

PROPERTY FILE

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REPORT AND RECOMMENDATIONS
on the
OWEN LAKE PROPERTY
of

FRONTIER EXPLORATIONS LTD. (N.P.L.)
E.O. Chisholm, P. Eng. February 2, 1972.

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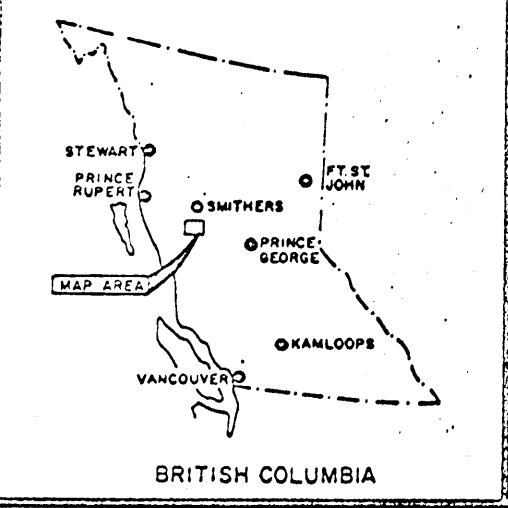
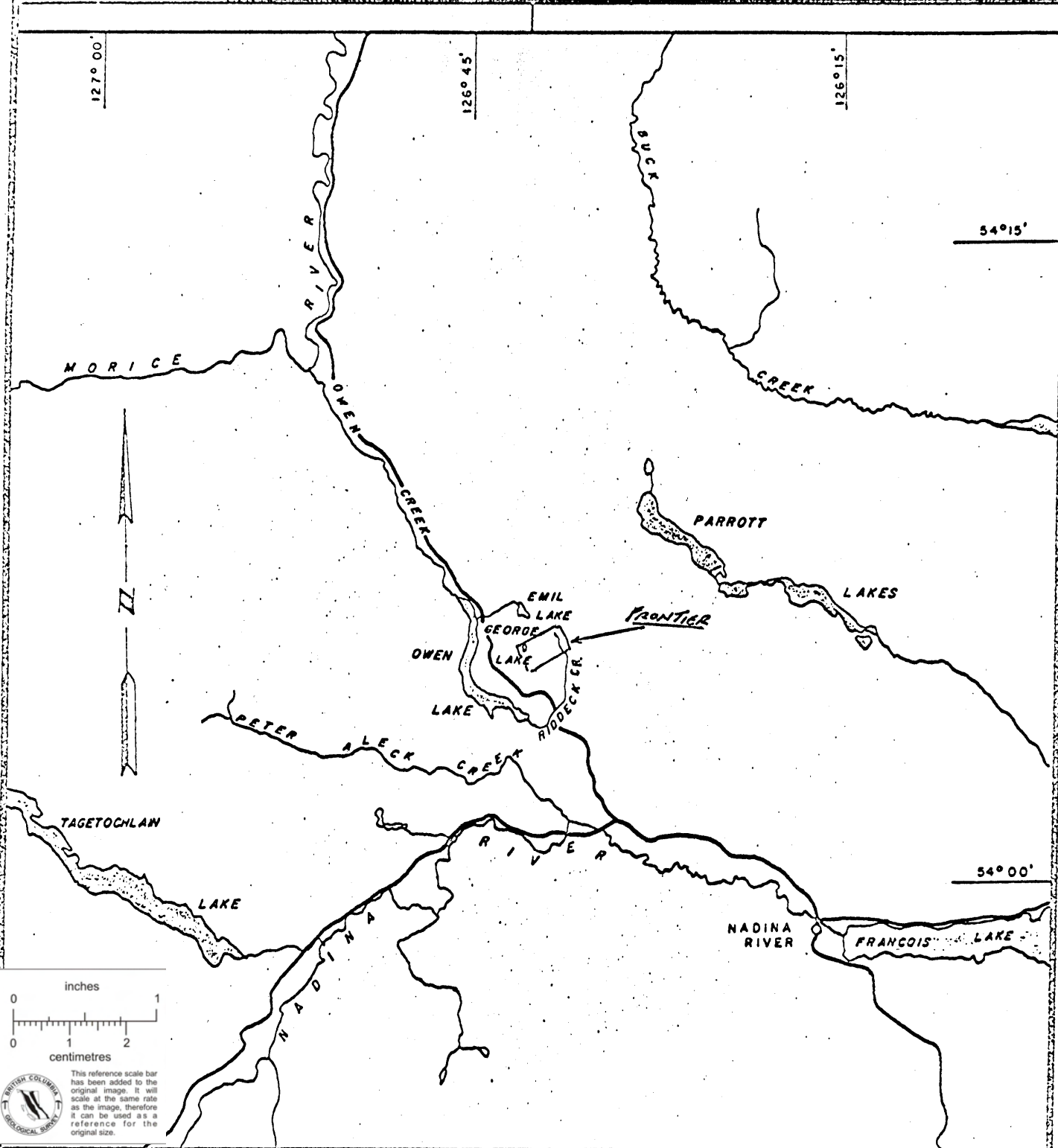
(Latitude ⁵⁴~~41~~° 06' N - Longitude 126° 45' W.)

by

Edward O. Chisholm, P.Eng.

