

Phosphate Mining at Lake Opinicon Village

By Frank Phelan

Phosphate (or properly, apatite) mining was a lucrative endeavour for local residents of Lake Opinicon Village and environs. About 1870 a market was established for shipment of high-grade ore to Brockville for processing into superphosphate and then transshipment to the United Kingdom to be used as fertilizer (Spence, H.S. 1920. Phosphate in Canada. Canada Department of Mines Report 396, Government Printing Bureau, Ottawa). In the period between 1880 to 1890, deposits of apatite were found and developed in the Lake Opinicon area. The Rideau Canal provided easy means of shipment of ore to processing and transshipment points in Kingston, Brockville and Montreal. Many of the mines could be worked with minimal equipment as the deposits often were surface or just sub-surface. However, major deposits warranted the investment in machinery (steam engines to provide pumps and lifts). There were two big mines which produced significant amounts of phosphate and many smaller excavations.

Neil Patterson and I spent some time years ago exploring in the vicinity of the Mill Pond (also known as the lower end of Rock Lake Creek). Indeed, we even led trips across the lake to view the mine sites. This sparked my interest in finding as many mine sites possible in the vicinity. It turns out that there were approaching 100 sites where digging and/or extraction occurred. Interestingly, these sites are contained within a slightly curving line as shown in Figure 1 (below).

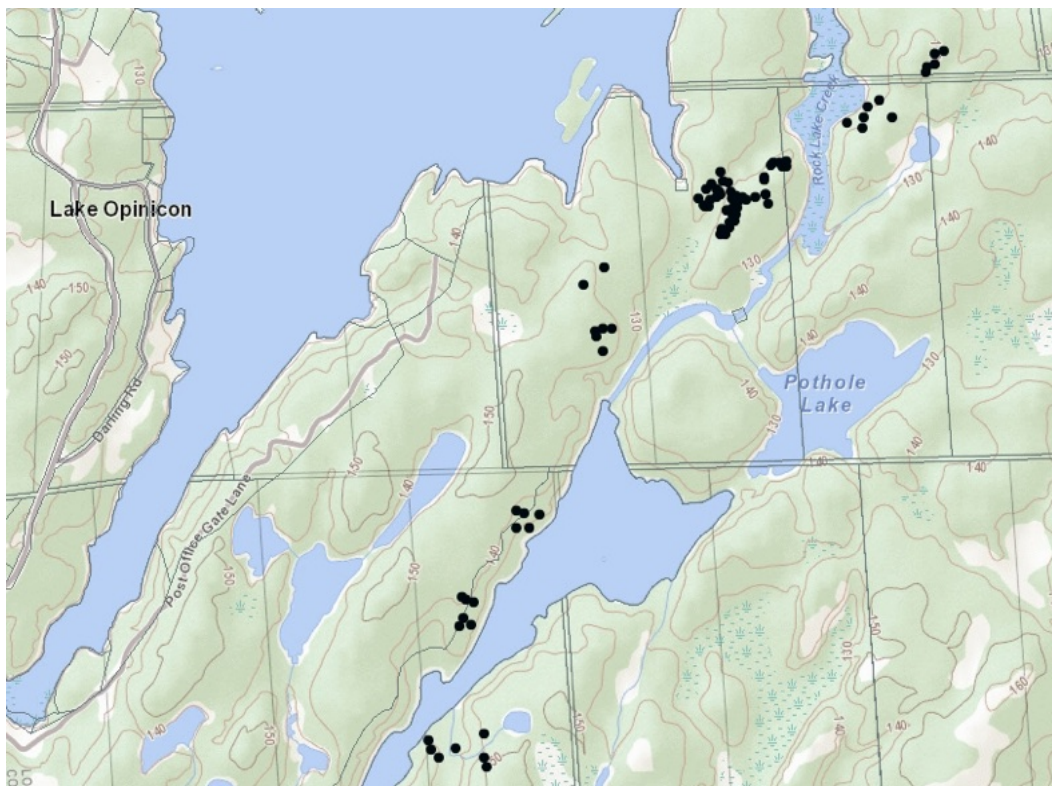


Figure 1. Locations of excavations in Mill Pond (Lower Rock Lake Creek) area.

Many trips to the locality were made over many years (decades, actually). Here I acknowledge the assistance of Neil Patterson, Ken Watson, Steve Lukits, Deborah Jodoin, Roger Lupton and Doug Menard.

