Draft Scenario Analysis

Case Selector: BC | Base Capacity

REAL PROVINCIAL REVENUES ($ billions)

BC Govt	
Royalties	
PRRT	
CIT	
CIT - BC Levy	
PIT	
PST	
Carbon Tax	
Total BC Provincial Revenues	
Less: Carbon Tax	
Total BC Provincial Revenues (ex Carbon Tax)	

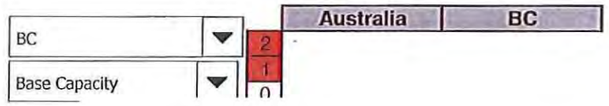
s13, s17, s21

PRESENT VALUE PROVINCIAL REVENUES ($ billi

s13, s17, s21

BC Govt	
Royalties	
PRRT	
CIT	
CIT - BC Levy	
PIT	
PST	
Carbon Tax	
Total BC Provincial Revenues	
Less: Carbon Tax	
Total BC Provincial Revenues (ex Carbon Tax)	

Key assumptions used in model

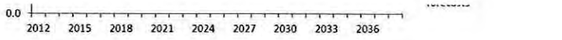


Tax Case		Australia
Capacity Case		BC
		Base Capacity
		High Capacity
CIT rate		Canadian rate
Federal Proportion		
Federal Rate		
Provincial Proportion		
Provincial Rate		
	s13, s17, s21	As provided by Deetken on 7 February 2013
Add: New Levy - BC Tax		
	s13, s17, s21	As provided by Deetken on 7 February 2013
		As provided by Deetken on 7 February 2013
		As provided by Deetken on 7 February 2013
Provincial Income Tax Rate	s13, s17, s21	
Initial		
s13, s17, s21		
PRRT rate		BC Treasury (based on Australia)
PST Assumptions		
Capex proportion upon which PST applied		As provided by Deetken on 7 February 2013
PST rate		As provided by Deetken on 7 February 2013
Employment - PIT income		
Include? (1 for yes, 2 for no)		
Operational commencement dates for purposes of BC Tax		
Base Case		
High Case		
Selected		
Other Assumptions		
	s13, s17, s21	

LNG / NG Pricing Assumptions

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Input cell																												
Inflation																												
Base Year																												
Revenue and cost basis:																												
Cost price indexation																												
Inflation Index applied to Model																												
Revenue price indexation																												
CBOE/EIA indexation (2011 base)																												
World Bank indexation (2012 base																												
Price Forecasts																												
SELECTED																												
NG Price ($ / MMBtu)																												
CBOE Forecast																												
EIA Forecast																												
World Bank (EIA/CBOE)																												
World Bank (extended)																												
Would Bank (mid)																												
LNG Price ($ / MMBtu)																												
CBOE Forecast																												
EIA Forecast																												
World Bank (EIA/CBOE)																												
World Bank (extended)																												
Would Bank (mid)																												
REAL PRICES																												
NG Price ($ / MMBtu)																												
CBOE Forecast																												
EIA Forecast																												
World Bank (EIA/CBOE)																												
World Bank (extended)																												
Would Bank (mid)																												
LNG Price ($ / MMBtu)																												
CBOE Forecast																												
EIA Forecast																												
World Bank (EIA/CBOE)																												
World Bank (extended)																												
Would Bank (mid)																												
EIA Forecast (80%)																												
NOMINAL PRICES																												
NG Price ($ / MMBtu)																												
CBOE Forecast																												
EIA Forecast																												
World Bank (EIA/CBOE)																												
World Bank (extended)																												
Would Bank (mid)																												
LNG Price ($ / MMBtu)																												
CBOE Forecast																												
EIA Forecast																												
World Bank (EIA/CBOE)																												
World Bank (extended)																												
Would Bank (mid)																												
EIA Forecast (80%)																												
Nominal Growth - NG																												
CBOE																												
EIA																												
Average																												
Nominal Growth - LNG																												
CBOE																												
EIA																												
Average																												