VANCOUVER, BRITISH COLUMBIA

FEBRUARY 2ND, 1972



FRONTIER EXPLORATION LIMITED

LOCATION MAP

OWEN LAKE AREA BRITISH COLUMBIA

4 0 4 8

SCALE IN MILES

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I N T R O D U C T I O N

Frontier Explorations Ltd., a Vancouver based Company, is the sole owner of 23 claims in the Houston area of British Columbia. These claims were originally part of a larger claim group that underwent an extensive development program in the late 1920's. This area had lain dormant until the middle 1960's, save for a division of ownership of the property. The vein exposures to the west were acquired by Canex Explorations and optioned to Nadina Explorations of Vancouver. The vein exposures to the east were acquired by Frontier Explorations Ltd.

The original development program by the single owner in the twenties was to sink a shaft on the eastern exposures while driving a long crosscut from the western area. This program was never completed due to the death of the owner and subsequent economic conditions. An extensive exploration program has taken place on the ground held by Nadina through public financing and options. Programs have been sponsored on the Nadina claims by Kennco Explorations (1967), Northgate Explorations (1970) and presently by Bralorne Can-Fer and Pacific Petroleum Ltd.

The ground held by Frontier was largely dormant until 1970. During this period an extensive trenching program combined with diamond and percussion drilling indicated several new veins. The deep diamond drilling sponsored by Northgate and managed by Frontier indicated that the claim group was underlain by an altered volcanic complex, with exploration possibilities other than the narrow veins. To date, some \$500,000 has been expended on the property.

The Nadina ground, now called the Bradina Joint Venture, is being readied for production at a rate of 600 tons per day and should be producing by March 1972.

The mineralization and geology are similar on both properties. In a report prepared for Kippen & Company Ltd. of Montreal by the writer dated March 11, 1970, the following data was compiled for the Bradina Project:

(1) Reserves	-	In excess of 1.6 million tons.				
(2) Mill	-	200,000 tons per year.				
(3) Grade of ore (10% dilution):						
		0.09 oz.Au	9.8 oz.Ag	0.72% Cu	1.44% Pb	6.12% Zn
(4) Recoveries		90%	90%	80%	80%	80%
(5) Metal Prices (Can. Funds)		\$37.50	\$2.00	\$0.60	\$0.14	\$0.14
Net Smelter Return					\$30.65	
Mine Operating Costs			\$11.00			
Freight			1.15			
Administration			.50		12.65	
Operating Profit					\$18.00/Ton	
Annual Profit - 200,000x18	=				\$3.6 Million before taxes and write-offs.	
Capital Costs	=				\$4.0 Million.	

The actual cost and profit data will be available as the Bradina operation begins to function. The proven ore on which the production decision on the Nadina ground was reached is in the order of 500,000 tons.

The trench exposed and drill-indicated vein mineralization on Frontier's ground appears to have similar potential to that of Bradina.

An exploration program of percussion drilling, geophysical survey and diamond drilling totalling \$78,400. is recommended to evaluate the principal vein areas on the property indicated by previous work.

The material for this report is taken from various reports compiled by the writer in his capacity as Consulting Geologist for the Company during the past three years and personal inspection at the property of all exploration activity carried out during this period. It is also derived from Government and private reports listed in Appendix No.1 attached.

L O C A T I O N A N D A C C E S S

The Owen Lake Property is located at co-ordinates Lat. $54^{\circ}06'$ N. Long. $126^{\circ}45'$ W., 28 road miles south of Houston B. C. in the Omineca Mining Division, adjoining the Nadina Mines property on the northeast. The claims are accessible by all-weather road from Houston, a station on the C.N.R. railroad connecting with the port of Prince Rupert, 270 rail miles to the east.

PROPERTY

The Owen Lake property consists of 15 claims and 7 fractions totaling approximately 950 acres, as follows:

CLAIMS

<u>Claim Name</u>	<u>Record Number</u>	<u>Expiry Date</u>
Diamond Bell	1684	July 2, 1984
Black Bear	1685	July 2, 1984
Ethel	7363	July 4, 1984
Bell No. 1	24929	June 15, 1984
Bell No. 2	24930	June 15, 1984
Bell No. 3	24931	June 15, 1984
Bell No. 1 Fraction	24932	June 15, 1984
Bell No. 2 Fraction	24933	June 15, 1984
Bell No. 3 Fraction	24934	June 15, 1984
Bell No. 4 Fraction	24935	June 15, 1984
Bell No. 5 Fraction	24936	June 15, 1984
Ivan Fraction	40867	June 20, 1984
Van No. 1 Fraction	35244	Feb. 23, 1984
Van No. 1	35245	Feb. 23, 1984
Van No. 2	35246	Feb. 23, 1984
Van No. 3	35247	Feb. 23, 1984
Van No. 4	35248	Feb. 23, 1984
Van No. 5	35249	Feb. 23, 1984
Van No. 6	35250	Feb. 23, 1984
Van No. 7	35251	Feb. 23, 1984
Van No. 8	35252	Feb. 23, 1984
Van No. 9	35253	Feb. 23, 1984

The claim posts on the property have been personally inspected by the writer and are staked according to the British Columbia Mining Act regulations. As far as is known, all claims are in good standing. Any other legal implications, if existing, regarding the property status are beyond the scope of this report.