Searching the locality is difficult because of the rough, irregular terrain and the omnipresence of trees (these would have been largely absent at the time of mining because of extensive timbering – more on this in another piece). However, the big pits themselves and their associated tailings piles are found without undue trouble. The tailings piles are camouflaged with moss and lichen and fallen leaves and are not conspicuous. The pits themselves are filled with water, disguising their extent and the depth of shafts. The area immediately surrounding the openings shows little sign of disturbance, having healed after some 125 years of disuse. The old roadways which serviced the mines are still detectable despite the years of disuse. These roads follow gentle slopes as they connect the mines with the wharf sites and access points. Some modern-day foot trails now follow these old routes. There are some stone embankments of old roadways still detectable, especially near Rock Lake Creek.

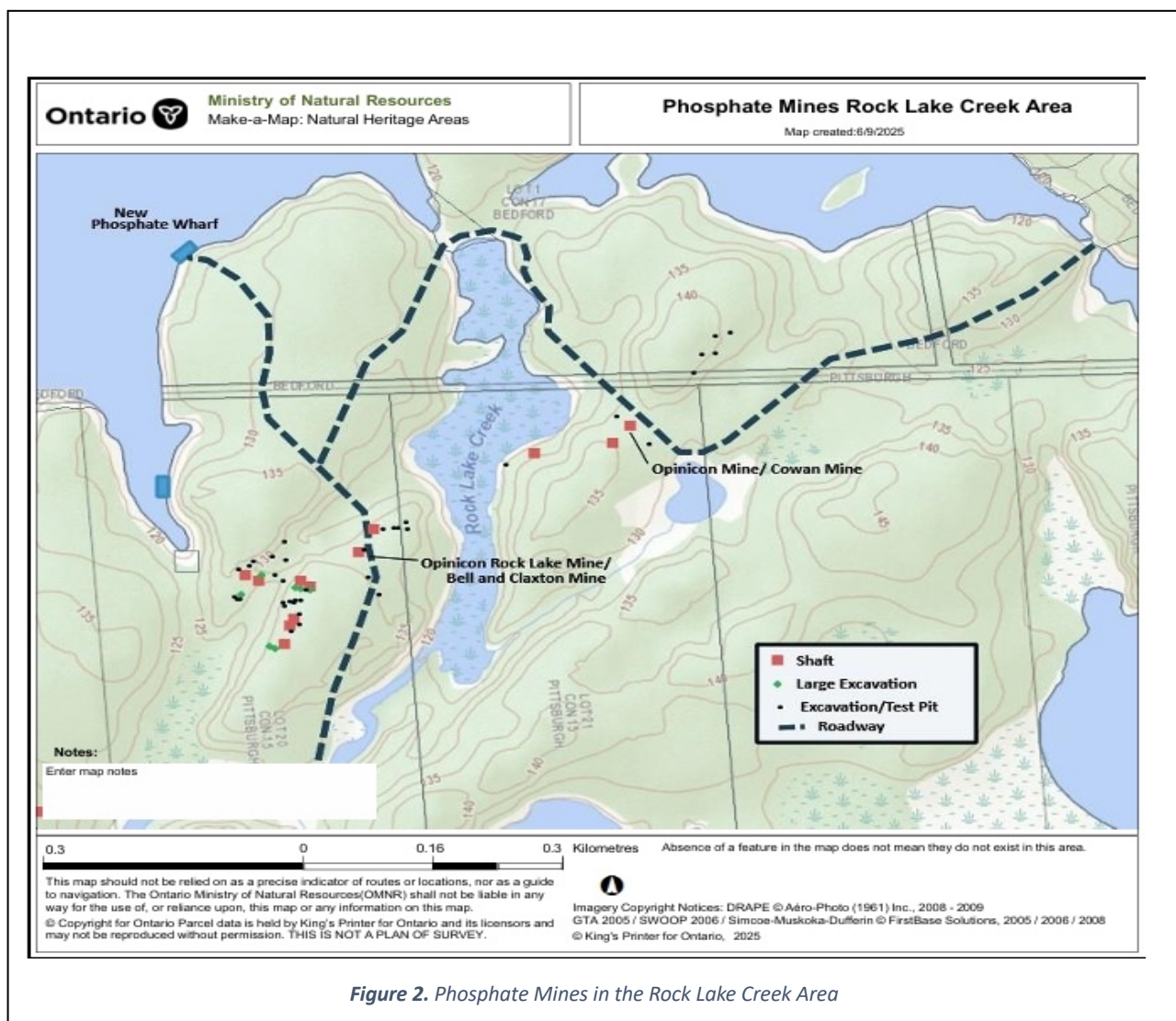


Figure 2. Phosphate Mines in the Rock Lake Creek Area

Figure 2 (above) shows the results of our mapping of the mines and features in the northern portion of the phosphate mining zone and the locations of the two major mines.

