CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

TOPICAL REPORT NO. 17

COAL RESERVES OF CANADA

PREPARED FOR

THE ROYAL COMMISSION ON COAL (1959)

BY

B. A. LATOUR

OTTAWA

1960

CANADA

DEPARTMENT OF MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

TOPICAL REPORT NO. 17

COAL RESERVES OF CANADA

Prepared for

THE ROYAL COMMISSION ON COAL (1959)

B. A. Latour

OTTAWA
1960

TABLE OF CONTENTS

FIGURES

INTRODUCTION

The first estimate of Canada's coal reserves was made in 1913 by D.B. Dowling, Geological Survey of Canada. Included was coal of all ranks occurring in seams with a minimum thickness of one foot and a maximum depth of cover of 4,000 feet. He estimated the coal within these limits to be a little more than 1.3 trillion short tons (2,000 pounds per ton).

Nowhere in Canada has a seam only one foot thick been mined to a depth of 4,000 feet. Indeed, in Canada it is only under exceptional conditions that a one-foot seam has been mined at all and never below a depth of 500 feet. Also, geological data obtained since 1913 have shown some of Dowling's assumptions on the areal extent of the coal fields and the continuity of seams to be in error. Dowling's estimate, therefore, cannot be considered to represent coal that could be won under the mining conditions, both economic and technological, as we know them today.

The second estimate of Canada's coal reserves was prepared by B.R. MacKay, Geological Survey of Canada, for the Royal Commission on Coal, 1946. Between 1913 and 1946 geological surveys and the expanding coal mining industry made available a considerable amount of information concerning the various coal fields across Canada. For his estimate MacKay used seam thicknesses and depths of cover that varied from coal field to coal field or region to region and were based on the mining practices that had been proven to be practical for each coal field or region. As a result MacKay's estimate was much more practical than Dowling's estimate. MacKay calculated the total reserves for Canada to

be some 99 billion short tons or less than 10 per cent of the 1913 estimate. It was pointed out by MacKay that despite this marked reduction in the estimated reserves there was still sufficient to allow for continual mining for over 2,700 years at the then current level of production.

In 1955 this writer prepared a short report on Canada's coal reserves for the Royal Commission on Canada's Economic Prospects. The report was based almost entirely on MacKay's estimate and included only a few changes where new information had come to hand and also took into account the tonnage produced between 1946 and 1955. These changes resulted in a slight downward revision of the total reserves to some 95 billion short tons.

The present report is not as detailed as that prepared in 1946. For the most part it is a condensation of the 1946 report and embodies some changes in the reserve figures. It also includes discussion of some of the economic factors that, in the opinion of the writer, have contributed to the changes in the reserve figures in some coal fields.

Tables of reserves have been prepared and are grouped together at the back of the report for convenient reference. The ton measure used is the "short" ton (2,000 pounds) which is the most common in this country.

ESTIMATE OF RESERVES

CLASSIFICATION OF COAL

Coal is a substance that is remarkably variable and a standardized scheme of classification is required in order to describe fully the different kinds of coal that are being discussed. The classification used in this report was developed jointly through close cooperation between various agencies in Canada and the United States and is now accepted and widely used in both countries. It is usually referred to as the A.S.T.M. (American Society for Testing Materials) system of classification. It is based upon the rank of the coal or, in other words, the degree of alteration that the coal has undergone from the original vegetal matter. The degree of alteration (rank) is determined by careful laboratory analysis of certain chemical properties of the coal and the coal is accordingly placed in one of four classes, i.e., lignitic, subbituminous, bituminous, and anthracitic. A further subdivision is made by dividing each class into a number of groups, each group having definite limits as determined by laboratory analyses. The table on page 4 gives a complete summary of the classification by rank.

The coals toward the bottom of the table are generally the less mature coals and are said to be low in rank. Conversely, the coals toward the top of the table are generally older and are said to be high in rank. The best coking coals are usually in the medium volatile bituminous class though not all coals of this class necessarily coke. Low volatile bituminous coal and high volatile bituminous coal can sometimes be used to make a satisfactory coke. Coals of these two classes can sometimes be blended with other

CLASSIFICATION OF COALS BY RANK

Legend: F.C. = Fixed Carbon. V.M. = Volatile Matter. B.t.u. = British thermal units.

Class	Group	Limits of Fixed Carbon or B.t.u., Mineral-Matter-Free Basis	Requisite Physical Properties
I. Anthracitic	1. Meta-anthracite	Dry F.C., 98% or more (Dry V.M. 2% or less).	Non-agglomerating.[a]
	2. Anthracite	Dry F.C., 92% or more and less than 98%. (Dry V.M. 8% or less and more than 2%.	
	3. Semianthracite	Dry F.C., 86% or more and less than 92%. (Dry V.M. 14% or less and more than 8%).	
II. Bituminous[c]	1. Low volatile bituminous coal.	Dry. F.C. 78% or more and less than 86%. (Dry V.M. 22% or less and more than 14%).	Either agglomerating or non-weathering.[e]
	2. Medium volatile bituminous coal.	Dry F.C., 69% or more and less than 78%. (Dry V.M. 31% or less and more than 22%).	
	3. High volatile A bituminous coal.	Dry F.C., less than 69% (Dry V.M. more than 31%) and moist[b] B.t.u. 14,000[d] or more.	
	4. High volatile B bituminous coal.	Moist[b] B.t.u. 13,000 or more and less than 14,000.	
	5. High volatile C bituminous coal.	Moist B.t.u. 11,000 or more and less than 13,000[d].	
III. Subbituminous	1. Subbituminous A coal.	Moist B.t.u. 11,000 or more and less than 13,000[d].	Both weathering and non-agglomerating.
	2. Subbituminous B coal.	Moist B.t.u. 9,500 or more and less than 11,000[d].	
	3. Subbituminous C coal.	Moist B.t.u. 8,300 or more and less than 9,500[d].	
IV. Lignitic	1. Lignite	Moist B.t.u. less than 8,300.	Consolidated.
	2. Brown coal.	Moist B.t.u. less than 8,300.	Unconsolidated.

(a) If agglomerating, classify in low-volatile group of the bituminous class.

(b) Moist B.t.u. refers to coal containing its natural bed moisture but not including visible water on the surface of the coal.

(c) It is recognized that there may be non-caking varieties in each group of the bituminous class.

(d) Coals having 69 per cent or more fixed carbon on the dry, mineral-matter-free basis shall be classified according to fixed carbon, regardless of B.t.u.

(e) There are three varieties of coal in the high-volatile C bituminous coal group, namely, Variety 1, agglomerating and non-weathering; Variety 2, agglomerating and weathering; Variety 3, non-agglomerating and non-weathering.

Standard Specifications for Classification of Coals by Rank. A.S.T.M. Designation D 388–38. 1938 supplement to Book of A.S.T.M. Standards—See also A.S.T.M. Standards on Coal and Coke—prepared by Committee D-5, October, 1938.

coal and then coked to produce a coke satisfactory to a certain need.

Quality, or grade, is another term under which coal is classified. Quality includes several characteristics, the most important of which are: amount and nature of the ash; sulphur content; and degree to which a coal breaks after extraction from the seam. In quality classification emphasis is placed on the amount and nature of the ash content. Thus, an anthracite coal with a high ash content is said to be a low quality anthracite.

DEFINITION OF RESERVE TERMS

Many factors, both economic and technological, are involved in determining what constitutes a reserve of coal. Some of the more important factors are: the rank and quality of the coal; the method employed to recover the coal; geological conditions in the area; the price the coal can command in the market; accessibility to a market; and transportation facilities. It is readily apparent that for Canada, with its great distances, its variety of coals, its diversity of geological, mining, and marketing conditions, it is impossible to apply a common measuring system in determining reserves in all the various coal fields across Canada.

There is difficulty enough in attempting to estimate what might be termed technologically mineable coal, but if all the economic factors are considered too, the task becomes monumental.

The technological factors do not tend to change as rapidly with time as do the economic factors. The almost overnight loss of a large market, such as resulted from the dieselization of the railways, is a case in point. Some mines that had been supplying the railways were forced to close as they could not find another market for their coal and it was, therefore not economical to continue mining. If we were estimating economically mineable coal then we would have to eliminate as a reserve all the coal remaining in the area around those mines. Technologically speaking, such coal was mineable and still is mineable.

The 1946 estimates comprise, for the most part, reserves of technologically mineable coal. The writer has followed this practice with only a few exceptions. Where exceptions do occur they are discussed later in this report under the particular coal field concerned. The limits imposed in the calculation of the reserves and the terms used to classify the reserves are discussed in the following paragraphs.

The limits conform to mining practices in the various areas in respect to minimum thickness of seam, maximum depth of cover, and the different ranks of coal. For Nova Scotia the estimate includes coal of a minimum thickness of 3 feet with not more than 4, 000 feet of cover except in the Joggins area where seams of average thickness of 2 feet to a depth of only 2, 000 feet are included. For New Brunswick, coal seams averaging 18

inches or more in thickness with not more than 100 feet of cover are included. The estimates for Ontario, Manitoba, and Saskatchewan lignites include seams not less than 3 feet in thickness to a maximum depth of 500 feet. Alberta subbituminous coals are estimated on the basis of seams 3 feet or more in thickness with not more than 1,000 feet of cover. The estimates of Alberta and British Columbia bituminous coals include seams not less than 3 feet in thickness with a maximum depth of cover of 2,500 feet. The estimated reserves of British Columbia and Yukon lignites and subbituminous coals are on the basis of seams not less than 3 feet in thickness with a maximum depth of cover of 1,000 feet.

"Mineable" coal is coal that is considered to exist in mineable thickness within a required distance from surface. Not all the mineable coal can be recovered, brought to surface, and sold. The percentage recovery depends on the physical properties of the coal, the nature of the seam, the mining method used, and the use to which it is put. The coal that is ultimately recovered is referred to as "recoverable" coal. In the 1946 estimate the recoverable coal was assumed to be 50 per cent of the mineable coal in all coal fields across Canada. In the present report some exceptions to this have been made and these are noted and discussed later in the report.

Further terms are used, namely "probable" reserves and "possible" reserves. Probable reserves include coal which by direct mining experience and by drilling, continuity to existing workings and areas drilled, or extensive geological data, can be reasonably expected to exist. Possible reserves are additional

to probable reserves and include coal, the reasonable existence of which is based on limited geological data and prospecting, and coal, the recovery of which is problematical due to its inferior quality and/or its relative inaccessibility.

DISTRIBUTION OF RESERVES

Table 1 shows that in Canada there are some 94 billion tons of mineable coal and about 47 billion tons of recoverable coal. About two-thirds are classified as probable reserves.

By provinces the reserves are divided as follows: Alberta, about 51 per cent; Saskatchewan, about 26 per cent; British Columbia, some 18 per cent; Nova Scotia, nearly 3 per cent; Yukon, nearly 2 per cent; and the three remaining provinces have a total of about one-fifth of one per cent. Some 95 per cent of the reserves are in the provinces of Saskatchewan, Alberta, and British Columbia.

The distribution of the reserves by rank and by provinces is shown in Table 2. The low volatile coals are 15 per cent of the total and are located mainly in the Inner Foothills belt of Alberta and the Peace River fields of northeastern British Columbia. The coals of medium volatile rank make up 32 per cent of the total reserves and occur mostly in the Inner Foothills belt of Alberta and in the fields of southeastern and north-central British Columbia. The high volatile coals, constituting 16 per cent of the total, are found in the Maritime Provinces, on Vancouver Island, in south central British Columbia, and in the Outer Foothills belt of Alberta with the greatest concentration located in

the last named area. The subbituminous coals are 9 per cent of the total with almost the entire amount located in the Plains region of Alberta. Reserves of lignite coals are 28 per cent of the total and are widely distributed, occurring in Ontario and in all the western provinces, with the largest and most important deposits located in Saskatchewan.

Figure 1 shows the distribution, by rank, of the coal deposits across Canada. This map and all other maps in this report were prepared for the 1946 estimate but they are still essentially correct and serve the purpose of this report.

RESERVES BY PROVINCES

NEWFOUNDLAND

Newfoundland became a province of Canada after the 1946 estimates were made so a short note is included concerning the coal deposits of this new province.

Coal occurs in three localities usually designated as Hawley (or Grand Lake) area, the St. George's coalfield, and the South Branch area. The St. George's coalfield is considered to be the most promising of the three.

To date investigations in all areas have shown the seams to be thin and dirty with clean coal occurring only as lensing bands that are rarely more than 2 feet thick. Folding and faulting of the coal-bearing strata are common resulting in truncated seams, shattered coal, and high dips to the seams, all of which would make for very difficult

mining. These facts preclude the inclusion in this report of reserves of mineable coal for the province of Newfoundland.