H I S T O R Y A N D D E V E L O P M E N T

The property was first staked in 1915 by O. W. Jones, J. D. Cole and Frank Brown. Development work consisted of shallow stripping to 4 feet on the Cole Vein system on the Diamond Bell Group. Due to the inaccessibility at the time, nothing further was done. In 1923, a limited amount of surface work was carried out by Federal Mining and Smelting Co. In 1928 extensive work was carried out in the area by the Owen Lake Mining and Development Company. A shaft was sunk on the Cole Vein to a depth of 85 feet, and drifting east and west on the vein for a total distance of 120 feet. This work established continuity of the vein at this depth and both faces were in the vein when work was stopped. A. W. Lang made a detailed study of the geology of the district. In 1941, Canadian Explorations Ltd. optioned the Cole property and an examination was made by B. I. Nesbitt. Six short diamond drill holes totalling 663 ft. were drilled and surface mapping and trenching carried out, mainly on the Cole Vein. Values encountered in the drilling were reported to be too low grade to be of interest at this time.

In 1961 Denison Mines Limited carried out detailed mapping, a self-potential survey and a geochemical survey over the west half of the claim group. Three new veins were exposed by a series of bulldozer trenches. Only low values in silver and gold were reported. In 1964, Frontier Explorations tested these veins by 4 short diamond drill holes totalling 608 feet. Several narrow veins containing values in silver, lead and zinc below ore grade were encountered. Work on the group was re-activated in 1967 by Frontier in the area of the Cole shaft. The vein was completely uncovered for a distance of 640 ft. in a

northwest-southeast direction and thoroughly sampled. The shaft was retimbered and underground workings re-examined and sampled. A new, higher grade north-south striking vein was exposed immediately to the southeast of the Cole Vein. It warrants additional detailed work by diamond drilling. A detailed geochemical survey was carried out by Kennco Explorations over a rectangular area 3,000 ft. by 1,000 ft. centred in the Cole shaft area. Several anomalous areas were outlined that warrant further investigation.

The property was covered by magnetic and electromagnetic aerial surveys which were followed up by ground electromagnetic surveys. During February and March 1970 Frontier drilled 9 AQ diamond drill holes totalling 3004 ft. along the Cole Vein system. Under option to Northgate, one AQ hole was extended and 4 more AQ holes were drilled totalling 2005 ft. Two of the latter drill holes were into the EM anomaly 4000 ft. southeast of Cole Lake. In addition, 4 BW holes were drilled totalling 5785 ft. Percussion drilling consisted of 17 - 2½" holes totalling 1290 ft.

Also during 1970 an extensive program of trenching was carried out along several veins and vein structures. A total of 22 small pits were constructed by using the percussion drill, blasting and mucking with a JD-350 front-end loader. These pits occur at intervals along the veins. A large pit 200 ft. by 15 ft. by 8 ft. was constructed to expose the NGVF 6 Vein. A small soil geochemical survey was carried out on a 100 ft. by 200 ft. grid centering on co-ordinates 20,000E and 28,000N. A total of 50 samples was collected. Geologic mapping was done on scales of 1"=10' and 1"=100'. Sampling on the property consisted of three types: diamond drill core, percussion drill cuttings and surface channel samples. Approximately \$500,000 worth of work has been completed on the property to date.

GENERAL GEOLOGY AND MINERALIZATION

The rocks in the Owen Lake district are a flat lying pile of volcanic rocks varying from dacites near the top to rhyolites with increasing depth in the pile. The rocks vary from a fine ash to coarse explosion or vent breccias. The district is complicated by andesitic dykes and sills, many ages of trachyte dykes and rhyolitic intrusions. The whole area is crossed by a strong fault pattern on almost a 3000 ft. by 3000 ft. grid.

The alteration in the camp is locally intense and is mainly pyritic, sericitic with accompanying carbonate, barite and specularite. Diamond drilling has indicated areas of disseminated bismuth, sphalerite and tourmaline. The rocks are quite young (Early Tertiary) and are a unique host in the Omineca District for mineralization.

The previous vein camps in the Omineca District were all in the older rocks and had a record for decreasing grade with depth. The only other occurrence in a similar setting is the large tonnage copper/silver prospect of Kennecott Copper at Goosly Lake, 25 miles to the north. This prospect is reported to be 50 million tons plus of 4 - 5 oz/ton silver and .5 to .6% copper and is amenable to open pit operations.