While many of the workings are mere surface scratchings, possibly test pits, some enlargements of natural openings, but there are progressively larger and deeper excavations scattered throughout. Some would have to classify as shafts – deep and clearly well-worked openings. Two of these were the signatory mines at Lake Opinicon, located across the “Mill Pond” or properly, Rock Lake Creek from each other. In reports and detailed accounts, these two, by their similar naming have caused much confusion. Who can readily distinguish Lake Opinicon Mine from Opinicon/Rock Lake Mine? To completely distinguish the mines, I have chosen to call them the Cowan Mine and the Bell and Claxton Mine, using their owners or operators to more clearly identify them with non-overlapping names.

The Cowan Mine today is merely a large opening uphill from the road leading eastward to the bridge which spanned the gap between Peterson Creek (out from Hart Lake) and Deadlock Bay (known back in the day as Hunter’s Bay). It is an opening some 15m in length by 10 m width and 12 m deep (to water). When working, the pit was 50 feet deep and following the vein of ore for some 150 feet.



Phosphate Mines in vicinity of Hunter Mill Pond on Opinicon Lake.
44.542017N 76.342317W
marked location as 3525/3528



Phosphate Mines in vicinity of Hunter Mill Pond on Opinicon Lake.
44.542017N 76.342317W
marked location as 3525/3528

Cowan Mine

East of Rock Lake Creek

(Mill Pond)

Ken Watson photos 2024

The Bell and Claxton Mine is a large cut in the landscape, possibly a natural opening at first, measuring some 28m wide, 5.1m across and 15m to water. There are two shafts in the opening, the larger to the east. In its day, the mine's larger shaft was 225 feet deep, the other merely 40 feet.



Early winter view of the Bell and Claxton Mine – a long opening – Frank Phelan photo 2008



Inside the Bell and Claxton (Opinicon Rock Lake) Mine – Ken Watson photo 2004
The investigators are standing by the opening of the larger shaft.



Looking up and out of the Bell and Claxton Mine – Roger Lupton looking in
Frank Phelan photo Nov. 2008



Timber with Forged Eye inside the Bell and Claxton Mine
Frank Phelan photo 2010

Outside the mine, there is a dry stone structure which might have been the base for the steam (donkey) engine. However, there seems to be no evidence of charcoal which would lend credence to that, so it may be the remains of a storage building or other accessory building.



Remains of structure associated with the Bell and Claxton Mine – located to east of the opening
Frank Phelan photo Nov 2008

Local lore has it that during low water years, the ends of narrow-gauge tracks had been visible in the larger shaft, perhaps remnants of the rail on which a self-dumping ore car was run. I have not been able to verify this and it seems unlikely that valuable steel of any length would have been left behind when the mine closed.

History of the Mines

In 1870, Alexander Cowan opened the first phosphate mine in the area (Ontario Mineral Inventory Record MD131C109SW00002:Opinicon). By the end of 1871, about 550 tons of apatite were mined. The mine was a pit 50 feet deep and 150 feet of vein was opened. Vennor (from: Report of Explorations and Surveys in the Counties of Addington, Frontenac, Leeds and Lanark, addressed to Alfred R.C. Selwyn, Esq., F.G.S., Director of the Geological Survey of Canada) writes: "The phosphate mine described as Cowan's Location No. 19 ... and the produce can be shipped from Mr. Cowan's wharf on Opinicon Lake, and sent without change, via the Rideau Canal, to Kingston, Montreal and ports in the United States."

Spence (Hugh S. 1920 – Phosphate in Canada. Report to Canada Dept of Mines/Mines Branch. Report No. 396. Government Printing Bureau. Ottawa) provides detailed information: "Opinicon Lake mine -

Attention was drawn to phosphate occurrences in the vicinity of Opinicon and Devil lakes as far back as 1869, and on the above property a deposit was opened up in 1870, by Mr. Alexander Cowan, of Brockville. The leads are reported to have been from 2 to 4 feet wide. The phosphate was chiefly green in colour, though zones of red mineral were also encountered. About 75 tons were mined in 1870, and by the end of 1871 a total of 550 tons was produced. The whole of this amount was shipped to England, and the cessation of work in 1872 was caused by the high ocean freight charges which rendered export of the mineral unprofitable. Mining was subsequently renewed in 1892 by a syndicate, which employed about a dozen men for a year, and also installed machinery. A pit 50 feet deep was sunk, and a vein was opened up for a distance of 150 feet."