NOVA SCOTIA

Nova Scotia, though possessing only 3 per cent of Canada's coal reserves, accounts for about 50 per cent of all the coal mined in Canada. At least 85 per cent of the Nova Scotia production comes from the Sydney coalfield on the east coast of Cape Breton Island. The remaining production is shared between the following: four small fields on the west coast of Cape Breton Island at St. Rose-Chimney Corner, Inverness, Mabou, and Port Hood; the Pictou coalfield in the Stellarton-Westville area of Pictou County; and the Joggins-Springhill area of Cumberland County. Other deposits from which there has been but very limited, or no, production are: two very small deposits at Richmond and at Loch Lomond in the southern part of Cape Breton Island; and a small deposit in Colchester County near Kemptown. Figure 2 shows the locations of these various deposits in Nova Scotia as well as those of New Brunswick.

All of the coal in Nova Scotia is of bituminous rank. Most of the coal, including all the coal in the Sydney coalfield, is classified as high volatile A bituminous. Generally the coals coke well but they have a relatively high sulphur content that handicaps its use in the manufacture of good metallurgical coke.

The more easily mineable coal has been extracted so that the land area now contains very limited reserves and the bulk of the reserves for the province are located in the submarine areas of the Sydney coalfield. Table 3 presents a summary of the reserves for Nova Scotia.

CANADA
DEPARTMENT OF MINES AND RESOURCES
MINES AND GEOLOGY BRANCH
BUREAU OF GEOLOGY AND TOPOGRAPHY

Map Showing

COALFIELDS, POTENTIAL COAL AREAS AND COAL OCCURRENCES OF CANADA

Prepared by B.R.MacKay, Geological Survey, 1946.

SCALE OF MILES
100 0 100 200 300 400 500

LEGEND

GEOLOGICAL REGIONS

1. *Canadian Shield*
2. *Acadia Region*
3. *St. Lawrence Lowlands*
4. *Hudson Bay Lowlands*
5. *Great Plains*
6. *Cordilleran Region*
7. *Arctic Region*

CLASSES AND GROUPS OF COAL

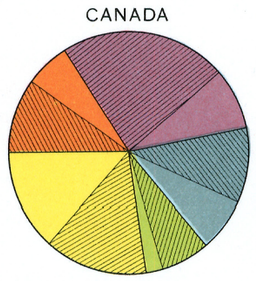
CLASS	GROUP
I *ANTHRACITIC*	1. *Meta-anthracite* 2. *Anthracite* 3. *Semi-anthracite*
II *BITUMINOUS*	1. *Low Volatile* 2. *Medium Volatile* 3. *High Volatile "A"* 4. *High Volatile "B"* 5. *High Volatile "C"*
III *SUB-BITUMINOUS*	1. *Sub-bituminous "A"* 2. *Sub-bituminous "B"* 3. *Sub-bituminous "C"*
IV *LIGNITIC*	1. *Lignite* 2. *Brown coal*

Principal Producing Centres indicated thus ●

PRELIMINARY ESTIMATE OF MINEABLE COAL RESERVES OF CANADA
(in short tons by rank)

Probable Reserves indicated thus . . .

Possible Reserves indicated thus . . . . .



	CANADA	ALBERTA	SASKATCHEWAN	BRITISH COLUMBIA	NOVA SCOTIA	NORTHWEST TERRITORIES	YUKON	ONTARIO	NEW BRUNSWICK	MANITOBA
Tons	*98,815,962,000*	*47,874,300,000*	*24,130,880,000*	*18,830,036,000*	*3,114,406,000*	*2,629,760,000*	*1,884,400,000*	*150,000,000*	*101,380,000*	*100,800,000*

RANK OF COAL — *Low volatile bituminous including Anthracite* — *Medium volatile bituminous* — *High volatile bituminous* — *Sub-bituminous* — *Lignite*

NOTE: The colours chosen for this grouping are those of the predominant rank of coal present.

FIG. 1

SYDNEY COALFIELD

Coal has been extensively mined in the Sydney Coalfield for the past 135 years and yet, today, this field still produces more than any other field in Canada. Though there are considerable reserves remaining in the field they are becoming increasingly more difficult of access.

The field has twelve coal seams that are considered to be mineable at least in part of their extent. The seams dip consistently seaward and outcrop in a narrow belt that extends along the shore for about 36 miles. The belt has a sinuous character due to northeasterly-plunging open folds that have been imposed on the strata. Because of this sinuous character the seams in places outcrop in the landward area and in other places outcrop in the seaward area. These features are illustrated in Figure 3.

The coal in this field is high volatile A bituminous. Of the twelve seams included in the estimate only one, the Point Aconi seam, has not been mined. Two seams, the Harbour and the Phalen, have been mined more extensively than the others. There are two reasons for this: first, the coal from these seams has a lower sulphur content and is more favourable for the manufacture of coke; and second, the two seams maintain higher mineable thickness as over a greater area than do the others.

In preparing the estimate for this field the writer followed a different practice than was followed in the 1946 estimate. In the latter estimate it was assumed that the recoverable coal was 50 per cent of the mineable coal. Past experience shows that the mining methods

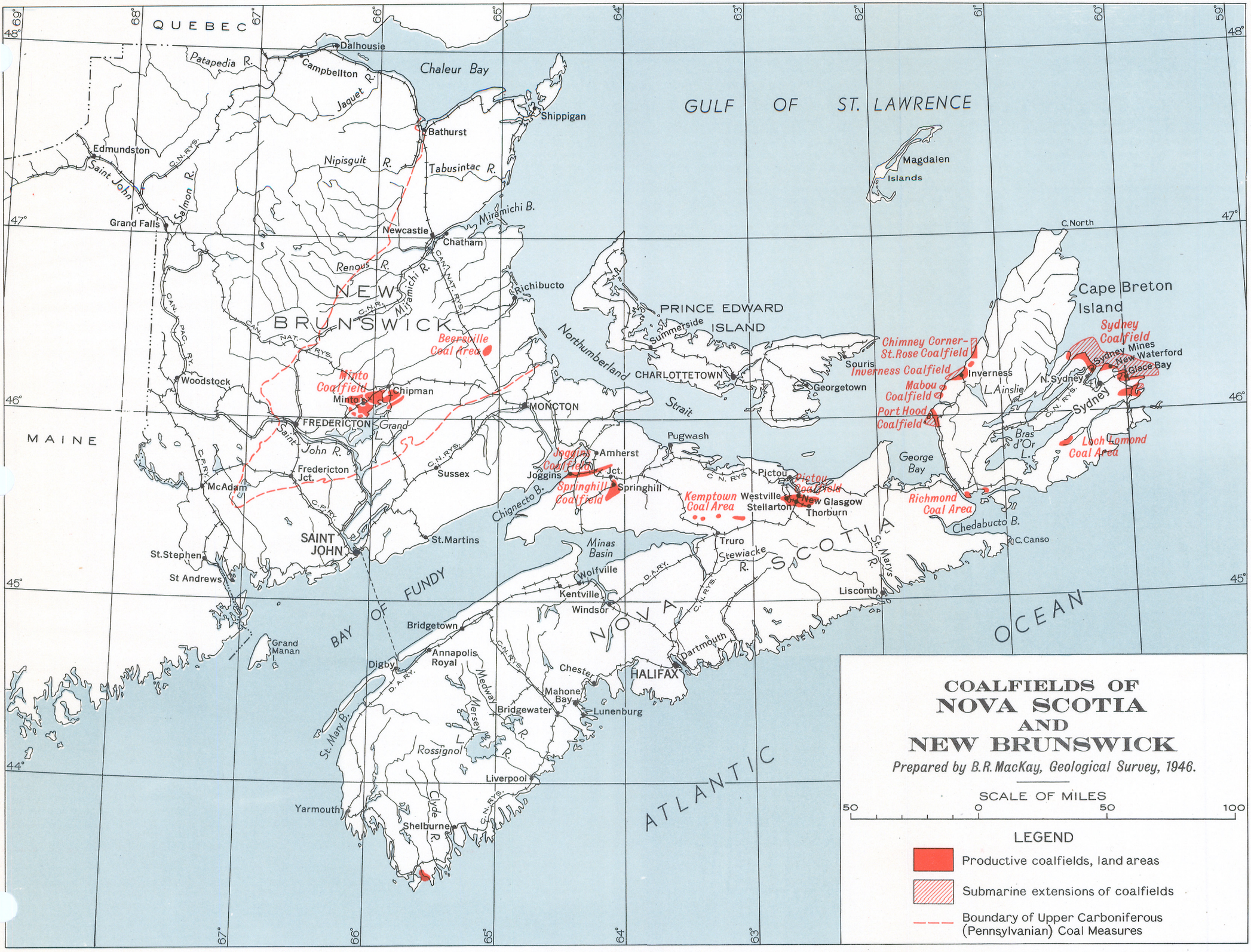

QUEBEC
GULF OF ST. LAWRENCE
Chaleur Bay
Dalhousie
Campbellton
Patapedia R.
Jaquet R.
Shippigan
Bathurst
Nipisguit R.
Tabusintac R.
Edmundston
Saint John R.
Salmon R.
Grand Falls
Newcastle
Miramichi B.
Chatham
Renous R.
Miramichi R.
NEW BRUNSWICK
Richibucto
Magdalen Islands
C. North
Cape Breton Island
PRINCE EDWARD ISLAND
Summerside
Northumberland Strait
CHARLOTTETOWN
Souris
Georgetown
Chimney Corner-St. Rose Coalfield
Inverness Coalfield
Inverness
Mabou Coalfield
L. Ainslie
Port Hood Coalfield
Sydney Coalfield
Sydney Mines
New Waterford
Glace Bay
N. Sydney
Sydney
Bras d'Or L.
Loch Lomond Coal Area
George Bay
Richmond Coal Area
Chedabucto B.
C. Canso
Bernardville Coal Area
Minto Coalfield
Minto
Chipman
Woodstock
MONCTON
FREDERICTON
Grand L.
Saint John R.
MAINE
Fredericton Jct.
McAdam
Sussex
Pugwash
Amherst
Joggins Coalfield
Joggins
Springhill Coalfield
Springhill
Pictou
Pictou Coalfield
Westville
New Glasgow
Stellarton
Thorburn
Kemptown Coal Area
Chignecto B.
SAINT JOHN
St. Martins
St. Stephen
St Andrews
Minas Basin
Truro
Stewiacke R.
St. Marys R.
Liscomb
Wolfville
Kentville
Windsor
BAY OF FUNDY
NOVA SCOTIA
OCEAN
Bridgetown
Grand Manan
Annapolis Royal
Digby
Dartmouth
HALIFAX
Chester
Mahone Bay
Lunenburg
Bridgewater
Medway R.
Mersey R.
Rossignol L.
St. Mary B.
Liverpool
Yarmouth
Clyde R.
Shelburne
ATLANTIC
COALFIELDS OF NOVA SCOTIA AND NEW BRUNSWICK
Prepared by B.R. MacKay, Geological Survey, 1946.
SCALE OF MILES
50 0 50 100
LEGEND
Productive coalfields, land areas
Submarine extensions of coalfields
Boundary of Upper Carboniferous (Pennsylvanian) Coal Measures

FIG. 2

employed in the mines in this field result in a recovery considerably higher than 50 per cent and often as high as 90 per cent. Therefore, in this estimate it was considered more realistic to use a recovery factor of 75 per cent. This higher recovery factor was applied only to the probable coal and the possible coal is still assumed to be 50 per cent recoverable.