The observed ability of the mineralization in the Owen Lake camp to pervade and replace the volcanic breccia wallrock adjacent to the veins leads to the speculation as to what has happened beneath, where the mineralization has passed through similar flat lying breccia horizons. The veins in the Owen Lake camp are of the epithermal fissure filling type. The average dip is 65° and the ore shoots vary in length and thickness. The structures are easy to follow underground and the walls are generally tight and frozen. The ore

shoots at Bradina vary from 100 ft. to 300 ft. in length and average slightly under 4 ft. in width. The width of the shoots vary from 2 to 15 ft. The sulphide ratios of the veins change along strike and with depth. The indications are that the grade increases with depth.

E C O N O M I C G E O L O G Y

VEIN STRUCTURES

Several major veins are present in the area west of Cole Lake on the Frontier property. Their strike is generally north-northwest with a steep easterly dip. One notable exception is the Cole Vein which dips to the west. The major veins describe a "cymoid loop" with a convergence to the north. The veins vary in width and grade along their strike. Most of the variation is caused by major faults, of pronounced strike/dip movement, coinciding with the hanging footwalls of the veins. An accompanying compilation plan of the Owen Lake property at 1000 ft. to 1 in. scale prepared by G.O.M. Stewart, Exploration Manager of Frontier Explorations Ltd., shows the various veins and structures on the property, together with their respective grade tenor as determined by surface sampling and diamond drilling.

All of the veins appear to be of an open fissure-filling variety as indicated by deposition textures and structures, such as comb (barite), rhythmic banding, colloidal deposition (chalcedonic quartz) and cockade features. The mineralogy of the veins is similar differing only in the percentage of each mineral present. The metallic minerals are sphalerite, galena, pyrite and minor amounts of chalcopyrite, tennantite and specularite. The

gangue comprises of rhodochrosite and barite with minor amounts of siderite and quartz (both crystalline and chalcedonic). Some consistent associations are evident, such as high galena content in high barite vein segments. Mineral zoning is not conspicuous with the exception of chalcopyrite which increases with depth on the Cole System and occurs more often in vein structures within the microdiorite area.

Several minor veins are present in the form of 6 inch to a foot wide structures. These veins, although high in barite, have the same mineralogy as the major veins. They appear to be cross links between the major veins with an east/west strike and southerly dip.

The wallrock alteration associated with the veins is similar in all cases. A bleached, silicified, pyritic envelope exists around each vein. Porphyritic and breccia textures become more distinct due to the alteration of feldspar to fine grained sericite and clay minerals. Traces of sphalerite and galena can be found but pyrite is the dominant sulphide mineral within the envelopes. Stringers of rhodochrosite, barite and quartz are also found within the alteration envelopes. A typical assay of altered wallrock is:

<u>Ag</u>	<u>Au</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
.60 oz/T	.04 oz/T	.03%	.40%	.80%

The width of the alteration envelope depends mainly on the type of host rock. Generally the dacite crystal tuff and breccia and the dacite feldspar porphyry and breccia permit wide envelopes and vein structures. The microdiorite, being more resistant to alteration, displays narrow envelopes and vein structures. Examples of the latter can be observed on the Barite Vein adjacent to Pit 4 and in the heavily oxidized zone 550 ft. westnorthwest of

the NGVF-6 Vein. The surface traces of the veins and envelopes are strongly oxidized. Invariably a thick capping up to 10 feet thick and comprising of weathered rock rich in limonite and wad, occurs above the veins. This capping displays a distinct layering parallel to the ground surface and often shows no indication of an underlying vein other than a few residual grains of galena and barite. Most of the faults and shear zones display a similar form of surface oxidation. These zones however are usually of lesser intensity and width. Minor traces of base metal and copper minerals as well as pyrite are commonly found in these latter structures.

The major veins on the Owen Lake property can be divided into surface and sub-surface veins:

SURFACE VEINS

(a) Cole Vein and Cole Shear

This system is the original vein system on the property and has been described in earlier reports. Two points of interest are that the Cole Vein dips west and there is a marked inflection in the system at the southwest corner of Cole Lake.

(b) Copper Vein

This vein occurs 200 ft. west of the Cole Vein and strikes north-northwest with an easterly dip. It consists of a zone of chalcopyrite, pyrite and tetrahedrite veinlets over a width of 15 ft. Some earlier galena, sphalerite, rhodochrosite veinlets also occur within the zone. Drill hole F-8 indicates that it changes to a lead-zinc vein at depth. A channel sample of 1.5 ft. long gives assays of:

<u>Ag</u>	<u>Au</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
35.6 oz/T	0.017 oz/T	3.70%	0.82%	1.05%

(c) Barite Vein

This strong vein lies 400 ft. west of the Cole system. With a strike length of 900 ft. it is second only in extent to the Cole system. It is sub-parallel to the Cole system with a similar inflection point. From the point of inflection north, the Barite Vein is parallel and cut by a large pulaskite dyke. The vein is characterized by a generally high percentage of barite gangue accompanied by a high percentage of galena. Another characteristic feature is the presence of a breccia ore which occurs on the hanging wall of the vein. The breccia, consisting of rhodochrosite fragments containing fine grained sphalerite and galena in a matrix of chalcedonic quartz containing pyrite and minor sphalerite and galena, is most noticeable south of the inflection point. A similar breccia occurs north of the Cole system in Cole Pit 1.