The Second Report of the Bureau of Mines (1892) for the Legislative Assembly of Ontario (Warwick and Sons, Toronto) states: "Lake Opinicon mine is situated in the township of Bedford, and comprises 1,750 acres. It is owned by Mr. Swift of Ottawa, W. H. Davis of Buffalo and others, but the company's organization has not yet been perfected. Eight men besides the foreman, William J. Shalea, were working at the mine. It was stated to me that a large force of workmen would be put on when the company was properly organized, which was expected to be accomplished at an early date. The mine had been worked two months in the previous year, and constantly since the beginning of April last. A shaft had been put down 48 feet, and an opening made following the lead for a distance of 136 feet, varying from 2 to 25 feet in width. Eighty tons of 85 per cent. phosphate had been taken out ; 45 tons were on the dock ready for shipment, and the remainder was at the mine. A boiler and engine of 30 h.p. were used for hoisting and for driving two steam drills. An engine-house, derrick, stabling and cobbing house have been built. The ladders going into the shaft were in an imperfect condition, so I gave instructions to have these properly placed, secured and walled off from the hoisting part of the shaft."

From searches of the Maritime Museum Listing (maritimehistoryofthegreatlakes.ca):

Daily News (Kingston, ON), May 13, 1879

Description

Comments (0)

Full Text

p.3 Phosphate - The first shipment of phosphate from the Opinicon, purchased by Mr. John Claxton, is now being loaded on board the scow Moravian for Kingston. There is a large quantity of the best quality on the Opinicon wharves awaiting transport, and many tons are about to be conveyed from the mines to the lake shore for shipment....

Spence (1920) also references a second mine in the area (referred to in the Daily News snippet above): "Known as the Opinicon, or Rock Lake mine, and worked during 1891 and 1892 by the Kingston Phosphate Company, of Montreal, and by Mr. James Bell, of Arnprior, under royalty to the Canada Company of \$2 per ton. Mr. Bell had previously mined on this property during 1888 and 1889, and extracted about 500 tons of mineral. A force of 25 to 30 men was employed, and work was conducted by

day and night shifts. Two pits were sunk, the larger reaching a depth of 225 feet on an incline of 45°, and being 75 feet long. The vein is reported to have widened from 2 feet at the surface to 8 feet at the bottom of the main pit. From 4 to 5 tons of phosphate per diem were raised from this opening. The second pit reached a depth of 40 feet, and measured 20 X 30 feet at the surface, widening as it went down. An average of 2 tons of mineral per diem was produced from this opening. Steam was used for drilling and pumping and for hoisting from the large pit. The phosphate produced was massive crystalline, and of a green colour, changing locally to red. After being cobbled and, in some cases, washed, it was hauled half a mile to the lake, and loaded into scows of 100-tons capacity, being then taken by water to Kingston, and shipped to London and Hamburg. The mine was closed in 1892, and has not since been worked. The total amount of phosphate produced from this property would amount to about 1,500 tons.”

The First Report of the Bureau of Mines (1891) for the Legislative Assembly of Ontario (Warwick and Sons, Toronto) provides other information: “Opinicon or Rock Lake mine is situated on lot 21 in the fifth concession of the township of Storrington, county of Frontenac. This property is leased jointly by the Kingston Phosphate Co. of Montreal and Mr. James Bell of Arnprior, and is owned by the Canada Company. It is worked on royalty at \$2 per gross ton. The work is carried on day and night with two shifts of men, a total force of 30 men being employed. Two openings were made about the middle of the lot; the larger one extends 40 feet in length and is sunk on the vein of phosphate to the depth of 150 feet. The vein increases in width from a few feet at the surface to 100 feet at the bottom of the cutting. The deepest workings of the mine had-reached the level of the lake. The hanging wall, which is limestone, was well supported by rock pillars which had been left. The output from this opening averages about four tons daily of 75 per cent. phosphate. It is sorted, washed and then hauled half a mile to a landing on the lake, loaded on scows each holding about 100 tons, and thence taken to Kingston. Steam power is used for drilling, hoisting the ore and pumping the water from the mine. The second opening has reached a depth of 35 feet ; the opening at the surface is 20 by 30 feet and widens as it goes down. About 1 ½ tons of ore of 75 per cent. Phosphate is taken out daily and treated in a similar way to that taken from the other works. A whim* is used for hoisting at this pit. From 6 to 8 men were employed at the working. Mr. Neal Cochrane, a graduate of a mining school in the west of Scotland, had the immediate charge of the work at the mine, and Mr. Gorman of the Foxton mine was general manager. Several other openings have been made on the property with excellent showing of phosphate, but they have not been extensively worked. The whole of the work on this property was conducted in an economic and satisfactory manner.”