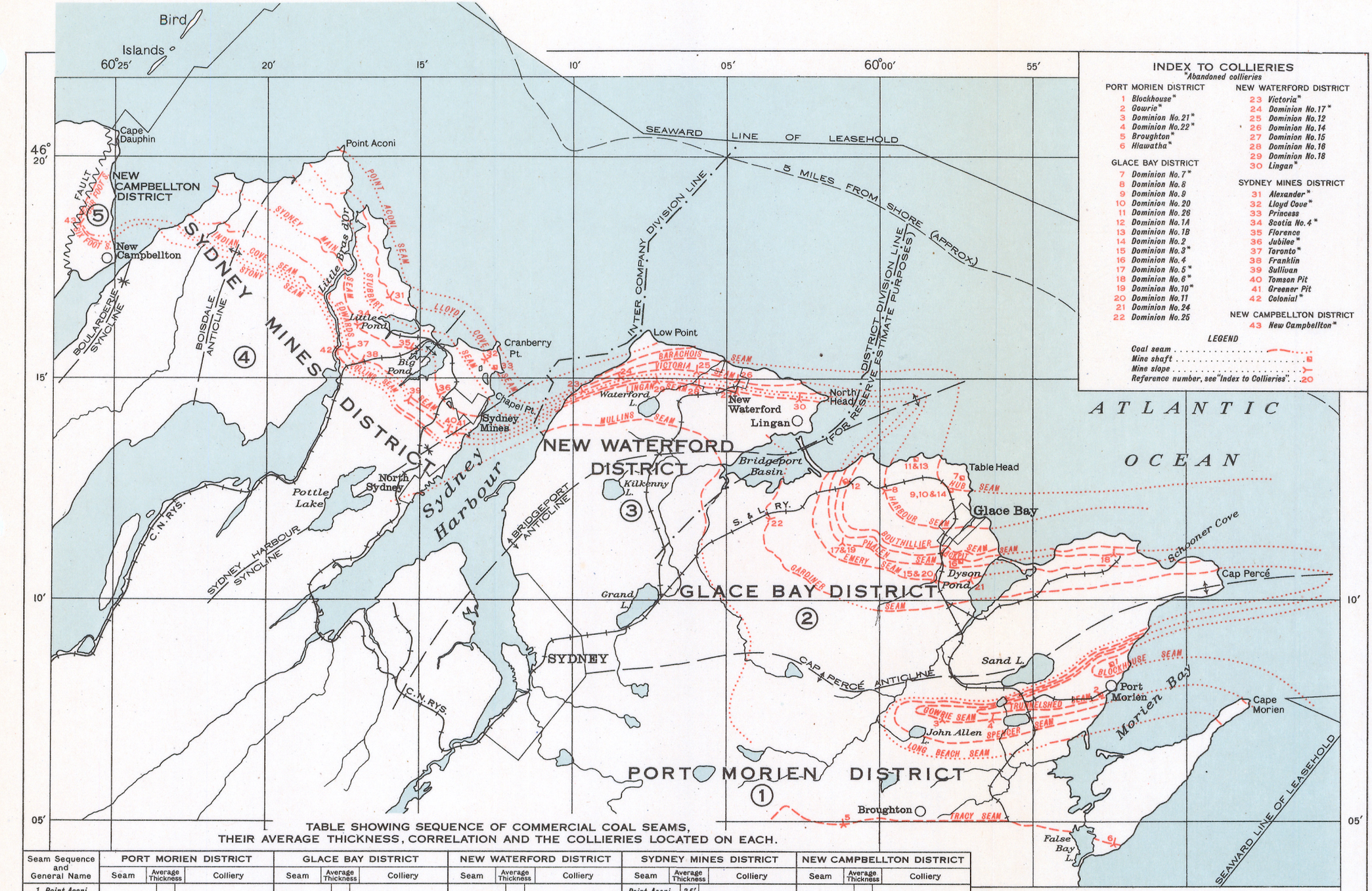
Allowing for the change in the recovery factor and for the production since 1946 the estimates for this field were calculated to be as shown in Table 4. At the bottom of the table the reserves for the Sydney coalfield as a whole are shown as well as the reserves contained in only the Hub, Harbour, and Phalen seams. These three seams account for 75 per cent of the reserves of the field. The most readily accessible area of reserves in this coalfield is the small land area and the adjacent seaward area between New Waterford and North Head in what is commonly known as the Lingan Block.

With the remaining mineable reserves becoming increasingly more difficult of access the costs of recovering the coal are becoming increasingly higher. Economic factors such as this, rather than a lack of reserves, are the major problems of the Sydney coalfield.

FIELDS ON THE WEST COAST OF CAPE BRETON ISLAND

As previously mentioned there are four small coal fields scattered along the west coast of Cape Breton Island. From south to north they are Port Hood, Mabou, Inverness, and St. Rose-Chimney Corner.

Table 5 is a summary of the reserves of these fields. New data regarding these fields have been obtained since 1946 and have



INDEX TO COLLIERIES

*Abandoned collieries

PORT MORIEN DISTRICT

1 Blockhouse*
2 Gowrie*
3 Dominion No. 21*
4 Dominion No. 22*
5 Broughton*
6 Hiawatha*

GLACE BAY DISTRICT

7 Dominion No. 7*
8 Dominion No. 8
9 Dominion No. 9
10 Dominion No. 20
11 Dominion No. 26
12 Dominion No. 1A
13 Dominion No. 1B
14 Dominion No. 2
15 Dominion No. 3*
16 Dominion No. 4
17 Dominion No. 5*
18 Dominion No. 6*
19 Dominion No. 10*
20 Dominion No. 11
21 Dominion No. 24
22 Dominion No. 25

NEW WATERFORD DISTRICT

23 Victoria*
24 Dominion No. 17*
25 Dominion No. 12
26 Dominion No. 14
27 Dominion No. 15
28 Dominion No. 16
29 Dominion No. 18
30 Lingan*

SYDNEY MINES DISTRICT

31 Alexander*
32 Lloyd Cove*
33 Princess
34 Scotia No. 4*
35 Florence
36 Jubilee*
37 Toronto*
38 Franklin
39 Sullivan
40 Tomson Pit
41 Greener Pit
42 Colonial*

NEW CAMPBELLTON DISTRICT

43 New Campbellton*

LEGEND

Coal seam
Mine shaft
Mine slope
Reference number, see "Index to Collieries" . . 20

TABLE SHOWING SEQUENCE OF COMMERCIAL COAL SEAMS, THEIR AVERAGE THICKNESS, CORRELATION AND THE COLLIERIES LOCATED ON EACH.

Seam Sequence and General Name	PORT MORIEN DISTRICT			GLACE BAY DISTRICT			NEW WATERFORD DISTRICT			SYDNEY MINES DISTRICT			NEW CAMPBELLTON DISTRICT		
	Seam	Average Thickness	Colliery	Seam	Average Thickness	Colliery	Seam	Average Thickness	Colliery	Seam	Average Thickness	Colliery	Seam	Average Thickness	Colliery
1 Point Aconi										Point Aconi	3.5′				
2 Lloyd Cove										Lloyd Cove	5′	Lloyd Cove, Alexander			
3 Hub				Hub	9′	Dominion No. 7	Barachois	5·5′		Stubbart	6′				
4 Harbour	Blockhouse	9′	Blockhouse	Harbour	6′	Dominion Nos. 8, 9, 20	Victoria	5′	Dominion Nos. 12, 14, 17 Victoria	Sydney Main	5′	Scotia No. 4, Florence, Princess, Jubilee			
5 Bouthillier				Bouthillier	3′		Fairyhouse	2′		Edwards	3′	Franklin			
6 Backpit	Trunnelshed	3′		Backpit	4′		North Head	4′		Indian Cove	3′	Tomson Pit, Greener Pit, Sullivan			
7 Phalen	Gowrie	6′	Dominion Nos. 21, 22 Gowrie	Phalen	7′	Dominion Nos. 1A, 1B, 2, 3, 4, 5, 6	Lingan	6′	Dominion Nos. 15, 16, 18 Lingan	Collins	5′	Colonial, (Toronto)	Four Foot	4′	
8 Stony										Stony	3′		Six Foot	6′	New Campbellton
9 Emery	Spencer	4′		Emery	4′	Dominion Nos. 10, 11, 24									
10 Gardiner	Long Beach	2·5′		Gardiner	4′	Dominion No. 25									
11 Mullins							Mullins	4′							
12 Tracy	Tracy	4′	Hiawatha, Broughton												

SYDNEY COALFIELD
CAPE BRETON ISLAND
NOVA SCOTIA

Prepared by B.R. MacKay, Geological Survey, 1946.

SCALE OF MILES
2 0 2 4

FIG. 3

resulted in a substantial reduction of the estimates for all fields except the St. Rose-Chimney Corner field. There are not sufficient reserves in any one field to allow for large scale mining operations. Future development of these deposits would seem to be restricted to small mines supplying the local domestic needs as they do now.

RICHMOND-LOCH LOMOND FIELDS

There is very little information available concerning these two coal areas. Such information as there is suggests that neither coal field will ever be more than of local significance. The writer believes there is insufficient data upon which to base reliable estimates so none are included in this report.

PICTOU COALFIELD

In Pictou County there is one coal field usually referred to as the Pictou coalfield. It comprises three separate mining areas, namely, the Westville, Stellarton, and Thorburn areas from west to east respectively. The areas are separated from one another by faults. Additional faults within the areas themselves have been a serious handicap to mining operations.

The coal from the Stellarton and Thorburn areas is high volatile A bituminous in rank whereas that of the Westville area is medium volatile bituminous. All the coals have a relatively high ash content with the ash so dispersed through the coal that its removal is difficult without elaborate cleaning methods.

Coal has been mined in the Pictou coalfield for about 140 years during which time some 80 million tons have been produced. This exploitation has seriously depleted the reserves in this field and there remain only small pockets of coal that are not readily accessible. This condition is evident from the estimate of reserves as shown in Table 6. The largest blocks of reserves are in the McBean seam of the Thorburn area and the Acadia and Scott seams of the Westville area.

In this estimate the reserves are considerably reduced from those of the 1946 estimate, especially the probable reserves which have been reduced by one-half. The chief reason for this is the closure of some of the large mines. In 1946, when these mines were operating, there were contiguous areas that could rightly be considered as reserve areas. However, the mines have since closed even though not all of those reserve areas were mined out. Though the coal is still there it is extremely doubtful that it will ever be mined as it would be too costly to gain entry to the areas for the amount of coal that could be obtained. Therefore, in this estimate the coal in those areas is not included as a reserve.

COAL FIELDS OF CUMBERLAND COUNTY

In Cumberland County there are two separate coal areas designated as the Springhill coalfield and the Joggins coalfield. The two areas are separated by a broad southwesterly-plunging syncline consisting of barren rock.

Springhill Coalfield

This coalfield has received public attention during the past few years perhaps more than any other field in Canada. The reasons for this were two major disasters that occurred in the mines. These two disasters, one an explosion and the other a "bump", brought about the decision to close the last two producing mines in this field. The future of the community of Springhill whose life was almost solely dependent upon the mines has posed a serious problem. The question of reserves has become of prime importance for reserves must be determined before the possibility of opening new mines can be considered. With this in mind the writer will briefly review the geological conditions in the field, some of the mining history of the field, and previous estimates that were made, and then outline the factors involved in determining the reserves for this report.

The Springhill coalfield is traversed by a southwest-plunging anticline. The seams are best developed on the northwest flank of this structure for a distance of about one mile from the crest of the anticline. To the north the seams split, thin, and disappear. The seams also thin on the southeast flank and have been subjected to more disturbance by faulting. On the northwest flank of the anticline, in the area that has proven to be most favourable for mining, there are more than twenty coal seams. Only five of these seams were found to be mineable and were extensively exploited. None of the others is known to have a mineable thickness over an area large enough to establish it as a reserve. The five seams are contained within a stratigraphic interval having an average thickness of 1,100 feet. Near surface,

the seams dip at about 30 degrees but become progressively flatter at depth. Each of the seams has been mined from the outcrop to varying depths with the result that the workings on any one seam are above, or below, or between the workings of the other seams. All the coal in this field is high volatile A bituminous in rank.

Coal was mined continuously in this field from 1868 to 1958 during which time 38.5 million tons were produced. The greatest tonnage produced in one year was nearly 675,000 tons in 1955. In November, 1956 a serious underground explosion forced the closure of No. 4 mine. The slope entry to this mine had afforded access to the three lowest seams (Nos. 2, 7, and 6, highest to lowest respectively). Production continued from the one remaining mine which afforded access to the middle seam (No. 2) and the seam above it (No. 1). This mine had reached a vertical depth of nearly 4,500 feet when in October, 1958 it experienced a very severe "bump" that forced the abandonment of the mine.

When the 1946 estimates were prepared the mines at Springhill were flourishing. No. 2 mine slope and No. 4 mine slope gave entry to the four lowest seams, all of which were being mined. There were areas adjoining the workings in each seam that constituted reserve areas. The limits for the reserves were set at a minimum thickness of seam of 3 feet and a maximum depth of cover of 4,000 feet. It is interesting to note that at that time No. 2 mine workings on the No. 2 seam had reached a vertical depth of about 3,800 feet. On the above basis there was estimated to be 34,384,000 tons of probable-mineable coal and 89,040,000 tons of possible-mineable coal.

For the 1955 estimate, the reserves of the field were reviewed. No. 2 mine was approaching a vertical depth of 4, 200 feet. It was 200 feet deeper than the limit established in the 1946 estimate and was extracting coal that had not been included in that estimate. Therefore, in 1955, for estimating the reserves of No. 2 seam only, the maximum depth of cover was extended to 4, 500 feet. The reserves for the other seams were recalculated, utilizing new data that had become available from geological surveys in the field, and the new reserves were set at 52, 748, 000 tons of probable-mineable coal and 143, 622, 000 tons of possible-mineable coal. It should be noted that at the time of its abandonment in 1958, No. 2 mine had reached a depth of almost 4, 500 feet which was the limit set for the 1955 estimate.