The Barite Vein is a zone of strong sub-parallel faults. Low assays occur where the vein has been destroyed by these faults. At the north and south ends of the vein it tends to pinch out into narrow shear structures. A narrow spur off the main vein occurs to the southwest of the inflection point. This may be a cross-vein connecting the Barite Vein to the Cole system.

Chalcopyrite is absent from the typical mineral assemblage of this vein but it does occur associated with specularite on fractures in the micro-diorite dyke adjacent to Barite Pit 4. In addition to the typical vein alteration envelope, small pods of pyrite, specularite and hydrothermal chlorite can be found on the vein's footwall. The best mineralization occurs at the north

end of the vein in Barite Pits 10 and 11. Here, a 3.8 ft. channel sample assayed:

<u>Ag</u>	<u>Au</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
6.15 oz/T	0.063 oz/T	0.21%	5.3%	13.2%

(d) Bear Vein

The Bear Vein lies 400 ft. west of the south end of the Barite Vein. It is sub-parallel to the Barite Vein and contains an inflection point that is in line with that of the Barite and Cole systems. This vein has been exposed intermittently for 350 ft. and appears to be open at both ends.

Although the vein averages only 2 ft. in width, it contains massive mineralization. Zinc and associated cadmium assays are consistently high. In places, greenish sphalerite crystals 2½" across are found in rhodochrosite. The mineral assemblage is typical of all the veins and consists of sphalerite, galena, pyrite in a barite rhodochrosite gangue. Minor chalcopyrite and specularite associated with quartz occurs toward the north end of the vein. A sample over 3.4 ft. near the north end of the vein assayed:

<u>Ag</u>	<u>Au</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	<u>Cd</u>
4.14 oz/T	0.02 oz/T	0.27%	1.83%	10.5%	0.06%

The north end of the Bear Vein appears to be offset by an east/west fault system. Coinciding with these faults is a one foot wide cross-vein adjacent to a narrow feldspar porphyry dyke. Four northerly trending veins occur on the north side of this cross structure.

A zone of intense surface oxidation occurs for a distance of 700 ft. south-southwest of the exposed sections of the Bear Vein. As these oxidized

zones contain very strong fault and vein structures and residual galena and sphalerite grains, it is possible that the intense oxidation marks the southern extension of the Bear Vein.

(e) NGVF-6 Vein

Although the exposure of this vein is only 170 ft., it represents the most consistent section of ore grade mineralization of all veins, other than the Cole system. The average width of this vein is just over 2 ft. The mineral assemblage is similar to other veins. Mineral zoning within the vein includes an increase of barite and galena towards the north and an increase in amber sphalerite towards the south. Although chalcopyrite has not been seen in the mineral assemblage, an indigo blue film forms on exposed black sphalerite. This film may be covellite formed upon oxidation of copper-rich sphalerite. A typical assay over 2.3 ft. would be:

<u>Ag</u>	<u>Au</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>	<u>Cd</u>
8.75 oz/T	0.05 oz/T	0.55%	4.2%	14.0%	0.08%

One of the main characteristics of this vein is the presence of rhythmic banding across the vein. The banding consists of successive zones of rhodochrosite, barite, quartz and massive sulphides towards the centre of the vein. The main structure associated with the vein is a 1½ ft. wide fault zone on the hanging wall. The gouge of this fault is 50% crushed sulphide material.

Unlike the other major veins, a dyke is not found associated with this vein. The NGVF -6 drill hole indicates the closest dyke is a pulaskite dyke 150 ft. to the west. Drilling has also indicated that the surface widths and grades of the vein are consistent to a depth of 80 ft. where a 1.6 ft.

intersection assayed:

<u>Ag</u>	<u>Au</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
13.05 oz/T	0.04 oz/T	0.17%	12.8%	10.2%

Although the vein pinches slightly towards the north, it appears to be open at both ends.

(f) Lead Vein

This narrow vein occurring between the Bear and NGVF-6 Veins appears to be a typical cross vein. Its gangue is mainly barite with the usual assemblage of metallic minerals. The 1.2 ft. wide vein is characterized by 3 inch wide bands of pyrite gouge on each wall and by an abnormally high percentage of sphalerite and galena disseminated and in fractures in the hanging wall.

SUB-SURFACE VEINS

Diamond Drill Intersections

(i) The NGVF-1 drill hole intersected a very strong vein of good grade at a depth of 440 ft. It has not been exposed at surface and was not intersected in the F-9 drill hole, thus it appears to be a faulted vein segment.

