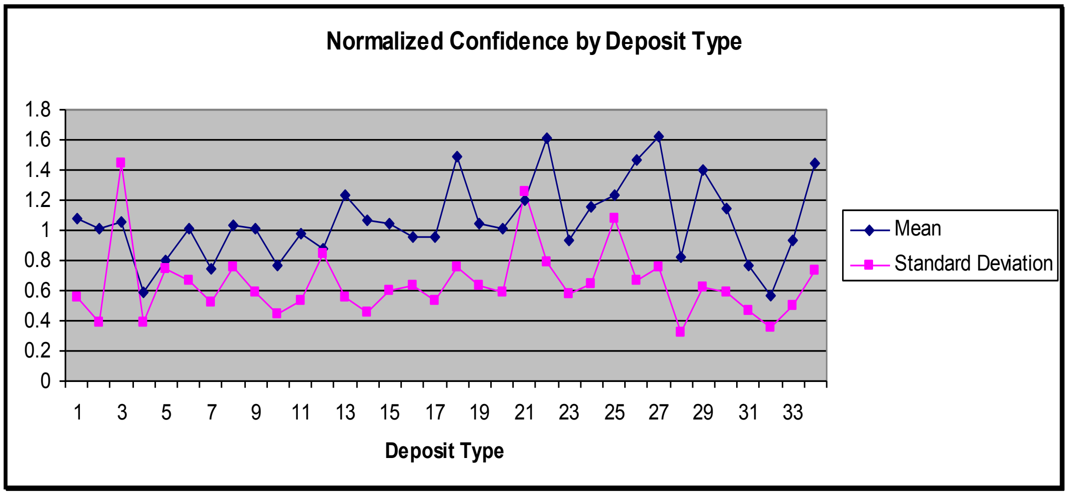


Figure 39. Normalized estimator confidence statistics relative to the different deposit types.

A correlation matrix was used to identify variables with significant correlations to the confidence levels. Figure 40 contains this matrix with some of the stronger correlations highlighted. There were 64 samples involved in this correlation. There is a very good correlation between the normalized confidence means (N_ConfMean) and the normalized confidence standard deviation (N_ConfSTD). Figure 40 shows this relationship which is somewhat interesting as one would not necessarily expect the standard deviation to correlate strongly with the mean. But the matrix also shows a strong correlation between the number of estimates (Estimates) and both of the normalized confidence measures. This correlation is somewhat affected by the inclusion of tracts with no estimates. When the eight tracts with no estimates are excluded the correlation factors are reduced by about 0.1. Tract area (AREA2) has a good correlation with the number of geochemistry sites (CHEMcount) as would be expected but a poor correlation with the number of MINFILE sites (Minfile_count). There are moderate positive correlations between the percent of a tract with greater than 45 degree slopes (percent45P) and the normalized mean and standard deviations of confidence, of 0.2685 and 0.3318, respectively. The DEPxTract value is the number of estimated deposits of all types calculated for each tract. There is a moderate correlation between this value and the MINFILE values.

	Minfile_count	CHEMcount	Minfile_Area	Chem_Area	N_ConfMean	N_ConfSTD	Estimates	percent60P	percent45_60	percent30_45	percent45P	percent30P	AREA2	CONFmean	COMFstd	DEPxTract
Minfile_count	1															
CHEMcount	0.227300957	1														
Minfile_Area	0.981361821	0.1846815	1													
Chem_Area	0.21198629	0.8513003	0.22081244	1												
N_ConfMean	0.486464893	0.4088318	0.48547698	0.28952867	1											
N_ConfSTD	0.441852365	0.2683016	0.41127694	0.10206636	0.828542169	1										
Estimates	0.465108703	0.1963853	0.46739014	0.17224292	0.71861606	0.59466156	1									
percent60P	0.044266965	-0.0365542	0.0804779	0.07178094	0.162079756	0.25635851	0.20227	1								
percent45_60	0.047455256	0.019415	0.07894449	0.13377153	0.269847081	0.33222572	0.167947	0.81289144	1							
percent30_45	-0.143301383	-0.1855568	-0.12437392	-0.07304025	0.062789295	0.14722496	0.008206	0.26628851	0.541963493	1						
percent45P	0.047542007	0.0182715	0.07927217	0.13302584	0.268528522	0.33180706	0.169363	0.82023042	0.999919038	0.538326962	1					
percent30P	-0.139754298	-0.1821462	-0.12019058	-0.06807453	0.069498347	0.15390755	0.012965	0.28575928	0.562182266	0.999703945	0.55860718	1				
AREA2	0.118092043	0.6133087	0.03228499	0.16236802	0.312442454	0.31564821	0.083404	-0.1439395	-0.130498509	-0.1774621	-0.13139618	-0.1785442	1			
CONFmean	0.480319025	0.4784023	0.4799705	0.35785699	0.972615777	0.78430151	0.744999	0.18516132	0.249049364	-0.00418416	0.2486102	0.0030551	0.343847	1		
COMFstd	0.405365985	0.3765389	0.39040079	0.25296227	0.756250666	0.62922011	0.652727	0.07475808	0.070990801	-0.1915414	0.07125674	-0.1865276	0.276259	0.8176638	1	
DEPxTract	0.492145635	0.3748297	0.44171079	0.27233699	0.30768451	0.23826742	0.299999	-0.0573581	-0.103051338	-0.30568125	-0.10253887	-0.3039243	0.250705	0.3496454	0.514225	1

Figure 40. Correlation matrix of the various variables examined in the estimator confidence investigation. Noted correlations are highlighted.

Unfortunately there does not seem to be any one variable or combination of variables that could be used as a proxy to the estimator's confidence scores. It was hoped that there would be some such metric that could be used to create confidence factors for those tracts with no estimates and also as a method of tying the confidence values to some physical characteristics of the tracts. The only relationship that holds promise in this regard is that between the normalized MINFILE density and the normalized mean confidence values. Figure 41 shows a relationship where there appears to be a lower confidence limit related to the density of MINFILE occurrences in the tract. But this is of no use in predicting a confidence value but rather could be used in saying something like at a given density of MINFILE occurrences there will be at least a given confidence value. More rigorous multivariate analyses such as factor or principle component analysis may provide a useful confidence measure based on these physical parameters but it is beyond the scope of this report.

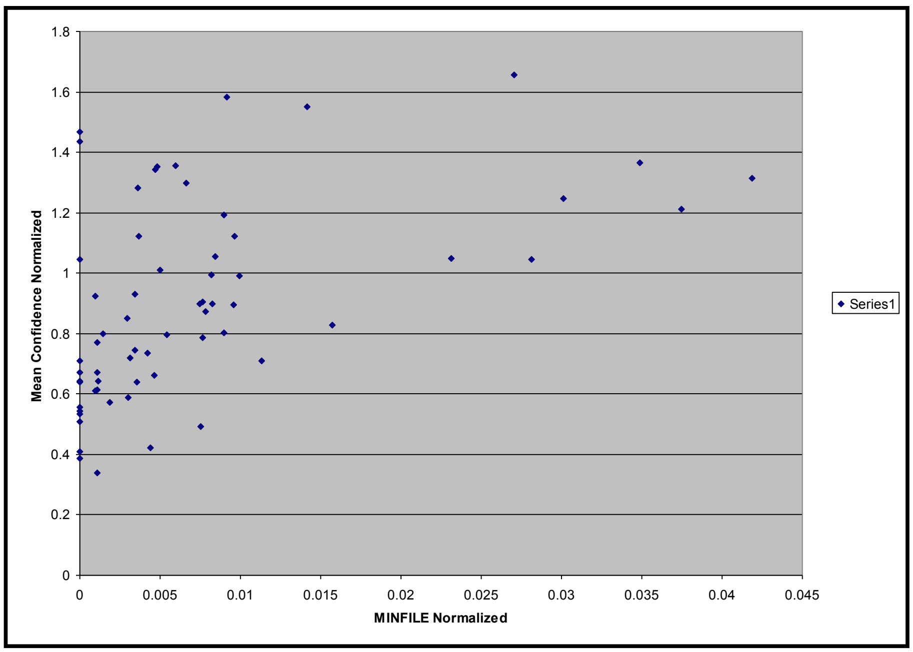


Figure 41. Cross plot showing the relationship between number of MINFILE occurrences in a tract and the normalized mean estimator confidence for the tract.

As a result the Normalized Mean Confidence score is what was used to qualify the tract confidence rankings. Figure 42 illustrates the distribution of the confidence values over the Dawson Assessment area classified with a 5-part equal area scheme. Figure 43 illustrates the same ranking but with each tract having a unique colour value.

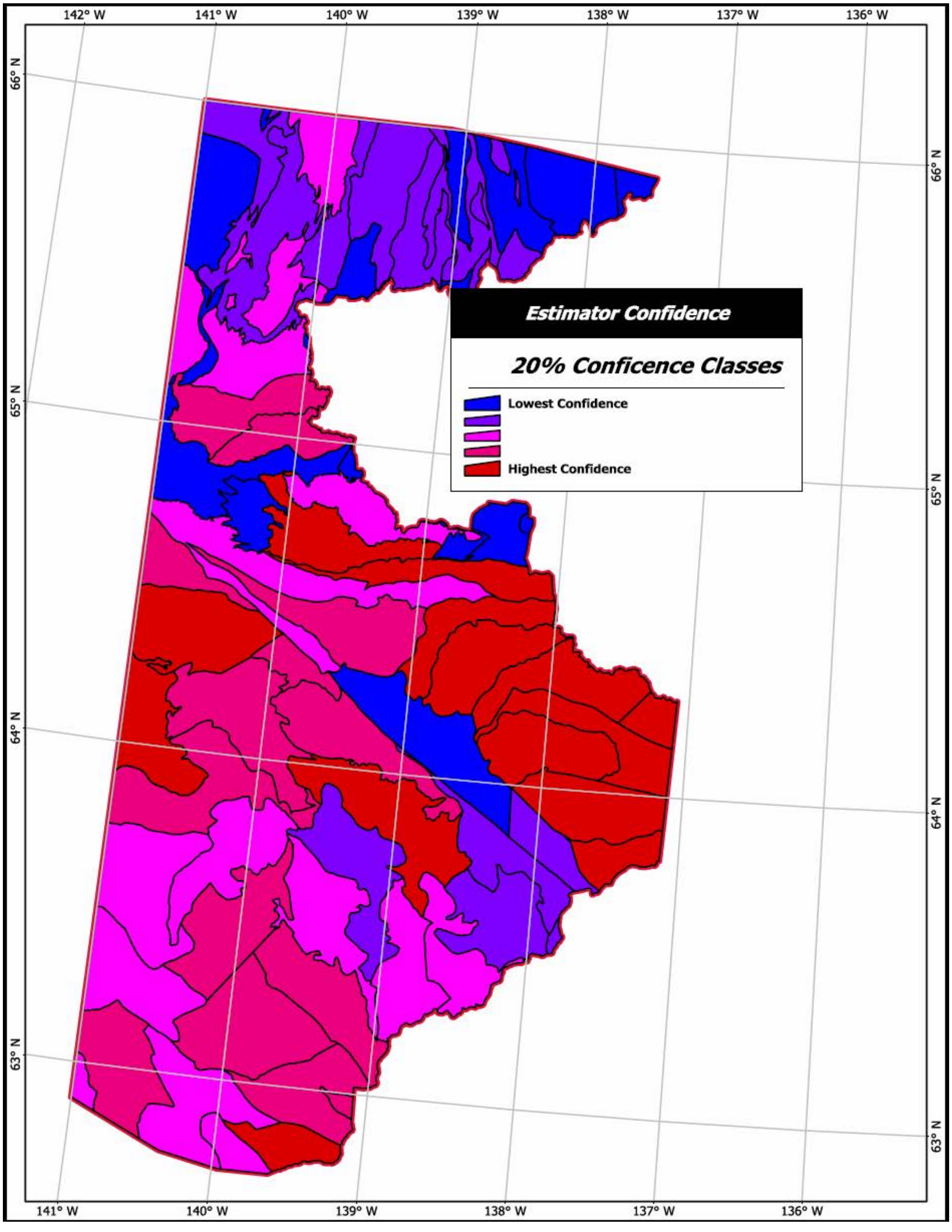


Figure 42. Distribution of normalized mean estimator confidence values grouped into five equal area classes.

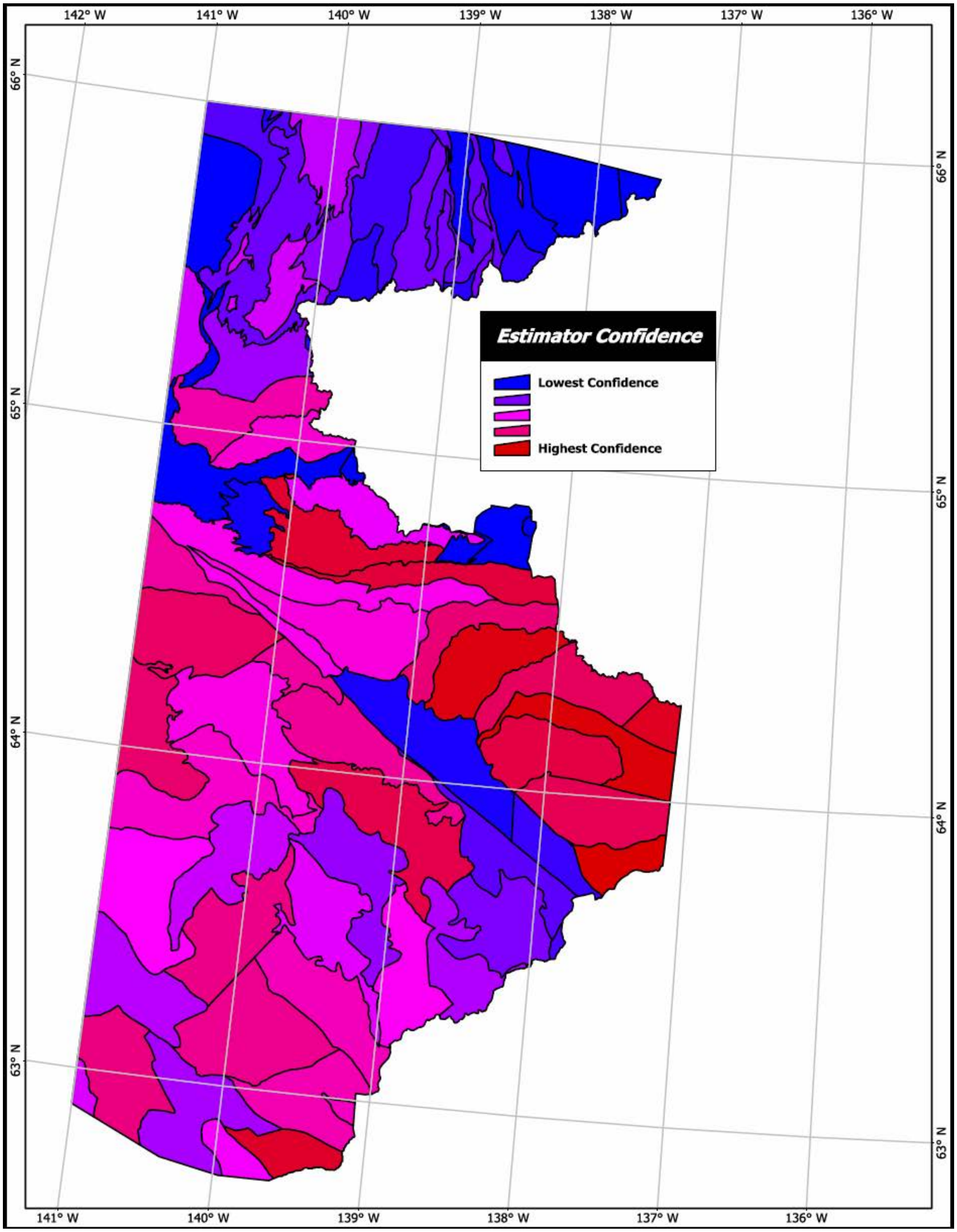


Figure 43. Distribution of normalized mean estimator confidence values with each tract shown as a unique colour.

DISPLAY OPTIONS

The mineral potential of the Dawson Assessment area can be portrayed with a range of graphic displays, maps, documenting various components of the results of this compilation or mineral potential estimates collected from five expert estimation workshops. The resulting information is in digital GIS format that can be used by virtually any system to create a range of map displays. Inclusion within a GIS system allows this mineral potential information to be integrated with other stake holder values to identify potential areas of compatible and conflicting potential land uses. This traditional style of information utilization and display is very valuable and commonly performed. The display options used to produce static views of this digital information are critical. Simply applying an inappropriate name to a mineral potential class in a legend can create an incorrect understanding of the analysis results. It is essential that the mineral potential information be properly described and any map displays contain an appropriate legend that accurately describes the information content. Simple terms such as low and high mineral potential imply certain values to an end user. Within an area such as the Dawson Assessment area there may not be any real low mineral potential land, rather the lower ranked tracts are just lower than the other tracts in the area. These lowly ranked tracts may in fact have significant mineral potential and have more potential than highly ranked tracts in another assessment area. These rankings are not absolute but just relative to the other tracts within the assessment area. Therefore terms such as lowest and highest rather than low and high should be used at all times when describing tract ranks.

The relative tact rank based on the unBiased GIPV calculation is the preferred method of this study. However there are a number of other ranking methods and even values that may prove valuable in answering certain questions surrounding the identification of valuable mineral lands. The present study utilizes all the commodities contained in all the deposits included. Depending on societal preferences some commodities may not have value in certain jurisdictions even though their global value is significant. An example of this is the value of uranium in the BC mineral potential analysis (Kilby, 2004). During that study and at present the value of in-situ uranium resources in BC must be considered to be negligible because the provincial government has placed a moratorium on development of uranium resources. A commodity such as asbestos may soon fall in this category in most jurisdictions if it has not already. For this reason there may be variations on the idea of including all commodities in a ranking scheme. The commodities presently included in the Dawson assessment are not known to be affected by this issue.

The types of deposits potentially existing within an area may be more important for ranking purposes than the actual value of the deposit's commodities. If a deposit type requires a significant labour force for its exploitation it may prove more valuable to society and economic development than another deposit type worth much more in metal value but involving a negligible labour component. A relatively simple method to get at this value would be to rank the tracts on the basis of the expected mean or weighted tonnage value. This value would give a partial indication of the amount of material that would need to be moved and processed to recover the involved resources. The more material needing to be moved would in general require a greater amount of activity in the tract with the resulting economic multipliers. Obviously, this is a gross estimation as there would be differences based on the type of mining operation but still it could be a better indicator of value to a jurisdiction than the value of the contained metals. The required information to produce this type of ranking is contained in the Digital Appendix.

A significant part of communicating the result of the mineral potential analysis is in the display format. Traditional static maps are one tried and true method that has an established audience. Most of the results of this analysis are displayed in this way. The near ubiquitous availability of the internet and interactive browsing viewers such as Google Earth™ provide for another information distribution method that may be more convenient and appeal to a significant segment of the population. Some of these methods provide for display opportunities not possible on a two dimensional paper map. For example this study has generated a tract ranking map and a map of estimator confidences. A two dimensional map can display the combination of this information through the use of pattern overlays or colour intensities. But these do not impart a feeling for the relative magnitude of the involved values. A three dimensional display such as is possible with viewers such as Google Earth™ easily portray these relative values. Most modern GIS can export information in KML format (Keyhole Markup Language) for viewing with one of these viewers. Figure 44 is a snapshot of the Dawson mineral potential tract ranking using colours to denote the rank classes and the tract extruded height to communicate the estimator's confidence for the tract estimates. Figure 45 shows the same features as Figure 44 but at a lower viewing angle to highlight the differences in estimator confidence of each tract. In addition to the visual display, other information can be include and queried by the end user through pop-up balloons. This format would provide a very effective means of communicating the findings of the Mineral Potential Assessment to a diverse audience without the requirement of some GIS capability or the limitations of a static map view. It also enables other themes such as MINFILE or other land use planning themes to be integrated in a free viewing format available to virtually all interested parties. The integration of the mineral potential information with a 3D representation of the topography and detailed imagery provides a very powerful communication opportunity. In the effort to get society to take an interest and understand the mineral potential of an area an interactive display such as this holds great potential. Figure 46 is a similar display to the previous two figures but in this case the height of the extruded tract shapes is the relative expected mean GIPV. This is additional information not provided by a simple colour scheme on a map.

The KML file used to create figures 44 to 46 is contained in the digital appendix.

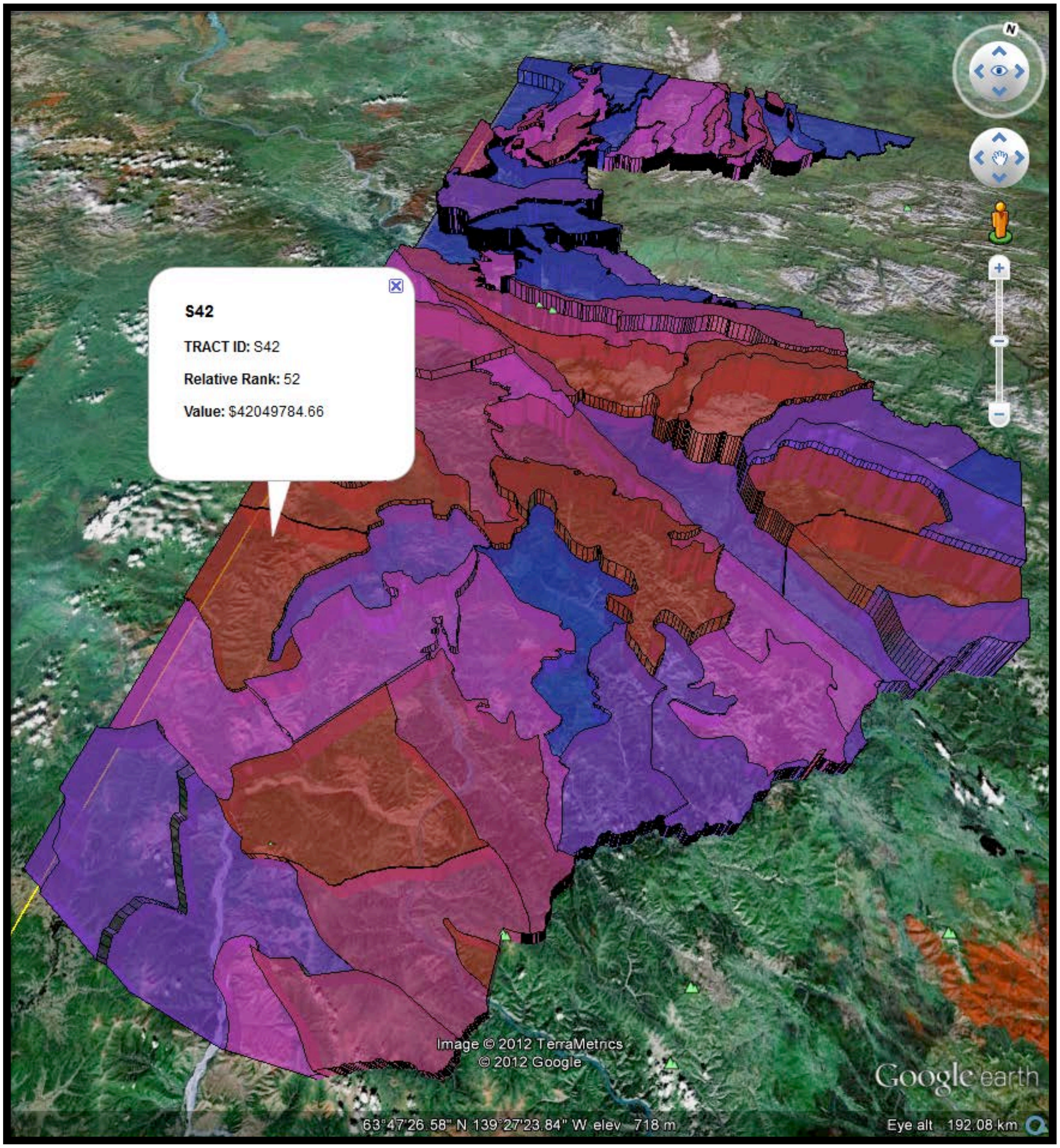


Figure 44. Google Earth™ view of the unBiased GIPV tract ranking with the height of the tract indicating the relative estimator confidence associated with each tract. The view can query some additional tract information by clicking on any tract of interest. The shown Values are in dollars per square kilometer.

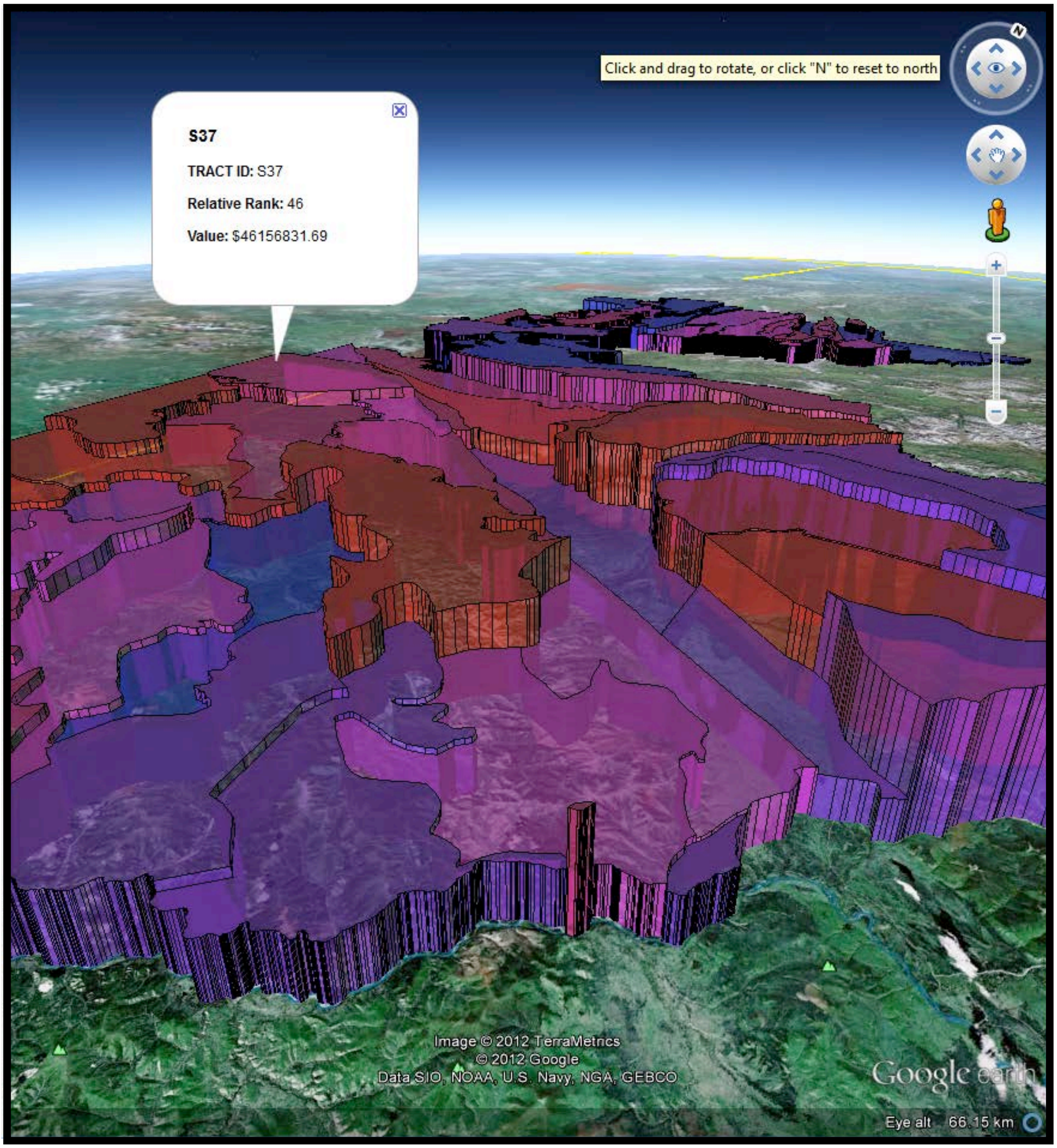


Figure 45. A Google Earth™ view of the same information as shown in figure 44 but from a lower elevation to accentuate the relative confidence values.

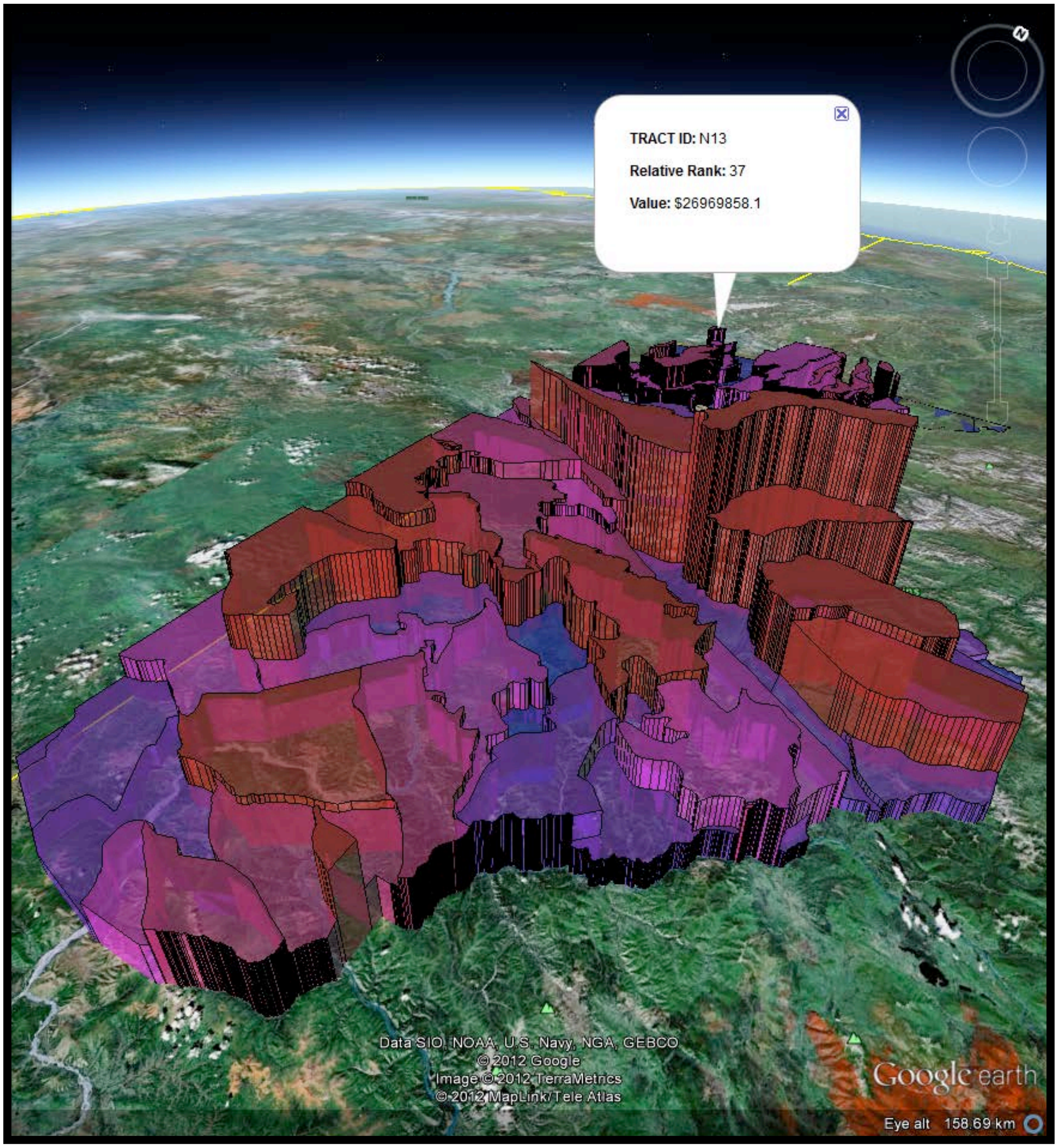


Figure 46. Google Earth™ view of the unBiased GIPV tract ranking similar to figures 44 and 45 but in this case the height of the tracts is related to the tracts weighted GIPV.

DISCUSSION and CONCLUSIONS

The Dawson Mineral Potential Assessment project utilized information from four previous mineral potential assessments to create a new assessment specific to the Dawson Land Use area. The previous assessments covered large portions of the Yukon and were performed to meet the needs of land use planning exercises carried out over the last twelve years. The portions of these larger assessments that were contained within the Dawson Planning area were compiled, vetted and reconciled to create the new assessment. A newly discovered deposit type, White Gold, was assessed and combined with the historic assessment values to make the assessment as current as possible. Information from the previous assessments was available as a large number of computer files covering all aspects of these early mineral potential assessments.

The combination of previous assessments resulted in 67 tracts that fully covered the planning area. These tracts were the combined to form a topologically correct spatial database. The tracts retained their original shapes with only minor insignificant adjustments to maintain the integrity of the estimates that were made for the original tract shapes.

A variety of deposit models were used in the original assessments. These models were reviewed and audited to assure that the digital grade and tonnage data they contained was correct and accurately represented the deposit model that the expert estimators used during the assessment workshops. A new digital model was constructed for the White Gold deposit type. This new deposit type was added to the existing models to bring the assessment up-to-date.

The original workshop estimates were reviewed and corrected where inconsistencies and errors were identified. The original coding sheets were available in PDF format and provided the means to get back to the original information for this critical verification process. These expert estimates were used to generate the input to the Mark3B Monte Carlo Mineral Resource Simulator and a series of maps displaying the distribution of each deposit type across the planning area.

The White Gold deposit type was identified after all the original estimation workshops were completed. To address this gap in deposit type estimates a one day estimation workshop was conducted in Whitehorse by Yukon Geological Survey staff. The estimates for this model type were digitized and integrated into this analysis.

A number of code lists referring to deposit types and commodity types were reconciled between the original assessments to and integrated into the Mark3B simulator and other analysis programs.

The Mark3B simulator was used to combine the probabilistic estimates of the number of undiscovered deposits existing in the area with the grade and tonnage distributions from the known deposits making up the deposit model. The results of the simulation were the probability distributions of the various commodities that would be expected from the expert's estimates. In addition the quantities of commodities already discovered were updated and included in the tract ranking calculations.

The amount of each commodity in each tract generated by the simulator provided the information needed to construct a series of maps displaying the distribution of each commodity across the assessment area. This type of map along with the deposit type distribution maps have proven very useful in other jurisdictions as a first pass indication of where one would expect to find a given deposit type or commodity. They represent the combined knowledge of the expert estimators.

Commodity prices were used to calculate the GIPV of metal resource expected to exist in each tract. Three sets of prices were utilized covering 3 to 10 year spans of time over the last thirty years. These three pricing scenarios were used in all the GIPV calculations to test the impact of highly variable commodity prices over time. This examination showed that while the value of an individual commodity varied considerably over time and in some cases the relative value between commodities varied considerably these changed did not cause large variations in the relative tract rankings. This is due to the mix of commodities found in most tracts. This is an important fact as it was unclear prior to this if price variations would significantly impact the rank order of the tracts.

A number of different GIPV calculation methods were used to generate tract rankings based on the GIPV. Each calculation method provided slightly different results but they were quite similar. Several of the calculations generated a GIPV for each tract that could be used for ranking or display purposes in its own right. A modification of a previously used ranking calculation was felt to best represent the mineral potential of the tracts. This unBiased method was very similar to the method used in the British Columbia assessment process and the four assessments that were used as the basis of the Dawson assessment.