With the abandonment of the mines at Springhill the entries to the productive seams have been lost. Access to the areas of coal that were considered reserves can only be had by driving new entries. The entries would have to be vertical or inclined shafts driven through barren rock to encounter the seams at considerable depth. Such shafts would be costly. It is very doubtful that such high initial costs would allow for the economical recovery of the coal. Even though this coal lies within the mineable limits set for the estimate and the recovery of the coal would present no insurmountable technological obstacles the economic factors of gaining access to this coal rule against including it as a reserve. Therefore, the reserves in this field are now considered to be a very small percentage of the former estimates.

There remain three small areas that appear to contain mineable reserves of easily accessible coal. A recent drilling program carried out by the Nova Scotia Department of Mines has been the source of information for outlining the reserves of the three areas. The greatest part of these reserves, some 6,400,000 tons of probable-mineable coal, are in one area of the No. 3 seam. Another 3,000,000 tons of probable-mineable coal are in one area in the No. 7 seam. The third area, in the No. 6 seam, contains 1,500,000 tons of probable-mineable coal. A recovery factor of 75 per cent, based on the mining experience in this field, is used rather than the 50 per cent used in the past estimates. A summary of the reserves for the Springhill coalfield is shown in Table 7.

It is evident that these reserves are not sufficient for even one large scale mining operation. The future of the Springhill coalfield would seem to be for one or two small mines to supply the local domestic demand.

Joggins Coalfield

The seams in the Joggins coalfield occur in a narrow belt that extends eastward from Chignecto Bay, in the Bay of Fundy, for nearly 20 miles. The dip of the seams increases from about 19 degrees at the western end (Joggins area) to nearly 60 degrees in the eastern part (Chignecto area). The seams are best developed in the Joggins area where five seams have been mined. Eastward from the Joggins area the seams become progressively thinner, dirtier, and fewer in number. Communities that have produced coal are Joggins, River Hebert, Strathcona, Maccan, and Chignecto, from west to east

respectively. At the present time two mines are operating; one in the Joggins area and the other in the River Hebert area. The coal is all high volatile A bituminous but is low in quality due to its high ash and sulphur contents.

The Joggins coalfield is somewhat unique in Canada in that coal has been produced by underground mining methods mostly from seams that average only between 2 and 3 feet in thickness. The maximum depth at which coal has been recovered in this field is nearly 2,000 feet. Those areas where the seams were best developed and most easily accessible have been depleted.

The reserves for the Joggins coalfield are significantly reduced from the 1946 estimate. The reasons for this are: the maximum depth of cover is reduced from 4,000 feet to 2,000 feet as it is most unlikely that seams as thin as these will ever be mined below 2,000 feet; the remaining area (above the 2,000 foot depth) believed to contain mineable coal of suitable quality is less than was allowed for in the 1946 estimate. The reserves are estimated to be 11,920,000 tons of probable-mineable coal and are shown in summary form in Table 7.

COLCHESTER COUNTY COALFIELD

Very limited production has come from one seam in this coalfield. These operations have indicated that the seam is thin, very dirty, and probably badly disturbed by folding and faulting. Little else is known about this field in the areas where it has not been mined. There is insufficient data upon which to base reliable estimates of mineable coal. Therefore, this report does not include reserves for this coalfield.

NEW BRUNSWICK

In New Brunswick only one coal field, the Minto coalfield, has been extensively mined and is known to contain reserves of mineable coal. Though coal has been reported from about 75 other localities widely scattered throughout the province only one of these, near Beersville, holds any promise. Present evidence concerning the remaining localities indicates that they are of no economic value.

The Minto coalfield is centrally located in southern New Brunswick. It comprises a relatively large central area with smaller areas situated near it to the east, south, and west and separated from it by areas made barren by glacial erosion. In overall length it is about 20 miles in an east-west direction and 5 to 6 miles wide in a north-south direction. A map of this coalfield is included as Figure 4.

There is only one coal seam in the Minto coalfield. The seam varies in thickness from 16 to 30 inches and averages about 18 inches. Over large areas it is uniform in thickness and quality. The seam is essentially flat-lying and is relatively undisturbed. Over much of the area it occurs at depths of less than 50 feet. The seam occurs under conditions that are very favourable for strip mining and today almost all of the coal is produced by this method.

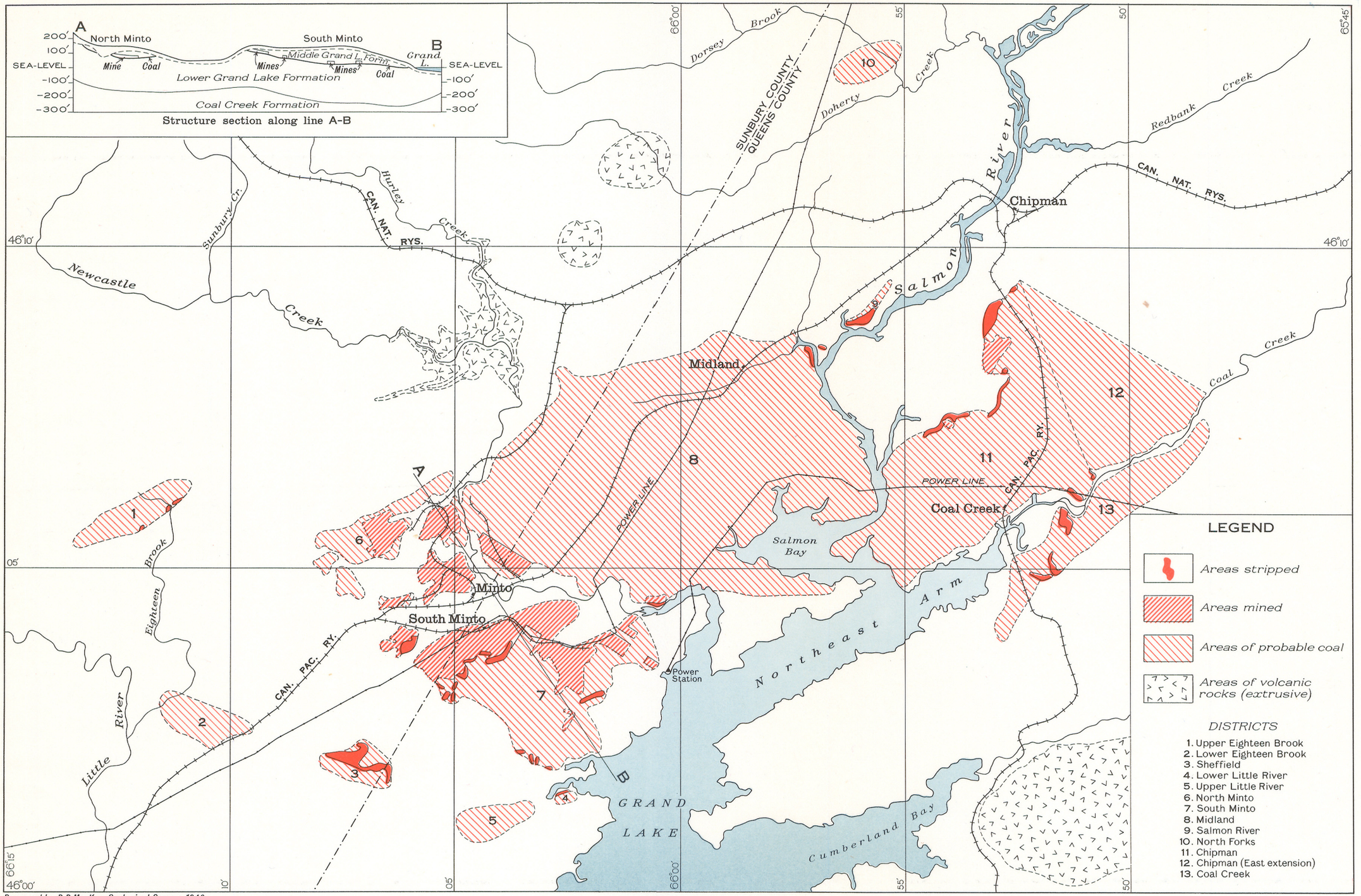
The coal is high in ash and sulphur content making it unsuitable for manufacturing coke. It is classified as high volatile A bituminous in rank.

In 1948 a geological investigation was made of this field. As a result the reserves have been modified from those of the 1946 estimate. Because, at present, almost all the coal is produced by strip mining and because future production will very likely be only by this method, the reserves have been estimated with due regard to their recovery by strip mining. The reserves are shown in Table 8 in a twofold division: those reserves that occur within 50 feet of the surface; and those reserves that occur at a depth of between 50 and 100 feet. It is highly unlikely that coal can be economically recovered from so thin a seam at depths below 100 feet. Therefore, no reserves are included for coal below this depth. Because of the high rate of recovery afforded by strip mining the recoverable coal is estimated to be 90 per cent of the mineable coal. At the present rate of production the estimated reserves would allow for a life of about 100 years for the Minto coalfield.

Very little mining has been done in the Beersville area and only a small amount of information is available concerning the deposit. The seam is thin, varying from 13 to 18 inches and averaging 15 inches. The depth of overburden ranges from a low of 20 feet to as much as 100 feet. The scarcity of information makes it impossible to include mineable reserves for this area.

ONTARIO

In northern Ontario, in the region south of James Bay, there are deposits of inferior quality lignitic coal. The Ontario Government has had intensive investigations made of these deposits to determine their extent and mineability, and the possibilities of beneficiating the coal into a more acceptable product. Based on these investigations



Prepared by B.R.MacKay, Geological Survey, 1946.
Based on G.S.C. maps and reports, and data supplied by the Department of Lands and Mines, New Brunswick.

MINTO COALFIELD
(GRAND LAKE COAL BASIN)
NEW BRUNSWICK

SCALE OF MILES
1 0 1 2 3 4 5

FIG. 4

the Ontario Department of Mines has estimated the reserves to be as shown in Table 1. The attempts to beneficiate the coal have not been successful. It is evident that these deposits are of no immediate commercial importance.

MANITOBA

In southwestern Manitoba, about 150 miles southwest of Winnipeg, are deposits of lignitic coal that extend along the northern and western slopes of Turtle Mountain. The deposits are generally covered with a thick mantle of glacial drift and the seams are exposed only in gullies that have been eroded in the hillsides. The few small mines that have operated in these deposits have all been located where the seam is exposed. Thus, little data are available concerning the extent and number of the seams. The seams are thin, seldom exceeding 3 feet in thickness. Development of these deposits has been retarded because of the nearness of the more favourable deposits in Saskatchewan where thicker seams occur closer to the surface.

Reserves in this estimate for Manitoba are the same as those in the 1946 estimate and are shown in Table 1. As stated in the 1946 estimate: "The figures included in the estimate are no more than an indication of the relative value of the deposits. They show that it is purely of local significance."

SASKATCHEWAN

Saskatchewan, possessing some 26 per cent of the total reserves of Canada, stands second in order of reserves by provinces. The coal occurs in formations of two geological ages, the Ravenscrag formation

of Tertiary age and the Belly River formation of Upper Cretaceous age. The Tertiary deposits occupy a belt about 70 miles wide extending across the southern part of the province from the Manitoba border to the Alberta border. The Upper Cretaceous deposits occur in a triangular-shaped area of about 30,000 square miles.

COAL DEPOSITS OF SOUTHERN SASKATCHEWAN

These deposits are by far the most important with respect to present and future mining development. The areal extent of the deposits is shown in Figure 5. The productive belt has been arbitrarily divided into 10 areas with appropriate names, such as Oxbow Block, Estevan Block, etc., as shown on the map. The reserves estimated to be within each block are shown in Table 9. All of the coal is of lignite rank.

The coal measures have their maximum development in the Estevan area where there are eight seams, seven of which are more than 4 feet in thickness. This area is also favoured in that the seams are almost flat-lying and some of them occur close to the surface. Thus, it is easily understood why, in this area, all the coal is produced from strip mines which, in 1958, accounted for some 2.2 million tons.

In the past, many small mines operated in various parts of this extensive belt but no mines are currently operating outside the Estevan area.

Until 1959, in the Estevan area, the maximum depth to which a seam could be mined employing the machinery then in use at the mines was about 50 feet. With the addition of a new, giant, earth moving machine this depth was doubled to 100 feet. There are available even larger machines that could mine to greater depths. The ultimate depth to which coal will be recovered by these machines is not predictable.

A maximum depth of 500 feet has been set as the limit of mineable reserves in southern Saskatchewan. Seams that are within this limit but are too deep for recovery by stripping can be effectively recovered by highly mechanized underground methods. The percentage of coal recovered by the latter methods may not be as high as is presently obtained by strip mining, so for this estimate the recovery factor of 50 per cent is maintained for all southern Saskatchewan.