[*whim – analogous to a capstan, a vertical windlass]

The Second Report of the Bureau of Mines (1892) for the Legislative Assembly of Ontario (Warwick and Sons, Toronto) states: “Work at the Opinicon or Rock Lake mine was being still carried on under the control of Neil Cochran with a force of 25 men at the time of my visit in May. Charles Pine of Westport was acting as shipping agent. The larger opening described in my last report at 150 feet depth his been sunk now to the depth of 225 feet. About 150 tons of 75 per cent. ore are being taken out monthly; 800 tons were on hand at the mine. A self-dumping car of one ton capacity is used in raising the ore. A new boiler and engine of 50 h.p. are now used for running the steam drills, hoisting the ore and working two pumps to keep the mine free from water. I directed that the ladderway should be placed on the west side of the pillars, which are left to sustain the hanging wall of the mine, as the workmen would then be entirely free from danger when going in and coming out of the mine; also, that an open unused pit near the roadway should be properly fenced. Otherwise, the mine was in a safe and workmanlike condition.”

Clearly, there was much mining activity in the area while phosphate was a marketable mineral. There were roadways created and phosphate wharfs on Opinicon Lake, mining equipment, crews and support buildings around the Mill Pond (Lower Rock Lake Creek).

Phosphate mining was lucrative for some time. Annual Reports of production submitted to the Geological Survey Department list some 685 tons and 1,000 tons of phosphate for 1890 and 1891 respectively for the Bell and Claxton Mine. Further, 11 men for 10 months and 20 men for 10 months worked this mine in 1890 and 1891 respectively. For the Cowan Mine, scant details from 1891 show 20 tons of ore from seven men over 1.5 months. Further notation adds that the mine has been effectively closed for lack of funds since February 1891.

Details of exports are catalogued by Ells (1904) (Ells, RW. 1904. Bulletin on Apatite. Geological Survey of Canada Report 881) in Table 1.

Table 1: Exports of Phosphate from Ontario and Quebec 1878 through 1895 (from Ells 1904)

Tons of Phosphate				
Year	Ontario		Quebec	
	Tons	Value	Tons	Value
1878	824	\$ 12,278	9,919	\$ 195,831
1879	1,842	\$ 20,565	6,604	\$ 101,470
1880	1,387	\$ 14,422	11,673	\$ 175,664
1881	2,471	\$ 36,117	9,497	\$ 182,339
1882	568	\$ 6,338	16,585	\$ 302,019
1883	50	\$ 500	19,666	\$ 427,168
1884	768	\$ 8,890	20,946	\$ 415,350
1885	434	\$ 5,962	28,535	\$ 490,331
1886	644	\$ 5,816	19,796	\$ 337,191
1887	705	\$ 8,277	22,447	\$ 424,940
1888	2,643	\$ 30,247	16,133	\$ 268,362
1889	3,547	\$ 38,833	26,440	\$ 355,935
1890	1,866	\$ 21,329	26,591	\$ 478,040
1891	1,551	\$ 16,646	15,720	\$ 368,015
1892	1,501	\$ 12,544	9,981	\$ 141,221
1893	1,990	\$ 11,550	5,748	\$ 56,402
1894	1,980	\$ 10,560	3,470	\$ 29,610
1895	...	...	250	\$ 2,500

Note that the heydays for Ontario were the years 1888 through 1890. The two mines at Lake Opinicon contributed significantly to the total production and export.

Figure 3 shows an old map of the Bell and Claxton Mine and environs obtained from Rideau Canal Office (Ottawa) through Ken Watson.