(ii) The F-8 drill hole intersected a vein that corresponds to the position of the Copper Vein. Although the vein is a strong structure, it is very low in copper and high in lead and zinc.

(iii) The George Lake Lineament

The George Lake Lineament is a marked linear topographic low trending southwest from George Lake. This linear which separates Nadina's Mine Hill and the hill west of Cole Lake almost coincides with the Nadina-Frontier claim boundary. The NGF-5 and NGVF-6 drill holes have indicated the presence of a major dyke swarm occupying the linear. In addition, a particular dyke, a drusy trachyte which was intersected by both holes, lies adjacent to a very strong vein structure of encouraging grade. The most interesting part of the structure was intersected near the bottom of NGVF-6. Here the rhyodacite breccia of NGF-5 which is intensely kaolinized and contains pyrite and tourmaline, has been intensely silicified. It appears as though a matrix of the breccia has been replaced with quartz, pyrite and minor amounts of galena and sphalerite. "Cave pebbles" of a massive sphalerite vein were recovered from this zone. The combination of structure, mineralization, rock type and intense alteration suggests the possibility of a massive sulphide body lying adjacent or along the George Lake Lineament.

(iv) The NGF-8 drill hole disclosed the presence of many veins and vein structures of varying widths and grades. The frequency of veins suggests the possible convergence of the cymoid structure described by the veins exposed at surface. A reticulate stringer zone near the collar of this hole assayed 3.30 oz. of silver over a 30 ft. core length with low values in lead and zinc. Below 1000 ft. in the hole, five narrow intersections varying from 0.1 to 4 feet in width assayed from 3 to 14 oz. in silver and from 1/2% to 12% combined lead and zinc.

In addition to the veins, possible hydrothermal channelways as indi-

cated by zones flooded with rhodochrosite, barite and quartz stringers, were intersected. These occur in intensely altered rhyodacite breccia similar to that intersected in NGF-5.

(v) Diamond drilling along the Cole system indicated a vertical extension of approximately 550 ft. The width of the vein, although traversed by dykes, is consistent with surface widths. The grade of the Cole system increases with depth especially in the Cole Shear. Because the other veins have not yet been examined at depth by drilling, this system still represents the main ore zone on the property.

C O N C L U S I O N S

The combined drilling and surface exploration programs carried out during 1970 on the Owen Lake property has greatly increased the geological understanding of the area. The diamond drill program was very successful and a number of conclusions can be drawn from the data obtained.

1. The two large zones of intense rock alteration as found along the George Lake Lineament and north of the exposed vein systems, provide good targets for the search for massive sulphide ore bodies.

2. A considerable number of veins occur on the property and extend to depths of 1600 ft. or more below surface.

3. There is a close relationship between dykes and vein systems.
4. Rock types and stratigraphy appear to be consistent throughout the area.
5. The Cole Vein and Cole Shear are the same vein and join at an inflection in the system's strike. The Cole Vein does not extend southeast from the inflection point.
6. The whole area has undergone an exceptional amount of structural stress resulting in intense faulting and shearing

The percussion drilling results indicate the presence of vein structures under oxidized cappings. This method of exploration may be used as a substitute for trenching in establishing lateral vein extensions. The program of extensive trenching has disclosed the presence and distribution of several major veins. In addition, many zones of intense oxidation which may cap additional veins were disclosed. Although encouraging sample assays were obtained from all veins, the generally narrow vein widths permit the possibility of only a few ore shoots to be developed. These ore shoots include the southern 140 ft. of NGVF-6 Vein, the north end of the Bear Vein and the north end of the Barite Vein. Possible ore shoots in the Cole system were established in earlier work.

The Copper Vein contains interesting values but its strike length is limited and its extension to depth is doubtful. The area west of the Copper Vein however merits more attention because of the number of copper bearing shear structures within the microdiorite.

The Cole, Barite and Bear Veins are all related to the same structural system, possibly a "cymoid loop" structure, as indicated by spacial relationship and similar inflections in strike directions. The vein intersections of

NGF-8 suggest the convergence of surface veins to the north. This may result in a major vein, such as the Ruby Vein of Nadina, extending north from the NGF-8 drill site.

In conclusion, the possibility of establishing mineable ore reserves on the Owen Lake property is good. The presence of several potential ore producing veins has been established and there is a great likelihood of others being discovered. In addition to the veins, massive sulphide bodies may also occur on the property.

R E C O M M E N D A T I O N S

Analysis of the data collected during 1970 indicates that more work should be done on the Owen Lake property in order to establish economic ore reserves within the vein systems. The search for a massive sulphide body should also be continued, especially in the areas indicated above. The development of the vein reserves necessitates more drilling to establish continuity of width and grade to depth. This should be followed by underground development.

(1) GEORGE LAKE LINEAMENT

The work done to date indicates that the next phase of exploration should be first concentrated along the major George Lake Lineament structure that extends for at least 3000 ft. across the south end of the property parallel to the production vein on the Nadina property and 2000 ft. distant.