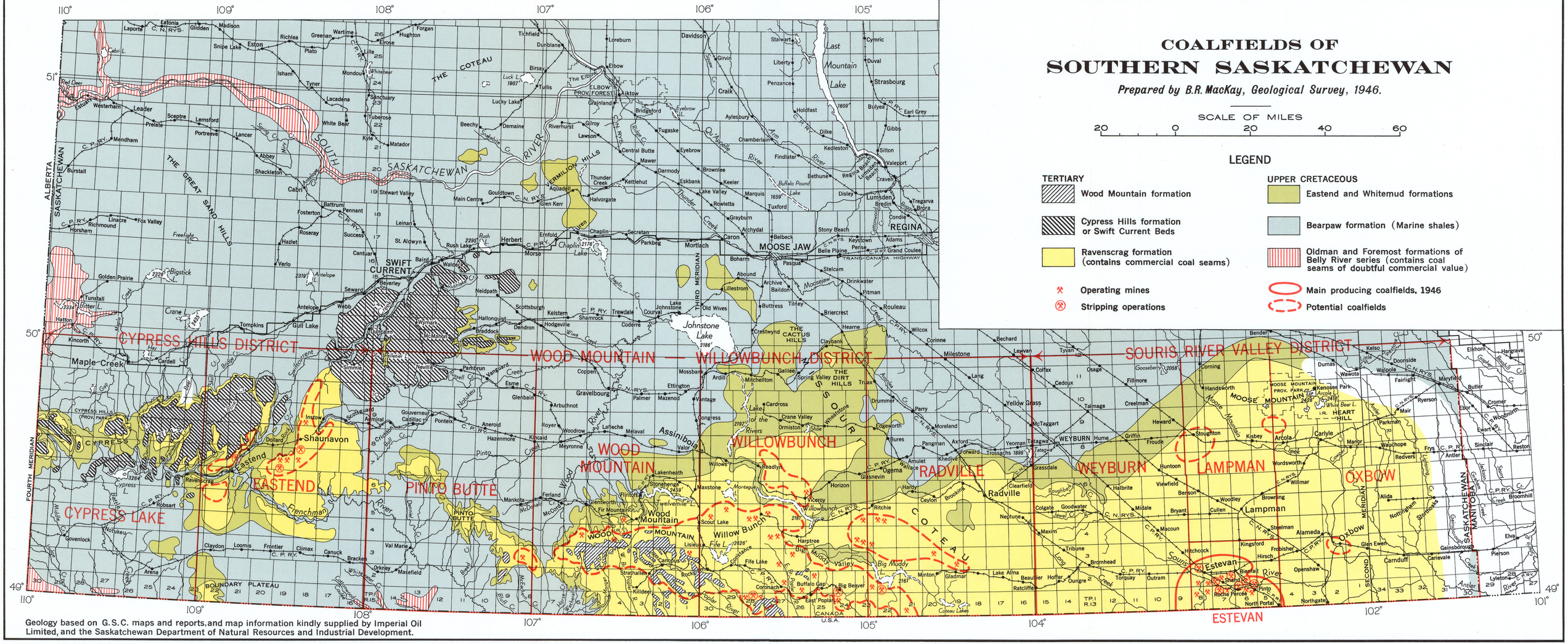
COAL DEPOSITS OF WESTERN SASKATCHEWAN

Not very much is known about these deposits. The seams outcrop in only a few widely scattered localities and are otherwise known only from being encountered in water wells and other borings. Their thickness, lateral extent, and quality are insufficiently known to allow for inclusion of any probable reserves and only a relatively small tonnage of possible reserves is included in this estimate.

ALBERTA

Alberta possesses about 51 per cent of the Canadian coal reserves, or nearly 48 billion tons. Most of these reserves are bituminous and subbituminous coals, but coals of all ranks from lignitic to anthracitic are represented. High volatile bituminous and higher rank coals, which constitute the greatest part of the reserves, occur in the foothills and the mountains, whereas the subbituminous and lignitic coals occur in the central Plains area.

In Alberta it is very difficult to define the boundaries of a coal field due to the great lateral extent of the coal-bearing measures, the continuity of the coal seams, and, especially in the Plains area, the



Geology based on G.S.C. maps and reports, and map information kindly supplied by Imperial Oil Limited, and the Saskatchewan Department of Natural Resources and Industrial Development.

FIG. 5

lack of structural boundaries. The Alberta Government, therefore, has designated as coal areas fifty districts underlain by coal. The boundaries of these areas were designed to conform to boundaries of the geological formations in which deposits of similar geological age and characteristics occur. Each of the coal areas has been given a name. The fifty coal areas can be conveniently put into four groups, as follows:

1. The Inner Foothills belt, in which the deposits occur mainly in Lower Cretaceous formations, and the coals are largely of medium and low volatile bituminous rank.
2. The Outer Foothills belt, in which the deposits are mainly of Upper Cretaceous and Tertiary ages, and the coals are largely of high volatile bituminous rank.
3. The Plains region, in which the deposits occur mainly in the Belly River formations of Upper Cretaceous age, the coals ranging in rank from lignite to high volatile B bituminous.
4. The Plains region, in which the deposits occur mainly in the Edmonton formation of Upper Cretaceous age, and the coals are largely of subbituminous rank.

The fifty coal areas and their groupings are shown in Figure 6. The reserves of Alberta are shown, according to their groups, in Table 10. The reserves will be discussed under each of the four groups.

THE INNER FOOTHILLS BELT

The Inner Foothills belt comprises ten coal areas. This belt alone contains more than one-half the reserves of Alberta. The coal is mainly of medium and low volatile rank and much of it is suitable

for manufacturing an excellent metallurgical coke. The coals in this belt are all of Lower Cretaceous age, occurring in the Kootenay and Luscar formations.

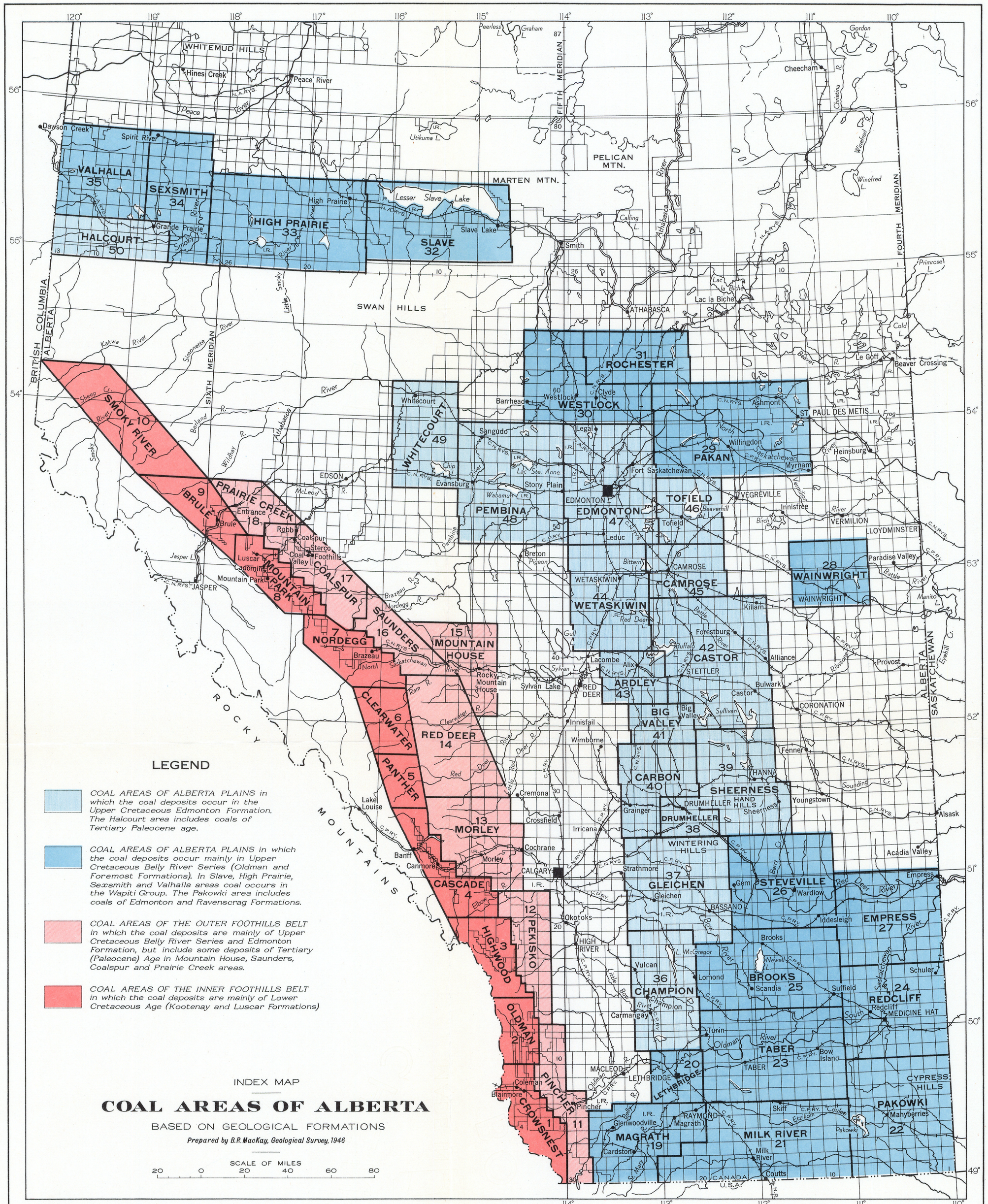
The mines that are presently producing coal in this belt are located at Coleman, Blairmore, and Bellevue in the Crowsnest area, and Canmore in the Cascade area. Other mines that were important producers and are now abandoned were located at Nordegg in the Nordegg area, and Luscar, Cadomin, and Mountain Park in the Mountain Park area.

The coal measures in this belt are highly folded and faulted. Generally the seams are steeply inclined and are subject to many local irregularities. The folding and faulting have in many places caused severe thinning, and sometimes complete truncation, of the coal seams. In some localities some of the above features are so pronounced as to cause the seams to be unworkable. In other localities these same features have caused a thickening of the seams to many times their normal thickness and have brought the seams close to surface where large tonnages may be easily mined. Mining conditions, therefore, are extremely variable throughout this belt.

None of the mines that has been abandoned was forced to do so by lack of reserves. Loss of market has been, and continues to be, the major problem not only in this belt but in Alberta as a whole.

THE OUTER FOOTHILLS BELT

The Outer Foothills belt includes eight coal areas in which the coal is mainly high volatile B bituminous and high volatile C bituminous



COAL AREAS OF ALBERTA

INNER FOOTHILLS BELT

	MAP NUMBER
CROWSNEST	1
OLDMAN	2
HIGHWOOD	3
CASCADE	4
PANTHER	5
CLEARWATER	6
NORDEGG	7
MOUNTAIN PARK	8
BRULE	9
SMOKY RIVER	10

OUTER FOOTHILLS BELT

PINCHER	11
PEKISKO	12
MORLEY	13
RED DEER	14
MOUNTAIN HOUSE	15
SAUNDERS	16
COALSPUR	17
PRAIRIE CREEK	18

ALBERTA PLAINS (BELLY RIVER SERIES)

MAGRATH	19
LETHBRIDGE	20
MILK RIVER	21
PAKOWKI	22
TABER	23
REDCLIFF	24
BROOKS	25
STEVEVILLE	26
EMPRESS	27
WAINWRIGHT	28
PAKAN	29
WESTLOCK	30
ROCHESTER	31
SLAVE	32
HIGH PRAIRIE	33
SEXSMITH	34
VALHALLA	35

(WAPITI GROUP)

ALBERTA PLAINS (EDMONTON FORMATION)

CHAMPION	36
GLEICHEN	37
DRUMHELLER	38
SHEERNESS	39
CARBON	40
BIG VALLEY	41
CASTOR	42
ARDLEY	43
WETASKIWIN	44
CAMROSE	45
TOFIELD	46
EDMONTON	47
PEMBINA	48
WHITECOURT	49
HALCOURT	50

FIG. 6

in rank. These coals are not good coking coals and have been used mainly as a domestic fuel. The higher rank coals are of Upper Cretaceous age and the lower rank coals are mainly Tertiary in age. Most of the production in this belt has come from the Coalspur and Saunders areas with small amounts from the Pincher and Pekisko areas. No mines are presently producing in this belt.

Because they are farther removed from the mountains the coal measures in this belt are less disturbed than those in the Inner Foothills belt. Such structural complications as are present are more difficult to determine because the rocks are not as well exposed. There is sufficient evidence available, however, to establish the fact that the reserves are substantial. The Coalspur area contains by far the largest reserves of the eight areas in the belt.