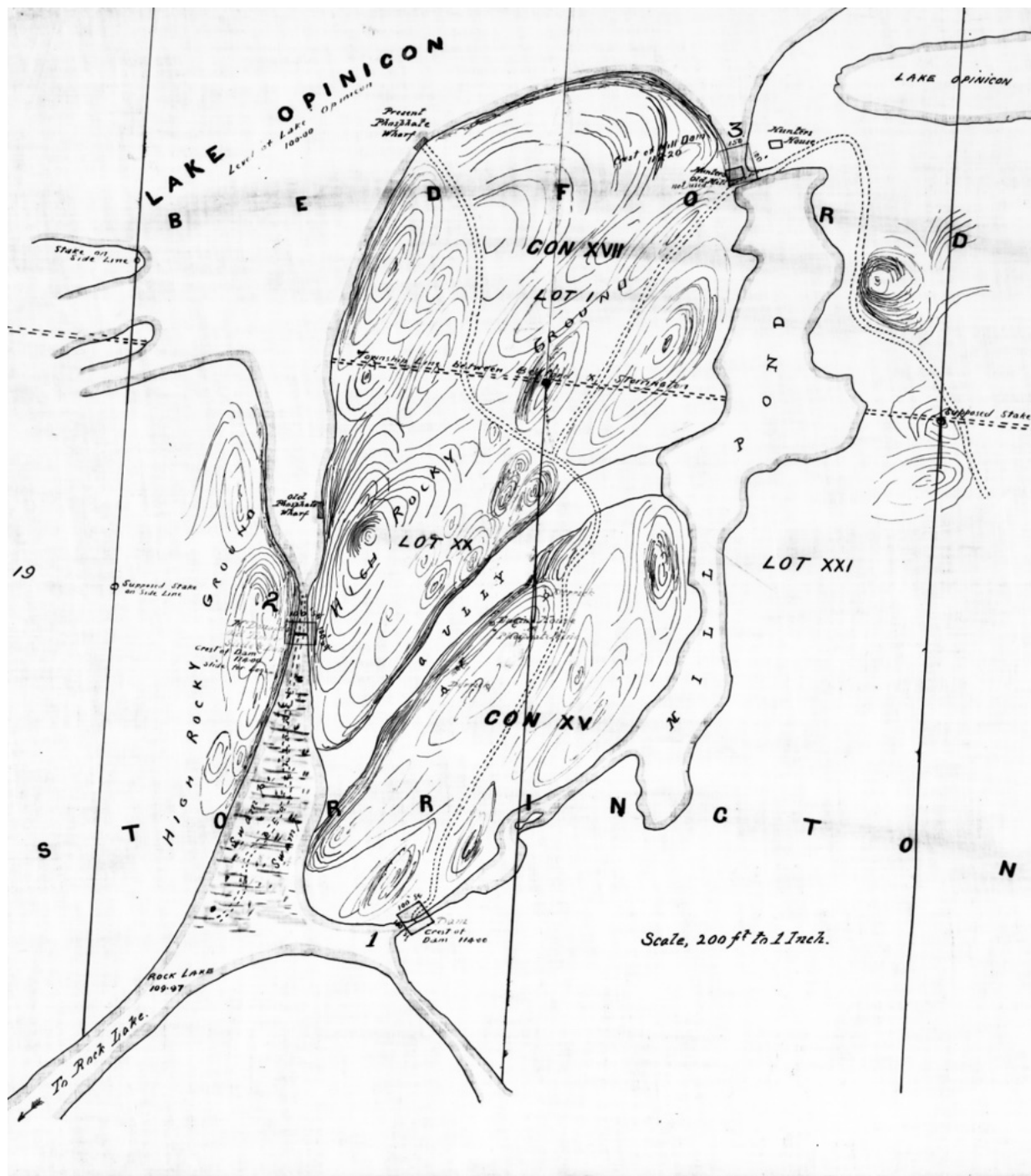


Figure 3. Mine and Mill Sites at Lake Opinicon Village NMC 130008 n.d.

Details are difficult to see unless enlarged, but the location of the Bell and Claxton Mine is shown just below the Gully but locates the mine, an engine house and two derricks used for cabling and hoists for the mine. Also located are the two phosphate wharfs on Opinicon Lake and the connecting roadways. There are other locations indicated in the map including McDonald's slide and dam, Hunter's Mill and dam and a third dam on the creek. These will be discussed in another section about mills at Lake Opinicon Village. With some imagination and perseverance, today one can still identify the major sites and remnants of roadways.

Some, especially in-water and shoreline remains have been surveyed as part of the archaeology of the Rideau Canal. The phosphate wharves, dams and the big mines themselves have been described by Jonathan Moore (*Rideau Canal National Historic Site of Canada: Submerged Cultural Resource Inventory*, Underwater Archaeological Services, Parks Canada, Ottawa, April 2005). Ken Watson has focused in on some of this history in his piece (The Dead Lock – Rideau Info 2015).

There was a cluster of workings on the north shore of Lower Rock Lake. These are known as the Poole Mines (although the ownership of the lot is listed as James Gray). There are records of material from these mines making their way for transshipment to wharves on Opinicon Lake. The easiest means of transporting material from these mines would be via a still discernible trail linking to the Post Office Gate Lane and thence onward. It would be nearly impossible to use the phosphate wharves for the larger mines by Rock Lake Creek because of the escarpment cutting across from Opinicon Lake (at McDonald's Slide – more on this in another section) to the Rock Lake Creek above the mill impoundment.

A second cluster of mines was worked by Bryce Davidson on the south side of Lower Rock Lake. Davidson would have faced the additional difficulty of moving material across Lower Rock Lake. Presumably this would have been easier to accomplish in the winter months when the lakes were frozen. There are records of Davidson also shipping phosphate to market. Figure 4 shows our mapping of mine sites at the southern end of the phosphate mining zone.

Mines were worked in the area from 1870 through 1892, with shipments of high-quality phosphate making its way to Britain, Germany and the United States. For a time, some went to Smiths Falls, specifically to the Smiths Falls Standard Fertilizer and Chemical Company to be made into "superphosphate" (Marilyn G. Miller, 1976. Small scale mining in the South Shield region of Eastern Ontario. A study under the auspices of the Ministry of Culture and Recreation for the Ministry of Natural Resources, Kemptville, Ontario).