A review of various methods to quantify the confidence that could be associated with each tract's values was undertaken. Physical information such as the amount of data available and the amount of rock exposure was evaluated along with the estimator's own evaluation of their confidence in their estimates. There was some correlation between the estimators confidence and some of the physical data quantity but in the end the estimator's confidence values were used to create a confidence value for each tract. This confidence value would include the value of the physical data along with the estimator's judgment of their own capabilities. These confidence values are relative.

Communication of the mineral potential results was a component of the project as it is important that the end users understand as well as possible the meaning of the tracts and the confidence that can be place in the rankings. The fact that the various pricing scenarios and tract ranking calculation methods provided remarkably similar results provides strong evidence of the robustness of the estimation method and procedures. Use of modern internet based viewing tools such as Google Earth hold potential to greatly enhance the understandability of the assessment results by all levels of expertise. These interactive tools also easily convey large quantities of additional information in the form of surface terrain and detailed imagery to help the user put the results in context. The value of a "fun" viewing tool cannot be overestimated in getting an audience to pay attention and investigate ones information.

In conclusion, the compilation and re-assessment of the mineral potential of the Dawson Land Use Planning area been completed with a new mineral potential ranking for just the planning area being produced. A number of ranking methods and commodity pricing scenarios were used to test the stability of the ranking. The ranking proved to be relatively insensitive to commodity price changes and the ranking methods provided slightly different but fully expected variations in the ranking order.

The new analysis along with all the original input data, software and important intermediate calculation files are include in the Digital Appendix. A KML based display file was produced to provide easy dissemination and viewing of the analysis results.

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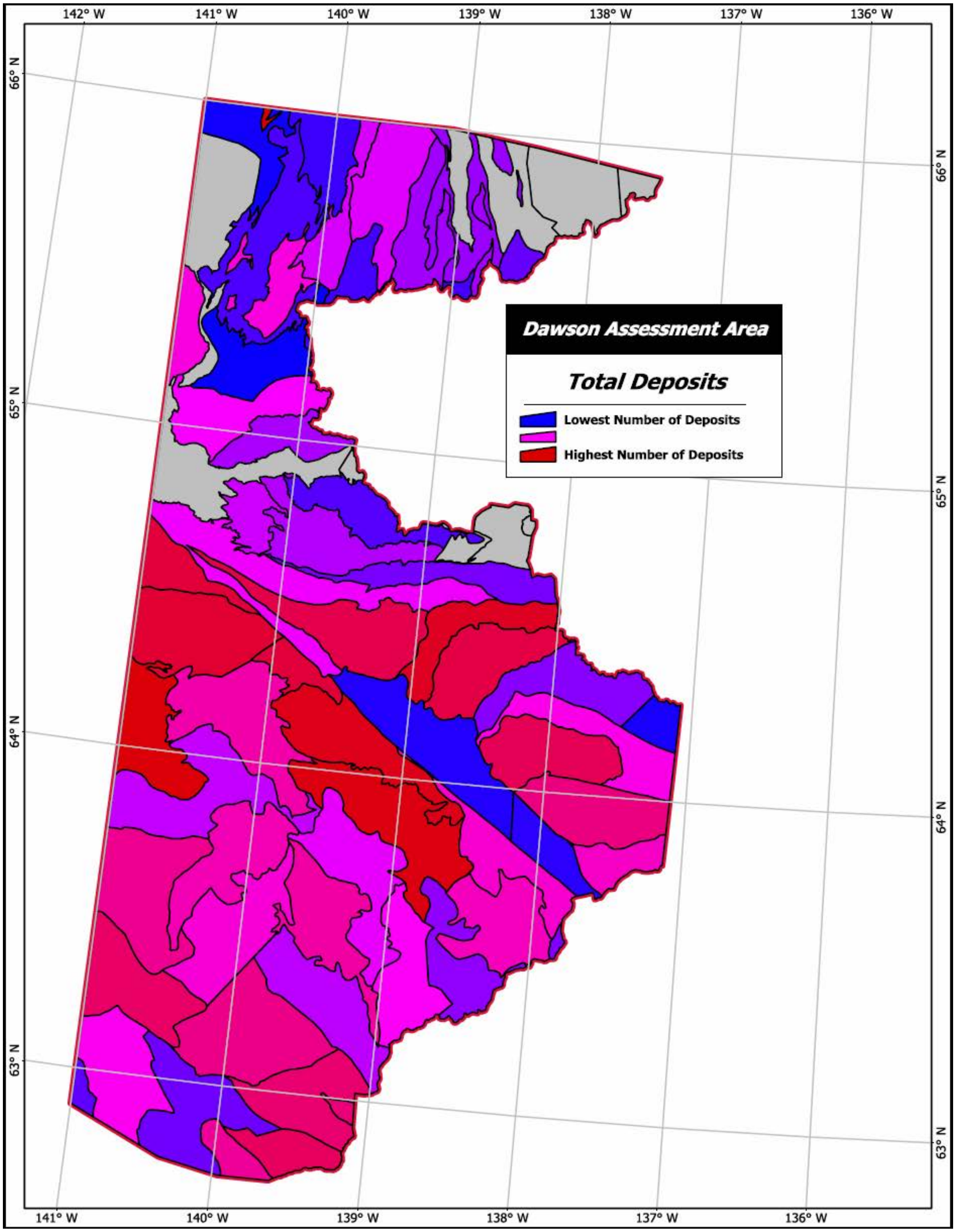
APPENDIX: Yukon Albers Projection

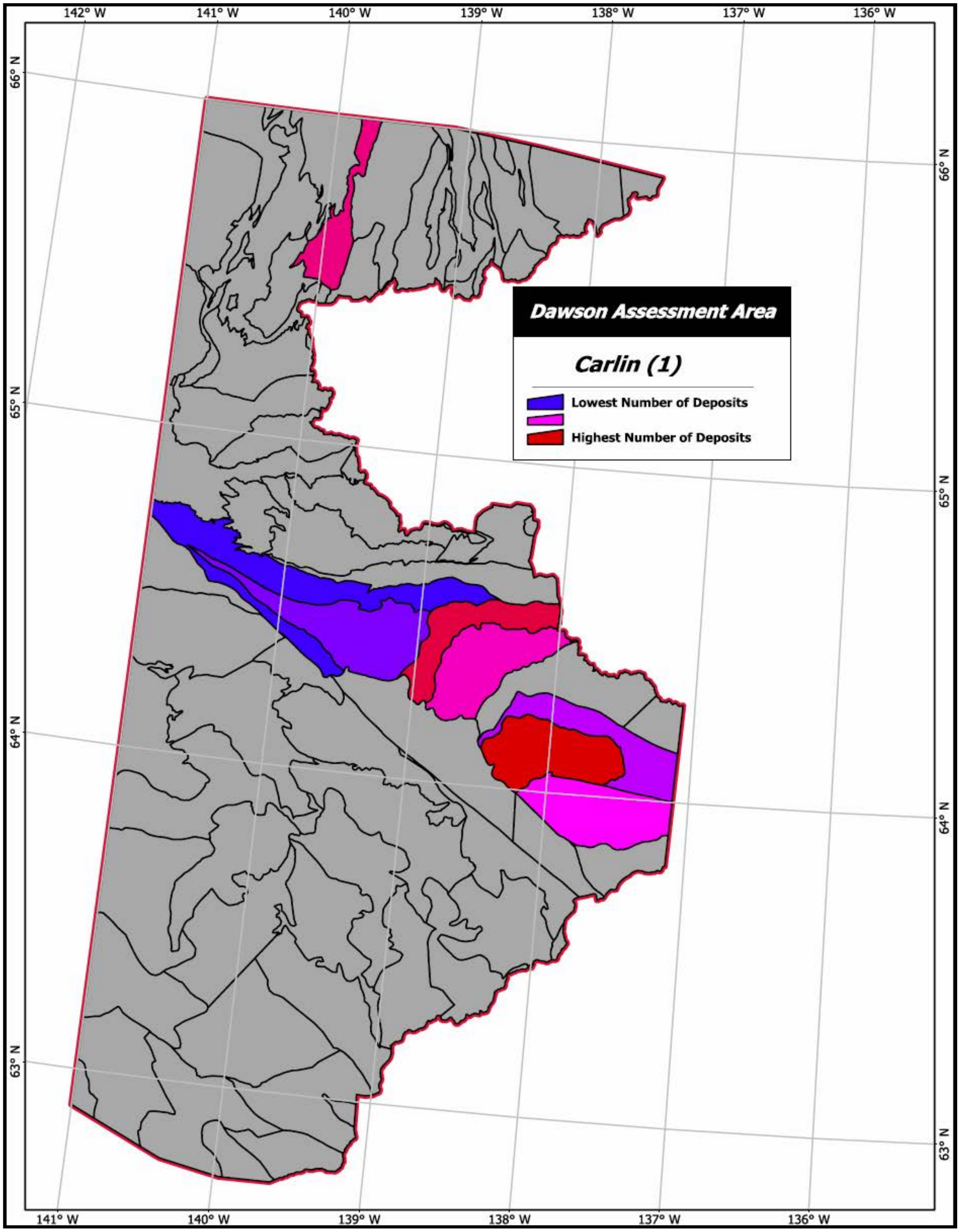
ESPG:3578 (European Petroleum Survey Group code)

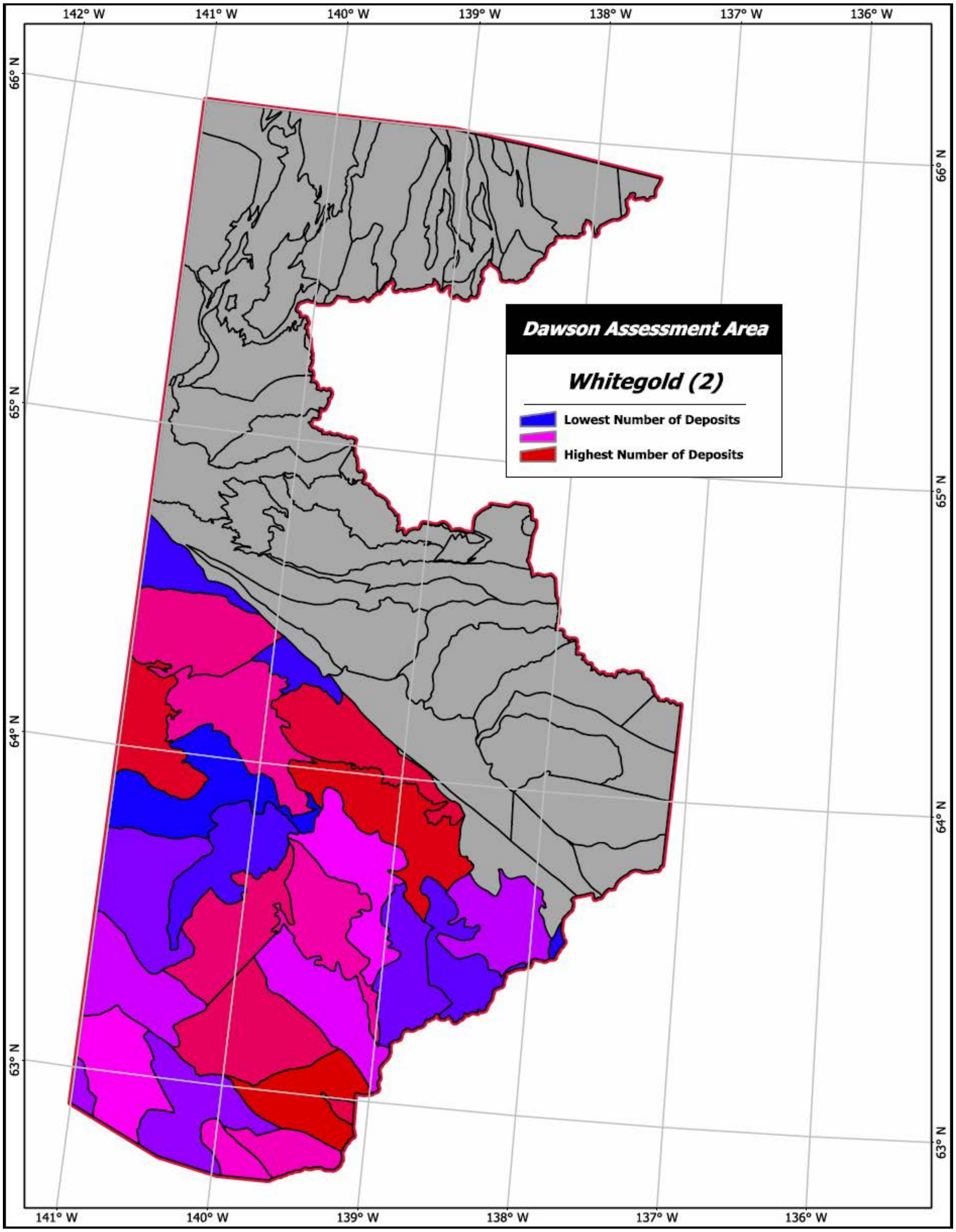
Projection: ALBERS
Datum: NAD83
Zunits: NO
Units: METRES
Spheroid: GRS1980
Xshift: 0.0000000000
Yshift: 0.0000000000

Parameters
1st Standard Parallel: 61 40 0.00
2nd Standard Parallel: 68 0 0.00
Central Meridian: -132 30 0.00
Latitude of Proj. Origin: 50 0 0.00
False Easting: 500000.0 m
False Northing: 500000.0 m

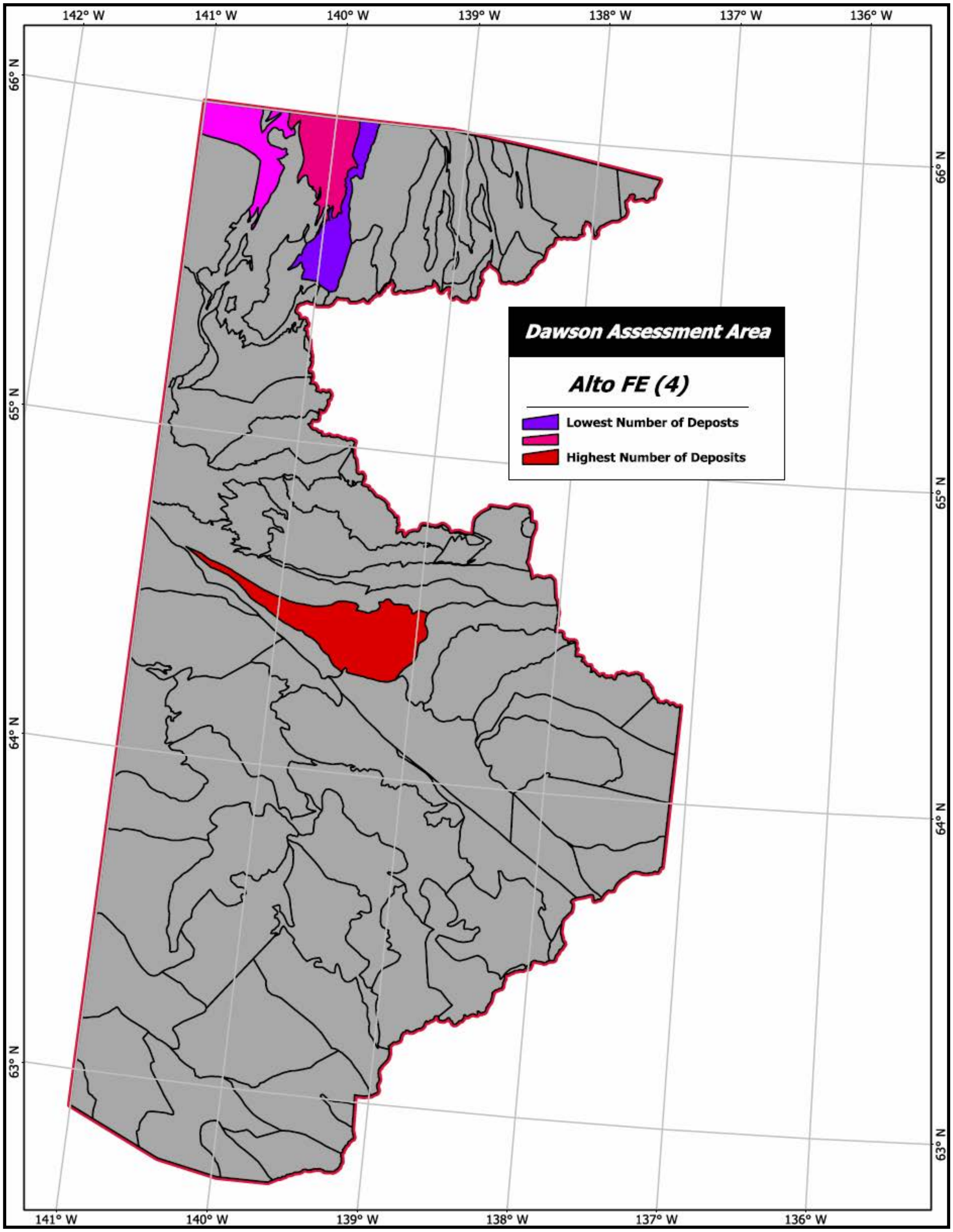
APPENDIX: Deposit Distribution Maps



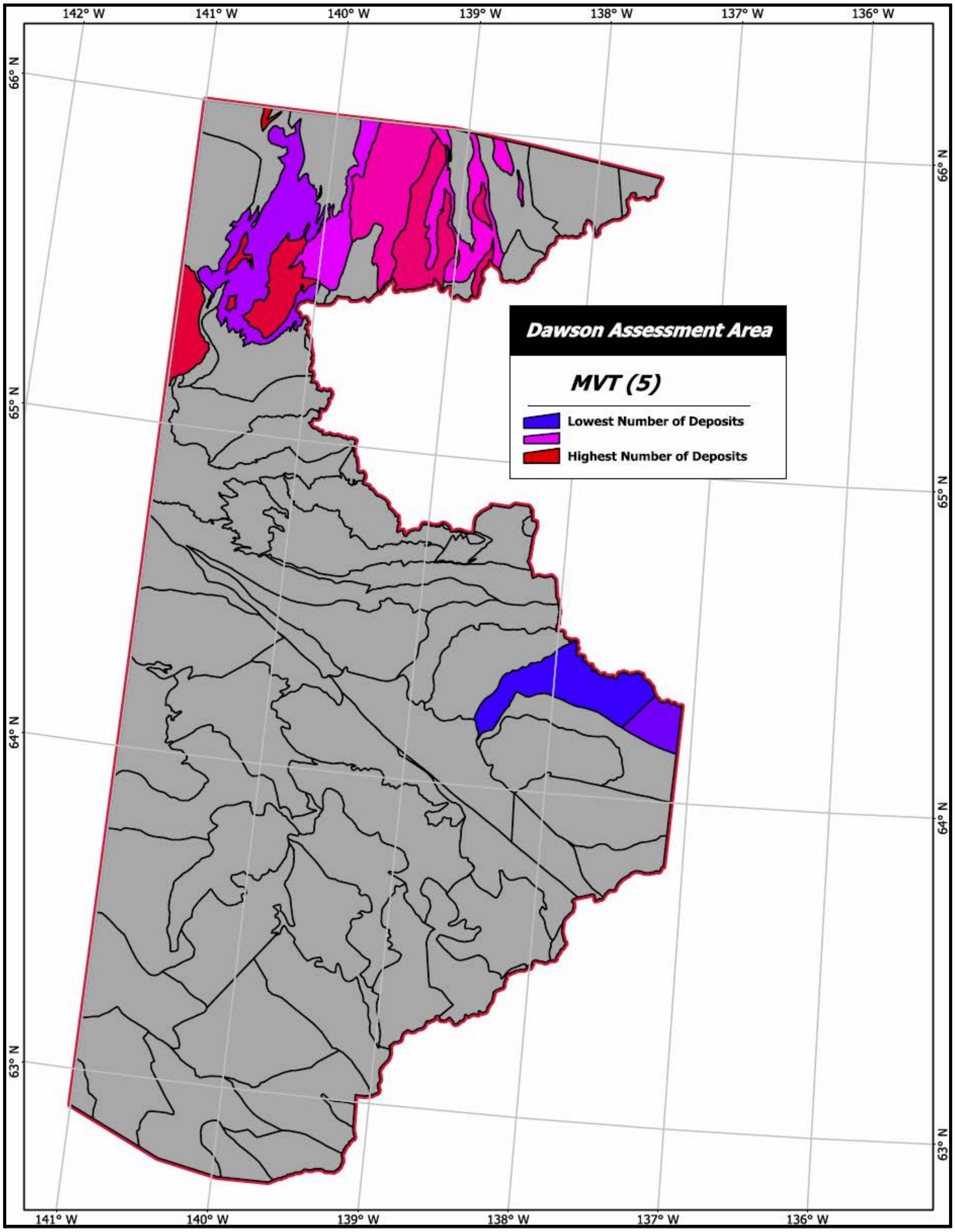

142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Carlin (1)
Lowest Number of Deposits
Highest Number of Deposits
141° W
140° W
139° W
138° W
137° W
136° W



142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Whitegold (2)
Lowest Number of Deposits
Highest Number of Deposits
141° W
140° W
139° W
138° W
137° W
136° W



Dawson Assessment Area
Alto FE (4)
Lowest Number of Deposts
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
MVT (5)
Lowest Number of Deposits
Highest Number of Deposits
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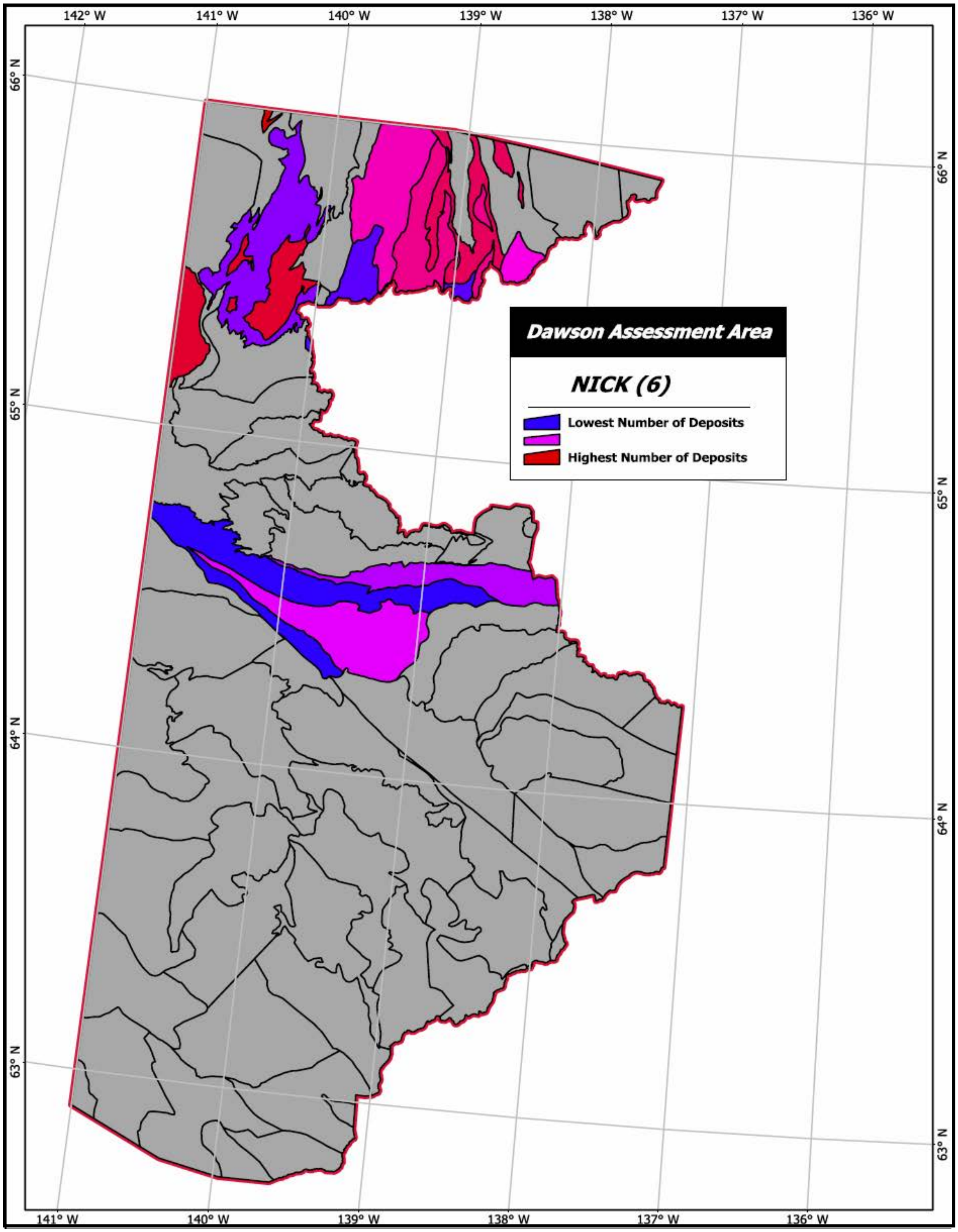
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



Dawson Assessment Area
NICK (6)
Lowest Number of Deposits
Highest Number of Deposits
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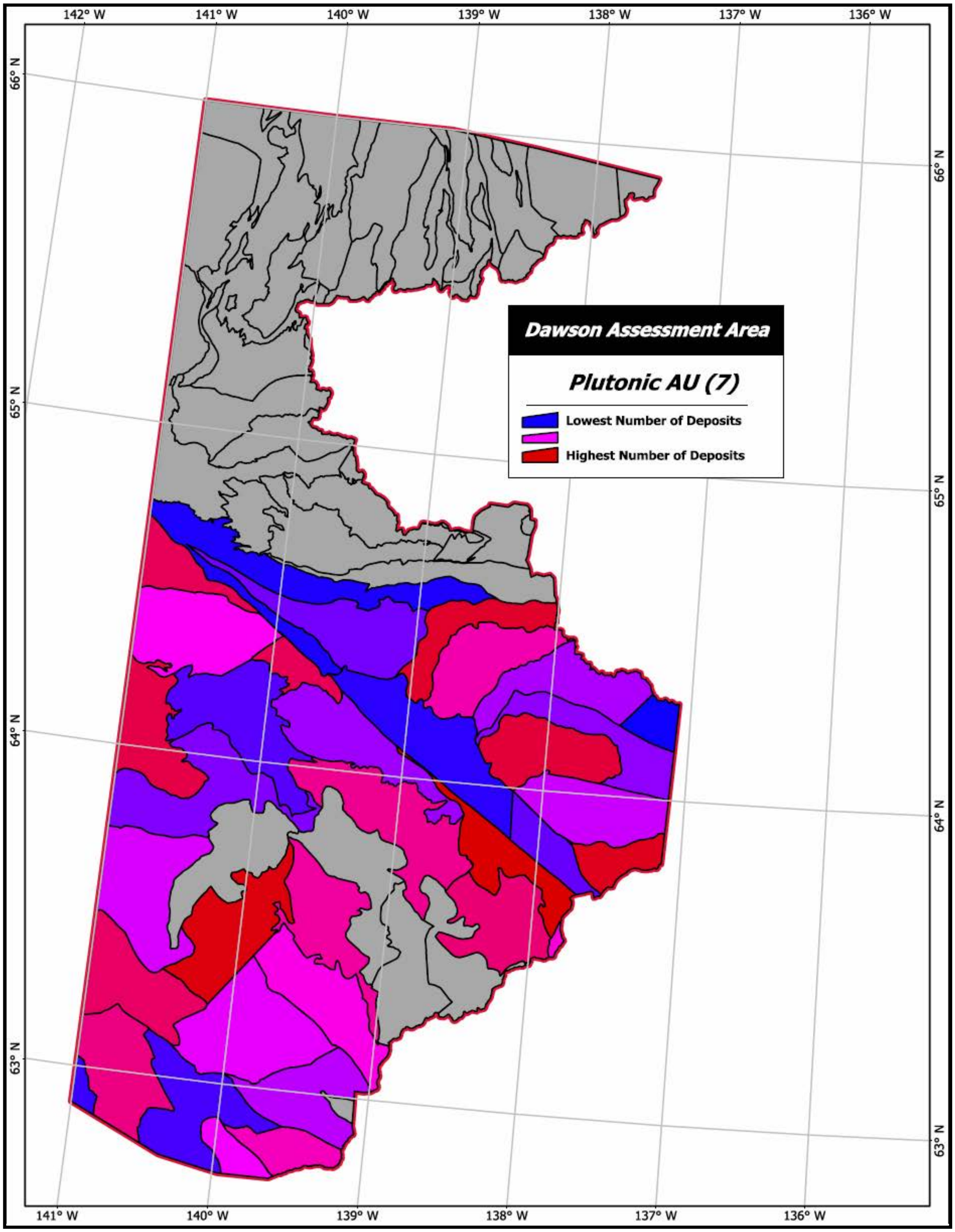
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Plutonic AU (7)
Lowest Number of Deposits
Highest Number of Deposits
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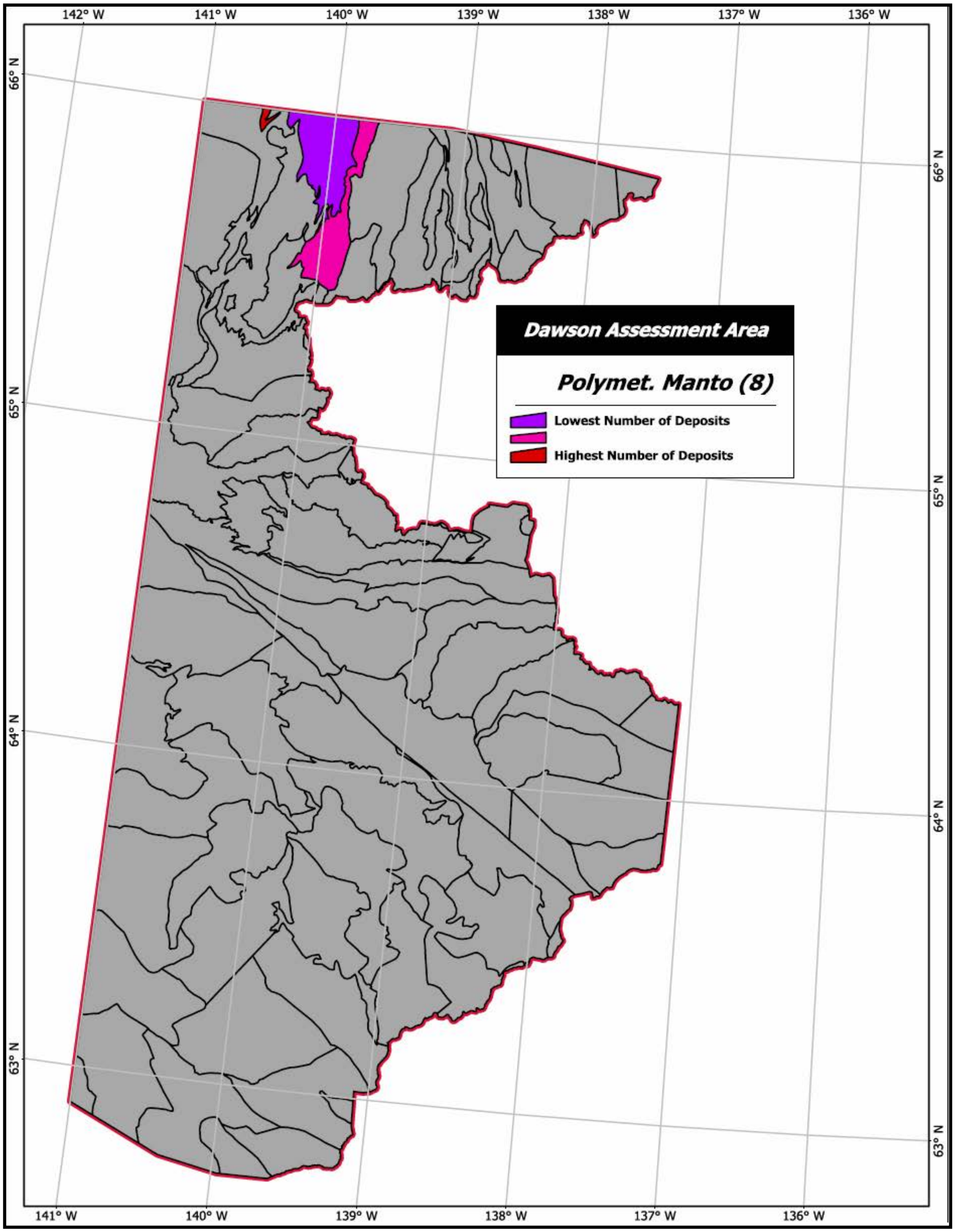
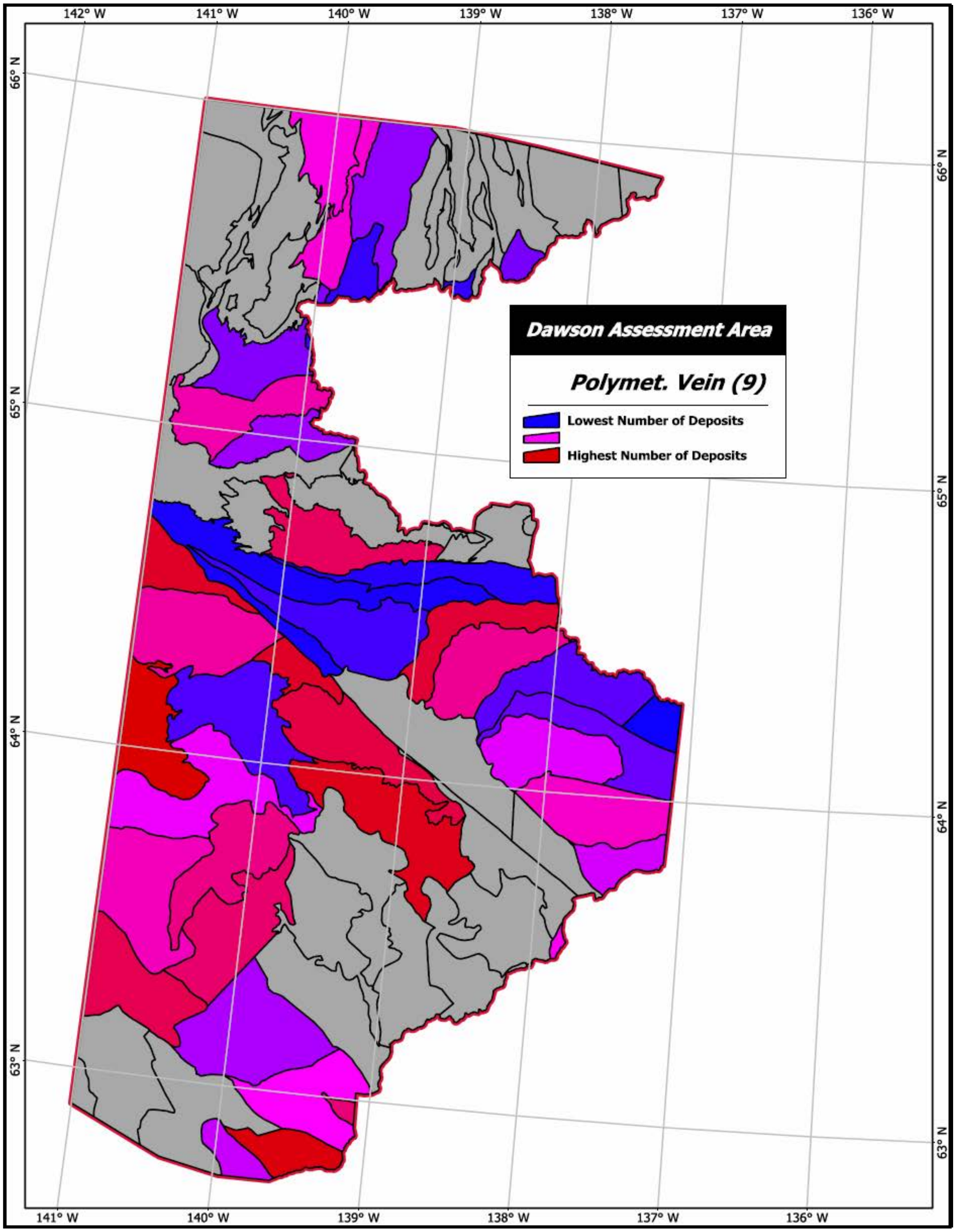
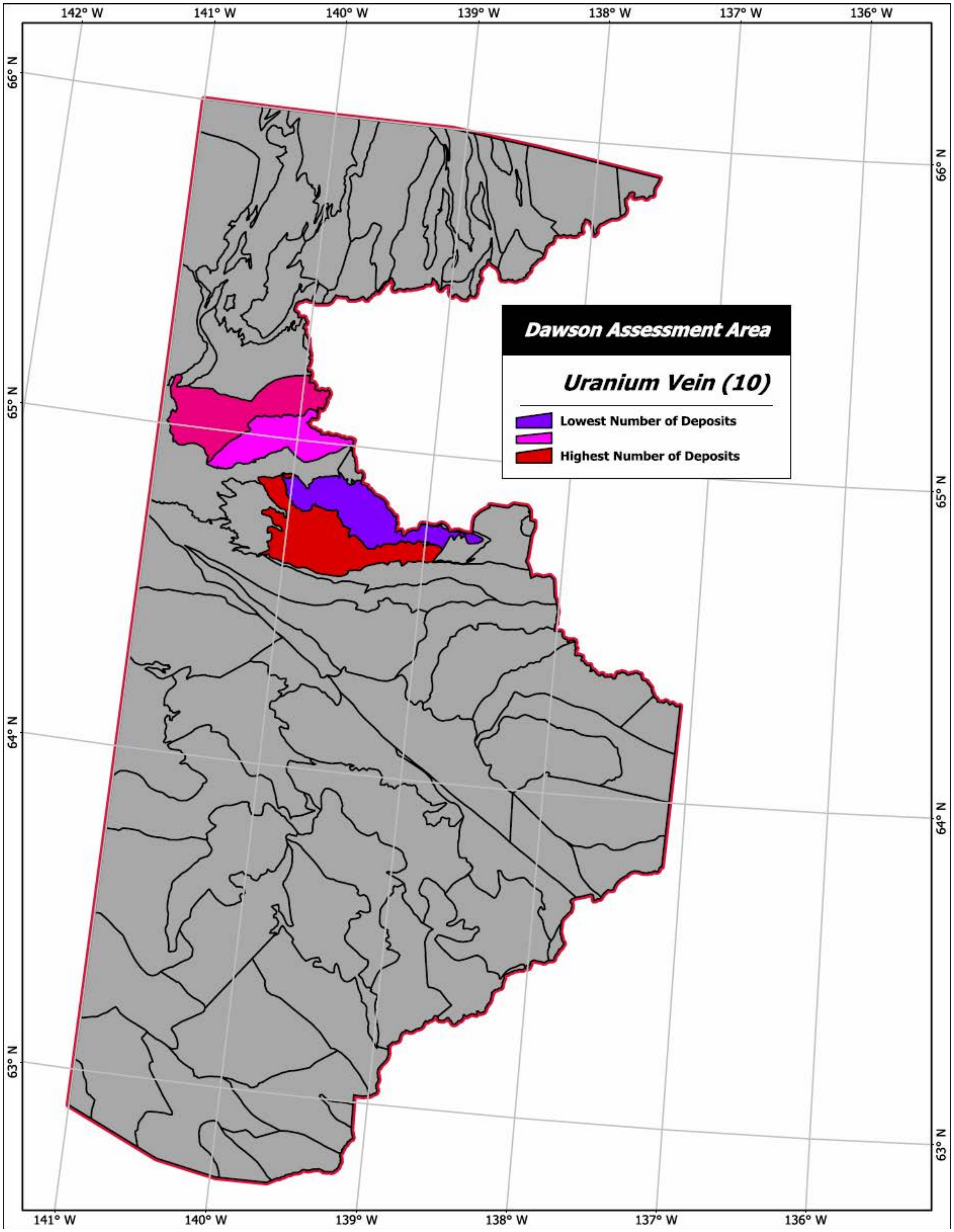
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Polymet. Manto (8)
Lowest Number of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Polymet. Vein (9)
Lowest Number of Deposits
Highest Number of Deposits