PLAINS REGION (BELLY RIVER)

There are seventeen coal areas in the region in which the coal occurs mainly in the Upper Cretaceous Belly River group. The coal is all of subbituminous rank except for the Magrath area which has high volatile A, B, and C bituminous coal and the Lethbridge area which has high volatile C bituminous coal. Small reserves of lignite are located in the Pakowki area.

The Lethbridge, Taber, and Brooks areas have been the principal producing areas. During the past 10 years production from all the areas has been greatly reduced to lack of markets.

Bedrock is largely concealed by a blanket of glacial drift so that little is known about the coal reserves. Mines, prospects, water wells, and borings for oil and gas have been the main sources of

information. It is known that the coal measures are flat-lying but the number of seams, their thickness, and continuity are not known in detail. Reserves based on so little information can only be approximations but there is no doubt that they are very substantial.

In places the coal occurs under conditions that make its recovery favourable for strip mining. The production from the Taber and Brooks areas is all from strip mines, whereas that of the Lethbridge area, the largest producer, is from underground mines.

None of the coals of this region are coking coals. The coal, except in the Magrath and Lethbridge areas, is unable to withstand exposure to the weather and, therefore, does not store well. Present production from all areas in this belt is mostly for domestic consumption.

PLAINS REGION (EDMONTON FORMATION)

The Plains Region underlain by the Edmonton formation includes fifteen coal areas. The coal in this region ranks as subbituminous, except in the Halcourt area where it is high volatile C bituminous. These coals do not coke and are very friable and slack rapidly on exposure to weather.

The seams are generally flat-lying. Where they occur close to the surface they present excellent opportunities for strip mining. Most of the coal in this belt is now produced in this manner. Indeed, the past decade has seen a marked change in this regard. Previously the Drumheller and Edmonton areas were the big producing areas in this region and the other areas produced very little from small intermittently worked mines. Production was principally from underground mines. Then a trend began in which other areas that had

easily strippable coal reserves were developed. Examples of this are the Drumheller and Castor areas: since 1946 the annual Drumheller production has shrunk from about 2 million tons to about one-half million tons; the annual production from the Castor area has increased from almost nothing to more than one-half million tons. During the same period the overall production from this Plains Region decreased by about one-half.

It is obvious that it would be most helpful if we could outline those areas where the coal could be strip mined. Unfortunately, the mantle of glacial drift that covers the bedrock throughout most of the area is a serious obstacle. Information necessary to delineate those favourable areas can only be obtained by detailed drilling. It is safe to say that the total reserves of this region are substantial and that part of those reserves will be found to be recoverable by strip mining.

BRITISH COLUMBIA

The coal deposits of British Columbia are generally confined to small areas that are widely distributed throughout the Province. This distribution is shown in Figure 7. The coals range widely in rank, quality, and age as would be expected over so broad an area.

From a reserve standpoint the Province ranks third, possessing some 18 per cent of the Canadian reserves. Many of the coal deposits, unlike those in the other provinces, are situated far from railways or other transportation facilities and are therefore relatively inaccessible.

The deposits are briefly described and discussed by separate areas. The reserves of these areas and of the Province are tabulated in Table 11.

SOUTHEASTERN BRITISH COLUMBIA

Coal deposits occur in the southeastern part of the Province close to the Alberta border and to the Crowsnest Coal area of Alberta. They are, in fact, a part of the deposits of the Inner Foothills belt of Alberta, being separated from the main body by a fault of great displacement. As would be expected, the characteristics of the coal and the coal measures are similar to those of the Crowsnest Area of Alberta.

The coal is all Lower Cretaceous in age. For the most part it ranks as a medium volatile bituminous coal. The quality is variable: some of it makes an excellent metallurgical coke; some, especially in the more disturbed zones, has a high ash content and is friable; and some is a top quality coal in all respects.

Folding and faulting are common throughout this coalfield and have actually divided the field into three distinct areas which are, from north to south, the Upper Elk River area, the Crowsnest area, and the Flathead River area.

The central or Crowsnest area is the most important of the three areas. Large production has come from this area from mines located near Fernie, at Michel, and at Corbin. Michel is currently the only producing centre, there being both large underground and strip mines in the vicinity that produce about 600,000 tons annually. The area is estimated to have reserves of about 6 billion tons. It has both good railway and highway facilities.

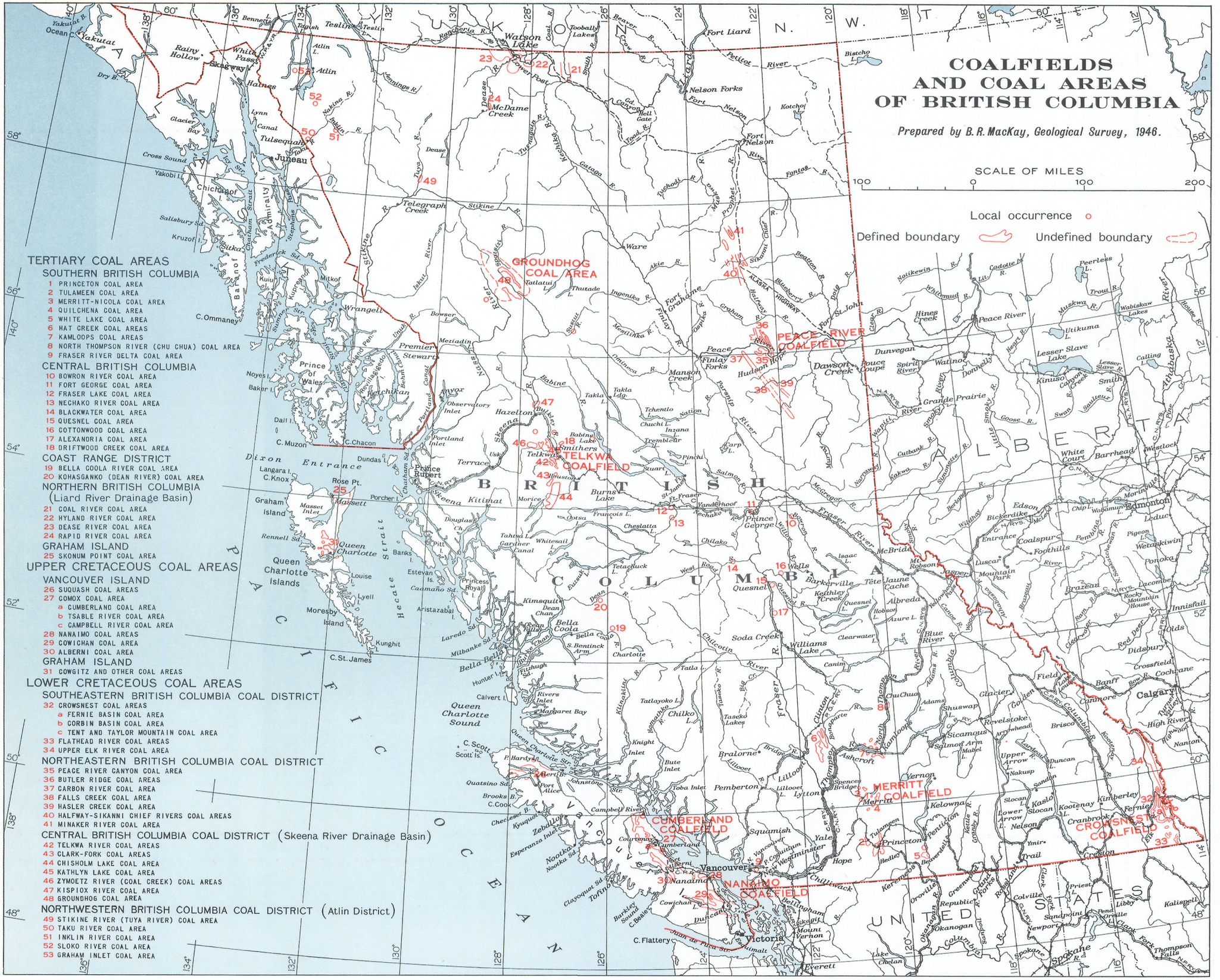

COALFIELDS AND COAL AREAS OF BRITISH COLUMBIA
Prepared by B. R. MacKay, Geological Survey, 1946.
SCALE OF MILES
100 0 100 200
Local occurrence
Defined boundary
Undefined boundary
TERTIARY COAL AREAS
SOUTHERN BRITISH COLUMBIA
1 PRINCETON COAL AREA
2 TULAMEEN COAL AREA
3 MERRITT-NICOLA COAL AREA
4 QUILCHENA COAL AREA
5 WHITE LAKE COAL AREAS
6 HAT CREEK COAL AREAS
7 KAMLOOPS COAL AREAS
8 NORTH THOMPSON RIVER (CHU CHUA) COAL AREA
9 FRASER RIVER DELTA COAL AREA
CENTRAL BRITISH COLUMBIA
10 BOWRON RIVER COAL AREA
11 FORT GEORGE COAL AREA
12 FRASER LAKE COAL AREA
13 NECHAKO RIVER COAL AREA
14 BLACKWATER COAL AREA
15 QUESNEL COAL AREA
16 COTTONWOOD COAL AREA
17 ALEXANDRIA COAL AREA
18 DRIFTWOOD CREEK COAL AREA
COAST RANGE DISTRICT
19 BELLA COOLA RIVER COAL AREA
20 KOHASGANKO (DEAN RIVER) COAL AREA
NORTHERN BRITISH COLUMBIA (Liard River Drainage Basin)
21 COAL RIVER COAL AREA
22 HYLAND RIVER COAL AREA
23 DEASE RIVER COAL AREA
24 RAPID RIVER COAL AREA
GRAHAM ISLAND
25 SKONUN POINT COAL AREA
UPPER CRETACEOUS COAL AREAS
VANCOUVER ISLAND
26 SUQUASH COAL AREAS
27 COMOX COAL AREA
a CUMBERLAND COAL AREA
b TSABLE RIVER COAL AREA
c CAMPBELL RIVER COAL AREA
28 NANAIMO COAL AREAS
29 COWICHAN COAL AREA
30 ALBERNI COAL AREA
GRAHAM ISLAND
31 COWGITZ AND OTHER COAL AREAS
LOWER CRETACEOUS COAL AREAS
SOUTHEASTERN BRITISH COLUMBIA COAL DISTRICT
32 CROWSNEST COAL AREAS
a FERNIE BASIN COAL AREA
b CORBIN BASIN COAL AREA
c TENT AND TAYLOR MOUNTAIN COAL AREA
33 FLATHEAD RIVER COAL AREAS
34 UPPER ELK RIVER COAL AREA
NORTHEASTERN BRITISH COLUMBIA COAL DISTRICT
35 PEACE RIVER CANYON COAL AREA
36 BUTLER RIDGE COAL AREAS
37 CARBON RIVER COAL AREA
38 FALLS CREEK COAL AREA
39 HASLER CREEK COAL AREA
40 HALFWAY-SIKANNI CHIEF RIVERS COAL AREAS
41 MINAKER RIVER COAL AREA
CENTRAL BRITISH COLUMBIA COAL DISTRICT (Skeena River Drainage Basin)
42 TELKWA RIVER COAL AREAS
43 CLARK-FORK COAL AREAS
44 CHISHOLM LAKE COAL AREA
45 KATHLYN LAKE COAL AREA
46 ZYMOETZ RIVER (COAL CREEK) COAL AREAS
47 KISPIOX RIVER COAL AREA
48 GROUNDHOG COAL AREA
NORTHWESTERN BRITISH COLUMBIA COAL DISTRICT (Atlin District)
49 STIKINE RIVER (TUYA RIVER) COAL AREA
50 TAKU RIVER COAL AREA
51 INKLIN RIVER COAL AREA
52 SLOKO RIVER COAL AREA
53 GRAHAM INLET COAL AREA
GROUNDHOG COAL AREA
PEACE RIVER COALFIELD
TELKWA COALFIELD
MERRITT COALFIELD
CUMBERLAND COALFIELD
NANAIMO COALFIELD
CROWSNEST COALFIELD
BRITISH COLUMBIA
ALBERTA
YUKON TERRITORY
UNITED STATES
PACIFIC OCEAN
Dixon Entrance
Hecate Strait
Queen Charlotte Sound
Juan de Fuca Str.

FIG. 7

Of the other two areas, the Upper Elk River is by far the most important. The reserves are estimated at about 3.5 billion tons. This area has not yet been exploited, there being no railway or highway into the area. At least 35 miles of construction would be necessary to connect it to the closest point (Michel) on the existing railway or highway.

The third area, the Flathead River, is relatively small and unimportant. There is no railway, and only a poor road, into the area which is about 40 miles south of Michel. The coalfield consists of four small deposits isolated from one another by barren rock. It is difficult to foresee the development of this area when there are such large easily accessible reserves in the central Crowsnest area.