A program of percussion drilling is recommended on sections at 250 ft. intervals along a length of 3000 ft. of the zone, totalling 7200 ft. of drilling at an overall cost of \$43,200. A series of three overlapping holes per section should be drilled across the lineament to a depth of 200 ft. each. In this work, any potential ore shoots similar to the Nadina structures as indicated in previous holes NGVF-6 and NGF-5 will be indicated. Success in this drill pattern should be followed up by diamond drilling, estimated at 4 holes, 200 ft. in length totalling 800 ft. at a cost of \$8,000.

(2) Concurrent with the percussion drilling, a limited program of electromagnetic survey should be carried out to further define the George Lake Lineament and the northeast shear zone indicated in drill hole NGF-8 lying between George Lake and the collar of NGF-8. The estimated cost of this program is \$3,000.

(3) Concurrent with the percussion drilling on the George Lake Lineament, a limited program of diamond drilling should be carried out on Bear Vein and NGVF-6 Vein. These structures were partially explored by surface trench on the Bear Vein and surface trenching and drill hole NGVF-6 on the NGVF-6 Vein. The grade tenor and length of these veins are as follows:

<u>Vein</u>	<u>Length</u>	<u>Width</u>	<u>Au</u>	<u>Ag</u>	<u>Cu</u>	<u>Pb</u>	<u>Zn</u>
Bear	350'	2.0'	.02 oz/T	4.2 oz/T	0.3%	1.8%	10%
NGVF-6	170'	2.3'	.05 oz/T	8.8 oz/T	0.5%	4.0%	14%


Two 750 ft. holes on each of the Bear and NGVF-6 Veins should be drilled to achieve intersections 500 ft. down dip of the veins. Cost is estimated at \$15,000. overall.

SUMMARY OF COSTS - RECOMMENDED EXPLORATION PROGRAM

(1)	<u>PERCUSSION DRILLING</u>	
	7200 ft. @ \$6.00 per foot	\$ 43,200
(2)	<u>GEOPHYSICAL SURVEY</u>	
	10 miles @ \$320 per line mile	3,200
(3)	<u>DIAMOND DRILLING</u>	
	(a) George Lake Lineament 800 ft. @ \$10 per foot	8,000
	(b) Bear & NGF6 Veins 1500 ft. @ \$10 per foot	15,000
(4)	<u>ASSAYING</u>	3,000
(5)	<u>CONTINGENCIES</u>	6,000

TOTAL COST \$ 78,400

Respectfully submitted,


Edward O. Chisholm, P.Eng.

C E R T I F I C A T E

I, Edward O. Chisholm of the City of Vancouver in the Province of British Columbia, hereby certify that:

- (1) I am a geologist with offices at 821-602 West Hastings Street, Vancouver 2, B. C.
- (2) I am a graduate of the University of Toronto, Ontario, Master of Arts, 1945.
- (3) I am a member of the Professional Engineers of Ontario and British Columbia.
- (4) I have no direct interest or indirect interest in either the property or securities of Frontier Explorations Ltd. (N.P.L.) or its affiliates, nor do I expect to receive any such interest.
- (5) This report is based on an examination of Company records, Government reports, private reports, and on numerous visits to the property during the period 1967 to 1972.

DATED AT VANCOUVER, BRITISH COLUMBIA

February 2nd, 1972



Edward O. Chisholm, P.Eng.

APPENDIX I

BIBLIOGRAPHY

Government Reports

- Minister of Mines, B.C., Annual Reports
 - 1966 - P. 104
 - 1969 - P. 122-141
 - 1970 - P. 129, 139 and 175.
- G.S.C. Map 971A, Smithers-Fort St. James

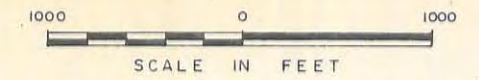
Private Reports

- T. Cameron Scott - 1971
- G.O.M. Stewart - 1972
- E.O. Chisholm - 1967, 1969, 1970
- Company Progress Reports and files - 1966 - 1972

X 1440 - 1470 -

29 oz Ag
29 % Zn
12 % Pb.

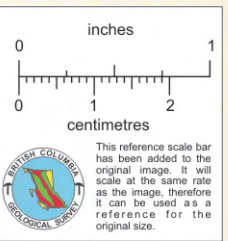
FRONTIER EXPLORATIONS LTD. (N.P.L.)
OWEN LAKE PROPERTY



January 6, 1972 Data by G. O. M. S.