Dawson Assessment Area
Uranium Vein (10)
Lowest Number of Deposits
Highest Number of Deposits
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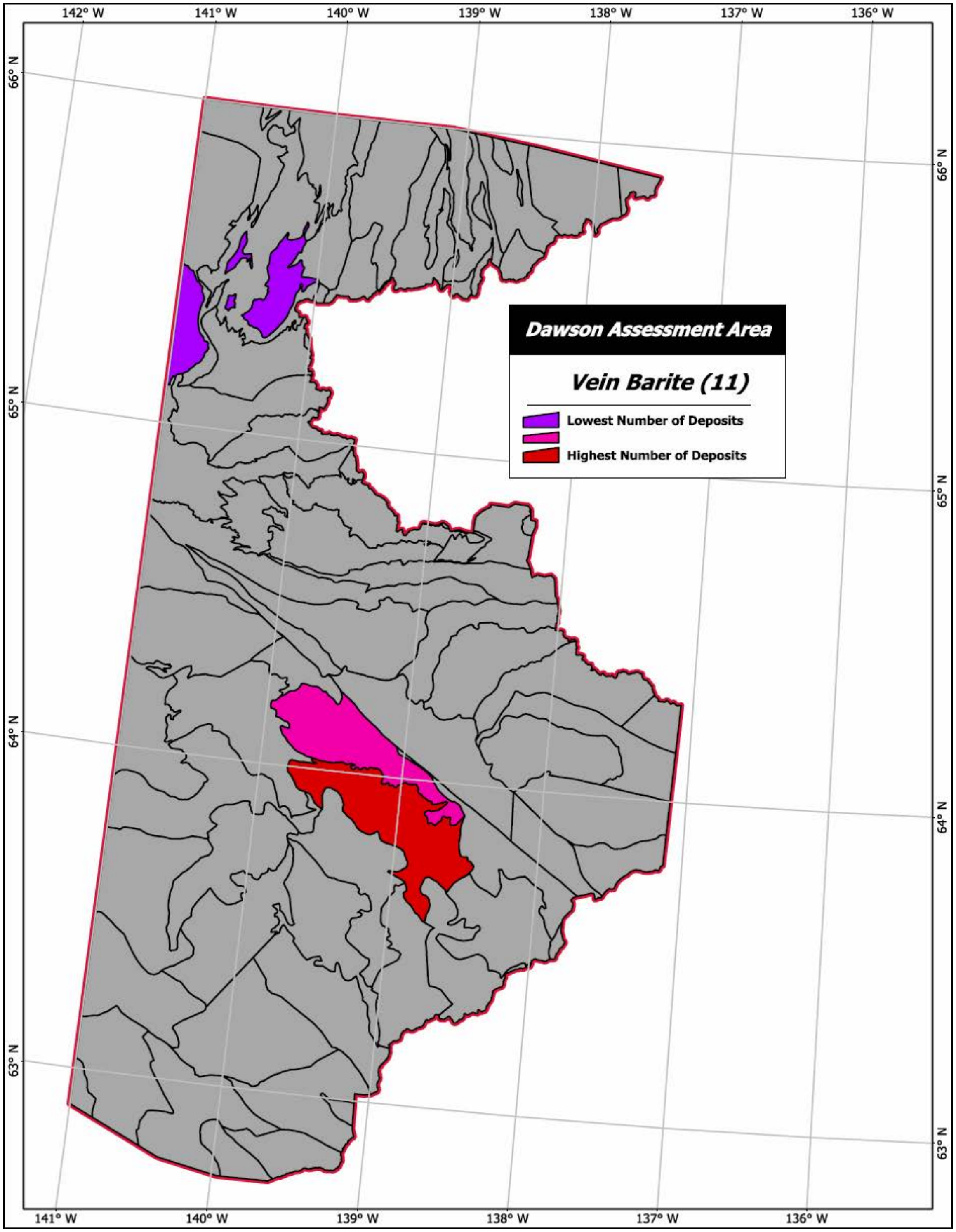
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Vein Barite (11)
Lowest Number of Deposits
Highest Number of Deposits
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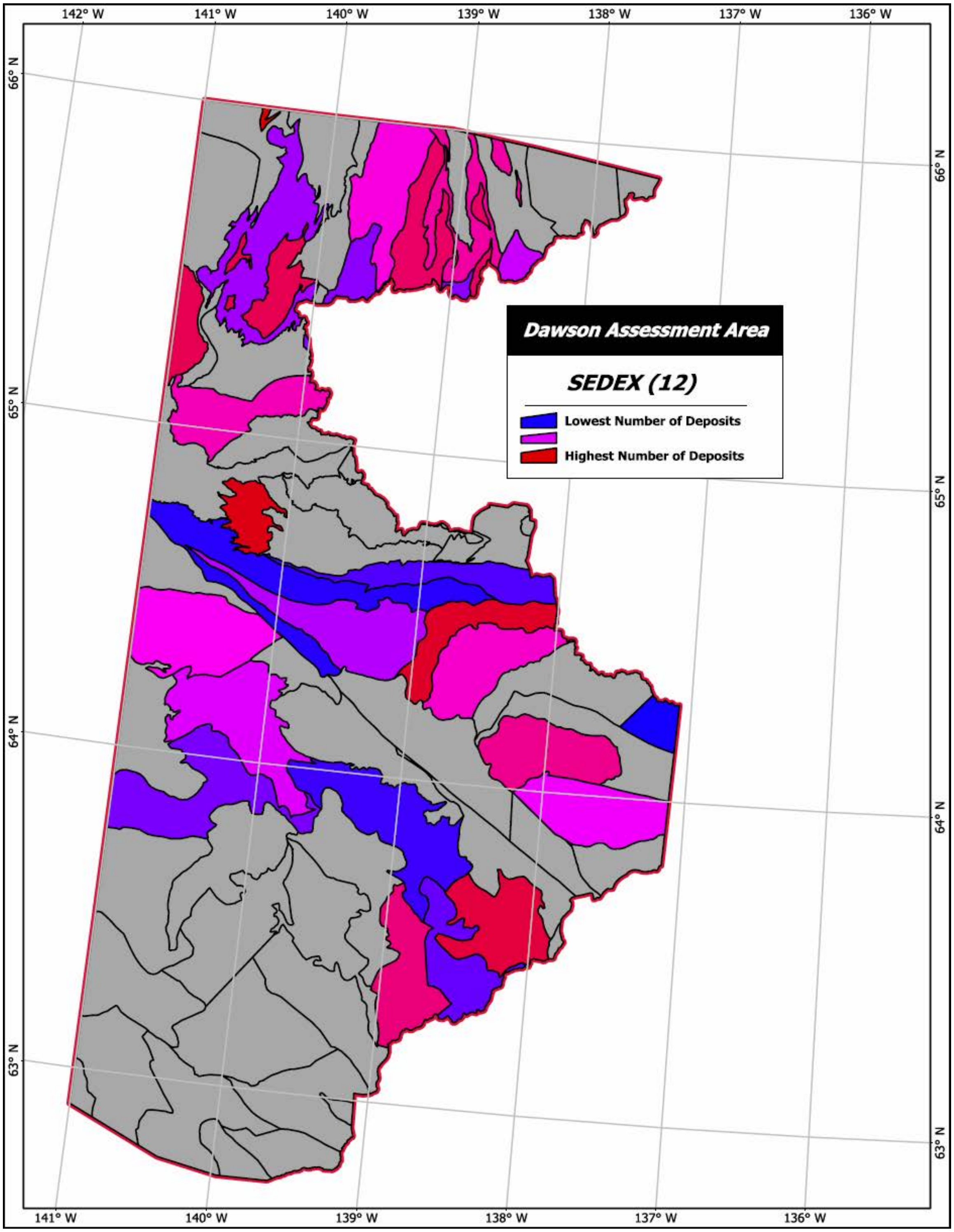
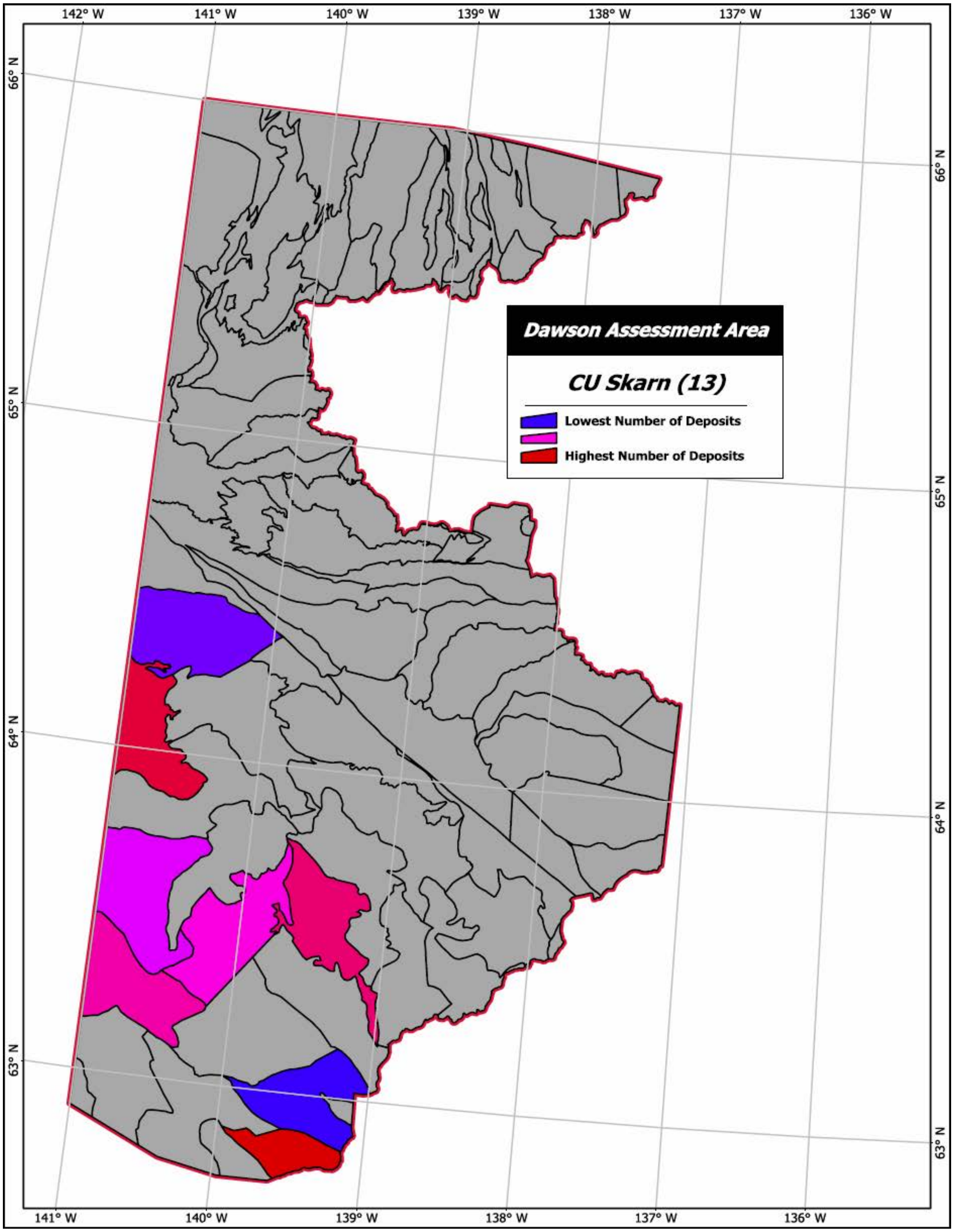
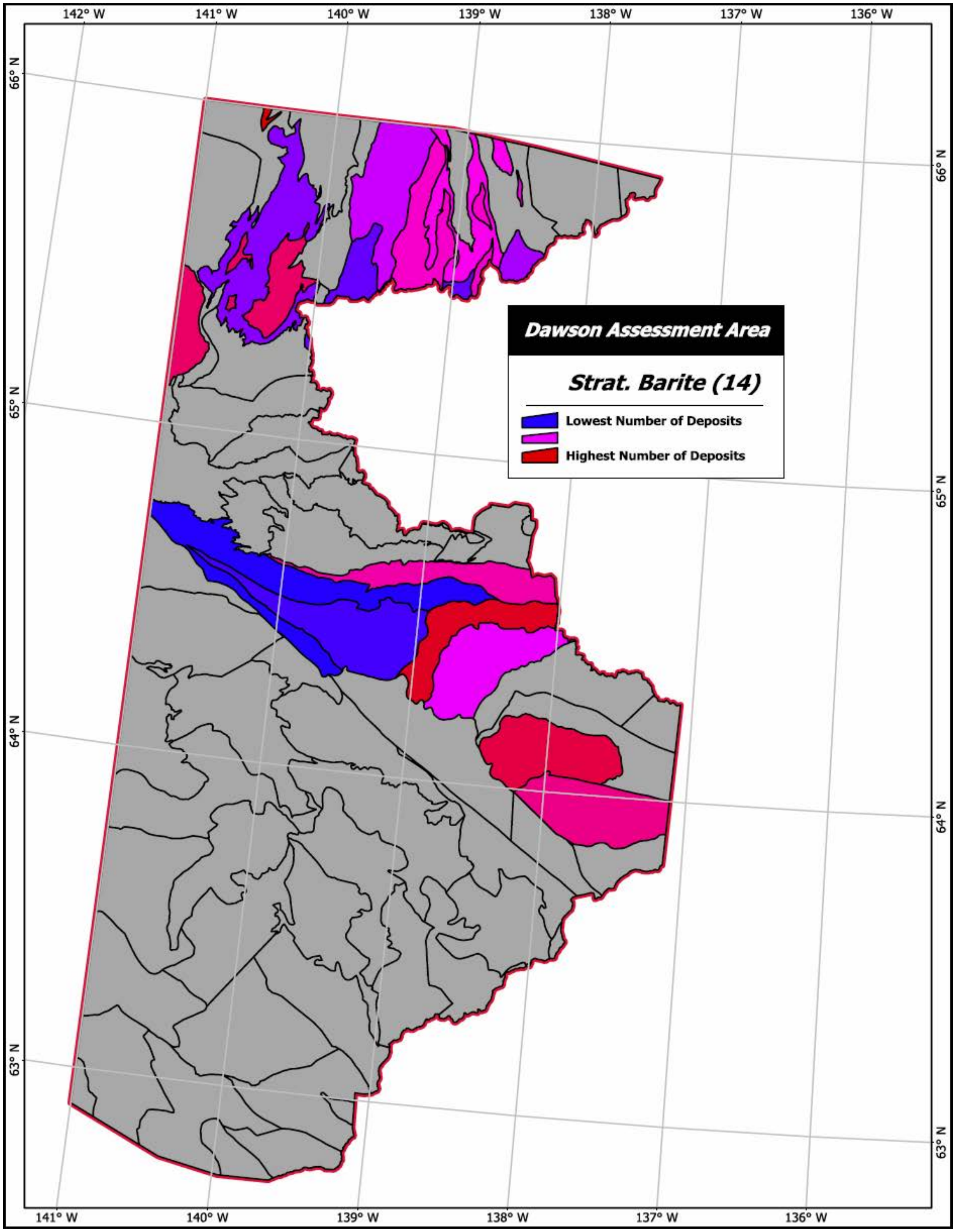
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
SEDEX (12)
Lowest Number of Deposits
Highest Number of Deposits



Dawson Assessment Area
CU Skarn (13)
Lowest Number of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Strat. Barite (14)
Lowest Number of Deposits
Highest Number of Deposits
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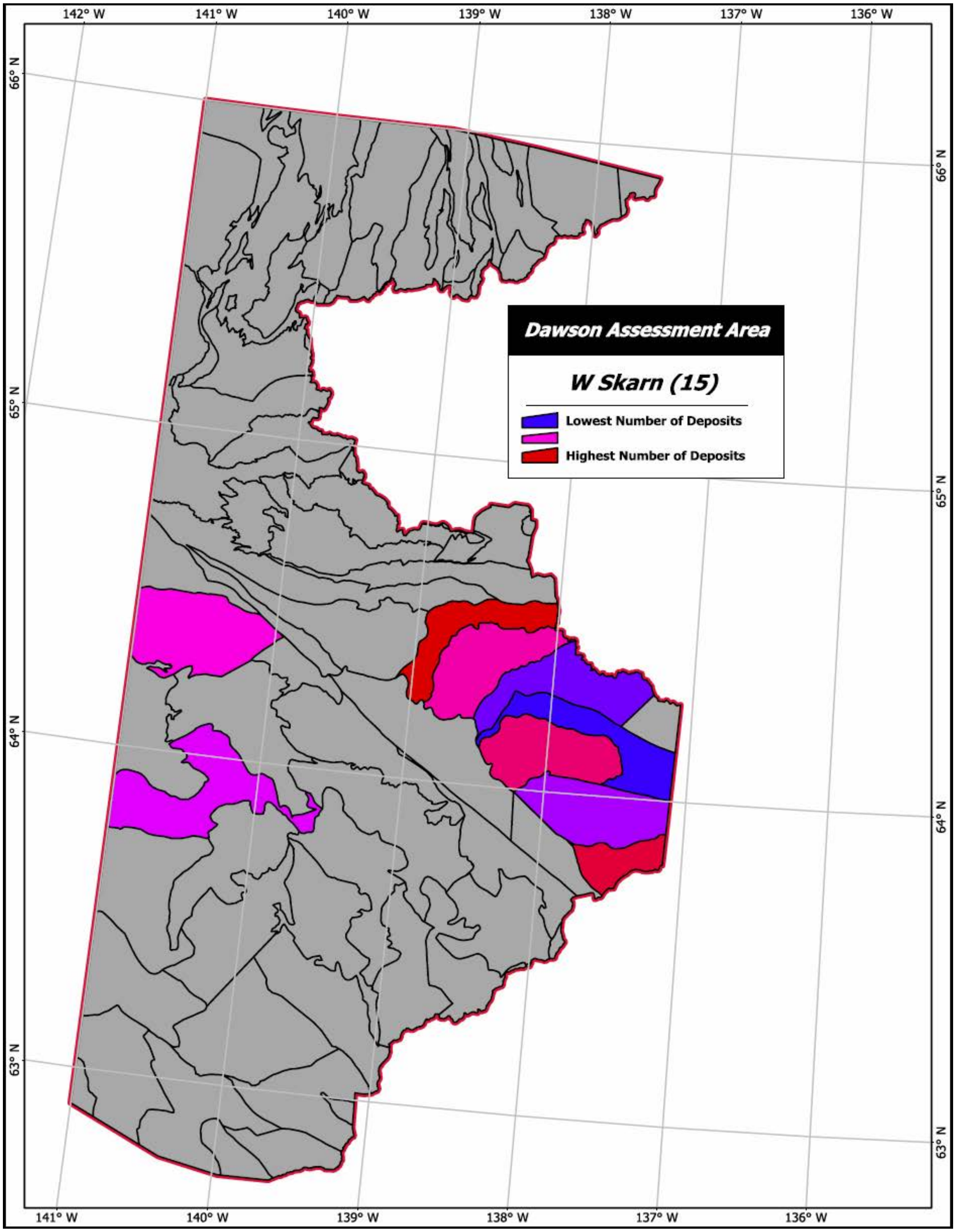
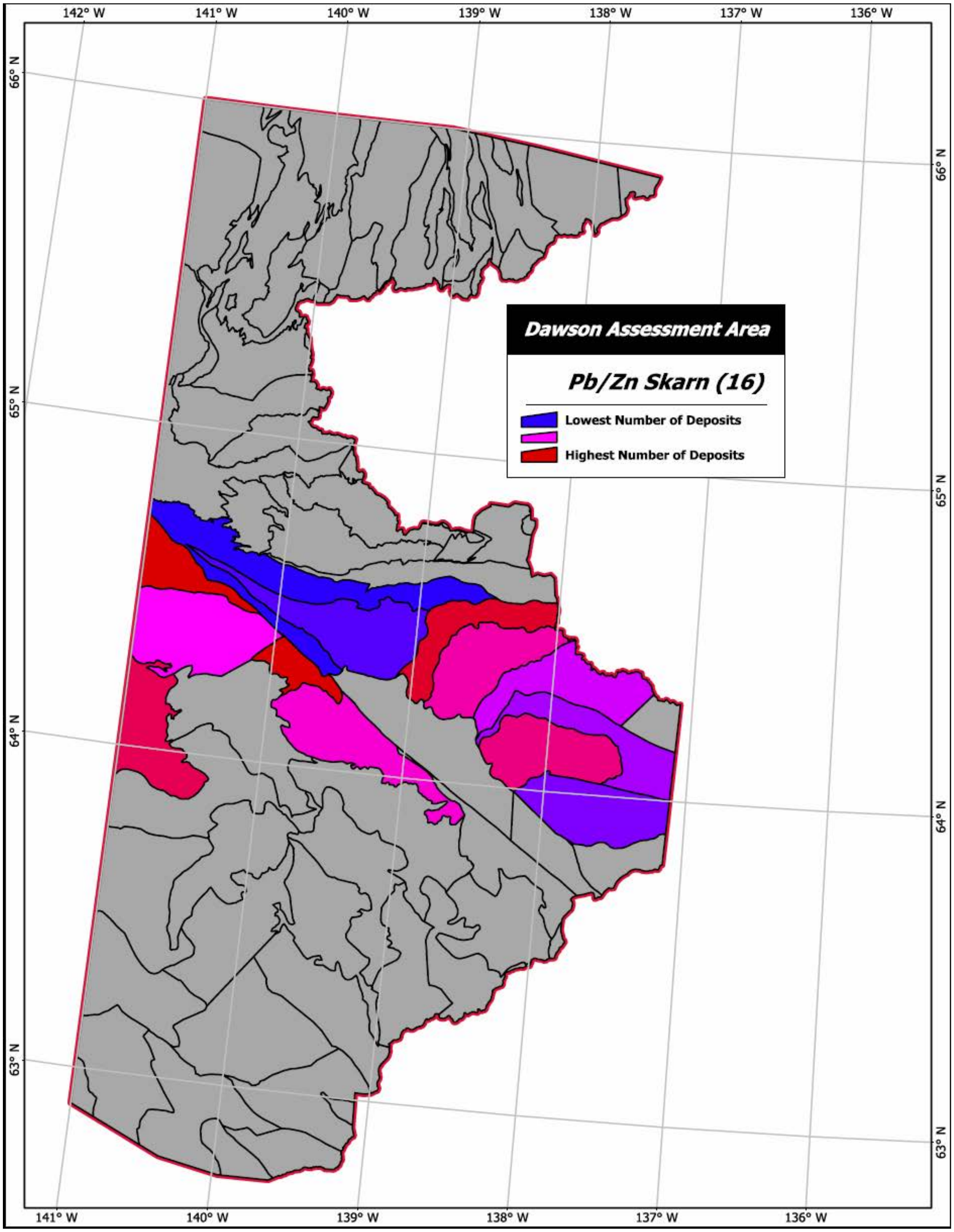
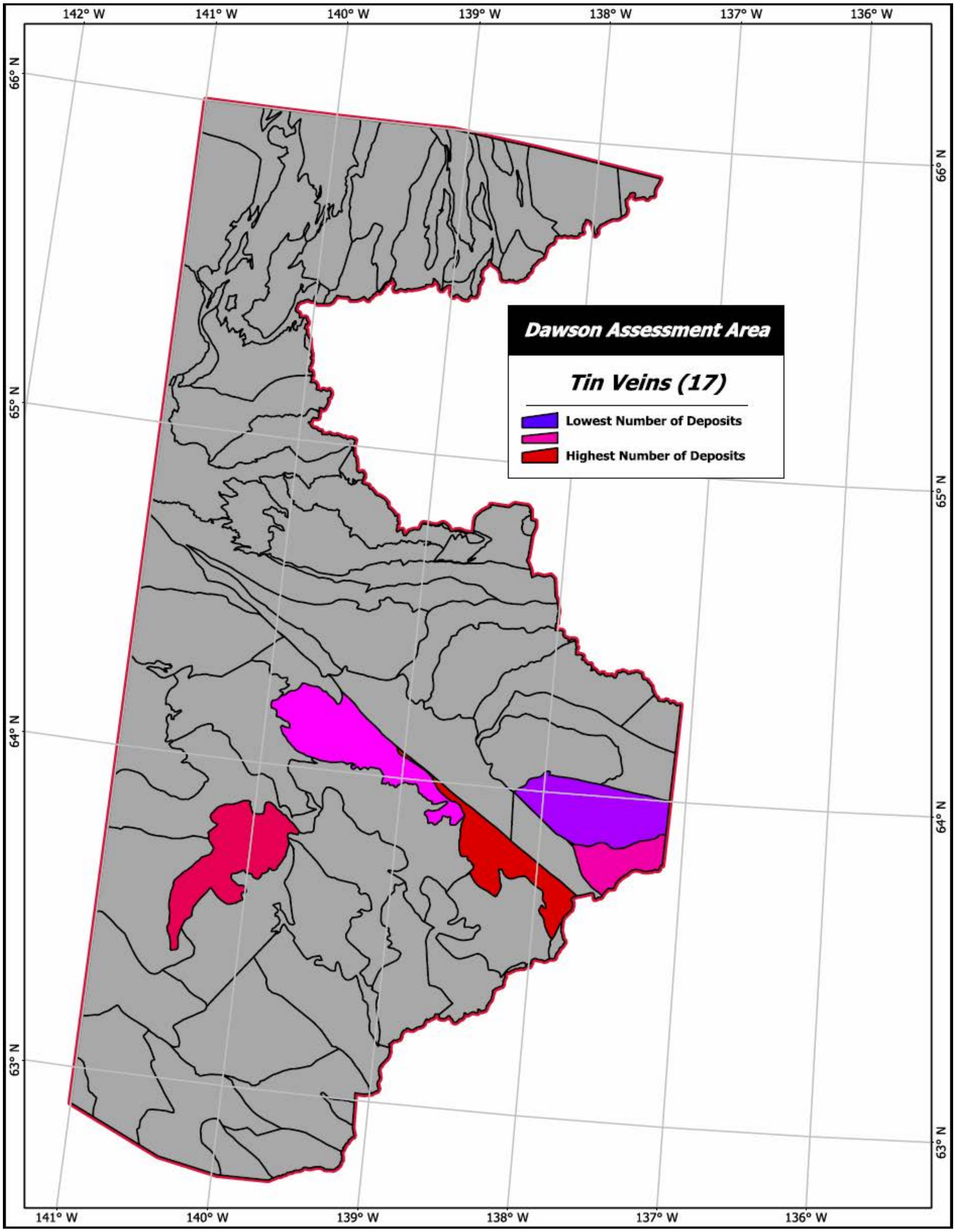
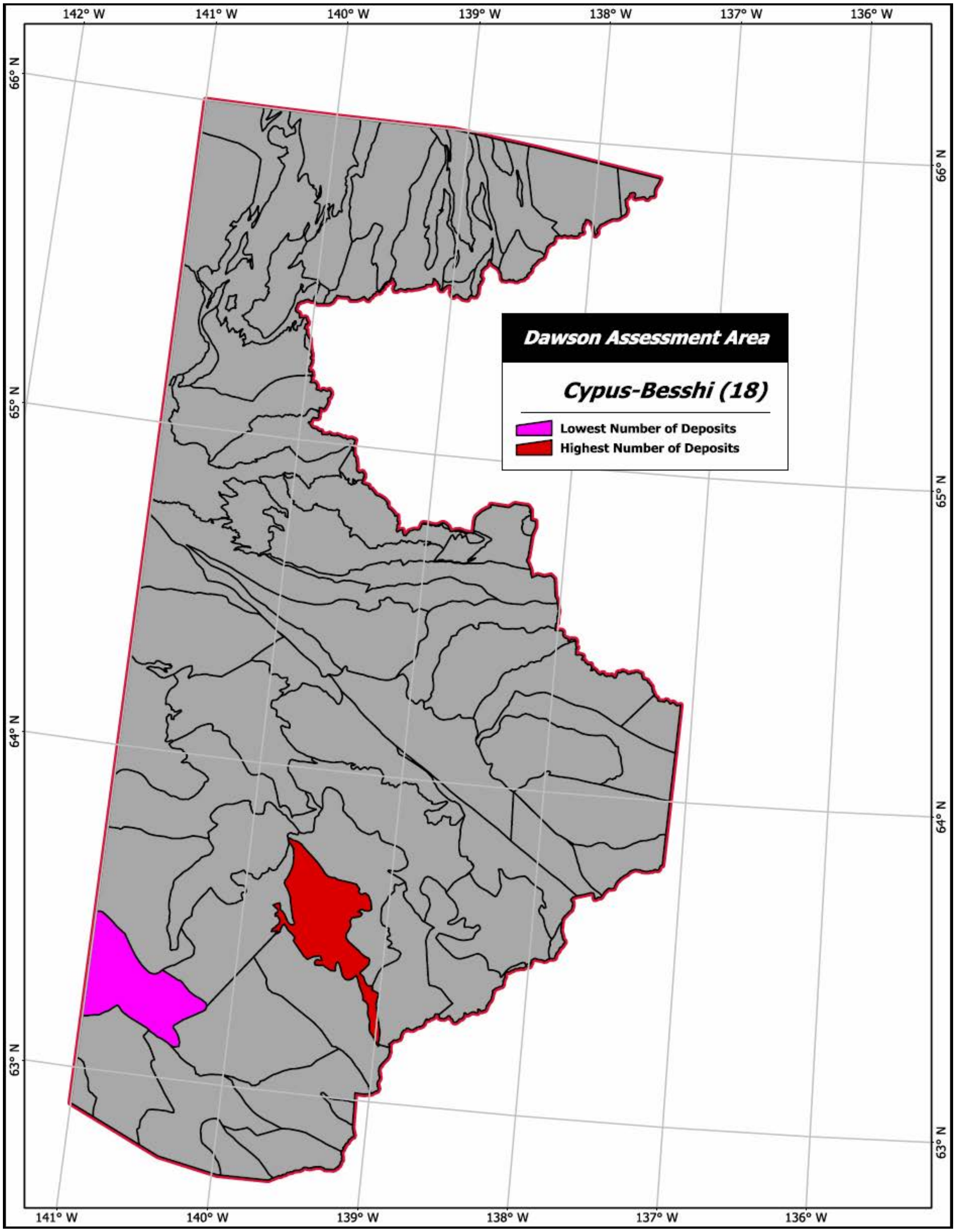
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