NORTHEASTERN BRITISH COLUMBIA

The coal deposits of northeastern British Columbia include what is commonly referred to as the Peace River coalfield, together with some lesser known fields both to the north and south. From south to north the fields are Falls Creek, Hasler Creek, Carbon River, Peace River Canyon, Butler Ridge, Halfway-Sikanni Chief Rivers, and Minaker River. These fields are shown in Figure 7 preceding page 30. The coal deposits in all areas are Lower Cretaceous in age and are a northward extension of the coal deposits in the Inner Foothills belt of Alberta.

With the exceptions of the Peace River Canyon and the Hasler Creek fields very little is known about these fields. Some

reserves have been estimated for these lesser known fields but the figures are considered to be only approximations. This is born out by the history of the Hasler Creek field. In the 1946 estimate the Hasler Creek field was reported to contain some 13 million tons of probable coal. Subsequently, the British Columbia Department of Mines carried out detailed exploratory work to prove up this field and, as a result of this new information, estimated the field to contain some 81 million tons of probable coal. Probably more information concerning the other fields will prove more reserves than are estimated in this report.

The Peace River Canyon field has the largest reserves of all the fields in this region. The coal measures are well exposed along the Canyon of the Peace River. Several small mines have operated in this field and two are presently operating. The coal is a high quality low volatile bituminous. The small production has been supplying the local demand in Fort St. John and Dawson Creek. Oil and gas have been discovered in the area so it is not likely there will be any further development of these deposits in the foreseeable future.

CENTRAL BRITISH COLUMBIA

The coal deposits of this region comprise fields of Lower Cretaceous age that occur along Bulkley and Skeena Rivers and other small fields of Tertiary age that are scattered through the upper Fraser River drainage basin. Their distribution is shown

in Figure 7 preceding page 30. Many of the deposits are in inaccessible areas that are far removed from existing transportation facilities.

The Tertiary deposits consist of numerous small isolated fields in which the coal is either too thin, or of inferior quality, or of too small areal extent to warrant development. One exception may be the deposit on Bowron River where the coal is of higher rank (bituminous), better quality, and is present in three mineable seams.

The Lower Cretaceous deposits occur in a number of isolated fields that are mainly concentrated in the Bulkley River area. The only deposit that is presently being developed is at Telkwa. There the coal is a very good quality high volatile A bituminous coal. The field is cut by folds and faults and the measures are poorly exposed so that it is difficult to estimate the reserves. The field is thought to contain at least 4.4 million tons of probable coal.

The Groundhog coalfield is the northernmost of the fields in this region. In the early part of the century it underwent a little development and was the subject of many optimistic reports. The field was reported to be extensive and to contain at least several anthracitic coal seams of mineable thickness and high quality. Reserves were reported to be high and the 1946 estimate included 896 million tons of mineable coal. Investigations by the Geological Survey of Canada in 1948 and 1949 failed to find evidence for such optimism. It was established that the coal was, indeed,

anthracitic in rank, but it was of such inferior quality and the seams so disturbed by folding and faulting that it little resembled the earlier concept of this field. Another serious handicap to overcome in the development of this field is the extreme inaccessibility of the area. In this report the reserves of the Groundhog coalfield are set at nil for the probable coal and only 10 million tons of possible coal.

NORTHERN BRITISH COLUMBIA

The coal deposits of northern British Columbia are of Lower Cretaceous and Tertiary ages. The Cretaceous coals are of high volatile C bituminous rank and the Tertiary coals are lignitic in rank. The full extent of these deposits is not known but due to the low rank of the coal and their inaccessibility their significance is purely local. Their distribution is shown in Figure 7 preceding page 30. The only reserves assigned to these areas are small tonnages of possible coal.

SOUTH CENTRAL BRITISH COLUMBIA

The coal deposits of south central British Columbia include those in the Princeton, Tulameen, Merritt-Nicola, Quilchena, White Lake, Hat Creek, Kamloops, and Chu Chua areas. They are all of Tertiary age and occur in relatively small detached basins as shown in Figure 7 preceding page 30. The total estimated reserves for the region are noted in Table 11.

The Princeton and Tulameen coalfields have been extensively developed so that there remain only small reserves estimated at about 6 million tons. One mine is presently producing a small tonnage for local domestic fuel. The coal ranks as lignite and subbituminous.

The Hat Creek deposit is lignite in rank but is exceptional because in three seams there is an aggregate thickness of about 450 feet. The deposit, however, is very impure and consists of interbedded lignite and clay beds that are highly folded and faulted. There is a possibility that a large tonnage could be recovered by strip mining.

The coal in the Merritt-Nicola coalfield ranks as high volatile B bituminous but is of inferior quality. Mines have produced intermittently from this field for the past 40 years. At present there is one small mine producing for the local domestic market. The reserves of the field are not large.

The other deposits in this region are all of lesser significance than those described above. They have never been mined and will probably never be of more than local interest.

VANCOUVER ISLAND

The coal deposits of Vancouver Island are all of Upper Cretaceous age and occur in five separate areas, namely, Nanaimo, Comox, Suquash, Cowichan, and Alberni. In the latter three areas the coal seams are too thin and dirty to be considered mineable and no reserves are estimated for them.

The Nanaimo coalfield was exploited continuously and extensively from 1852 until 1953. Today the field is considered to be mined out. There are no reserves of probable coal and only a small amount of possible coal estimated for the field. Though these reserves may be technologically recoverable they are not economically recoverable under present conditions.

The Comox coalfield embraces six districts, namely, Cumberland, Tsable River, Dove Creek-Brown's River, Tsolum River, Quinsam, and Campbell River. The latter four districts are relatively unknown as no mining and very little exploratory work has been done in them. The seams in the Cumberland district have been extensively worked and this district is now in the same depleted condition as the Nanaimo coalfield. The Tsable River area presently supports the only mine producing in the Comox coalfield. This mine was opened in 1946 and produces about 200,000 tons annually. The probable reserves are set at about 11 million tons of high volatile A bituminous coal. This area constitutes the most important coal reserves area in the Comox coalfield.

GRAHAM ISLAND

Graham Island, the most northerly of the Queen Charlotte Islands, has small coal deposits of both Upper Cretaceous and Tertiary ages. The most important are the Upper Cretaceous deposits which are found in five small basins in the western part of the Island. The seams are badly folded and faulted and seldom exceed 3 feet in thickness. The coal is mostly low volatile

bituminous with some anthracite occurring close to volcanic intrusions. The coal generally has a high ash content. The Tertiary deposits are found along the northern coast of the Island. They consist of thin seams of low quality lignite that are considerably disturbed by folding and faulting. The reserves of coal on Graham Island are of very limited significance.

YUKON TERRITORY

Coal deposits of Jurassic-Cretaceous and Tertiary ages are scattered thoughout the Yukon with the former being the most important. The Jurassic-Cretaceous coals range in rank from lignite to low volatile bituminous but are mainly medium and high volatile bituminous whereas the Tertiary coals are all lignite. Comparatively little is known about the coal resources of the Yukon except for the few localities where there has been some mining. However, there is sufficient evidence to reasonably conclude that the reserves are considerable, as indicated by the figures in Table 12. These figures are only approximations and probably future detailed investigations will show the coal reserves to be greater than this estimate.

NORTHWEST TERRITORIES

Since the 1946 estimate was made, the Geological Survey of Canada has carried out investigations in the Northwest Territories which have added considerably to our knowledge of the coal deposits that are so widely scattered throughout this vast area. However, that knowledge is still comparatively meager and is insufficient

to allow for calculating reserves. Therefore, no reserve figures for the Northwest Territories are included in this estimate, but a brief discussion relative to some of the deposits is presented.

Coal-bearing strata, ranging through all geological ages from Upper Devonian to Tertiary, have been observed at many localities. A few of these occurrences are on the mainland but most of them are on the islands that constitute the Arctic Archipelago. The older deposits (Devonian to Triassic) contain thin seams, never exceeding one foot, that are of geological interest only. Some of these seams, where they outcrop along the shores of the islands, give rise to "float" coal. This "float" was observed and reported by early explorers and reserve estimates have been mistakenly based on such reports. There are 61 localities where coal seams have been reliably observed and information pertaining to them has been recorded. At 45 of these localities the seams are less than 3 feet thick and at most of them the seams are only a few inches thick. These occurrences are of no economic interest and mineable reserves cannot be estimated for them.

At the remaining 16 localities at least one seam of a minimum thickness of 3 feet has been observed. The most favourable localities where large reserves are assured are along Strand Fiord on the west coast of Axel Heiberg Island and along Bay Fiord and Fosheim Peninsula on the west coast of Ellesmere Island. At the former locality at least twelve seams, each having a thickness of 3 feet or more, are contained within a stratigraphic interval of 2,500 feet. A 15-foot seam and a 30-foot seam are

present in this coal-bearing formation which has been traced along Strand Fiord for 20 miles. Information such as this makes it apparent that large reserves of mineable coal are available in these areas.

Coal mines are presently operating at only two widely separated localities. One, near Pond Inlet on the north coast of Baffin Island, produces a little over 100 tons annually, the coal being dug from the seam where it is exposed along a bend in Salmon River. The coal is subbituminous in rank. It is used to supply part of the fuel requirements of the settlement of Pond Inlet. The extent of the deposit is not known, but where mined there are three lensing seams, the thickest of which attains a thickness of 3.5 feet. The other mine is located on the western edge of the Mackenzie River delta about 50 miles from the town of Aklavik. The output, about 200 tons annually, is obtained from an underground mine that operates on a seam 7 feet thick. The coal ranks as high volatile C bituminous. The seam has a dip of 90 degrees which indicates there are structural complications in the area. Though a geological investigation was made in the vicinity of the mine, lack of exposures made it impossible to interpret the structure and to determine the extent of the mineable reserves.

APPENDIX

TABLES OF CANADIAN COAL RESERVES BY PROVINCES, AREAS, AND RANK AS PREPARED FOR THE ROYAL COMMISSION ON COAL (1959), MARCH, 1960

TABLE 1

RESERVES BY PROVINCES

(Thousands of short tons)

PROVINCE	MINEABLE			RECOVERABLE		
	PROBABLE	POSSIBLE	TOTAL	PROBABLE	POSSIBLE	TOTAL
Nova Scotia	1,738,920	1,031,240	2,770,160	1,287,010	515,620	1,802,630
New Brunswick	81,890	.....	81,890	73,700	.....	73,700
Ontario	100,000	50,000	150,000	50,000	25,000	75,000
Manitoba	33,600	67,200	100,800	16,800	33,600	50,400
Saskatchewan	13,023,160	11,056,080	24,079,240	6,511,580	5,528,040	12,039,620
Alberta	34,274,060	13,436,560	47,710,620	17,137,030	6,718,280	23,855,310
British Columbia	10,960,180	6,387,340	17,347,520	5,480,935	3,193,670	8,674,605
Yukon	416,480	1,431,920	1,848,400	208,240	715,960	924,200
Canada Total	60,628,290	33,460,340	94,088,630	30,765,295	16,730,170	47,495,465

TABLE 2

RESERVES BY RANK AND BY PROVINCES

(Thousands of short tons)