The small-scale miner or farmer found a supplement to income and benefitted from the ease of access. The larger companies and outfits did a brisk business until vast and easily worked deposits of phosphate were found in Florida (Elwood. S. Moore, 1933. The Mineral Resources of Canada, Ryerson Press, Toronto). In a very short period thereafter, the local production of phosphate came to a halt.

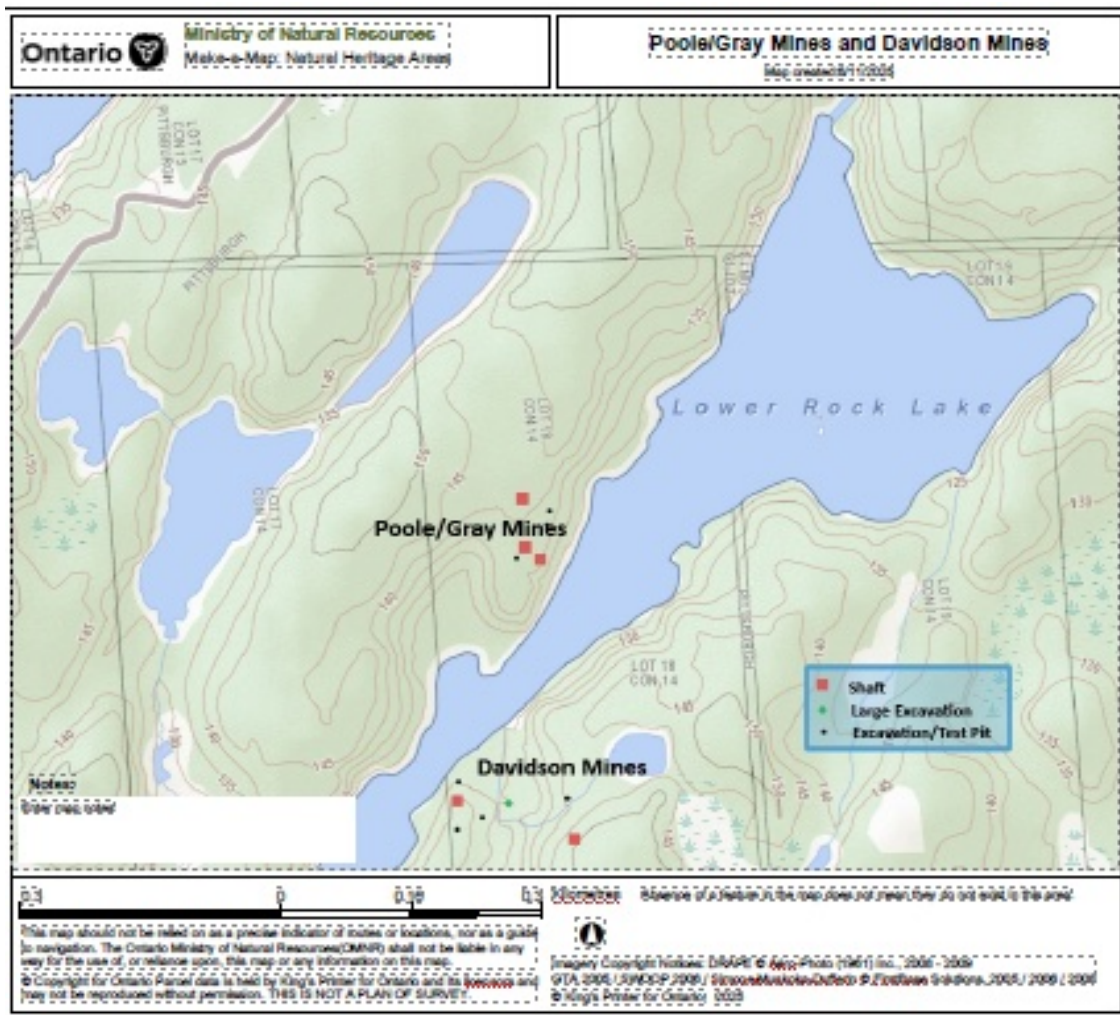


Figure 4. Location of Poole/Gray Mines and Davidson Mines flanking Lower Rock Lake

As a point of interest, George Hughson, in reminiscing about his time at Lake Opinicon, told me that his father worked with horses even as a young lad and remembers him being involved with horse teams moving phosphate and timber (more of this in another segment) in the early 1890s.