LEGEND

- ==== Road
- Vein
- - - - Inferred Vein
- Drill Hole
- ~~~~ Major Fault
- Frontier Claims
- Bradina Claims
- Shaft
- - - - Underground Workings

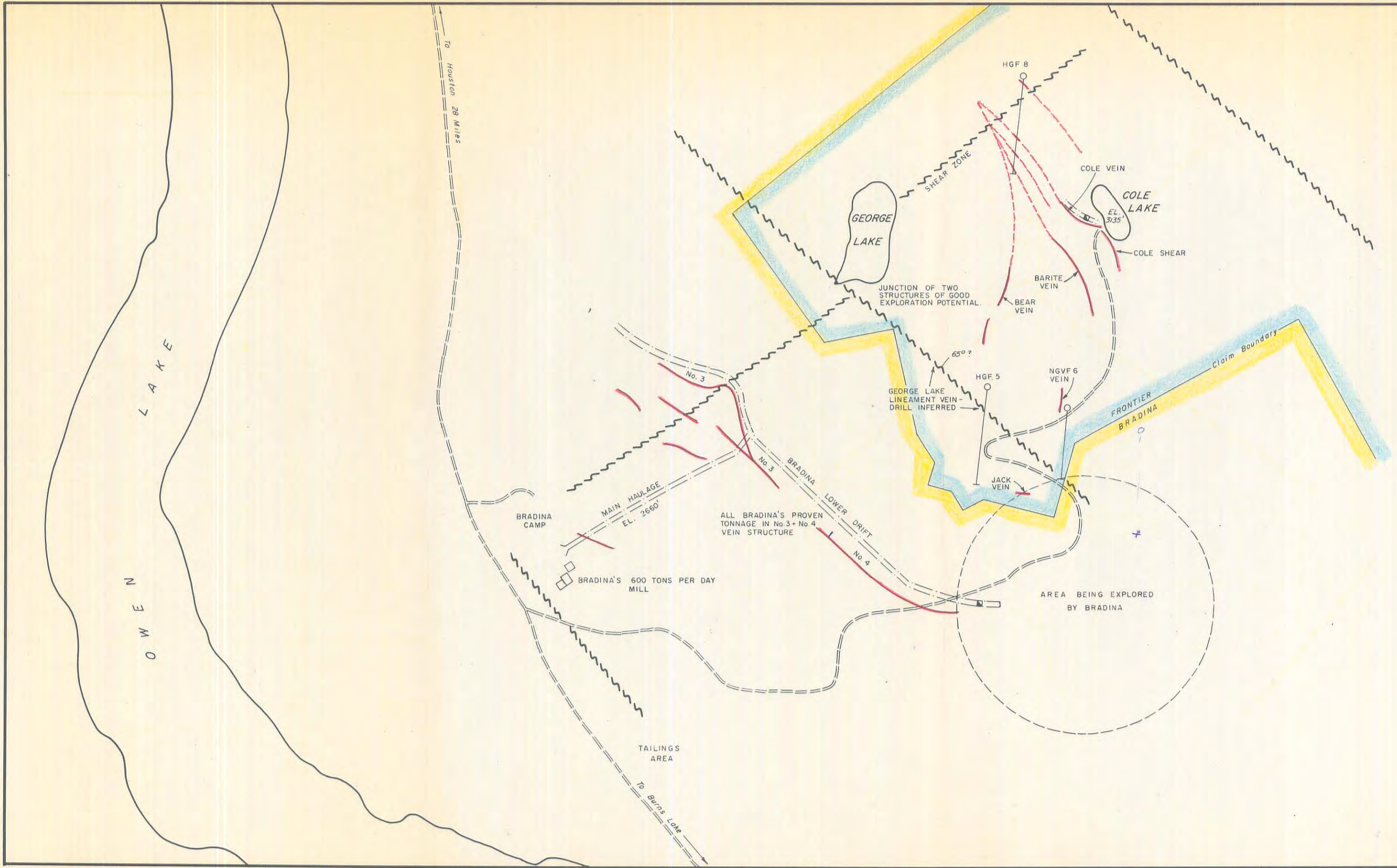


ASSAYS

	Length (ft)	Width (ft)	Au oz/T	Ag oz/T	Cu %	Pb %	Zn %
* Cole Vein	600	2.8	.01	2.5	.2	3.2	2.8
** Cole Shear	1000	6.3	.01	8.8	.5	33	3.4
Barite Vein (Samples from selected shoots)	900	3.8	.06	6.0	.2	5.	13.
Bear Vein	350	2.0	.02	42	.3	1.8	10.
NG6 Vein	170	2.3	.05	88	.5	4.	14.
*** George Lake Lineament	1000	10+?	.03	8.	.2	3.	7.
Jack Vein Drill intercept		1.7	.50	3.9	2.3	-	.1

NOTES

- * 3 Holes tested to 200 ft. depth av. 2 ft. or less ranging 6 oz Ag to 47 oz Ag. Decrease in rhodochrosite, increase in quartz.
- ** Lenses, sampling over 400 ft.
- *** Taken from drill hole data - poor recovery Hole 5. Strong structure for 19' of which 1.5" was assayed. Hole 6 - vein structure 28' - 3 interrupted sections assayed totalling 13 ft. - all "Ruby" type.



OWEN LAKE

To Houston 28 Miles

To Burns Lake