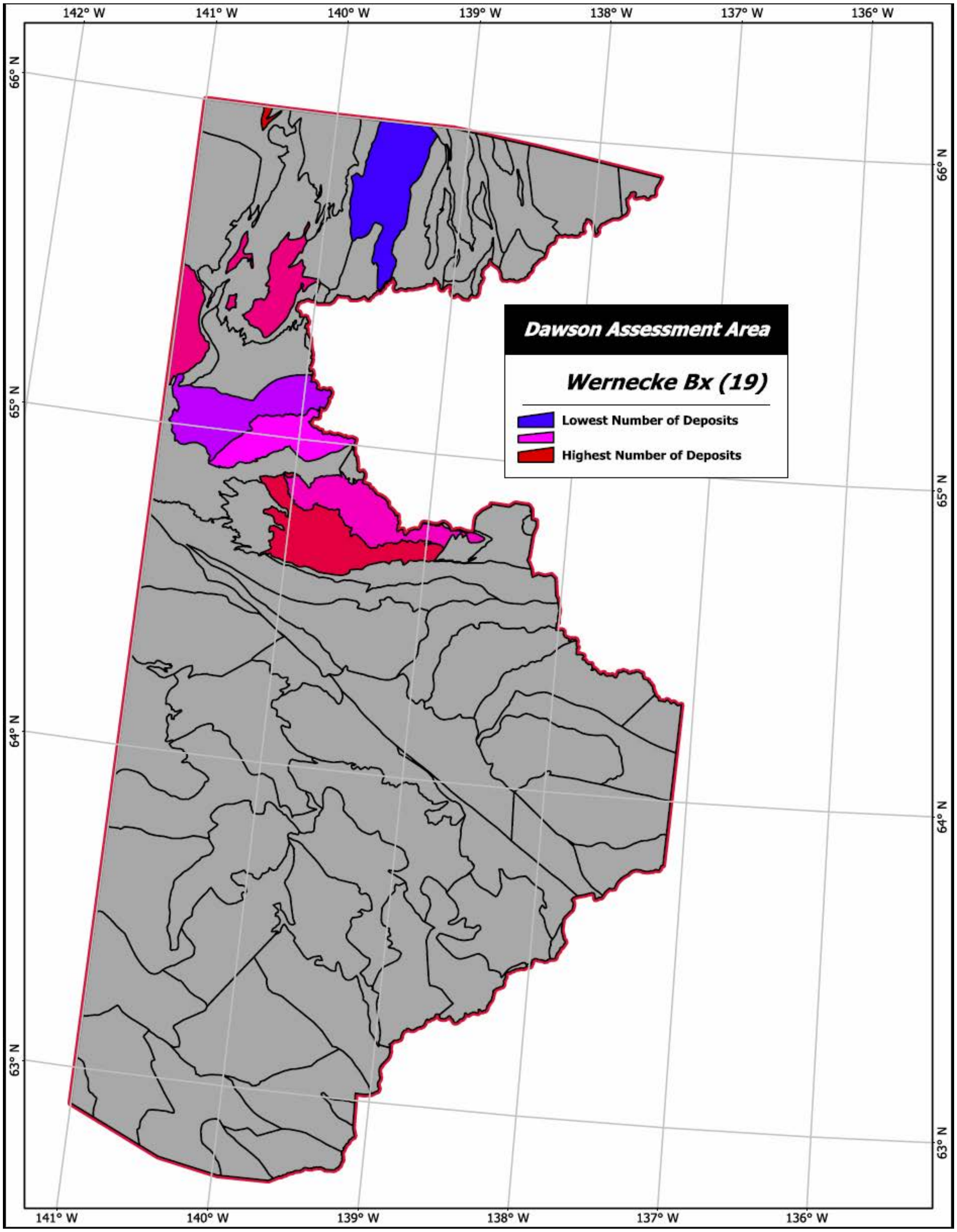


Dawson Assessment Area
W Skarn (15)
Lowest Number of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Pb/Zn Skarn (16)
Lowest Number of Deposits
Highest Number of Deposits
141° W
140° W
139° W
138° W
137° W
136° W


Dawson Assessment Area
Tin Veins (17)
Lowest Number of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Cypus-Besshi (18)
Lowest Number of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Wernecke Bx (19)
Lowest Number of Deposits
Highest Number of Deposits
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141° W
140° W
139° W
138° W
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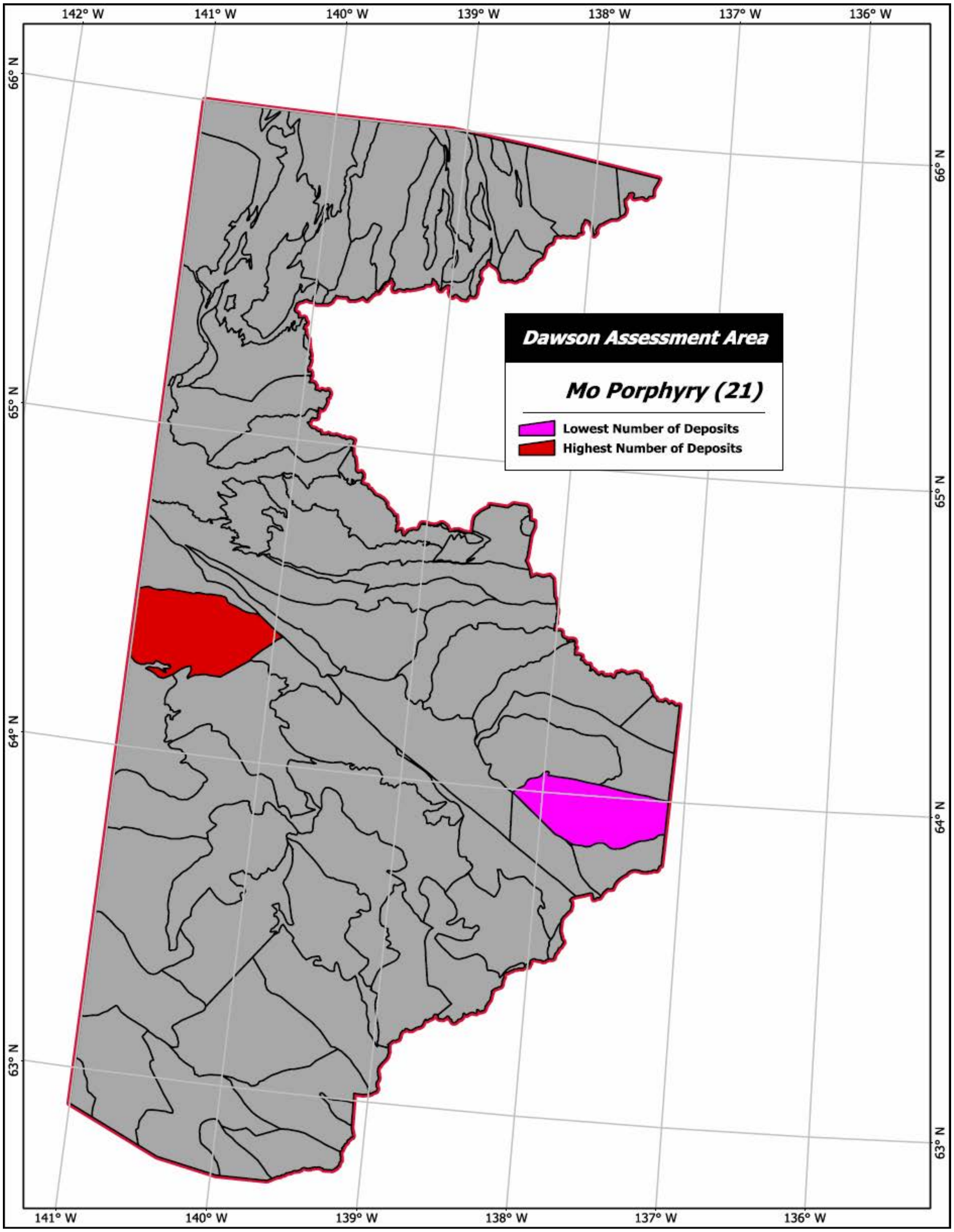
66° N
65° N
64° N
63° N


Dawson Assessment Area
Mo Porphyry (21)
Lowest Number of Deposits
Highest Number of Deposits
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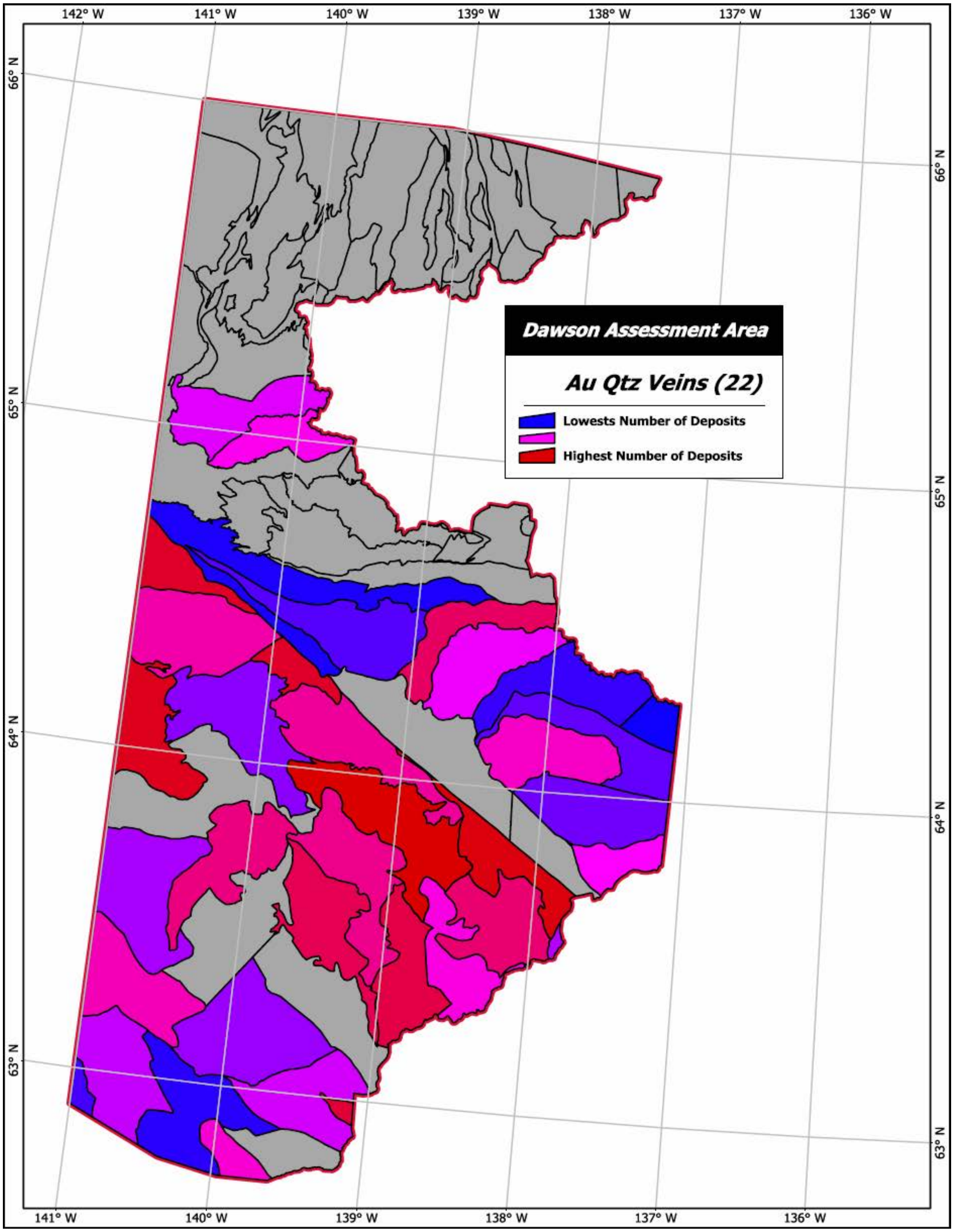
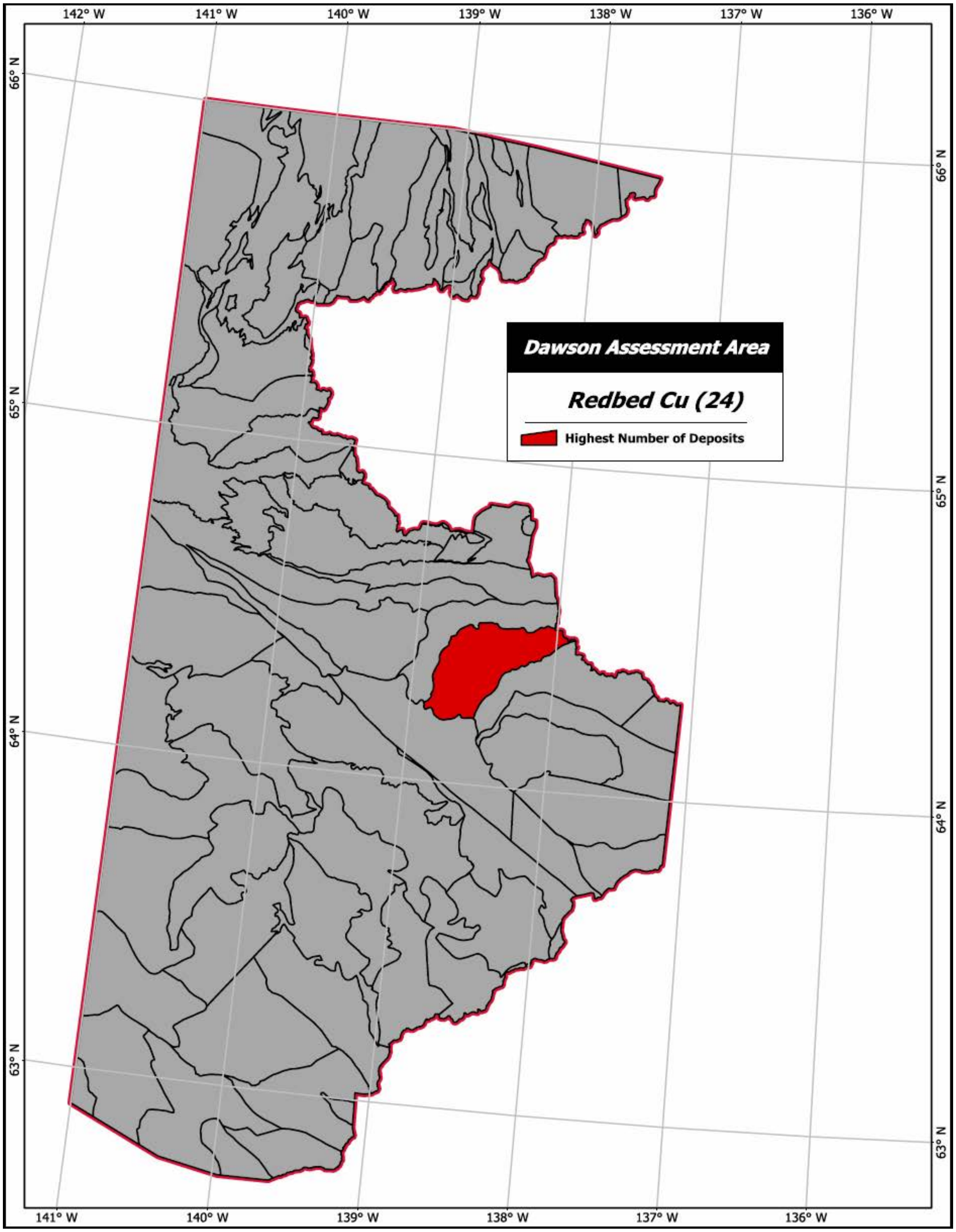
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



Dawson Assessment Area
Au Qtz Veins (22)
Lowests Number of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



Dawson Assessment Area
Redbed Cu (24)
Highest Number of Deposits
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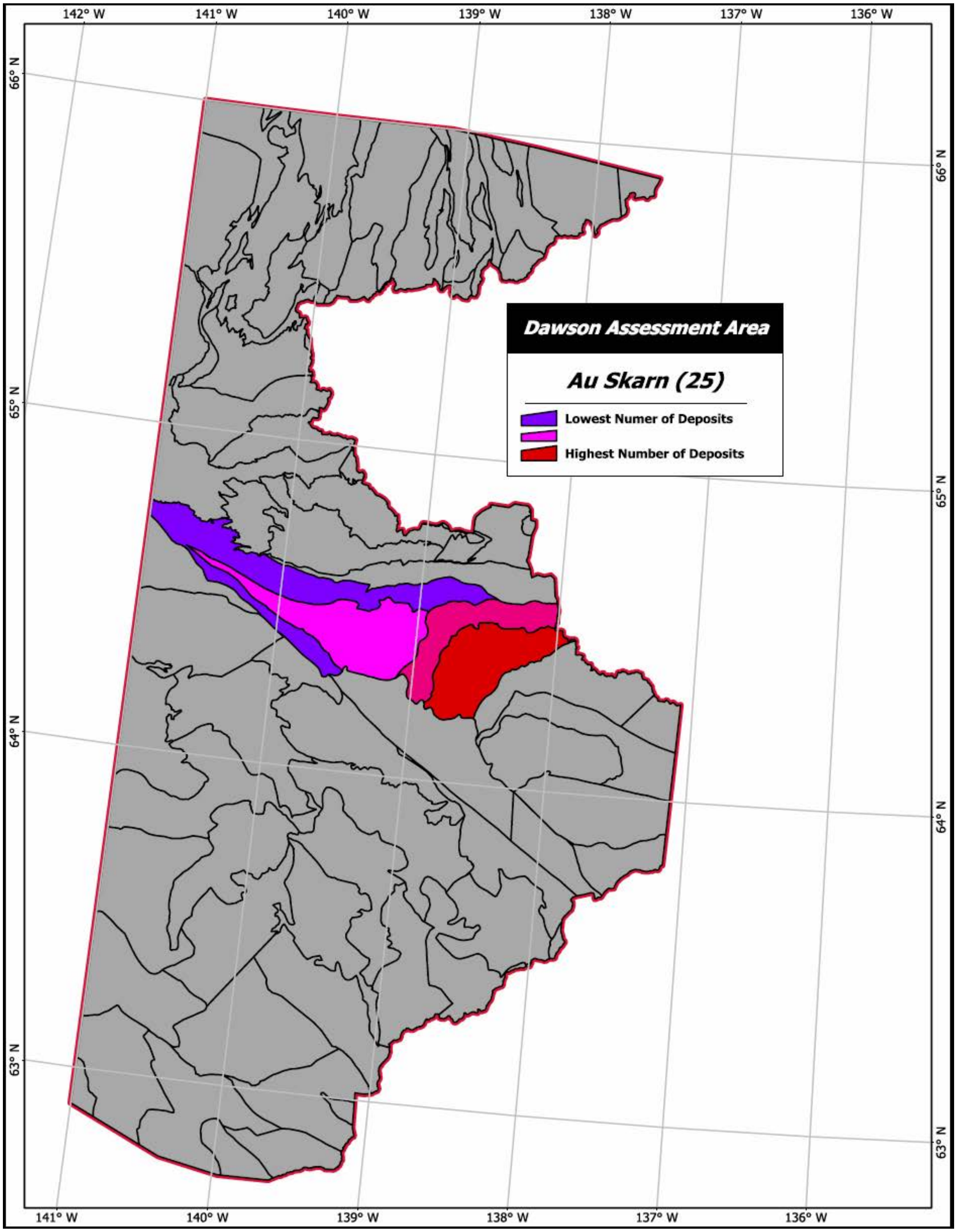
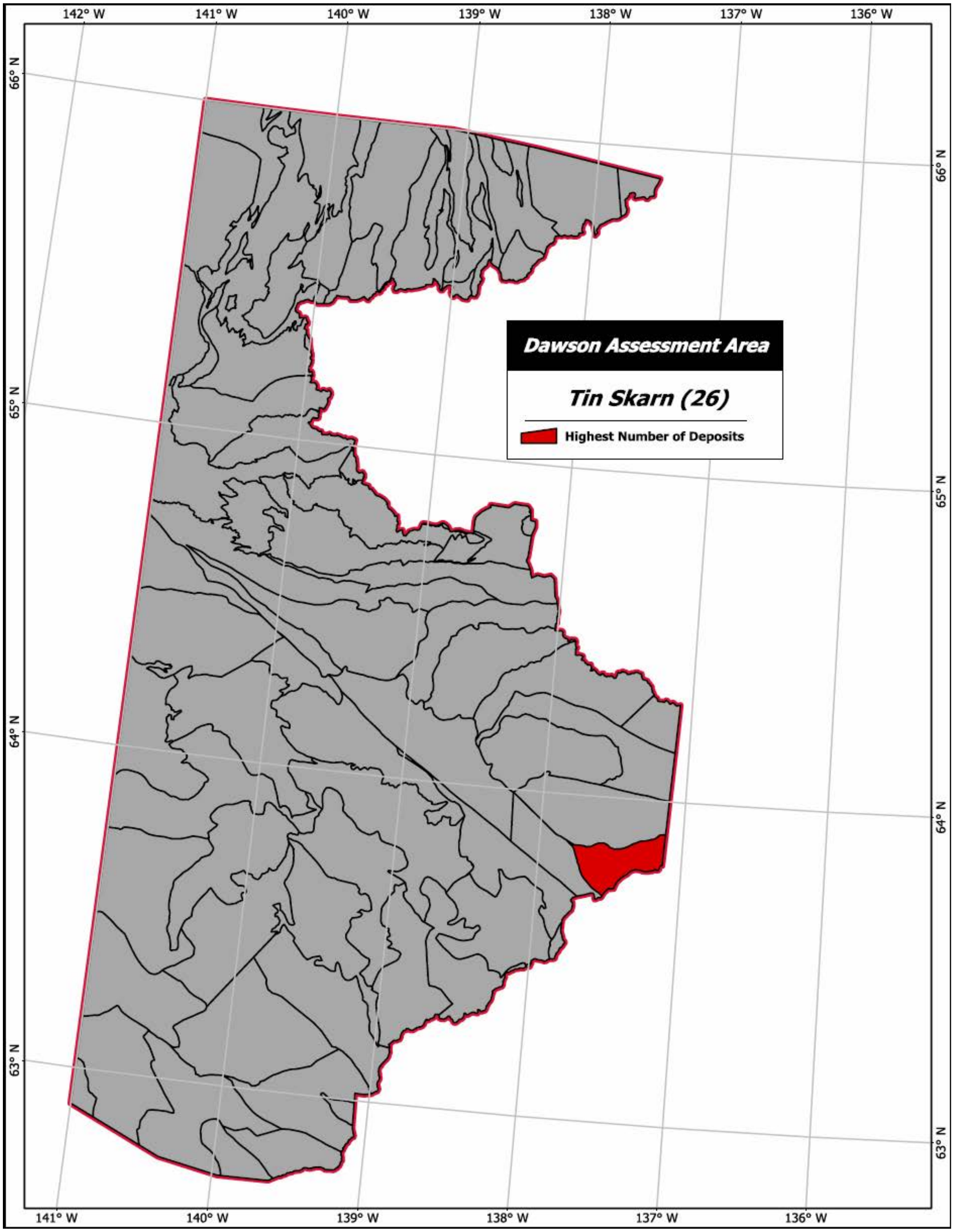
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Au Skarn (25)
Lowest Numer of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Tin Skarn (26)
Highest Number of Deposits
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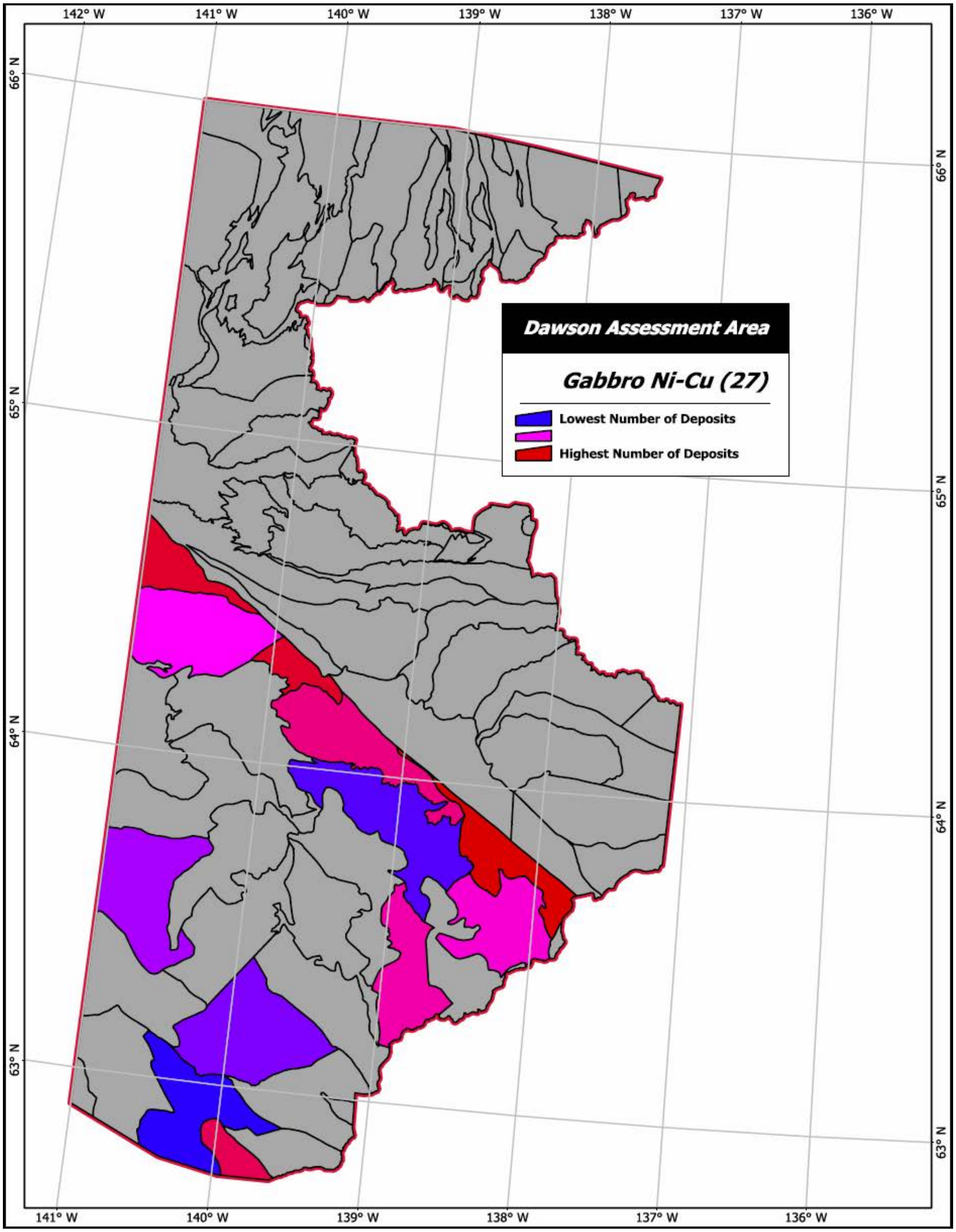
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Gabbro Ni-Cu (27)
Lowest Number of Deposits
Highest Number of Deposits
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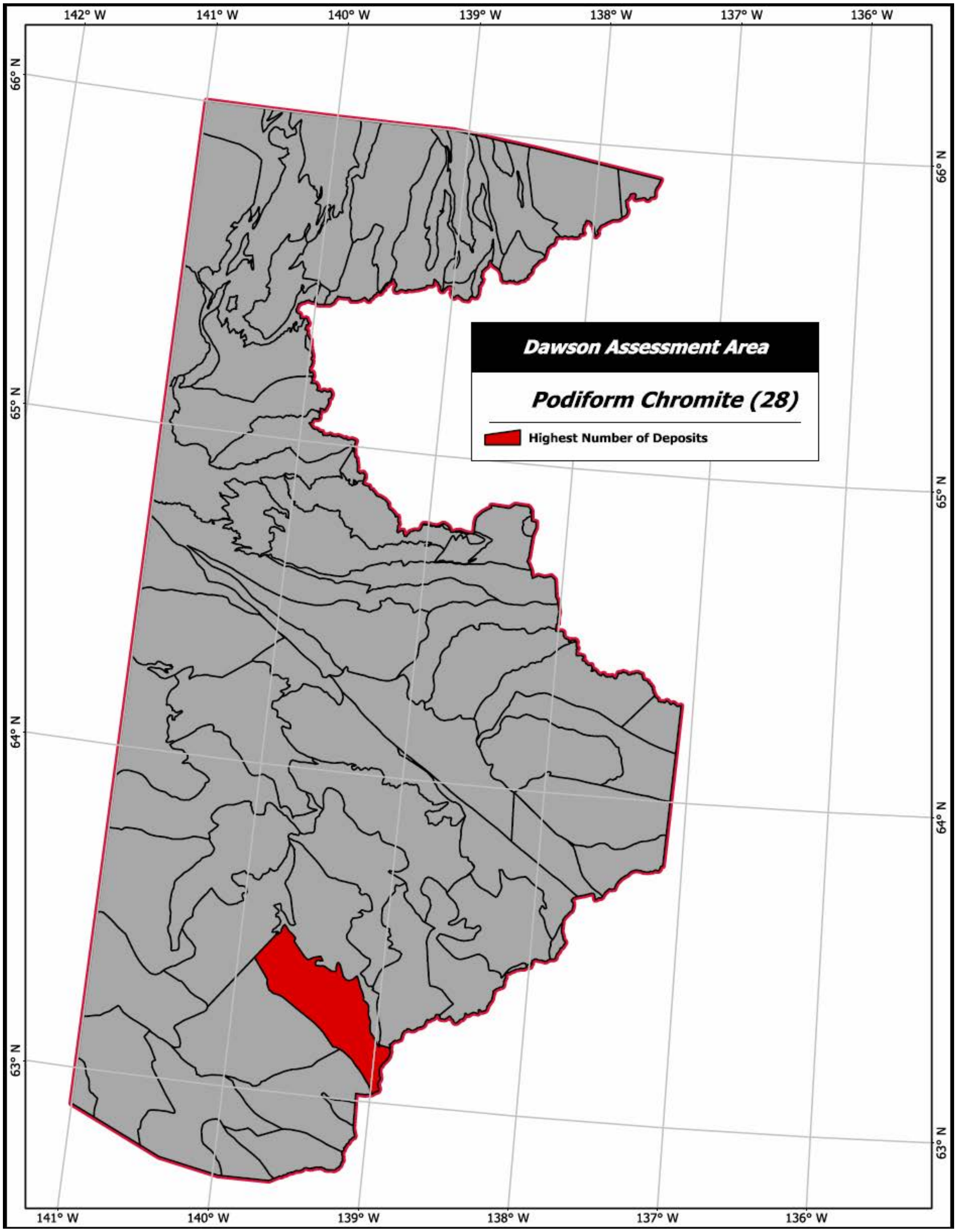
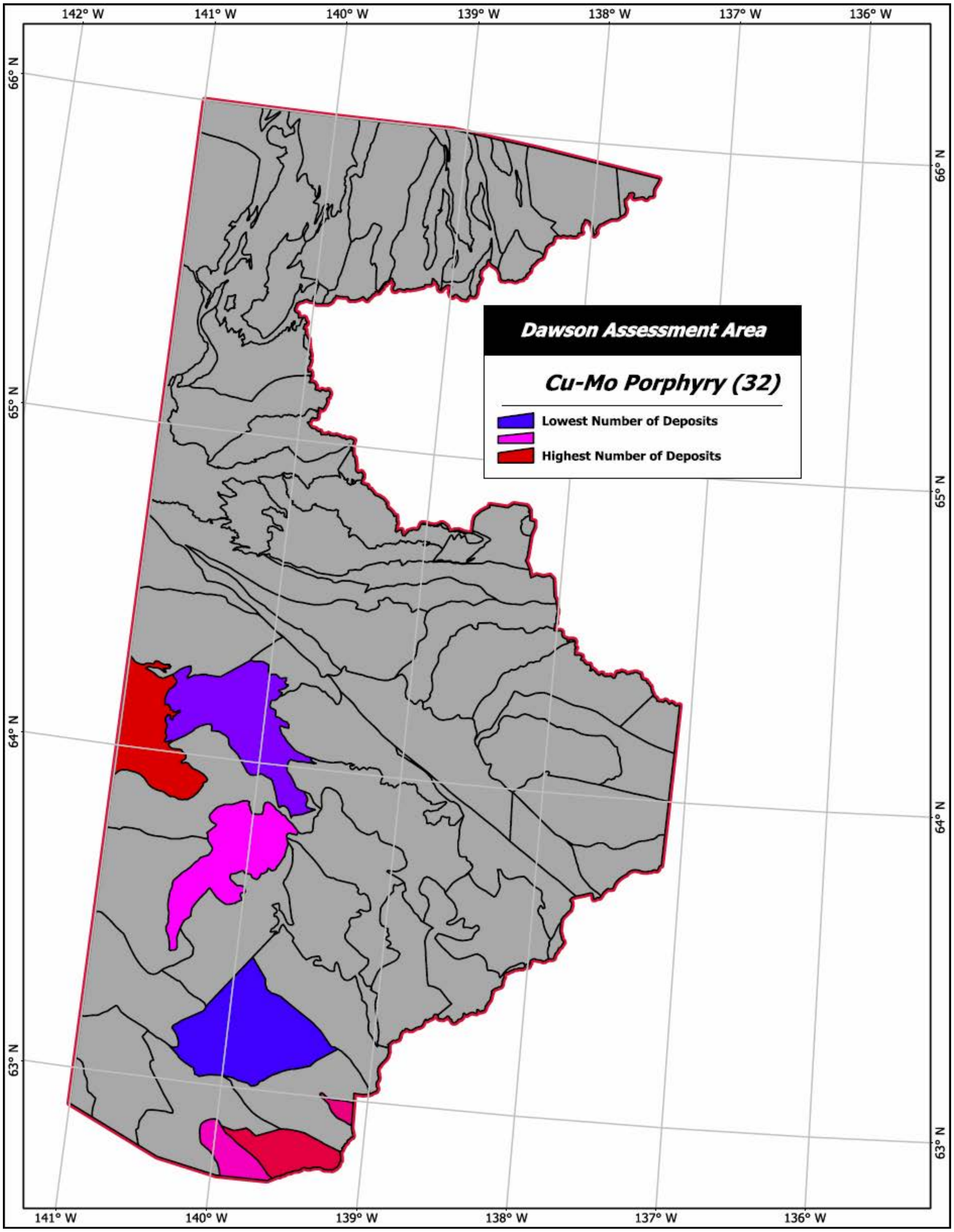
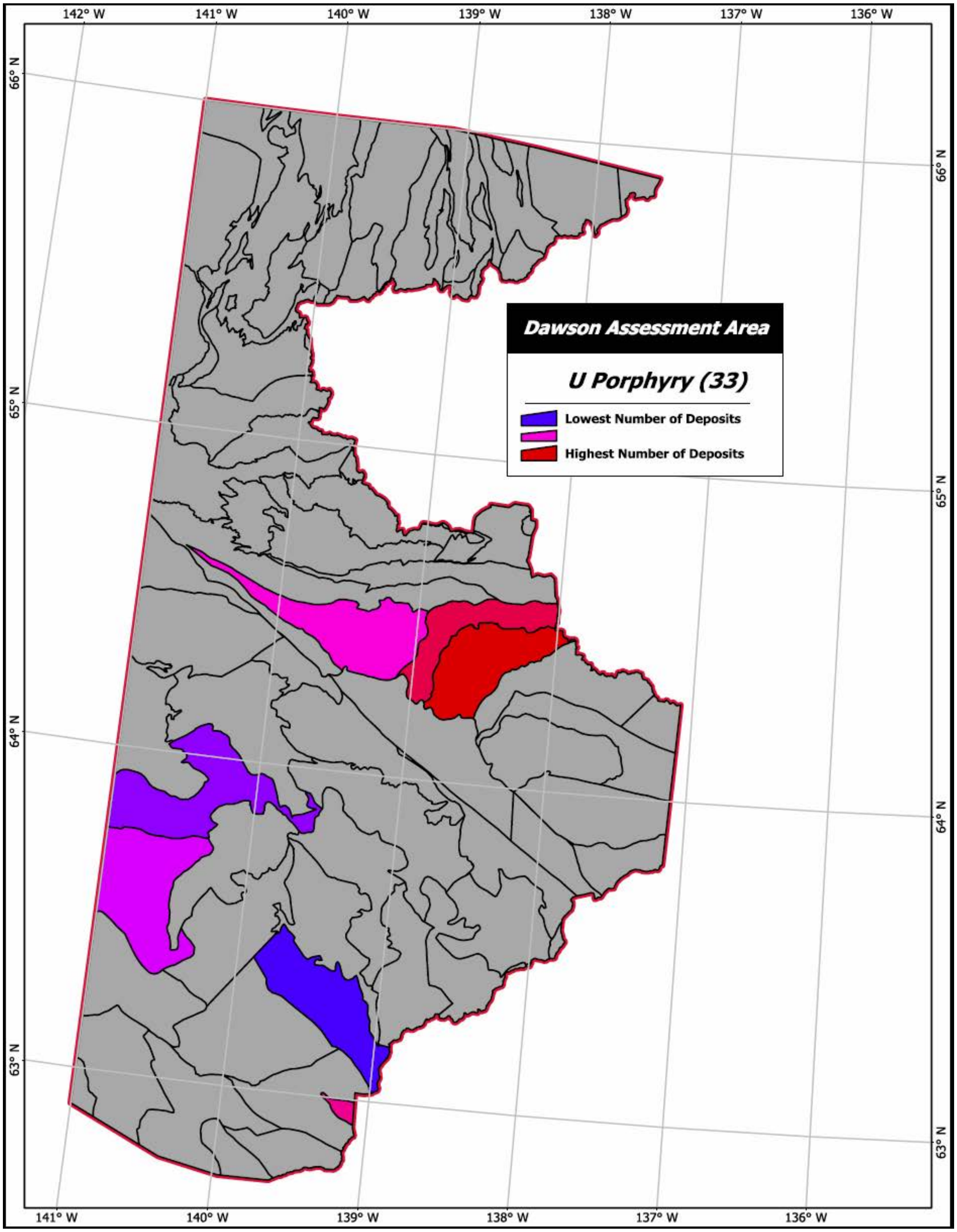
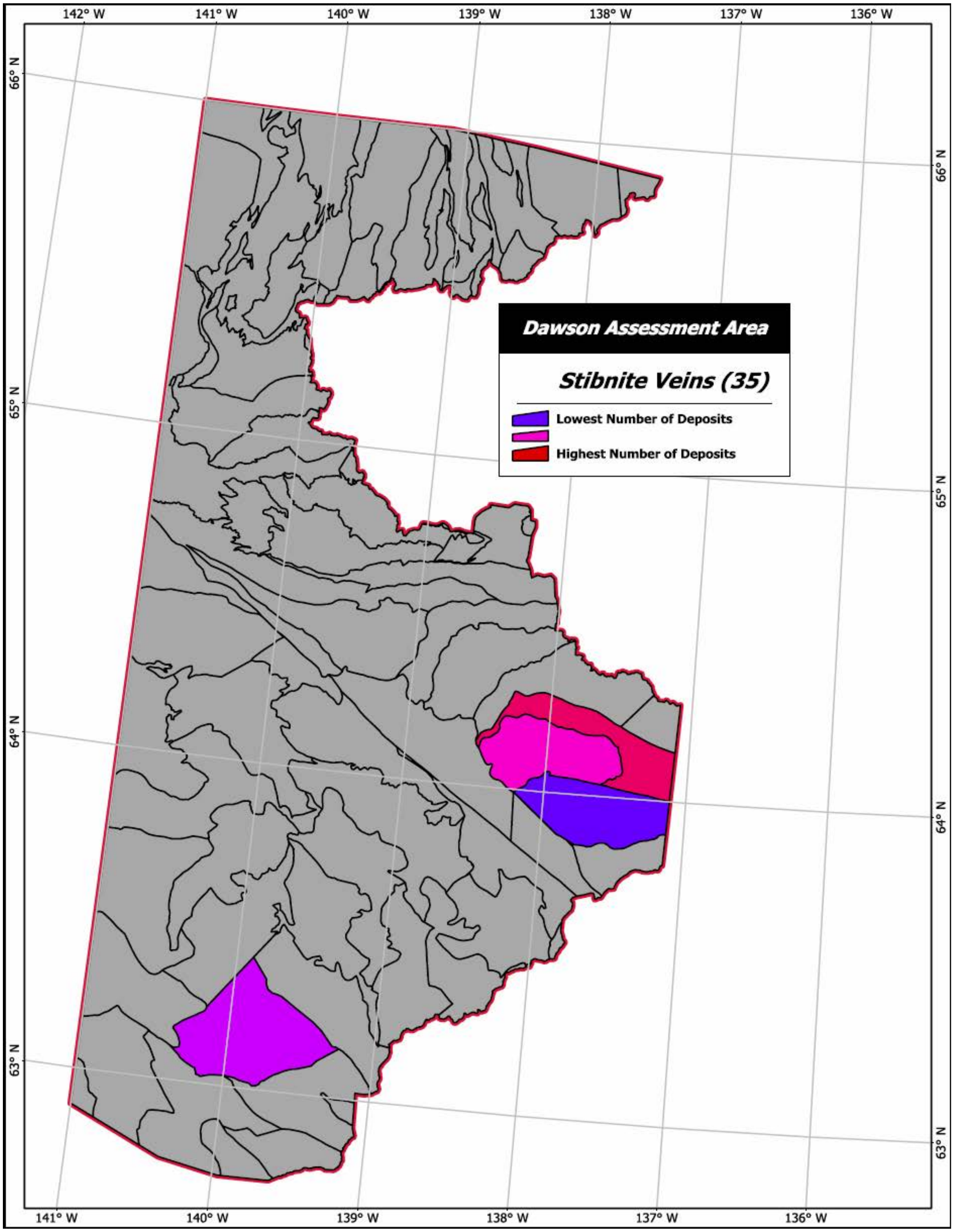
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