Steve Lukits in what I call a sidehill opening – enlargement of a natural opening
Frank Phelan photo Dec 2023

Table 2: (following pages)

Locations of Mines and Features in Rock Lake Creek/ Lower Rock Lake Area

Mine Locations - Rock Lake Creek Area

	Northing	Westing	length	width	depth	description	photo	notes
1	44.543283	-76.340733				excavation	3519/3524	
2	44.543217	-76.34095				excavation	3511	
3	44.542983	-76.3409				excavation	3518	
4	44.542967	-76.341183				excavation	3503/3508	
5	44.542683	-76.3413				excavation	3499/3502	
6	44.54215	-76.34255				excavation	3484	
7	44.542017	-76.342317	15m	10m	12m to water	shaft	3523/3428	Opinicon Mine/Cowan Mine
8	44.541767	-76.3426				shaft	3534/3542	
9	44.541667	-76.343867				shaft	3561	
10	44.541517	-76.344333				excavation	3591	
11	44.53971	-76.34857				excavation		
12	44.53971	-76.34858				excavation		
13	44.53973	-76.34853				excavation		
14	44.53976	-76.3485				large excavation		
15	44.53996	-76.3486				excavation		
16	44.53996	-76.34682				excavation		
17	44.5401	-76.34856				sidehill excavation		
18	44.54003	-76.34842	5.19m	3.96m	5.35m	shaft		
19	44.54015	-76.34837				excavation		
20	44.54021	-76.34829				sidehill excavation		
21	44.53999	-76.34821				shaft		
22	44.54002	-76.34814				large excavation		
23	44.5002	-76.34797				excavation		
24	44.54029	-76.34801				excavation		
25	44.54048	-76.34805				sidehill excavation		porcupine den
26	44.54025	-76.34779				excavation		
27	44.54037	-76.34658				excavation		
28	44.54034	-76.34662	28m	5.1m	15m to water	shaft		Opinicon Rock Lake Mine/Bell and Claxton
	44.54015	-76.34657	3.84m	2.19m	1.26m			donkey engine base (?)
29	44.54065	-76.3464	5.7m	4.53m	3.87m	shaft		
30	44.54065	-76.34632				excavation		
31	44.54065	-76.34601				excavation		
32	44.54065	-76.34602				excavation		
33	44.54075	-76.34589				excavation		
34	44.54064	-76.34585				excavation		
35	44.53999	-76.34647				excavation		
36	44.53976	-76.34631				excavation		
37	44.53969	-76.34756				excavation		
38	44.53968	-76.3476				excavation		
39	44.53965	-76.34766				excavation		
40	44.53968	-76.34767				excavation		
41	44.53985	-76.34746				long excavation		
42	44.53985	-76.34747				excavation		
43	44.53986	-76.34741	6.86m	6.89m	2.95m	shaft		
44	44.5399	-76.34755			6.08m	shaft		
45	44.53984	-76.34756	8.75m			large excavation		
46	44.53985	-76.34757	6m			large excavation		
47	44.53962	-76.34782				excavation		
48	44.53963	-76.34782				sidehill excavation		
49	44.5395	-76.34757				sidehill excavation		
50	44.53943	-76.34766	4.29m	4.3m	7m	shaft		
51	44.53939	-76.34758				excavation		
52	44.53935	-76.34772	14.5m	6m	8m	shaft		
53	44.53924	-76.3477				excavation		

54	44.53911	-76.34783			6m	shaft	
55	44.53907	-76.34797				large excavation	
56	44.5391	-76.34804				large excavation	
57	44.53909	-76.34804				large excavation	
58	44.5383	-76.35189				excavation	
59	44.5379	-76.35268				excavation	
60	44.53671	-76.35227				large excavation	
	44.53635	-76.35146					cairn
61	44.53688	-76.35167	4m	4.49m	9.5m	shaft	in the midst of 4 small excavations
62	44.53324	-76.35416					
63	44.53298	-76.35405					
64	44.52389	-76.35422					
65	44.53253	-76.35328					
66	44.53279	-76.35394					
67	44.53683	-76.35202				excavation	
68	44.53671	-76.35223				large excavation	
69	44.53527	-76.34114				excavation	
70	44.53008	-76.35639	10.61m	3.73m	2.57m to water	shaft	Poole #1
71	44.53021	-76.35659	4.76m	3.46m	2.5m to water	shaft	Poole #2
72	44.53077	-76.35663	6.76m	5.23m	1.5m to water	shaft	Poole #3 - water sounded to 3.35m deep
73	44.53047	-76.35626					Poole
74	44.5301	-76.35673					Poole
75	44.52685	-76.35583	9.87m	4.6m	3.0m to water	shaft	Davidson #1
76	44.52728	-76.35767	4.92m	3.66m	3.0m to water	shaft	Davidson #2
77	44.52725	-76.35686				large excavation	Davidson #3
78	44.5275	-76.35765					Davidson
79	44.52707	-76.35729					Davidson
80	44.52732	-76.35592					Davidson
81	44.52694	-76.35768					Davidson
	44.53231	-76.35482					cairn

most mines in a strike line 60 deg E of North