PART I - PROBABLE COAL

PROVINCE	LOW VOLATILE BITUMINOUS		MEDIUM VOLATILE BITUMINOUS		HIGH VOLATILE BITUMINOUS		SUBBITUMINOUS		LIGNITE		TOTAL	
	MINEABLE	RECOVERABLE	MINEABLE	RECOVERABLE	MINEABLE	RECOVERABLE	MINEABLE	RECOVERABLE	MINEABLE	RECOVERABLE	MINEABLE	RECOVERABLE
Nova Scotia	.....	.....	22,040	11,020	1,716,880	1,275,990	.....	.....	.....	.....	1,738,920	1,287,010
New Brunswick	.....	.....	.....	.....	81,890	73,700	.....	.....	.....	.....	81,890	73,700
Ontario	.....	.....	.....	.....	.....	.....	.....	.....	100,000	50,000	100,000	50,000
Manitoba	.....	.....	.....	.....	.....	.....	.....	.....	33,600	16,800	33,600	16,800
Saskatchewan	.....	.....	.....	.....	.....	.....	.....	.....	13,023,160	6,511,580	13,023,160	6,511,160
Alberta	8,786,330	4,393,165	11,795,890	5,897,945	7,517,020	3,758,510	6,174,820	3,087,410	.....	.....	34,274,060	17,137,030
British Columbia ..	586,160	293,080	10,047,590	5,024,840	197,630	98,915	.....	.....	128,200	64,100	10,960,180	5,480,935
Yukon	.....	.....	87,360	43,680	24,480	12,240	.....	.....	304,640	152,320	416,480	208,240
TOTAL PROBABLE	9,372,490	4,686,245	21,953,280	10,977,485	9,538,100	5,219,355	6,174,820	3,087,410	13,589,600	6,794,800	60,628,290	30,765,295
PART II - POSSIBLE COAL												
Nova Scotia	.....	.....	16,000	8,000	1,015,240	507,620	.....	.....	.....	.....	1,031,240	515,620
New Brunswick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario	.....	.....	.....	.....	.....	.....	.....	.....	50,000	25,000	50,000	25,000
Manitoba	.....	.....	.....	.....	.....	.....	.....	.....	67,200	33,600	67,200	33,600
Saskatchewan	.....	.....	.....	.....	.....	.....	.....	.....	11,056,080	5,528,040	11,056,080	5,528,040
Alberta	4,334,400	2,167,200	3,315,200	1,657,600	3,473,120	1,736,560	2,310,480	1,155,240	3,360	1,680	13,436,560	6,718,280
British Columbia ..	548,160	274,080	4,495,680	2,247,840	598,180	299,080	.....	.....	745,320	372,660	6,387,340	3,193,670
Yukon	.....	.....	182,560	91,280	28,560	14,280	.....	.....	1,220,800	610,400	1,431,920	715,960
TOTAL POSSIBLE	4,882,560	2,441,280	8,009,440	4,004,720	5,115,100	2,557,550	2,310,480	1,155,240	13,142,760	6,571,380	33,460,340	16,730,170
GRAND TOTAL	14,255,050	7,127,525	29,962,720	14,982,205	14,653,205	7,776,905	8,485,300	4,242,650	26,732,360	13,366,180	94,088,630	47,495,465

TABLE 3

SUMMARY OF RESERVES OF NOVA SCOTIA BASED ON COAL SEAMS NOT LESS THAN 3 FEET IN THICKNESS TO A MAXIMUM DEPTH OF 4,000 FEET*

(Thousands of short tons)

DISTRICT	MINEABLE		RECOVERABLE	
	PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Sydney.....	1,660,830	930,270	1,245,240	465,135
West Coast Cape Breton ..	23,650	37,330	11,825	18,665
Pictou County	31,620	48,700	15,810	24,350
Cumberland County	22,820	14,940	14,135	7,470
TOTALS	1,738,920	1,031,240	1,287,010	515,620

*Estimate of Joggins coalfield in Cumberland County includes seams of minimum thickness of 2 feet to a maximum depth of 2,000 feet.

TABLE 4

RESERVES OF SYDNEY COALFIELD, NOVA SCOTIA, BASED ON SEAMS NOT LESS THAN 3 FEET IN THICKNESS TO A MAXIMUM DEPTH OF 4,000 FEET, OR NOT MORE THAN 5 MILES FROM SHORE

(Thousands of short tons)

SEAM	DISTRICT	MINEABLE		RECOVERABLE	
		PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Point Aconi	Sydney Mines	.....	134,400	.....	67,200
Lloyd Cove	New Waterford	14,110	47,040	10,580	23,520
	Sydney Mines	117,260	97,440	87,900	48,720
Hub	Glace Bay	172,370	.....	129,280	.....
	New Waterford	131,040	28,560	98,280	14,280
	Sydney Mines	164,640	95,760	123,480	47,880
Harbour	Port Morien	.....	15,120	.....	7,560
	Glace Bay	289,510	.....	217,020	.....
	New Waterford	109,360	.....	81,980	.....
	Sydney Mines	100,130	.....	75,060	.....
Bouthillier	Glace Bay	28,900	75,600	21,670	37,800
	Sydney Mines	3,850	43,680	2,880	21,840
Backpit	Port Morien	8,060	.....	6,050	.....
	Glace Bay	28,900	20,830	21,670	10,415
	New Waterford	11,760	45,360	8,820	22,680
	Sydney Mines	17,520	48,720	13,130	24,360
Phalen	Port Morien	27,720	.....	20,790	.....
	Glace Bay	156,280	28,560	117,150	14,280
	New Waterford	116,010	36,400	86,970	18,200
	Sydney Mines	7,960	.....	5,960	.....
	New Campbellton	3,490	.....	2,620	.....
Stony	New Campbellton	3,020	.....	2,270	.....
Emery	Port Morien	37,180	.....	27,890	.....
Gardiner	Port Morien	.....	40,320	.....	20,160
	Glace Bay	30,010	66,640	22,490	33,320
Mullins	New Waterford	44,800	38,640	33,600	19,320
Tracy	Port Morien	36,950	67,200	27,700	33,600
SYDNEY COALFIELD TOTALS		1,660,830	930,270	1,245,240	465,135
TOTALS FOR HUB, HARBOUR, AND PHALEN SEAMS ONLY		1,278,500	204,400	958,590	102,205

TABLE 5

RESERVES OF CAPE BRETON ISLAND, OTHER THAN SYDNEY COALFIELD, BASED ON SEAMS NOT LESS THAN 3 FEET IN THICKNESS TO A MAXIMUM DEPTH OF 4,000 FEET, OR NOT MORE THAN 3 MILES FROM SHORE

(Thousands of short tons)

DISTRICT	SEAM	MINEABLE		RECOVERABLE	
		PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Port Hood	Six Foot	8,990	23,820	4,495	11,908
	Five Foot	.....	1,000	.....	500
Mabou	Fifteen Foot	960	1,170	480	585
	Five Foot	540	490	270	245
Inverness	Forty-two Inch	.....	500	.....	250
	Port Ban	1,730	1,730	865	865
St. Rose	No. 2	2,100	1,340	1,050	670
	No. 5	6,420	3,920	3,210	1,960
Chimney Corner	No. 2	1,300	1,680	650	840
	No. 5	1,610	1,680	805	840
TOTALS		23,650	37,330	11,825	18,665

TABLE 6

RESERVES OF PICTOU COUNTY, NOVA SCOTIA, BASED ON SEAMS NOT LESS THAN 3 FEET IN THICKNESS TO A MAXIMUM DEPTH OF 4,000 FEET

(Thousands of short tons)

DISTRICT	SEAM	MINEABLE		RECOVERABLE	
		PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Thorburn	Captain	260	.....	130	.....
	McKay	1,330	840	665	420
	Six Foot	940	1,680	470	840
	McBean	7,050	1,680	3,525	840
THORBURN TOTAL		9,580	4,200	4,790	2,100
Stellarton	Foord	.....	7,390	.....	3,695
	Cage	.....	.....	.....	.....
	Third	.....	2,960	.....	1,480
	McGregor or Fleming	.....	4,200	.....	2,100
	New	.....	3,360	.....	1,680
	Oil Coal	.....	3,350	.....	1,675
	Norah	.....	800	.....	400
	No. 5	.....	640	.....	320
	No. 6	.....	2,000	.....	1,000
	No. 8	.....	2,000	.....	1,000
	No. 9	.....	1,800	.....	900
STELLARTON TOTAL		.....	28,500	.....	14,250
Westville	Acadia or Main	12,120	5,000	6,060	2,500
	Scott	9,920	6,000	4,960	3,000
	Third	.....	2,000	.....	1,000
	Fourth	.....	3,000	.....	1,500
WESTVILLE TOTAL		22,040	16,000	11,020	8,000
GRAND TOTAL		31,620	48,700	15,810	24,350

TABLE 7

RESERVES OF CUMBERLAND COUNTY, NOVA SCOTIA, BASED ON SEAMS NOT LESS THAN 3 FEET IN THICKNESS TO A MAXIMUM DEPTH OF 4,000 FEET*

(Thousands of short tons)

DISTRICT AND AREA	SEAM	MINEABLE		RECOVERABLE	
		PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
SPRINGHILL	No. 3	6,400	.....	4,800	.....
	No. 7	3,000	.....	2,250	.....
	No. 6	1,500	.....	1,125	.....
SPRINGHILL TOTAL		10,900	.....	8,175	.....
JOGGINS - Joggins	Forty Brine	1,706	1,100	853	550
	Fundy	202	404	101	202
Joggins Total		1,908	1,504	954	752
River Hebert	Joggins	1,932	718	966	359
	Queen	1,438	2,112	719	1,056
	Kimberly	2,148	1,954	1,074	977
	Forty Brine	674	4,000	337	2,000
River Hebert Total		6,192	8,784	3,096	4,392
Maccan	Chignecto	3,820	4,652	1,910	2,326
JOGGINS TOTAL		11,920	14,940	5,960	7,470
CUMBERLAND COUNTY TOTAL		22,820	14,940	14,135	7,470

*Estimate of Joggins coalfield includes coal seams not less than 2 feet in thickness to a maximum depth of 2,000 feet.

TABLE 8

RESERVES OF NEW BRUNSWICK (MINTO COALFIELD), BASED ON SEAMS NOT LESS THAN 18 INCHES IN AVERAGE THICKNESS TO A MAXIMUM DEPTH OF 100 FEET

(Thousands of short tons)

DEPTH OF COVER	MINEABLE		RECOVERABLE	
	PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Less than 50 feet	34,890	.....	31,400	.....
Between 50 feet and 100 feet	47,000	.....	42,300	.....
TOTALS	81,890	.....	73,700	.....

TABLE 9

RESERVES OF SASKATCHEWAN BASED ON SEAMS NOT LESS THAN 3 FEET IN THICKNESS TO A MAXIMUM DEPTH OF 500 FEET

(Thousands of short tons)

DISTRICT	MINEABLE		RECOVERABLE	
	PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Oxbow Block	2,016,000	1,545,600	1,008,000	772,800
Estevan Block	1,286,760	487,200	643,380	243,600
Lampman Block	1,680,000	1,512,000	840,000	756,000
Weyburn Block	2,016,000	2,856,000	1,008,000	1,428,000
Radville Block	2,352,000	1,008,000	1,176,000	504,000
Willowbunch Block	2,408,000	2,184,000	1,204,000	1,092,000
Wood Mountain Block	616,000	672,000	308,000	336,000
Pinto Butte Block	44,800	33,600	22,400	16,800
Eastend Block	570,000	268,800	285,000	134,400
Cypress Lake Block	33,600	33,600	16,800	16,800
West Central Sask.	.....	455,280	.....	227,640
TOTALS	13,023,160	11,056,080	6,511,580	5,528,040

TABLE 10

RESERVES OF ALBERTA

(Thousands of short tons)

	MINEABLE		RECOVERABLE	
	PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Inner Foothills Belt*	20,256,300	7,323,680	10,128,150	3,661,840
Outer Foothills Belt*	6,565,360	3,531,360	3,282,680	1,765,680
Plains (Belly River Formation)**	2,601,060	1,501,920	1,300,530	750,960
Plains (Edmonton Formation)**	4,851,340	1,079,600	2,425,670	539,800
TOTALS	34,274,060	13,436,560	17,137,030	6,718,280

*Includes coal seams not less than 3 feet in thickness to a maximum depth of 2,500 feet.

**Includes coal seams not less than 3 feet in thickness to a maximum depth of 1,000 feet.

TABLE 11

RESERVES OF BRITISH COLUMBIA

(Thousands of short tons)

DISTRICT	MINEABLE		RECOVERABLE	
	PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Southeastern British Columbia*	10,044,630	4,485,600	5,023,160	2,242,800
Northeastern British Columbia*	535,200	492,800	267,600	246,400
Central British Columbia*	110,940	127,040	55,470	63,520
Northern British Columbia**	.....	138,880	.....	69,440
South Central British Columbia**	145,080	91,320	72,540	45,660
Vancouver Island, B.C.***	21,290	349,460	10,645	174,730
Graham Island, B.C.***	103,040	702,240	51,520	351,120
TOTALS	10,960,180	6,387,340	5,480,935	3,193,670

*Includes coal seams not less than 3 feet in thickness to a maximum depth of 2,500 feet.

**Includes coal seams not less than 3 feet in thickness to a maximum depth of 1,000 feet.

***Includes coal seams not less than 3 feet in thickness to a maximum depth of 2,000 feet.

TABLE 12

RESERVES OF YUKON TERRITORY BASED ON SEAMS NOT LESS THAN 3 FEET IN THICKNESS TO A MAXIMUM DEPTH OF 1,000 FEET

(Thousands of short tons)

DISTRICT	MINEABLE		RECOVERABLE	
	PROBABLE	POSSIBLE	PROBABLE	POSSIBLE
Carmacks	24,480	28,560	12,240	14,280
Whitehorse	21,280	71,680	10,640	35,840
Laberge	66,080	110,880	33,040	55,440
Dawson	56,000	56,000	28,000	28,000
Kluane	21,280	41,440	10,640	20,720
Watson Lake	3,360	3,360	1,680	1,680
Bonnet Plume	224,000	1,120,000	112,000	560,000
TOTALS	416,480	1,431,920	208,240	715,960