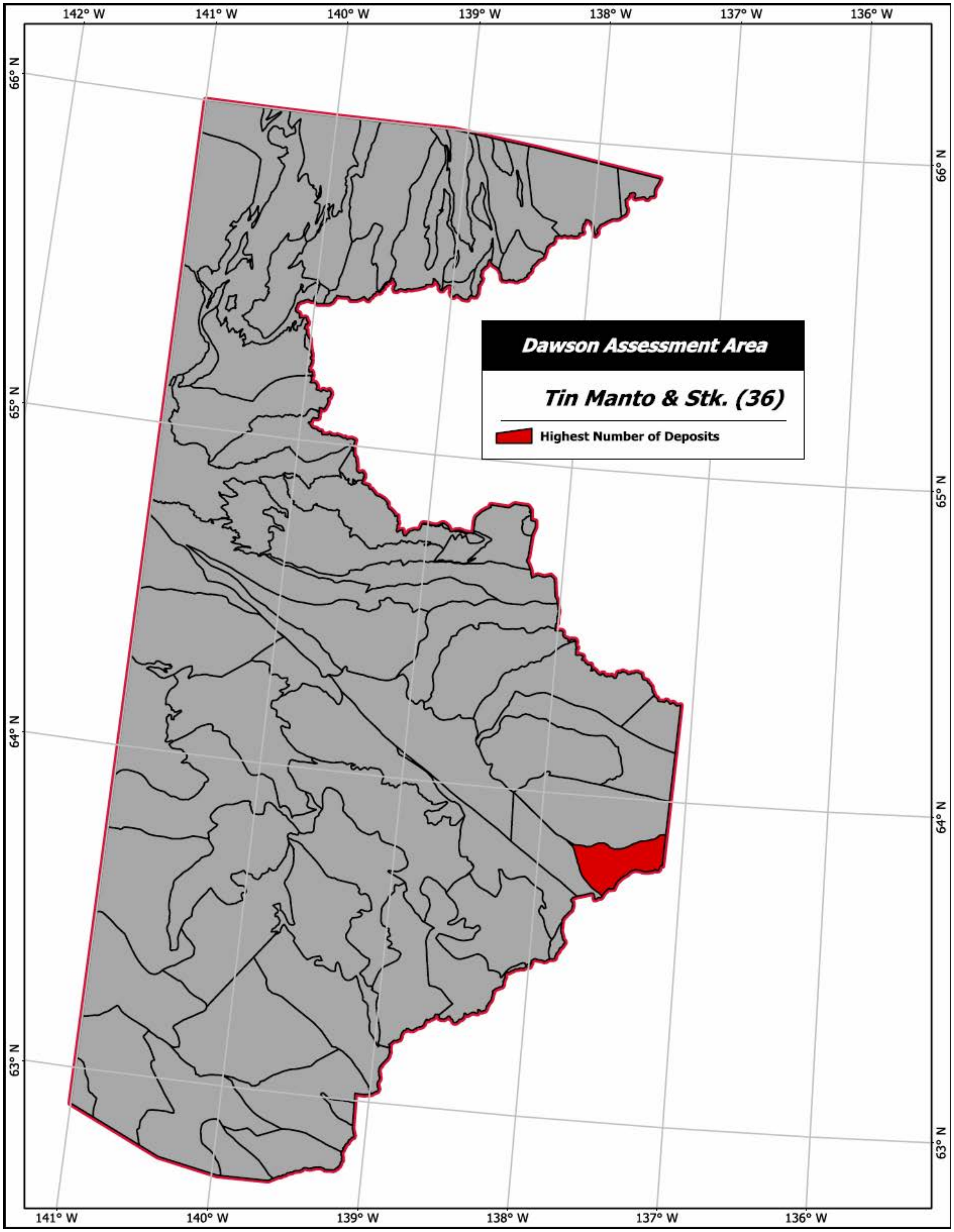
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
141° W
140° W
139° W
138° W
137° W
136° W
Dawson Assessment Area
Podiform Chromite (28)
Highest Number of Deposits


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Cu-Mo Porphyry (32)
Lowest Number of Deposits
Highest Number of Deposits
141° W
140° W
139° W
138° W
137° W
136° W


Dawson Assessment Area
U Porphyry (33)
Lowest Number of Deposits
Highest Number of Deposits
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
141° W
140° W
139° W
138° W
137° W
136° W



142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
141° W
140° W
139° W
138° W
137° W
136° W
Dawson Assessment Area
Stibnite Veins (35)
Lowest Number of Deposits
Highest Number of Deposits



Dawson Assessment Area
Tin Manto & Stk. (36)
Highest Number of Deposits
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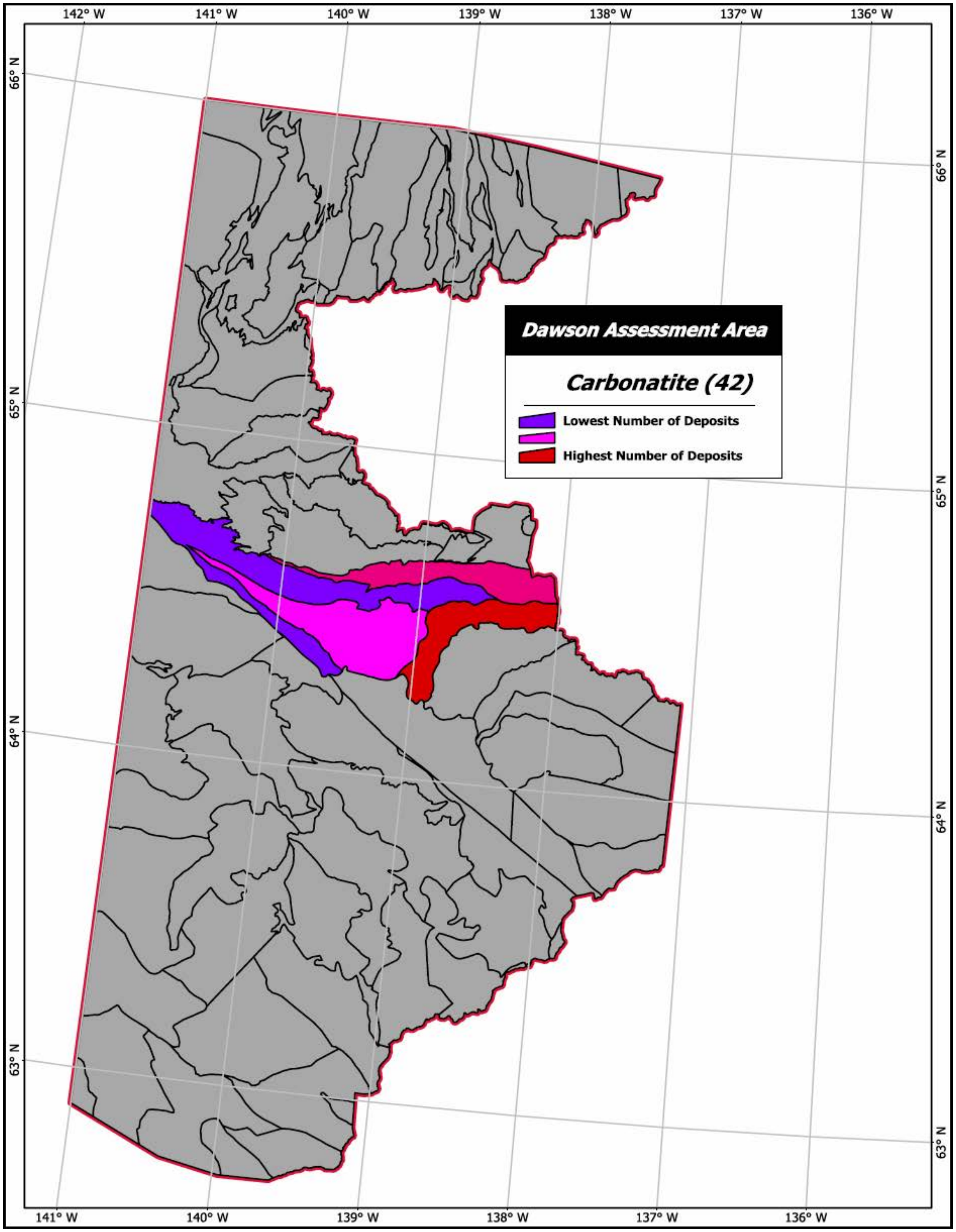
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



Dawson Assessment Area
Carbonatite (42)
Lowest Number of Deposits
Highest Number of Deposits
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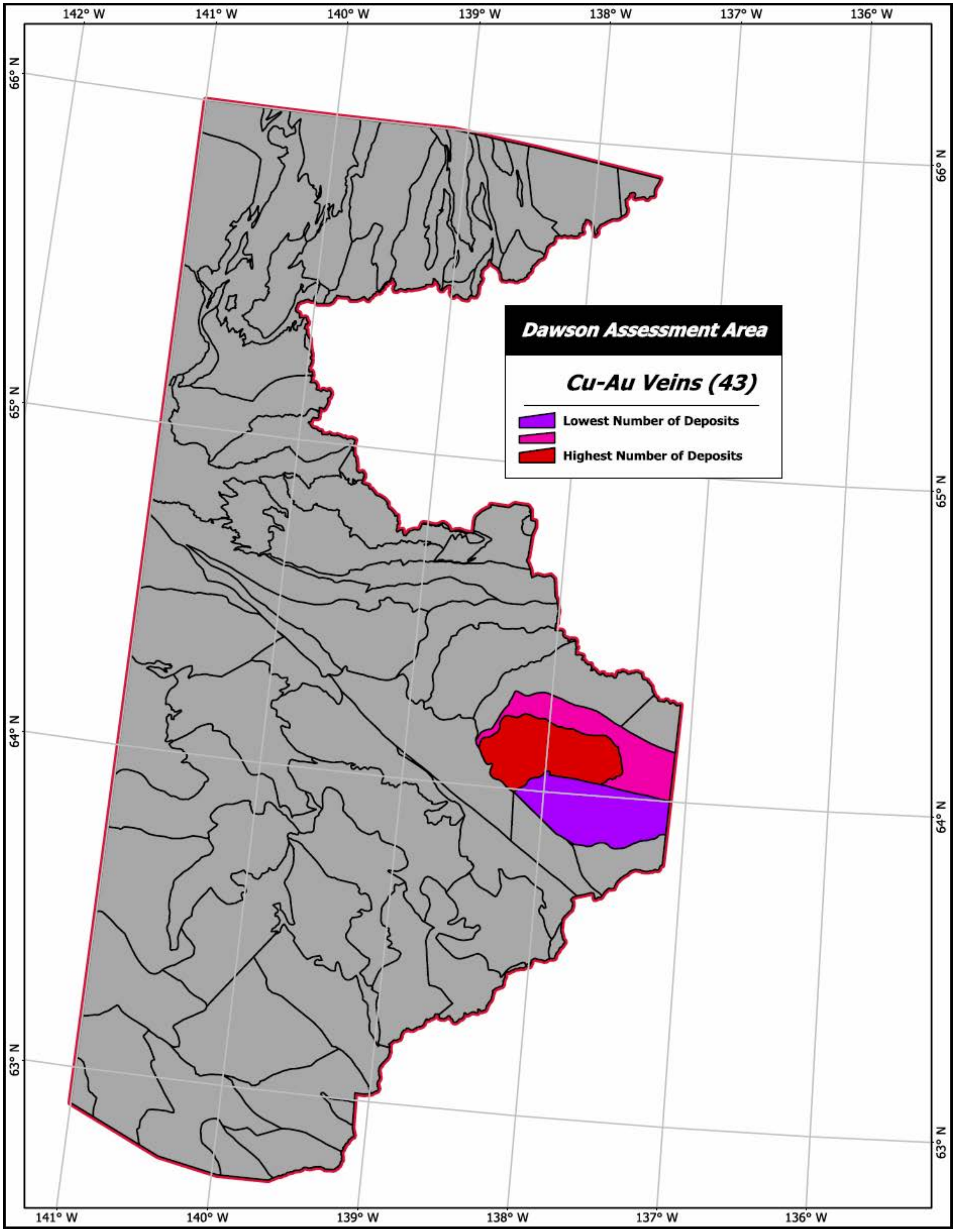
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Cu-Au Veins (43)
Lowest Number of Deposits
Highest Number of Deposits
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141° W
140° W
139° W
138° W
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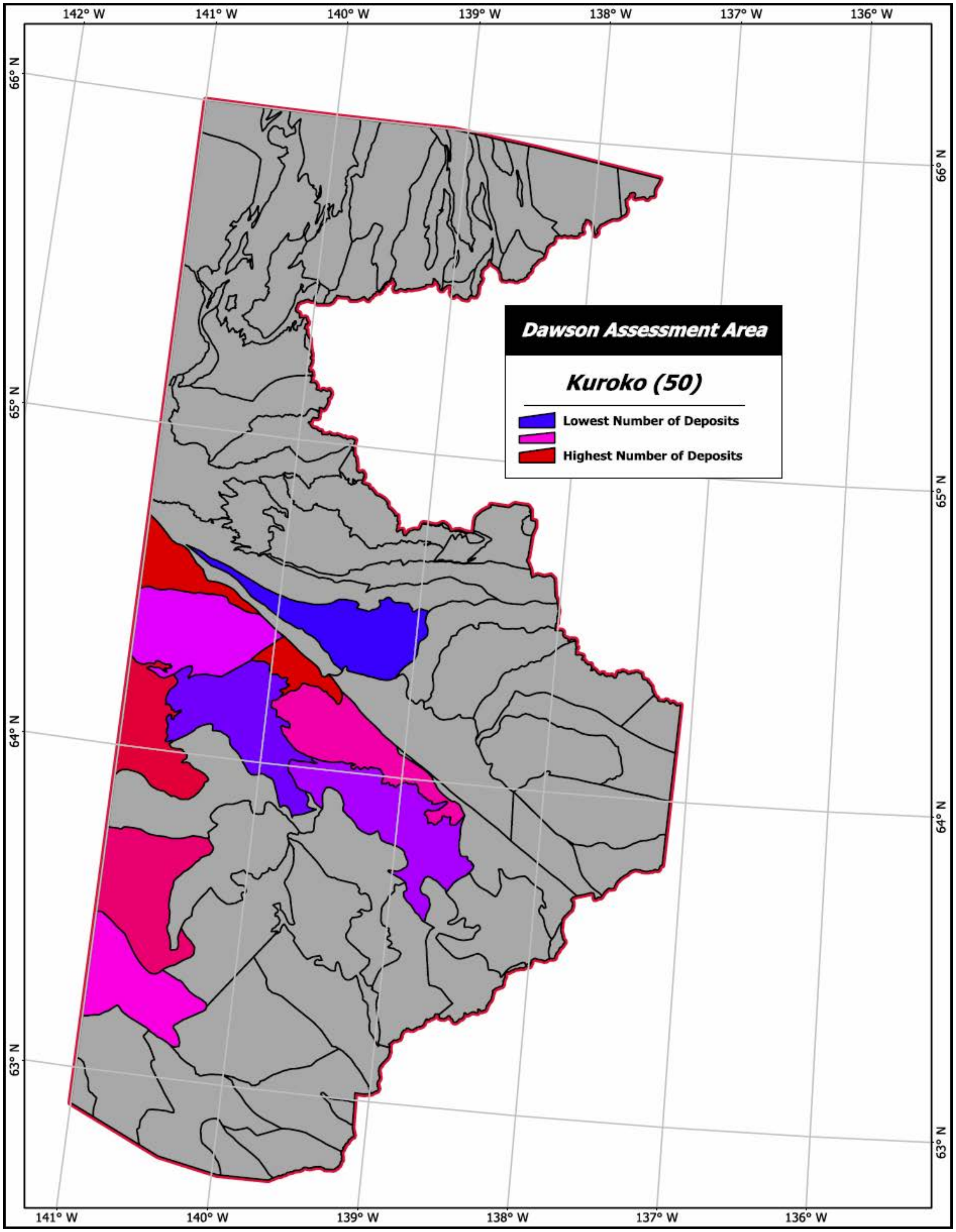
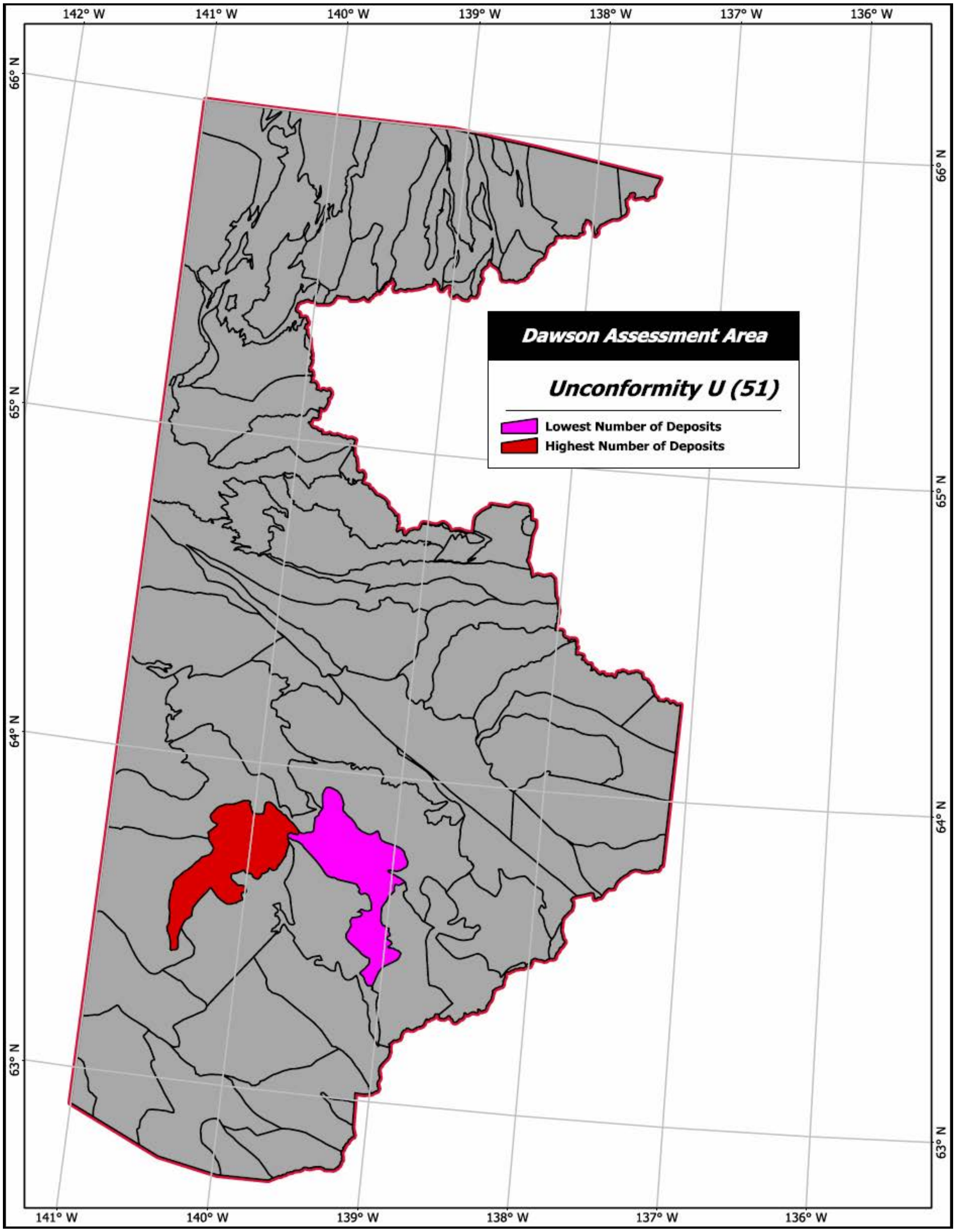
136° W
66° N
65° N
64° N
63° N



142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
141° W
140° W
139° W
138° W
137° W
136° W
Dawson Assessment Area
Kuroko (50)
Lowest Number of Deposits
Highest Number of Deposits


Dawson Assessment Area
Unconformity U (51)
Lowest Number of Deposits
Highest Number of Deposits
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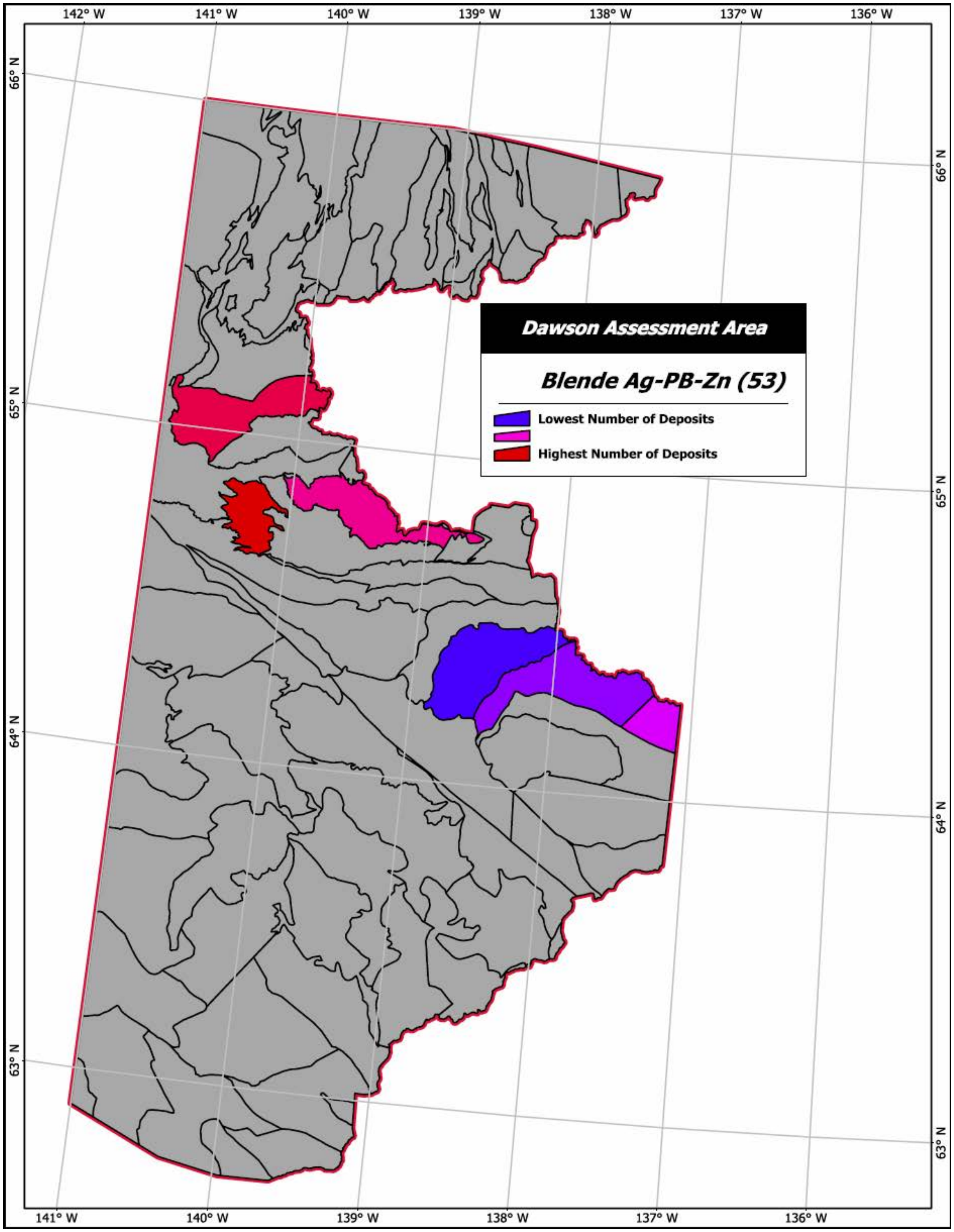
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Blende Ag-PB-Zn (53)
Lowest Number of Deposits
Highest Number of Deposits
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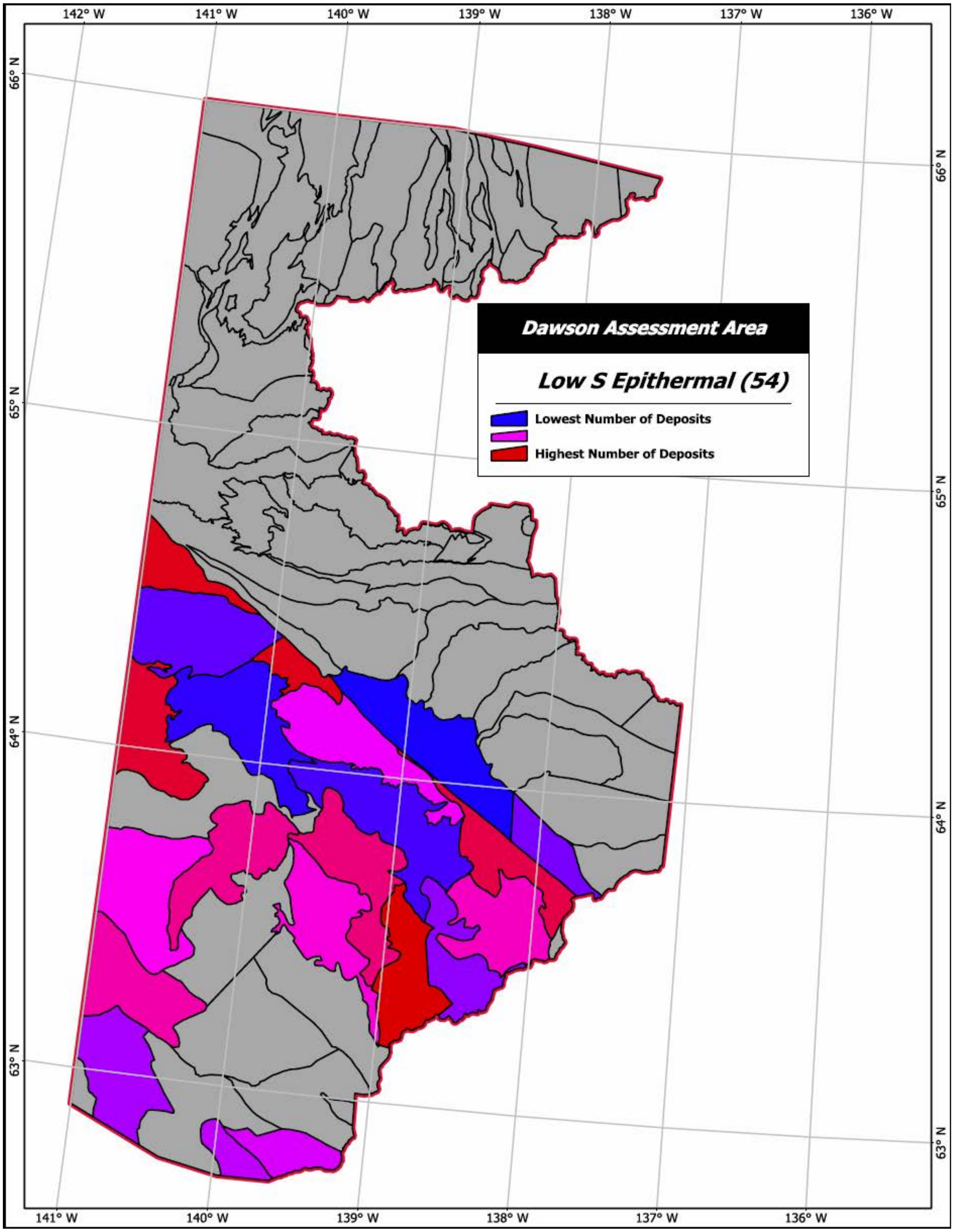
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Low S Epithermal (54)
Lowest Number of Deposits
Highest Number of Deposits
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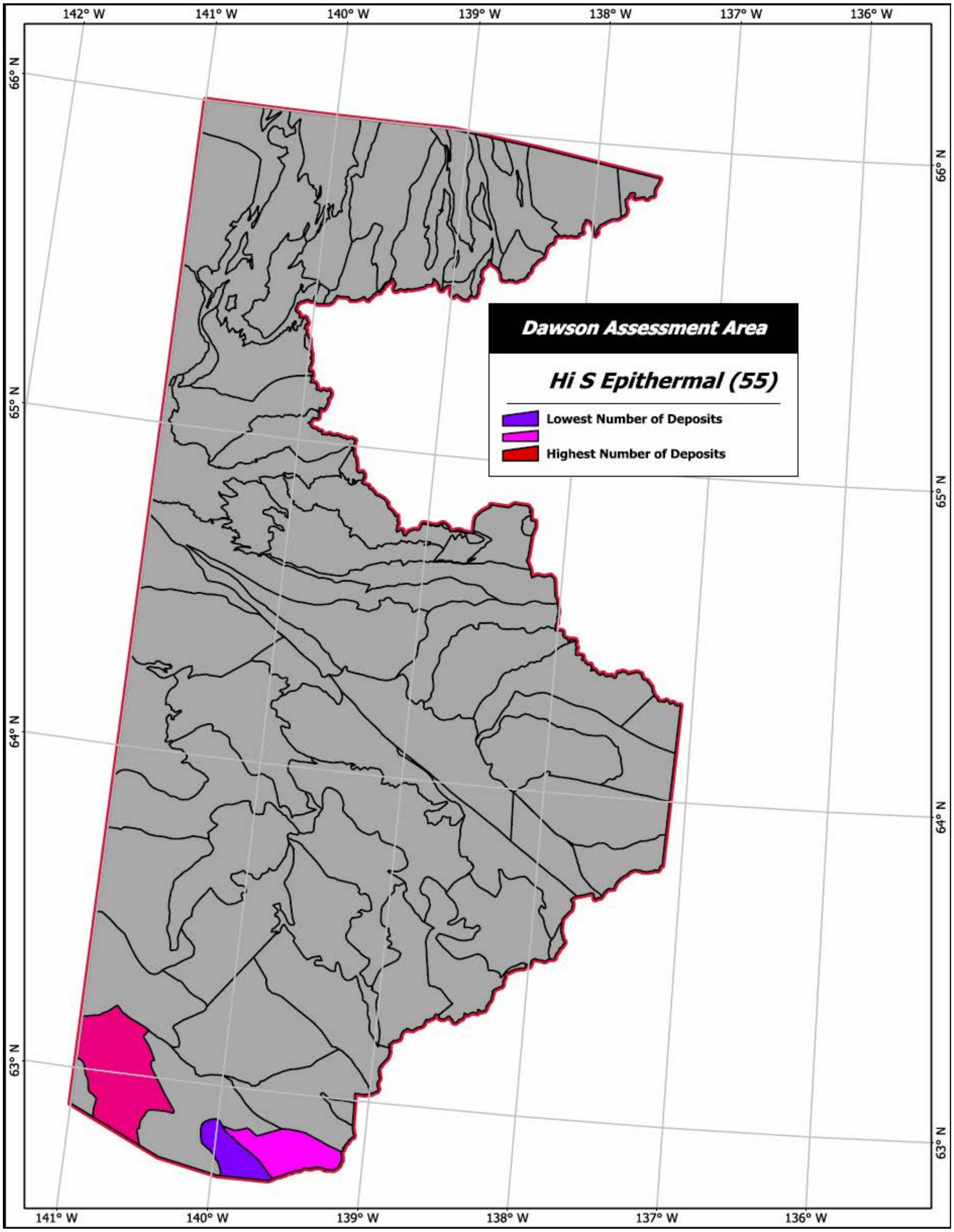
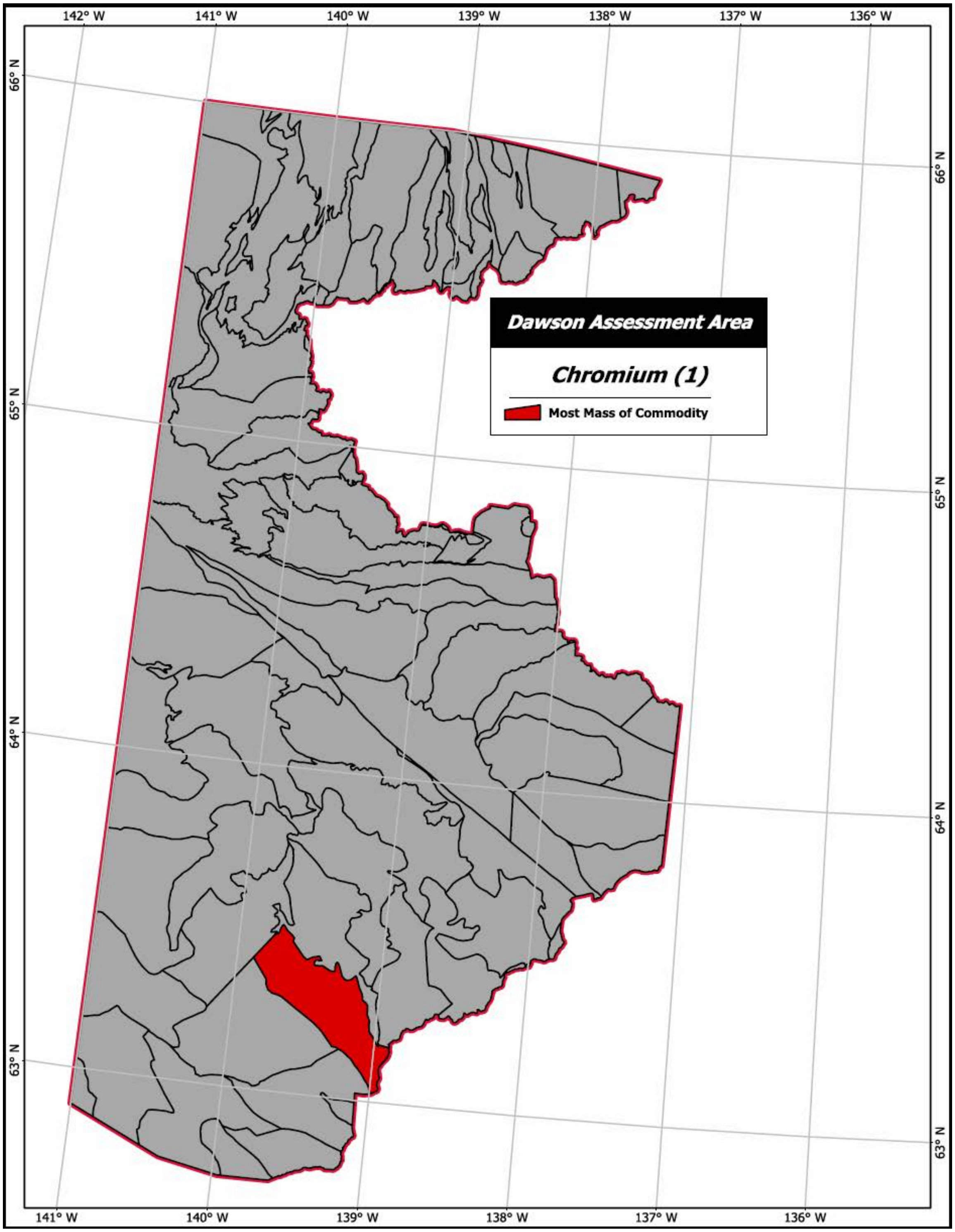
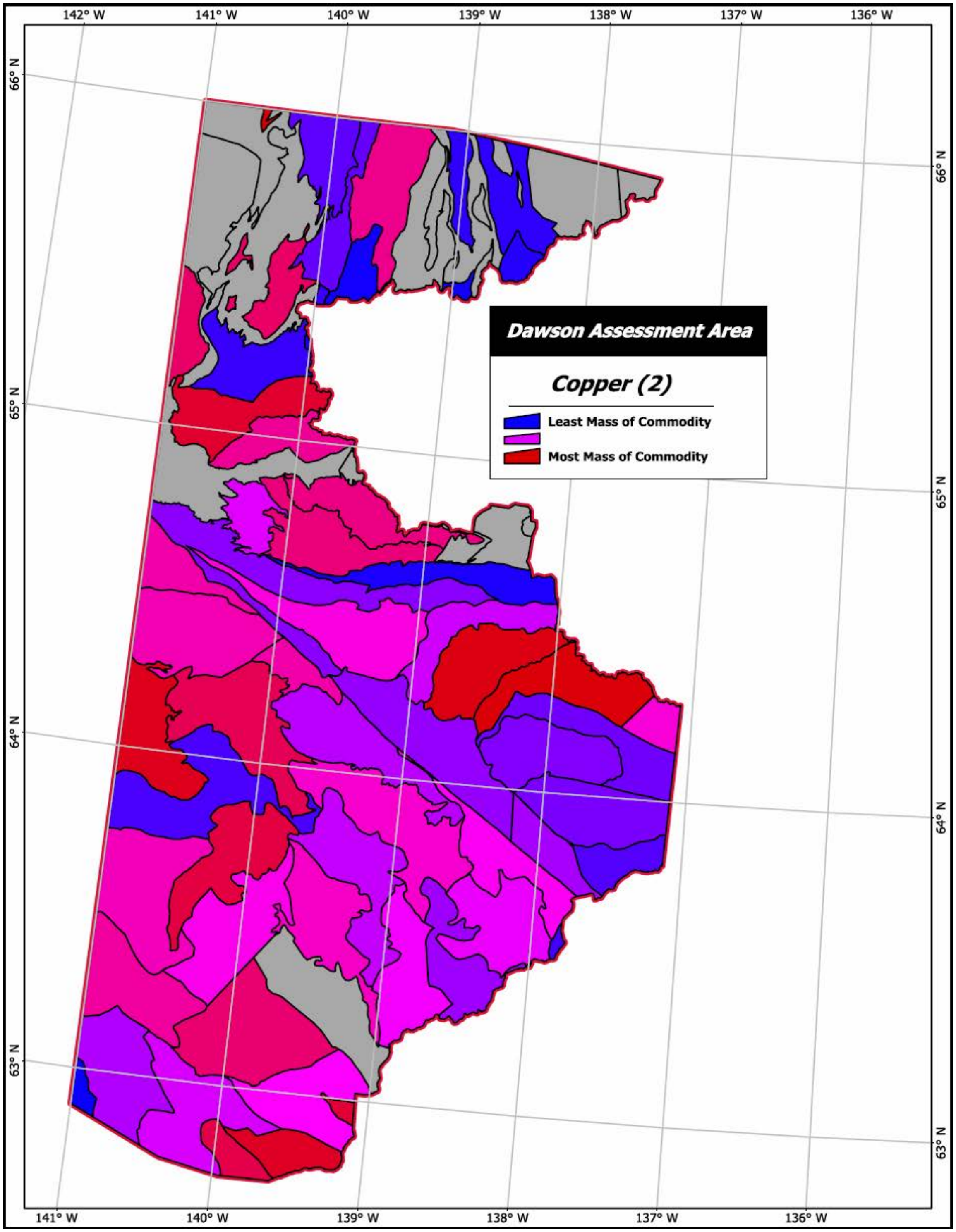
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

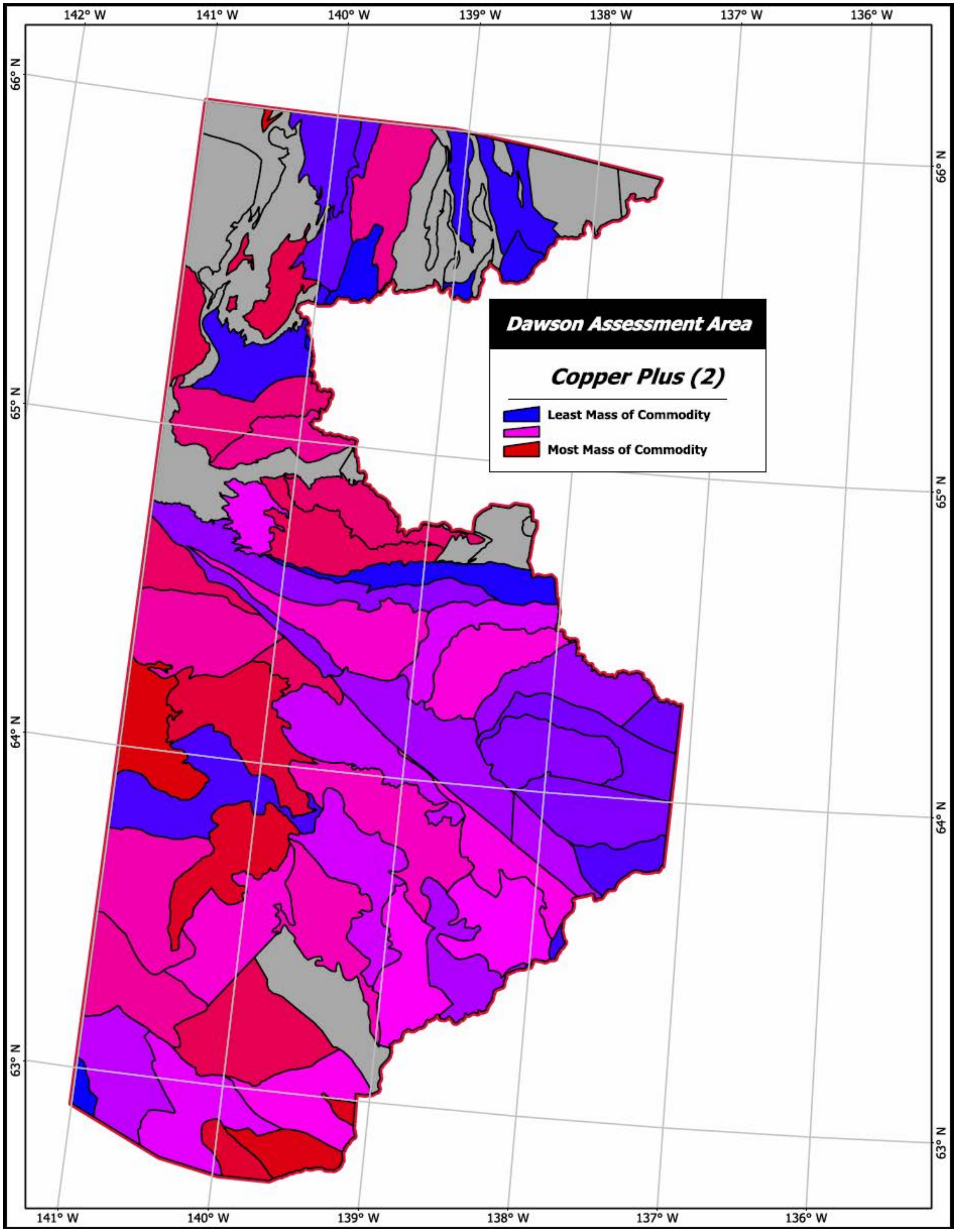


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Hi S Epithermal (55)
Lowest Number of Deposits
Highest Number of Deposits

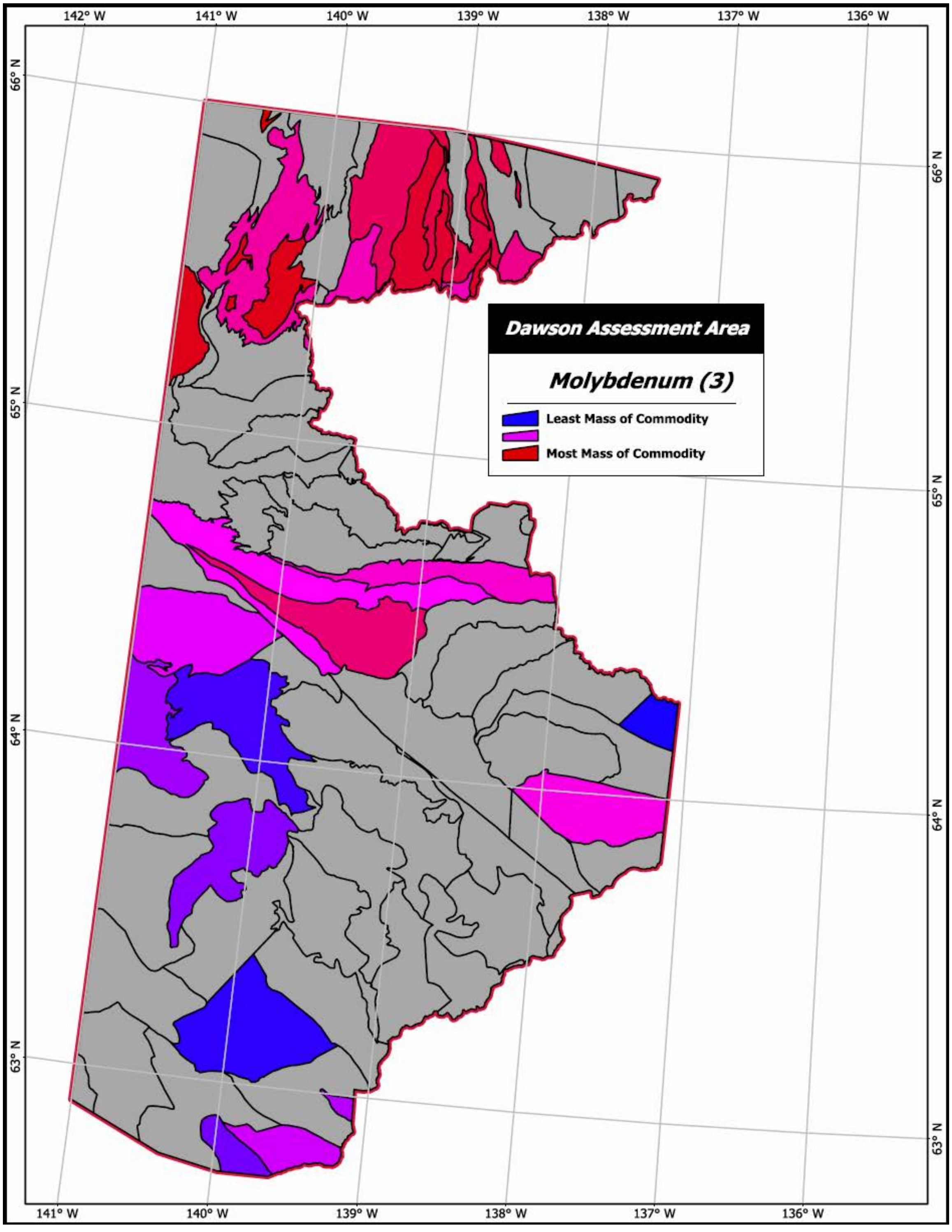
APPENDIX: Commodity Distribution Maps

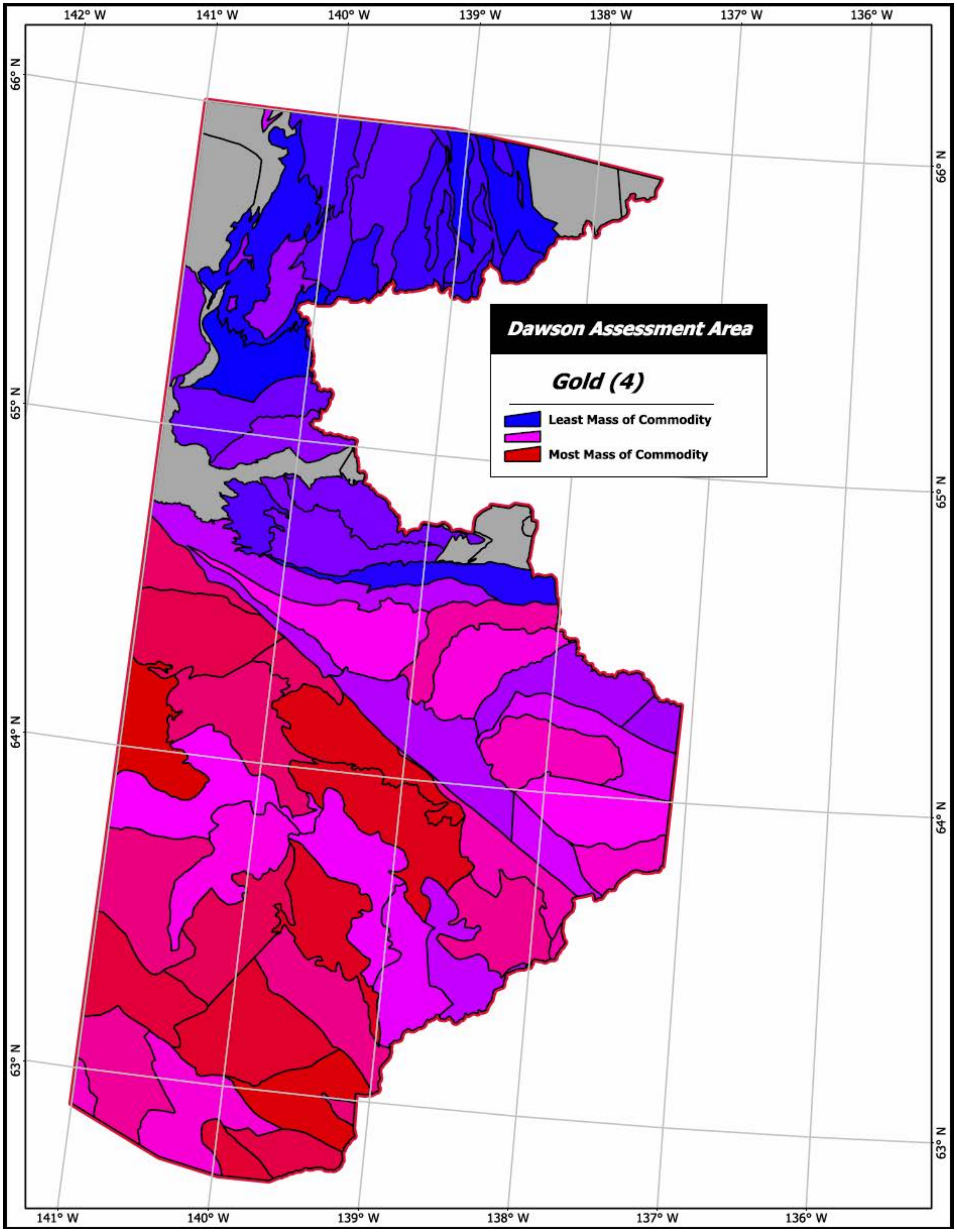



Dawson Assessment Area
Copper (2)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

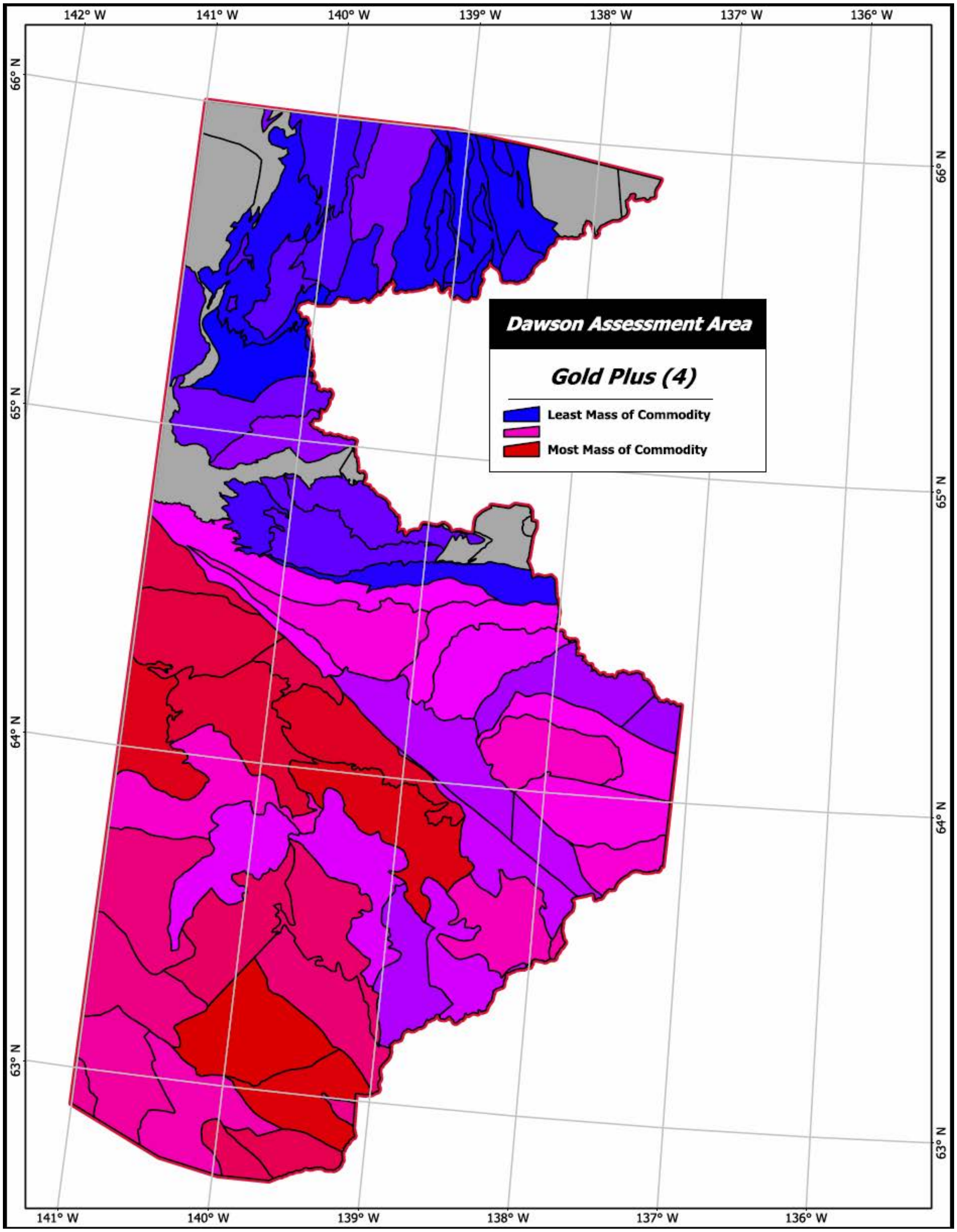


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Copper Plus (2)
Least Mass of Commodity
Most Mass of Commodity
141° W
140° W
139° W
138° W
137° W
136° W


Dawson Assessment Area
Molybdenum (3)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
141° W
140° W
139° W
138° W
137° W
136° W
Dawson Assessment Area
Gold (4)
Least Mass of Commodity
Most Mass of Commodity


Dawson Assessment Area
Gold Plus (4)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
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140° W
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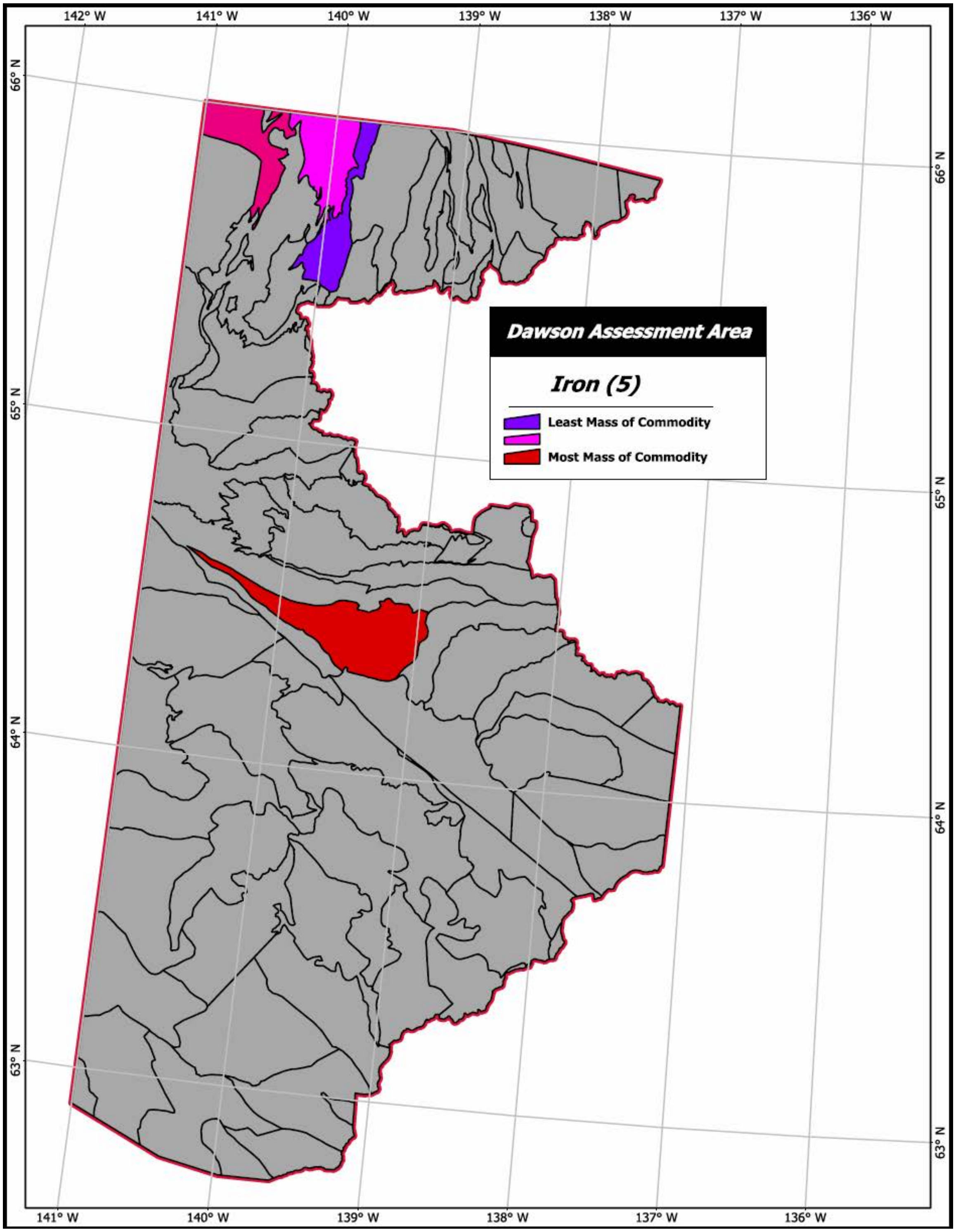
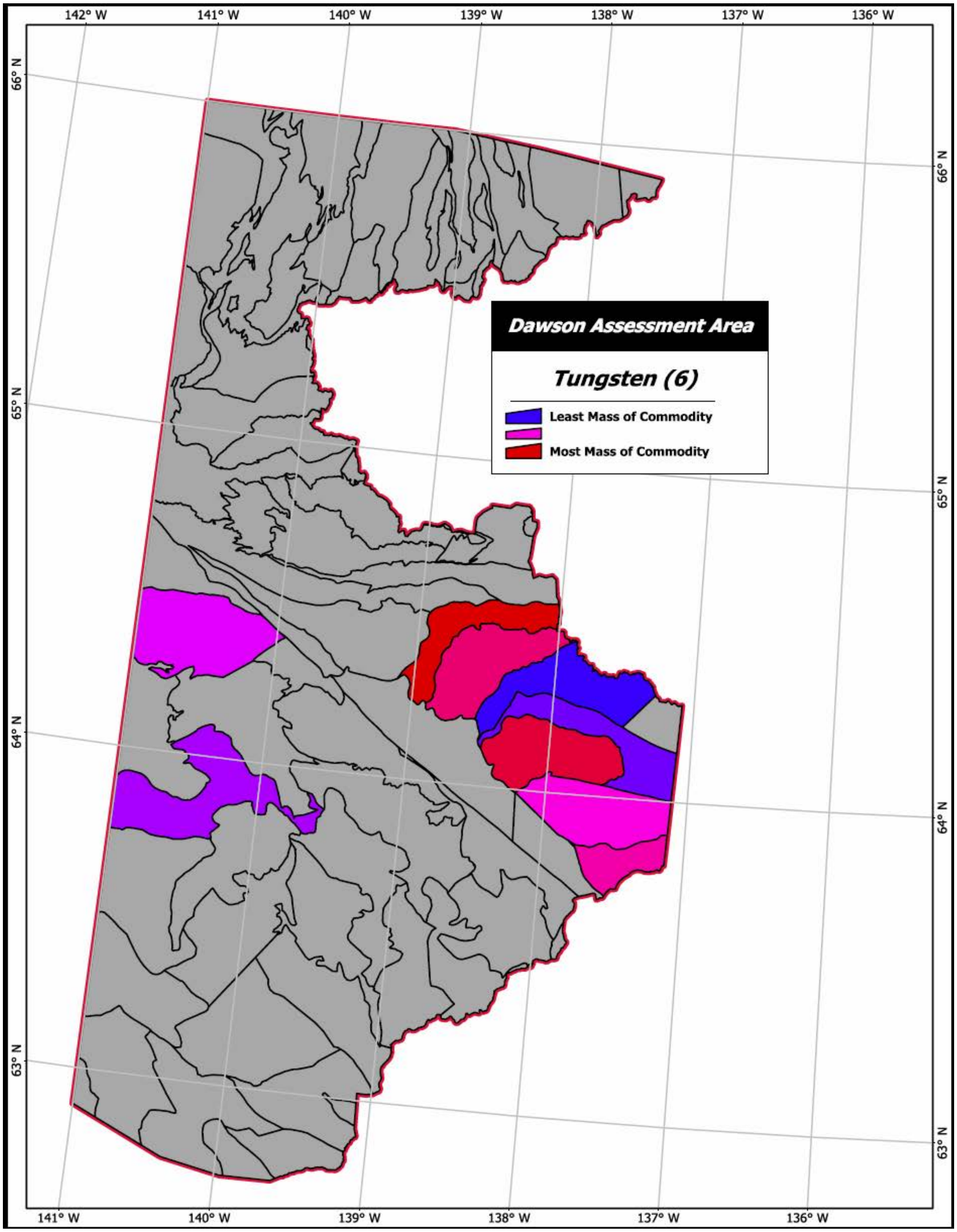
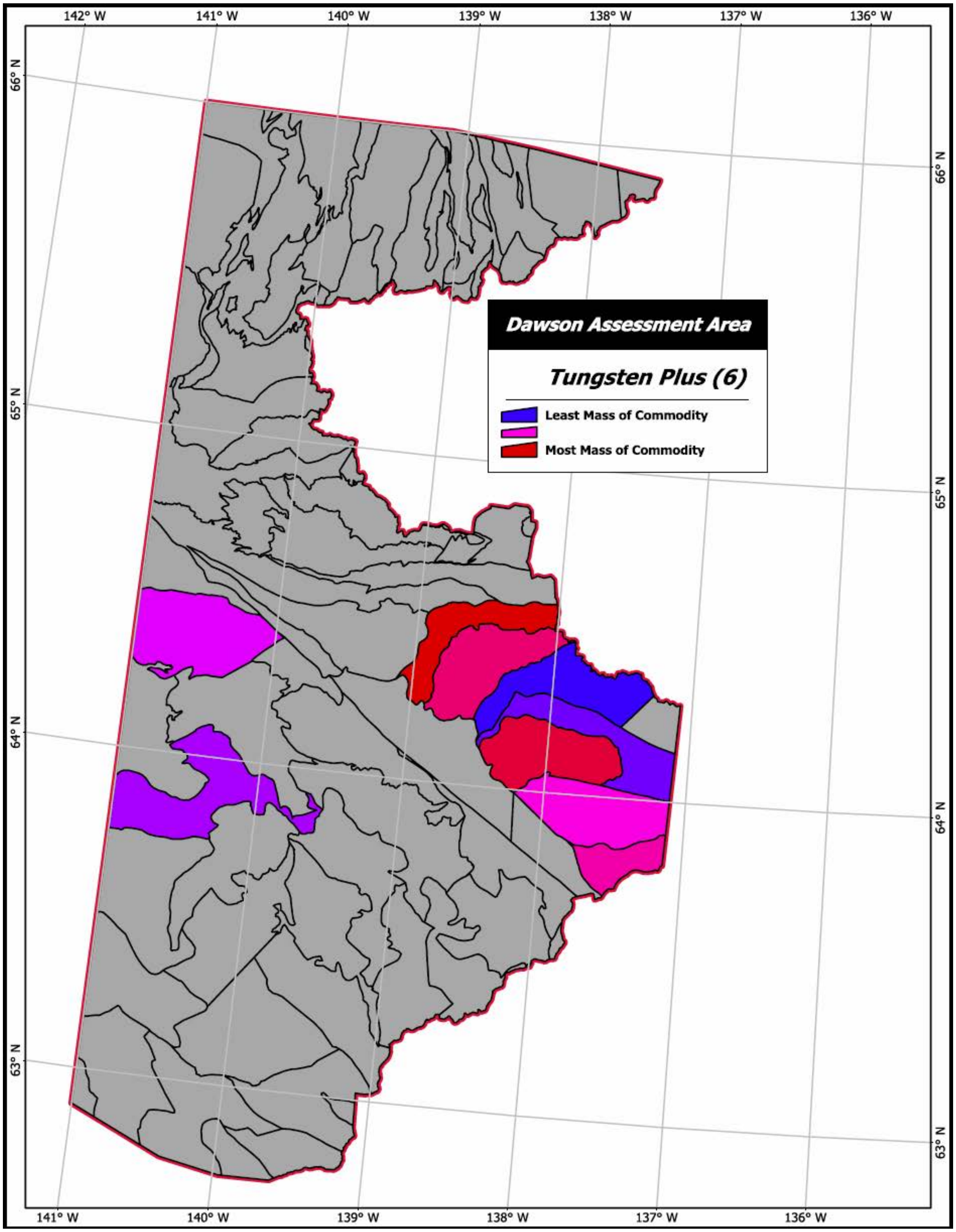
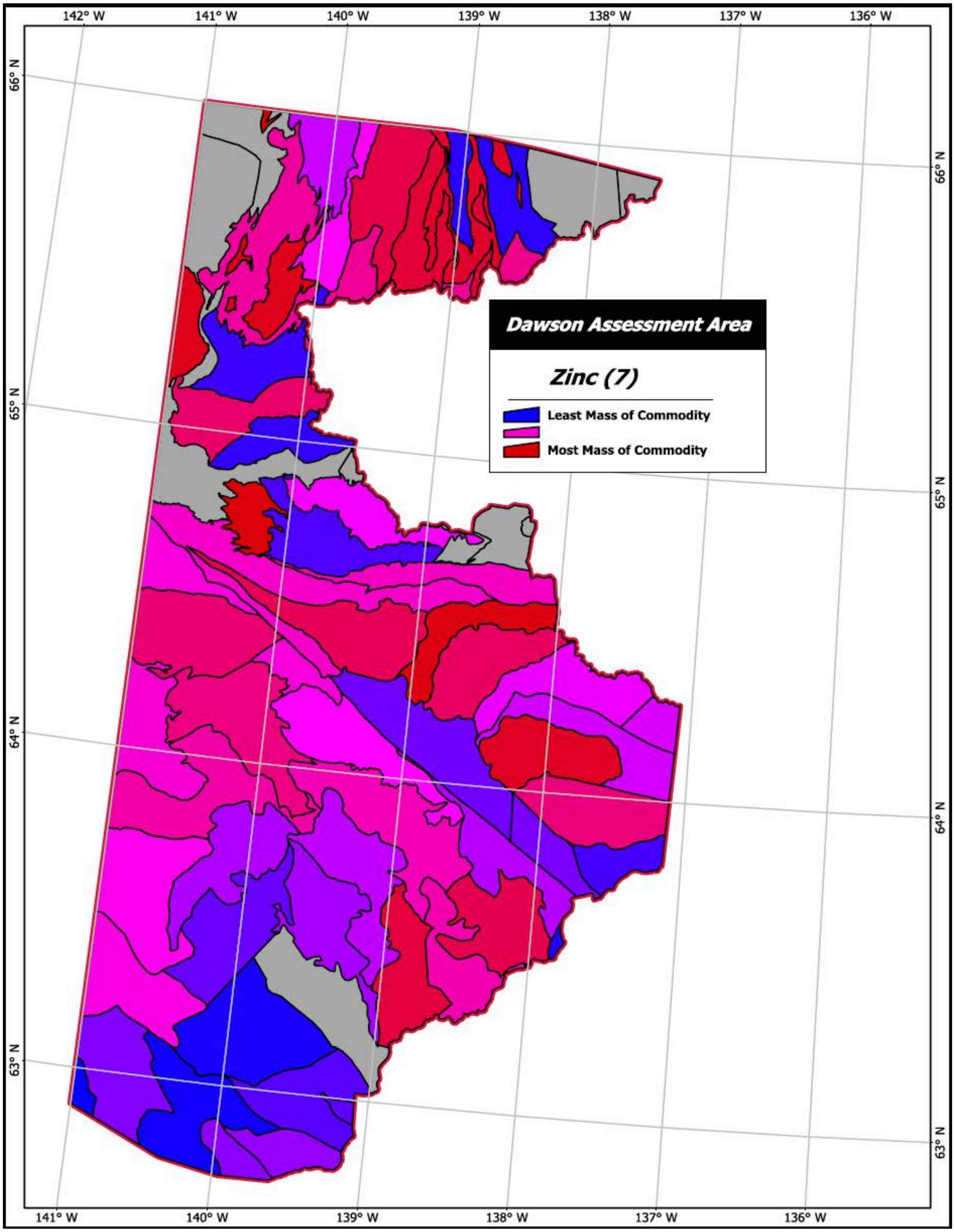
138° W
137° W
136° W

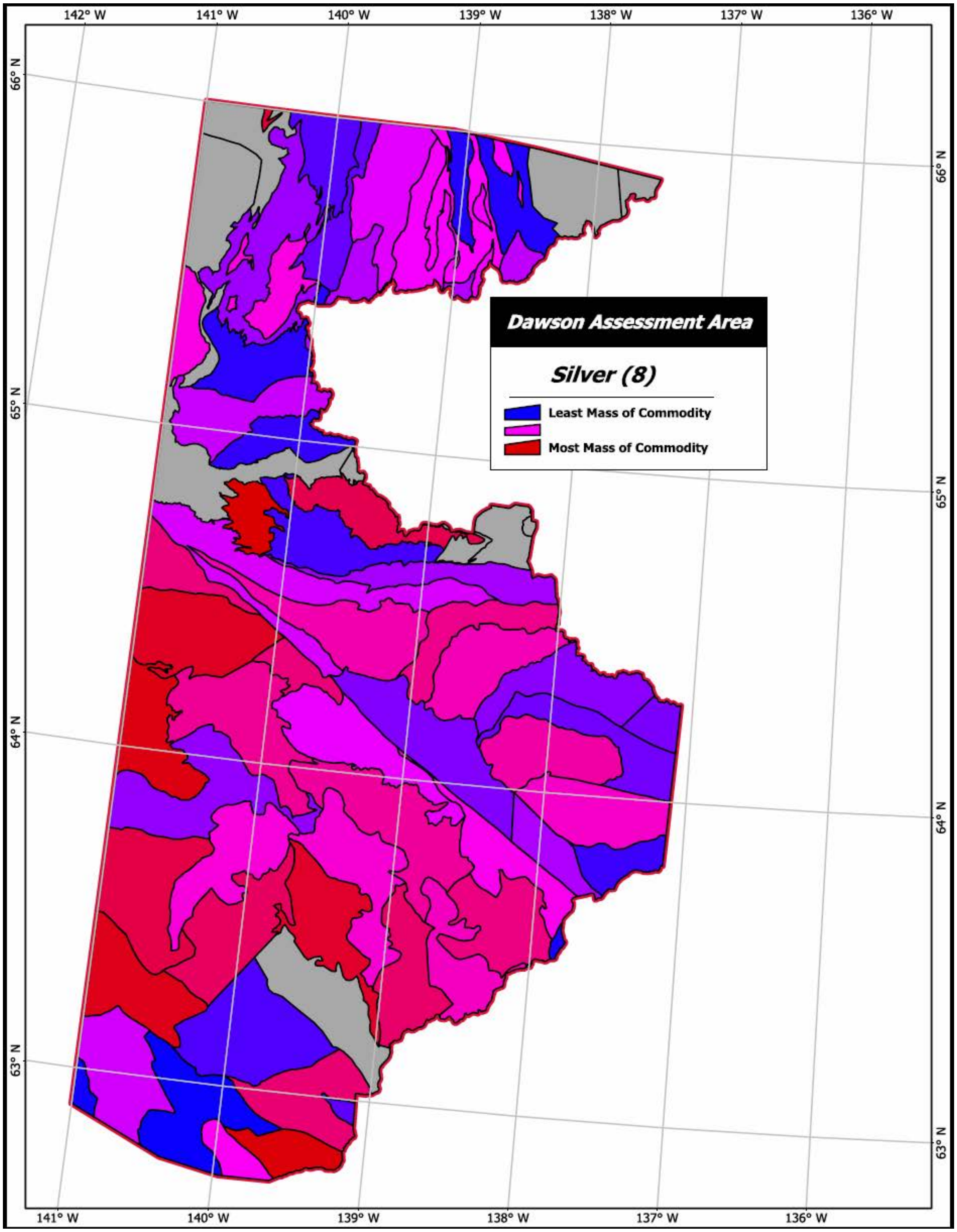


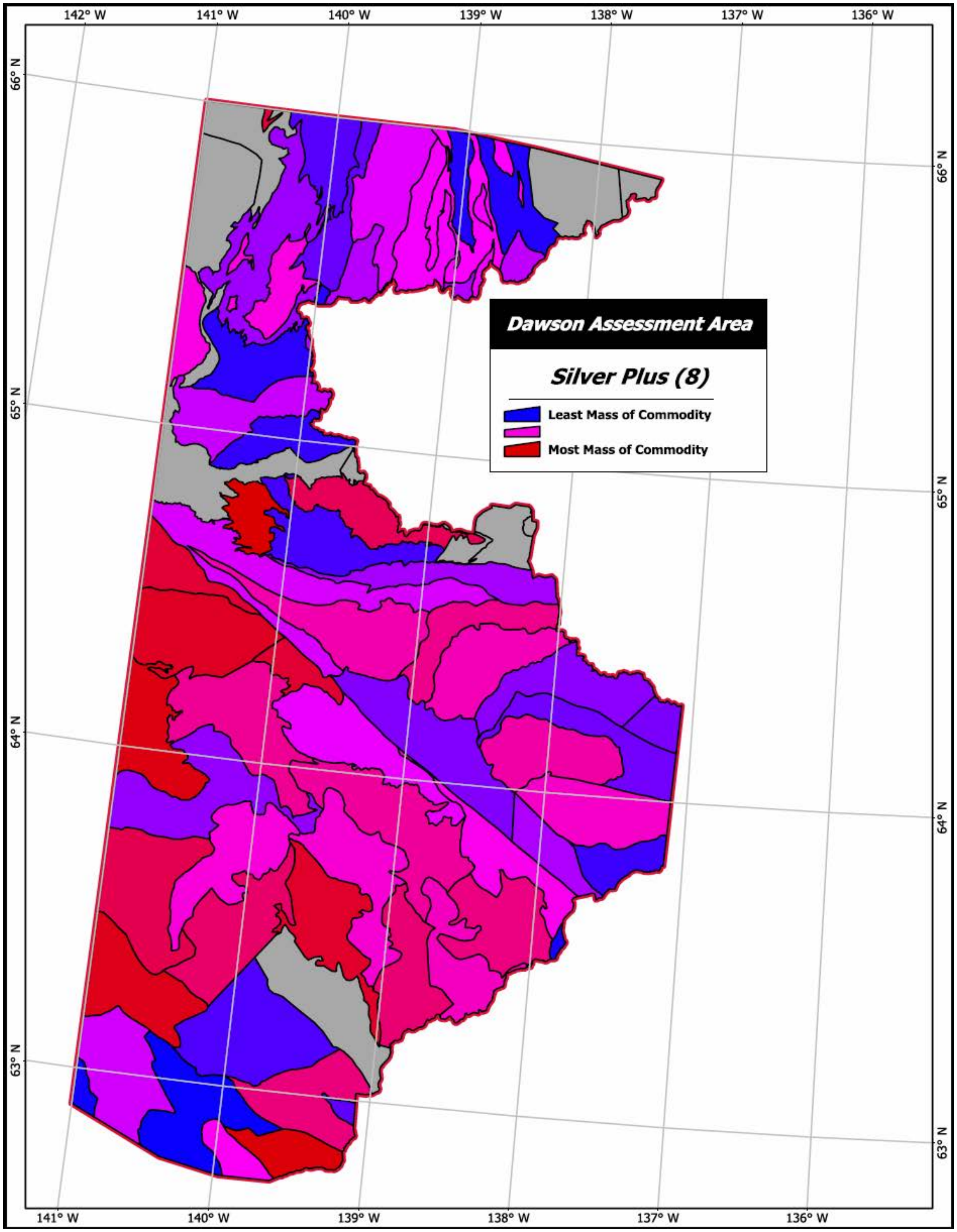
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Iron (5)
Least Mass of Commodity
Most Mass of Commodity
141° W
140° W
139° W
138° W
137° W
136° W


Dawson Assessment Area
Tungsten (6)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

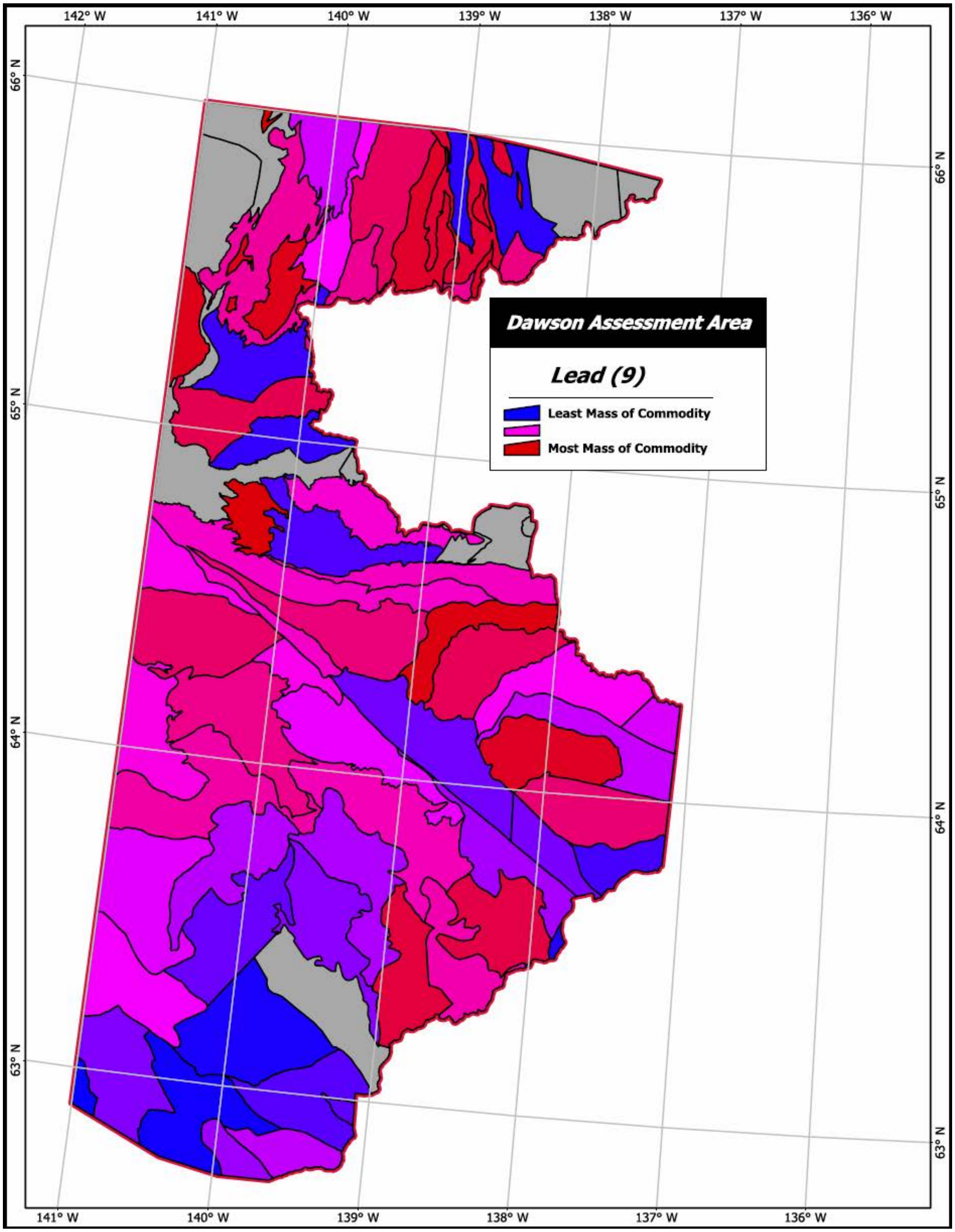

Dawson Assessment Area
Tungsten Plus (6)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

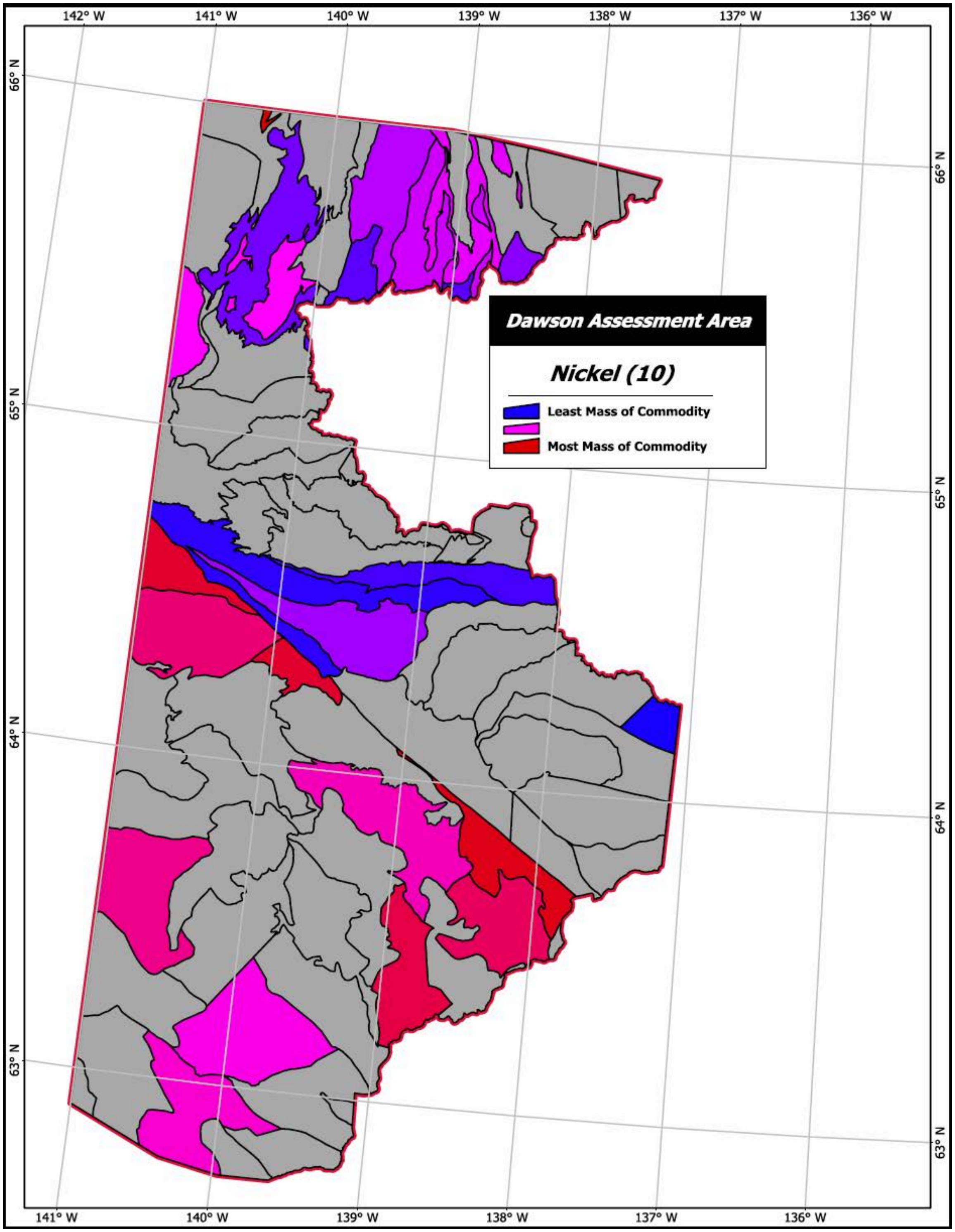

Dawson Assessment Area
Zinc (7)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

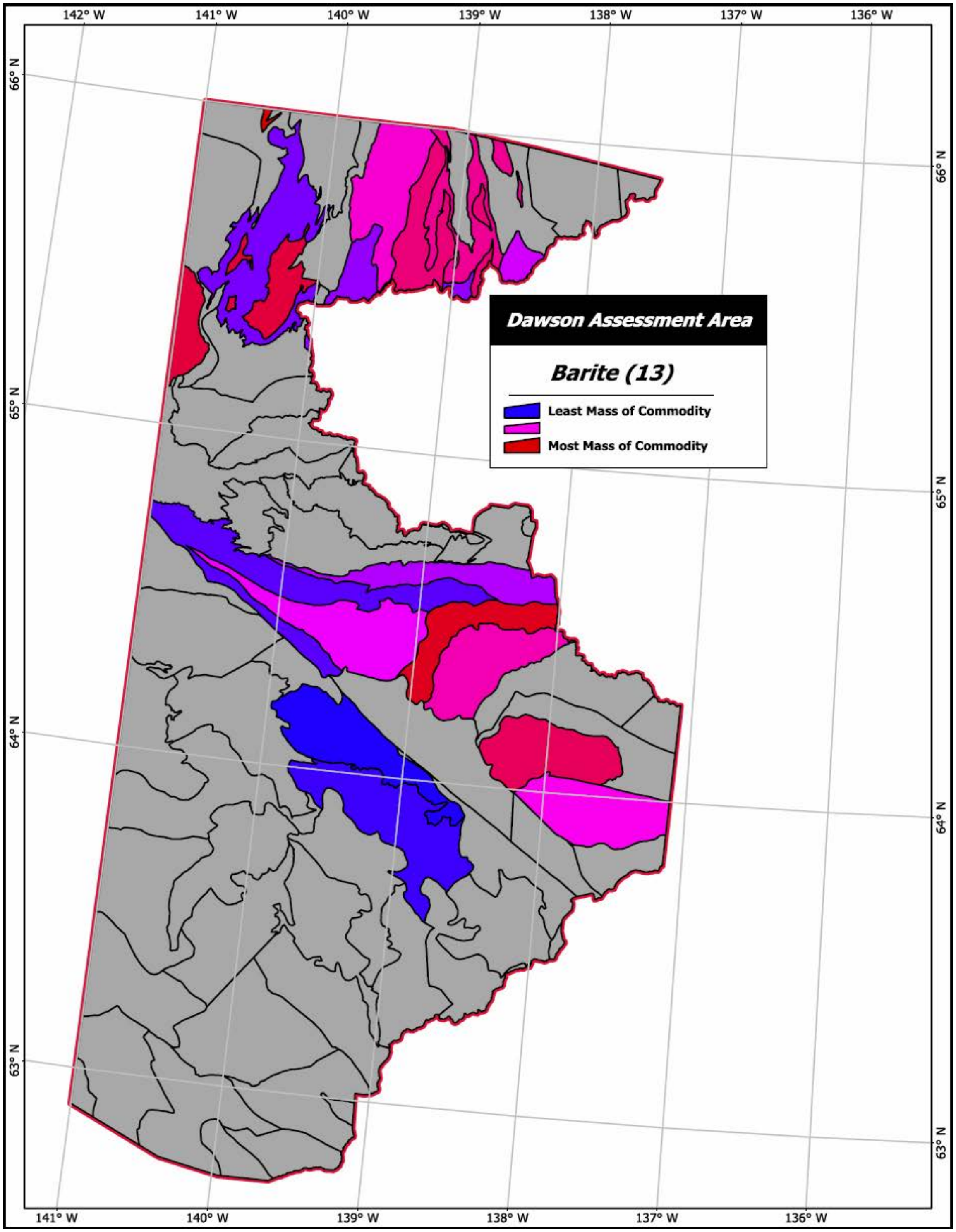

Dawson Assessment Area
Silver (8)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



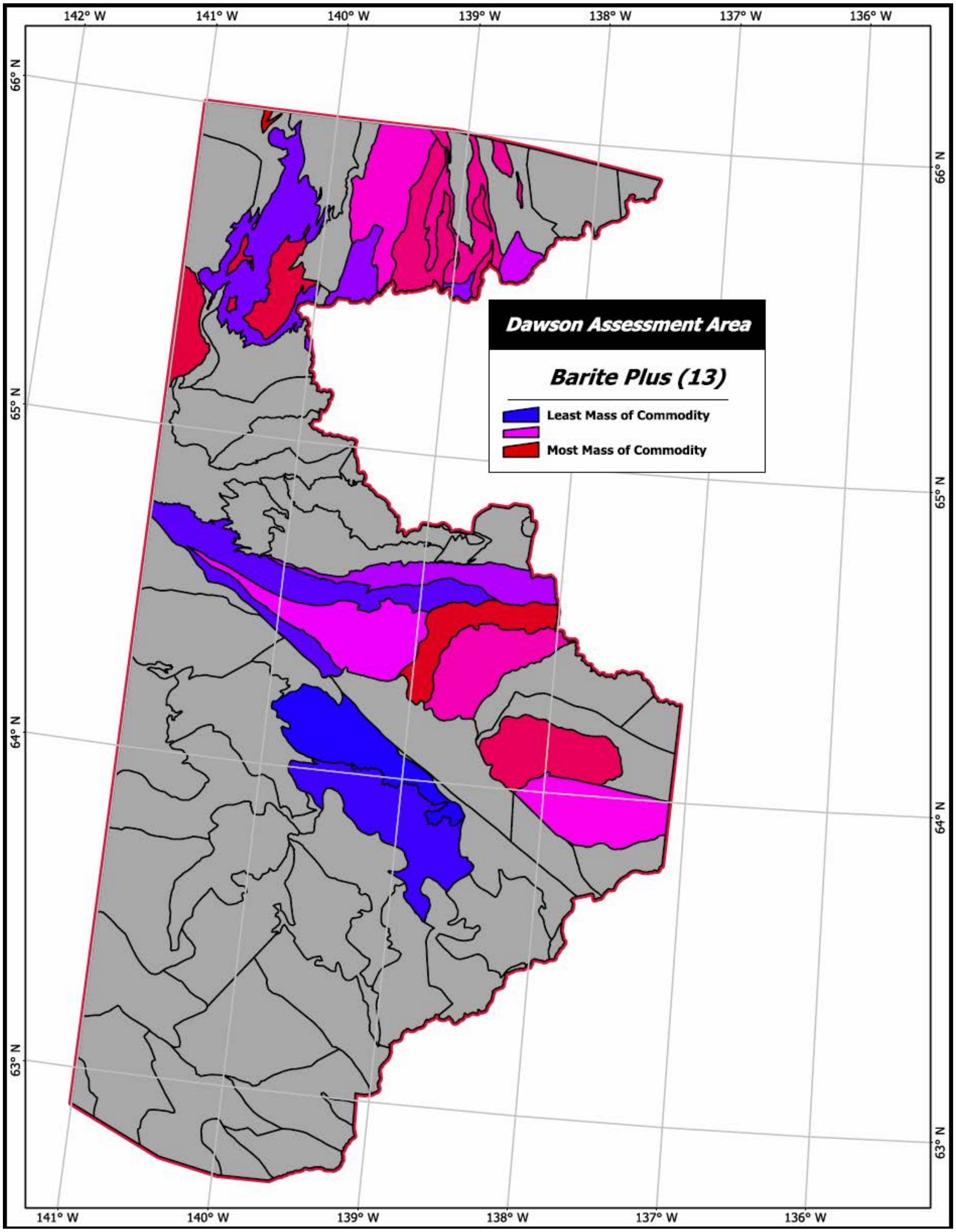
Dawson Assessment Area
Silver Plus (8)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

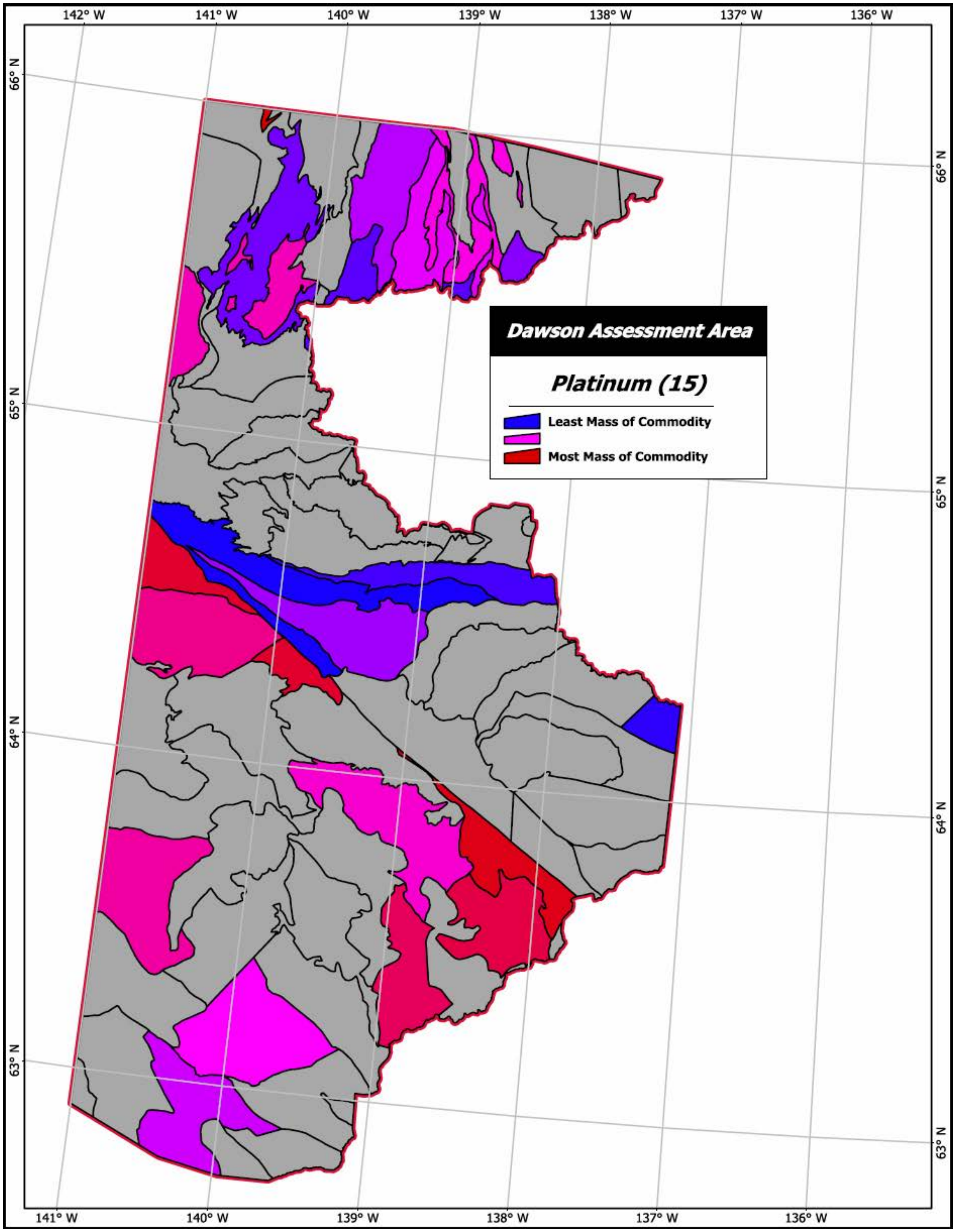

Dawson Assessment Area
Lead (9)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

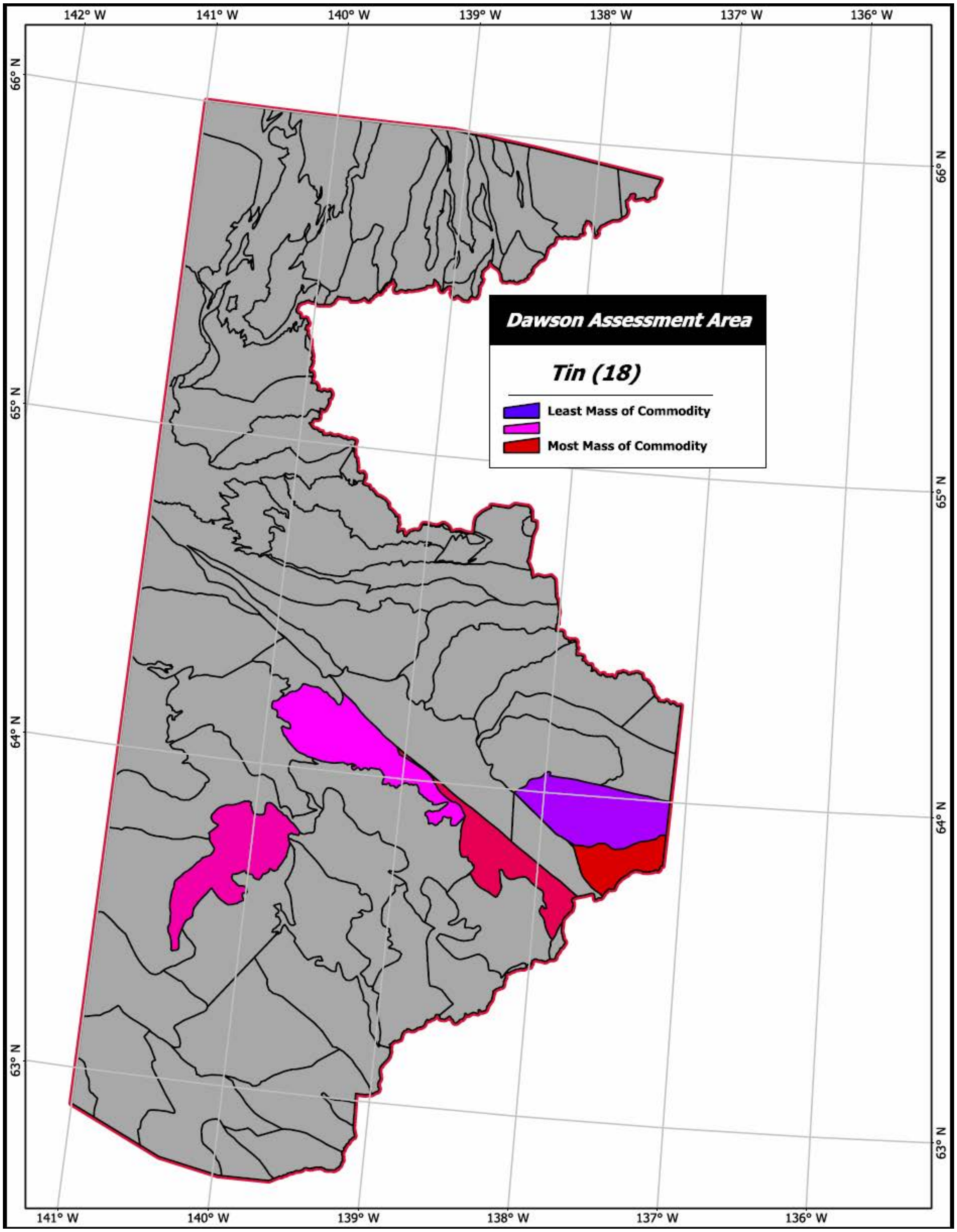

Dawson Assessment Area
Nickel (10)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

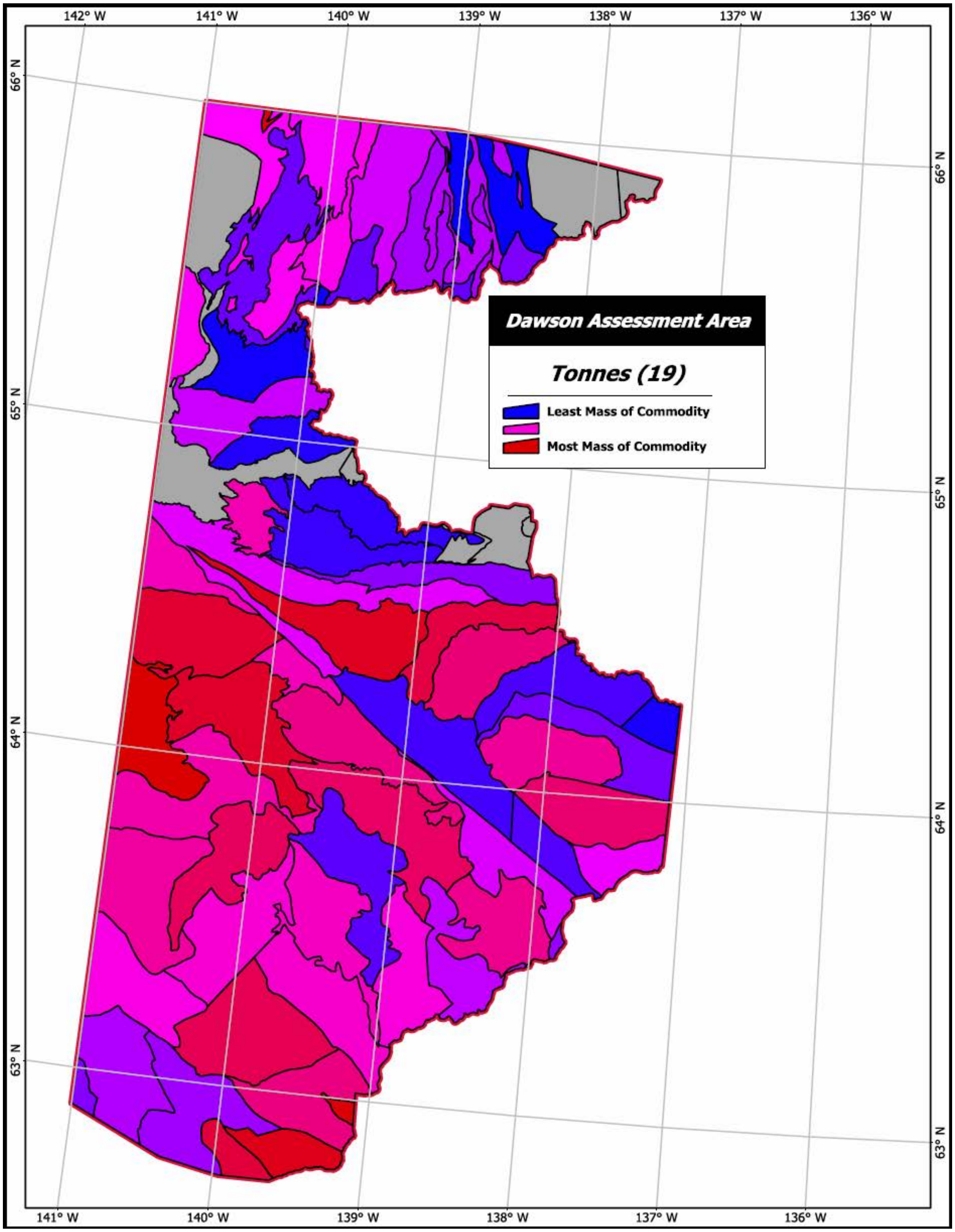


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Barite (13)
Least Mass of Commodity
Most Mass of Commodity
141° W
140° W
139° W
138° W
137° W
136° W

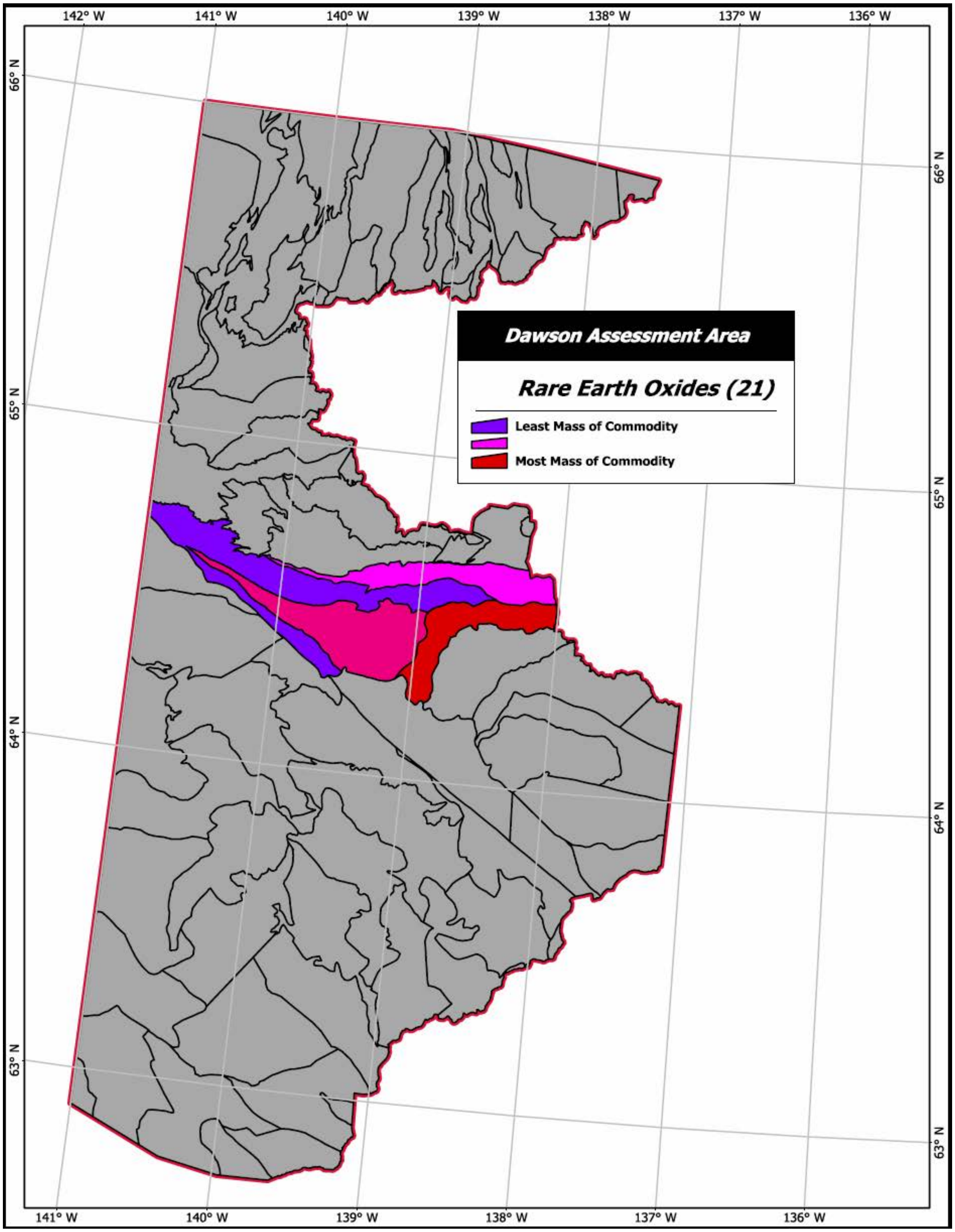

Dawson Assessment Area
Barite Plus (13)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

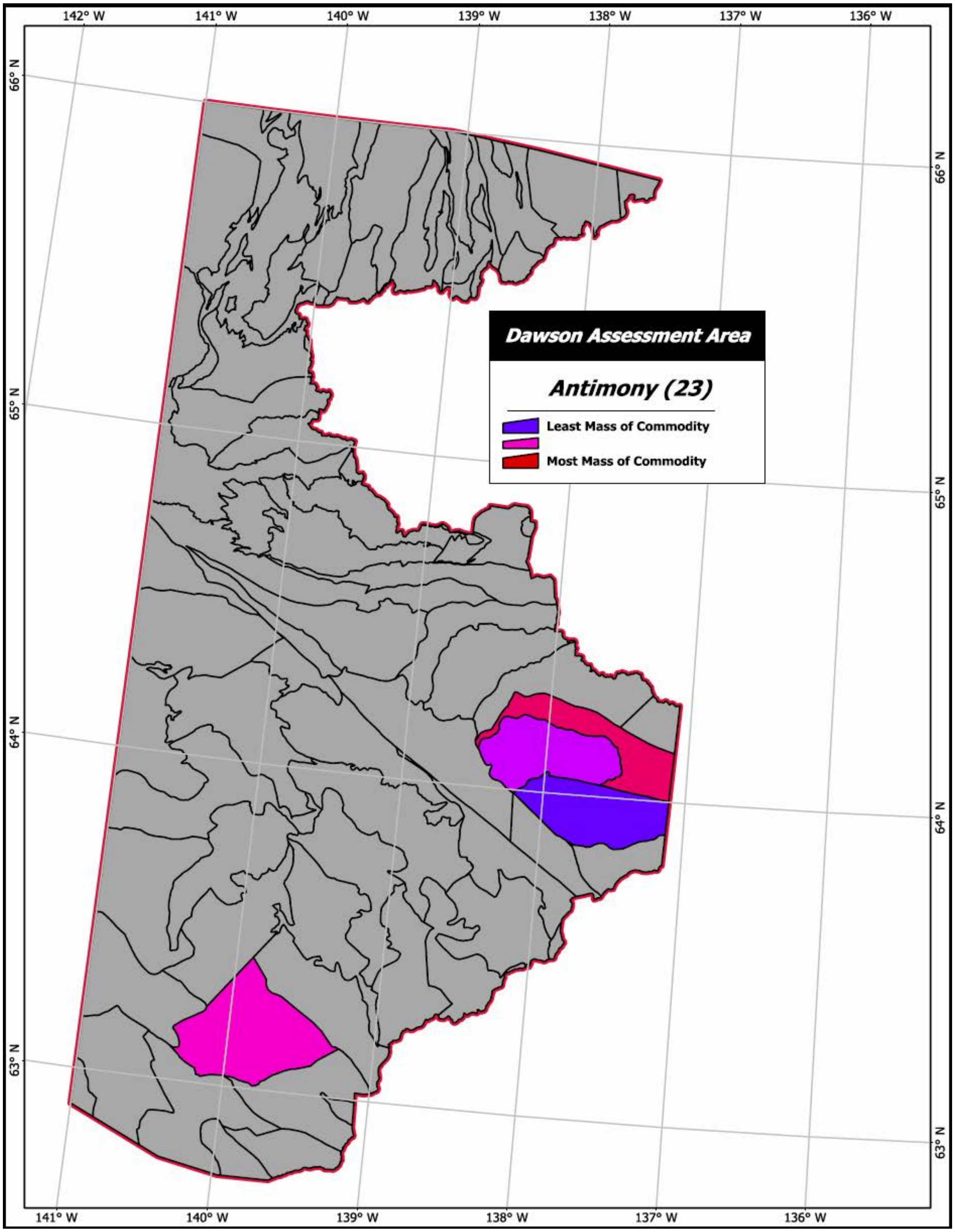

Dawson Assessment Area
Platinum (15)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

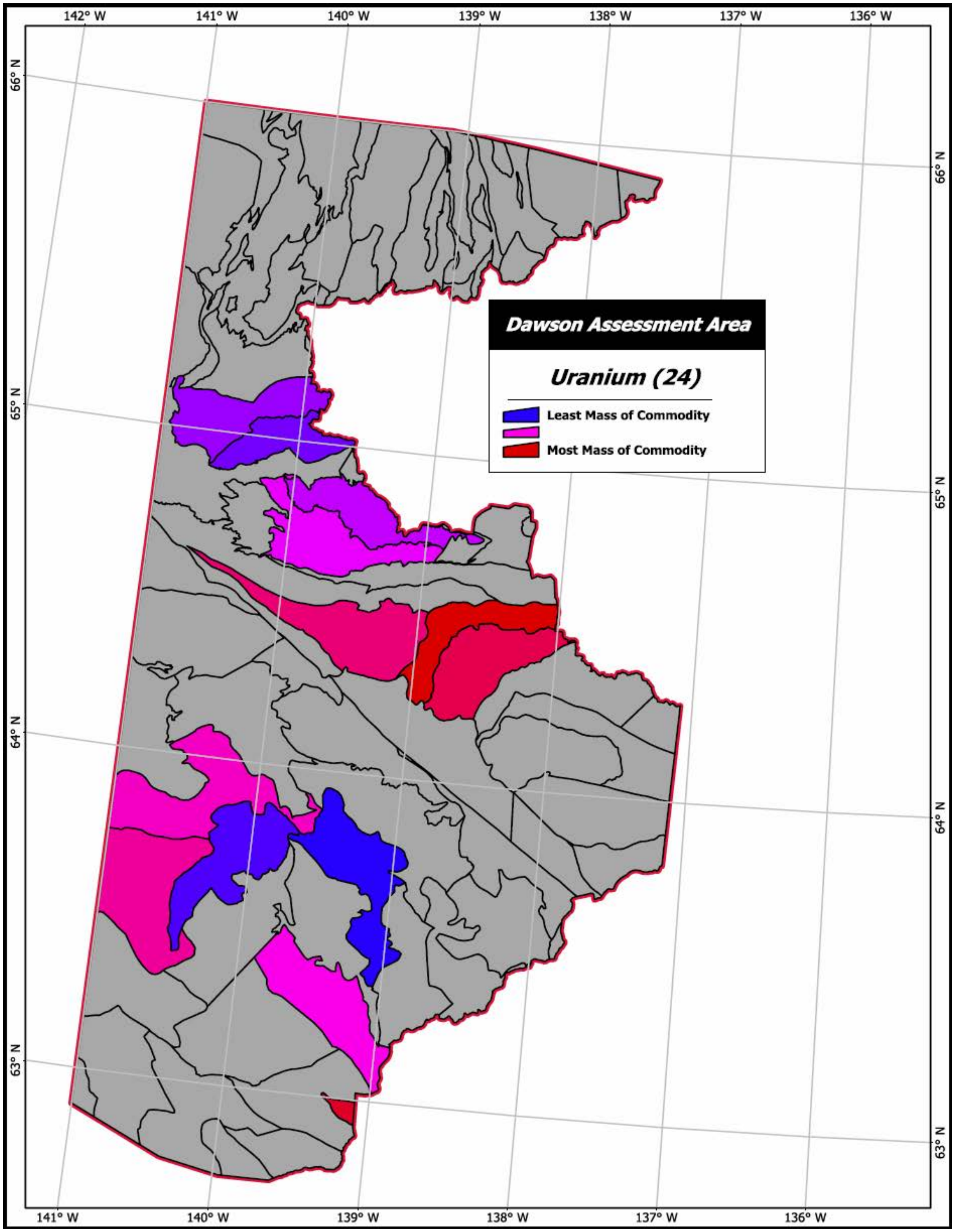

Dawson Assessment Area
Tin (18)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

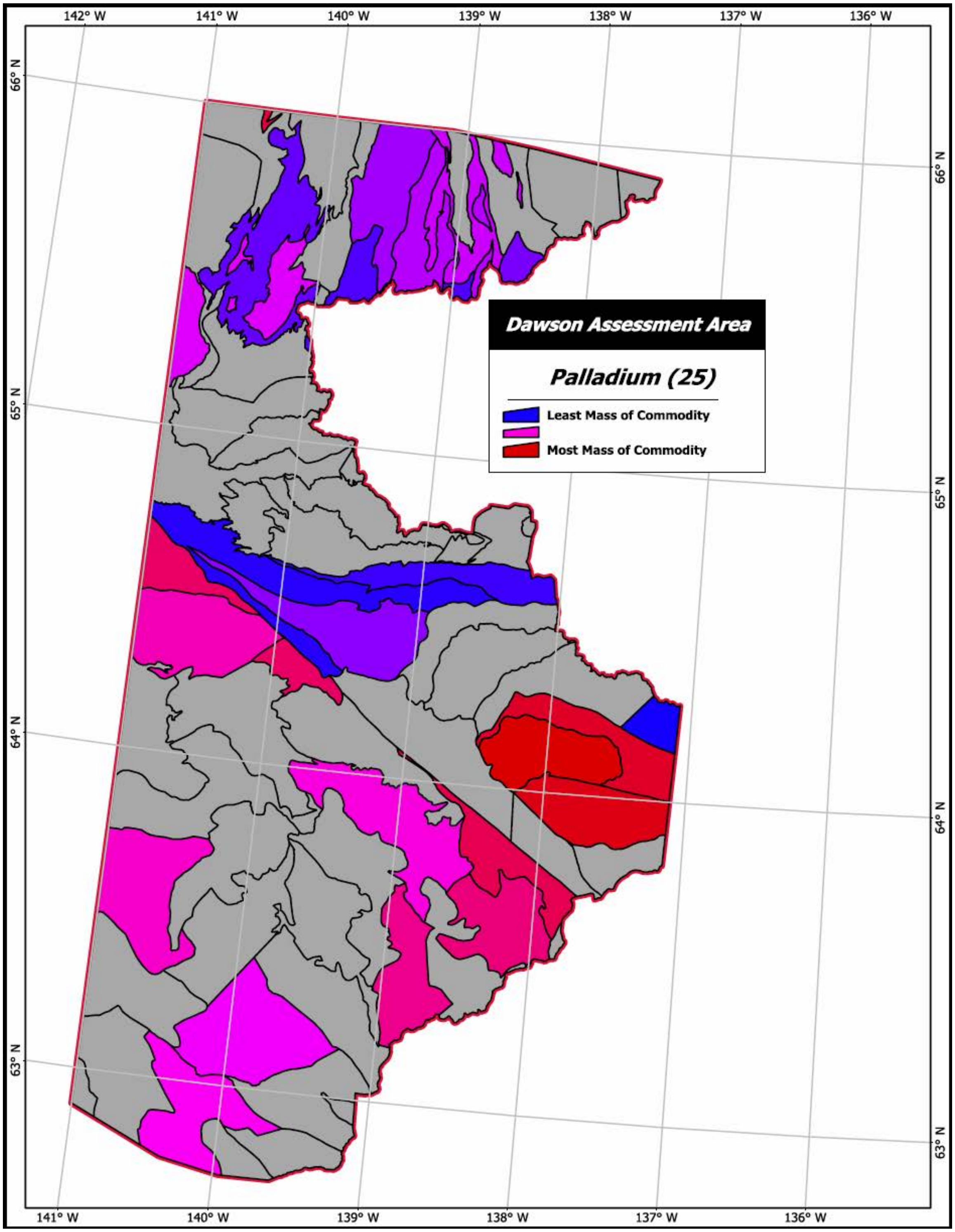


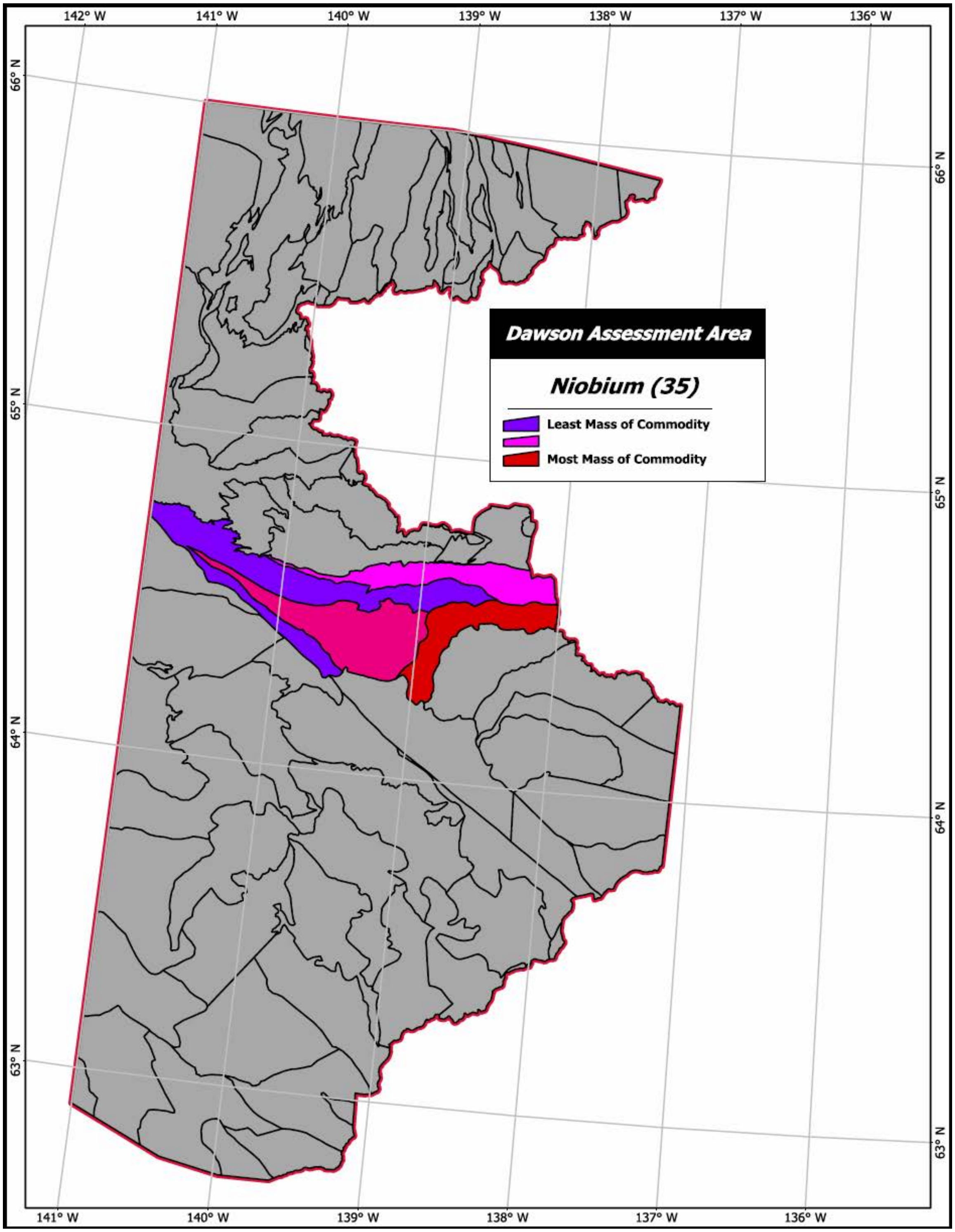
Dawson Assessment Area
Tonnes (19)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Rare Earth Oxides (21)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

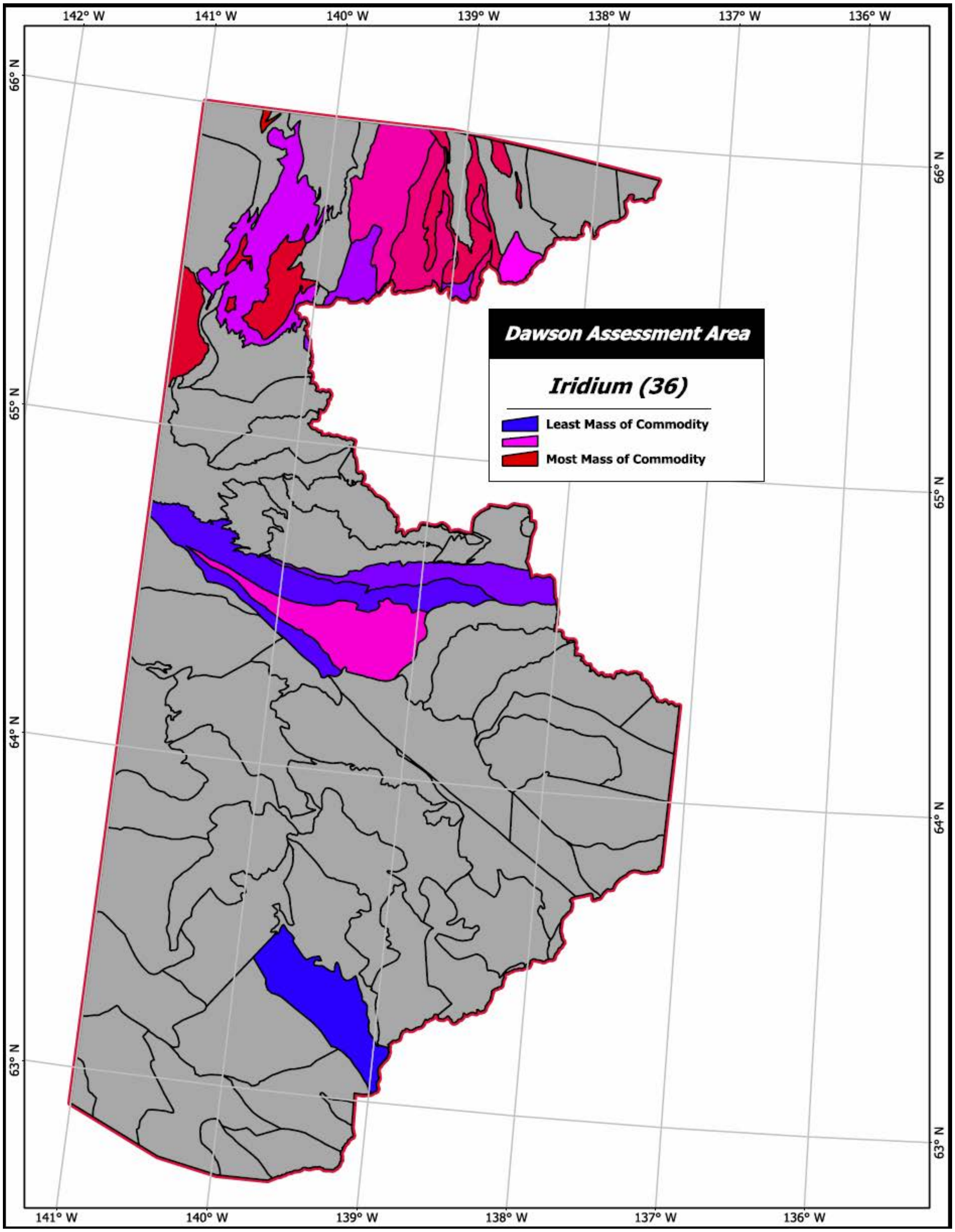

Dawson Assessment Area
Antimony (23)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

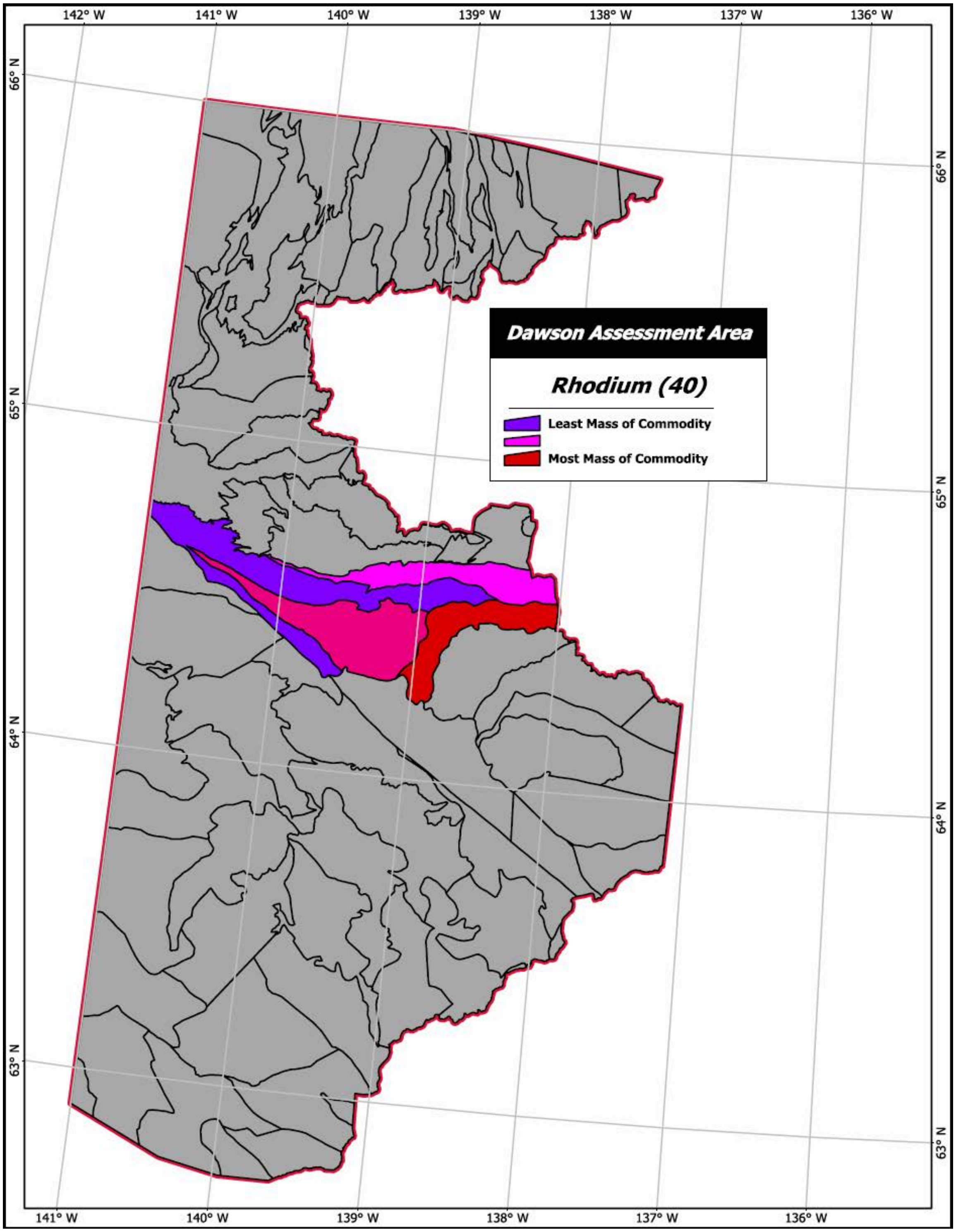

142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Uranium (24)
Least Mass of Commodity
Most Mass of Commodity
141° W
140° W
139° W
138° W
137° W
136° W

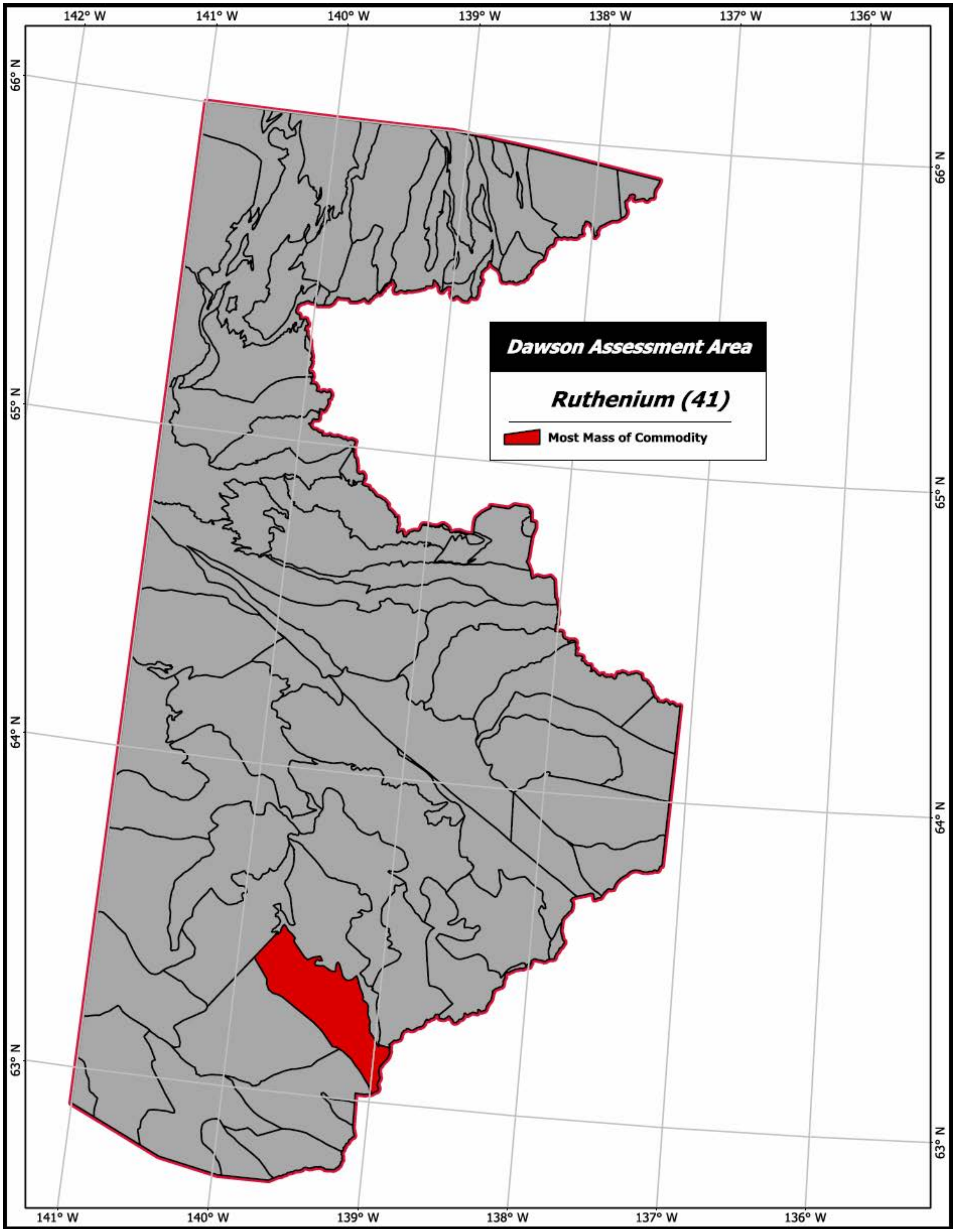

Dawson Assessment Area
Palladium (25)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N



Dawson Assessment Area
Niobium (35)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


Dawson Assessment Area
Iridium (36)
Least Mass of Commodity
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N


142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N
Dawson Assessment Area
Rhodium (40)
Least Mass of Commodity
Most Mass of Commodity
141° W
140° W
139° W
138° W
137° W
136° W


Dawson Assessment Area
Ruthenium (41)
Most Mass of Commodity
142° W
141° W
140° W
139° W
138° W
137° W
136° W
66° N
65° N
64° N
63° N

DIGITAL APPENDIX (Separate digital media)

The digital appendix is provided on the digital media associated with this report. The digital products are provided in a variety of formats. Some of the contents are historic information compiled from the previous mineral potential assessment processing used in this compilation while others are products generated during this compilation effort.

Shapefiles

Deposits_by_Tract- A Shapefile containing the number of deposits of each type that were estimated by the expert estimators at the four estimation workshops. The deposit values are in estimated deposits per km^2. The spatial information is provided in the Yukon Albers projection on the NAD 83 Datum.

Commodity_by_Tract- A Shapefile containing the mass of each type of commodity that was estimated by the expert estimators. The mass values are in tonnes per km^2. The spatial information is provided in the Yukon Albers projection on the NAD 83 Datum. Those fields labeled with a "PLUS" contain the known commodity tonnages as well as the estimated values.

Confidence_by_Tract- A Shapefile containing the confidence values for each tract calculated from the expert estimators individual evaluations made during the workshops.

CUR_GIPV- A Shapefile containing the tabulated GIPV of all the commodities contained in the tracts of the Dawson Assessment Area. The ranking results are provided for all the calculation types. The GIPV units are dollars per km^2. The commodity prices are from the Current Price List. The spatial information is provided in the Yukon Albers projection on the NAD 83 Datum.

YT_GIPV- A Shapefile containing the tabulated GIPV of all the commodities contained in the tracts of the Dawson Assessment Area. The ranking results are provided for all the calculation types. The GIPV units are dollars per km^2. The commodity prices are from the Yukon Price List. The spatial information is provided in the Yukon Albers projection on the NAD 83 Datum.

BC_GIPV- A Shapefile containing the tabulated GIPV of all the commodities contained in the tracts of the Dawson Assessment Area. The ranking results are provided for all the calculation types. The GIPV units are dollars per km^2. The commodity prices are from the BC Price List. The spatial information is provided in the Yukon Albers projection on the NAD 83 Datum.

Deposit Models

This appendix contains the digital deposit model files (*.DAT and *.DEF) for all the models used in the Dawson Assessment.

Estimation Files

This section of the digital appendix contains the scanned estimation coding sheets for the tracts involved in the Dawson Assessment. The coding sheets are in PDF format. The are provided in directories for each workshop (North, Peel, Selwyn, South and White Gold). In addition to the coding sheets the files containing the digitized data from the coding sheets are also included in the appropriate directories.

Keyhole Markup File

Keyhole markup file (KML) that can be viewed with the Google Earth viewer.

Software

- **Mark3B.BAS**
- **Phase1.BAS**
- **Raw2Mark.BAS**
- **Sim-Valu.EXE**
    - **price lists**
- **Depnum.BAS**
- **ComSum.BAS**