s13, s17, s21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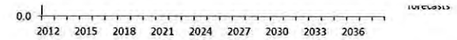
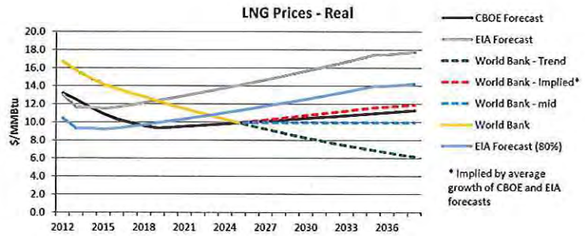
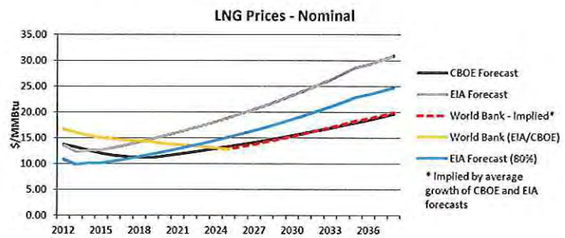
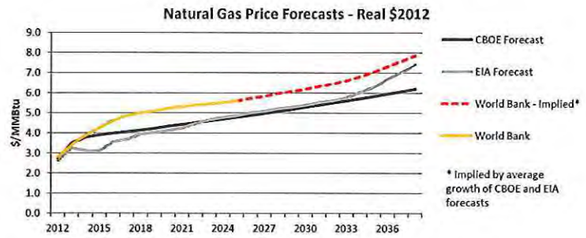
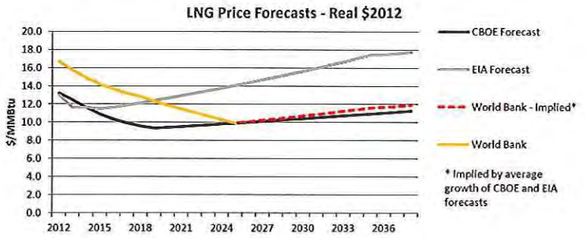
2012 2015 2018 2021 2024 2027 2030 2033 2036


0.0
2012 2015 2018 2021 2024 2027 2030 2033 2036


LNG Prices - Real
$/MMBtu
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2012 2015 2018 2021 2024 2027 2030 2033 2036
CBOE Forecast
EIA Forecast
World Bank - Trend
World Bank - Implied*
World Bank - mid
World Bank
EIA Forecast (80%)
* Implied by average growth of CBOE and EIA forecasts


LNG Prices - Nominal
$/MMBtu
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2012 2015 2018 2021 2024 2027 2030 2033 2036
CBOE Forecast
EIA Forecast
World Bank - Implied*
World Bank (EIA/CBOE)
EIA Forecast (80%)
* Implied by average growth of CBOE and EIA forecasts


Natural Gas Price Forecasts - Real $2012
$/MMBtu
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
2012 2015 2018 2021 2024 2027 2030 2033 2036
CBOE Forecast
EIA Forecast
World Bank - Implied*
World Bank
* Implied by average growth of CBOE and EIA forecasts


LNG Price Forecasts - Real $2012
$/MMBtu
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
2012 2015 2018 2021 2024 2027 2030 2033 2036
CBOE Forecast
EIA Forecast
World Bank - Implied*
World Bank
* Implied by average growth of CBOE and EIA forecasts

Capital and Operating Expenditure Assumptions

Provided by Deetken 7 Feb 2012

s13, s17, s21

Base Case
Upstream Operating Costs

Upstream CapEx

Pipeline Operating Expenditures
Pipeline Capital Expenditures

Downstream Operating Expenditures
Downstream Capital Expenditures

Carbon Emissions (total) - Tonnes
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)

s13, s17, s21

High Case (stretch)
Upstream Operating Costs

Upstream CapEx

Pipeline Operating Expenditures
Pipeline Capital Expenditures

Downstream Operating Expenditures
Downstream Capital Expenditures

Carbon Emissions (total) - Tonnes
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)

Capex proportion upon which PST applied
PST rate

Inputs after PST

s13, s17, s21

Base Case
Upstream Operating Costs

Upstream CapEx

Pipeline Operating Expenditures
Pipeline Capital Expenditures

Downstream Operating Expenditures
Downstream Capital Expenditures

Carbon Emissions (total) - Tonnes
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)

Incremental PST

s13, s17, s21

High Case (stretch)
Upstream Operating Costs

Upstream CapEx

Pipeline Operating Expenditures
Pipeline Capital Expenditures

Downstream Operating Expenditures
Downstream Capital Expenditures

Carbon Emissions (total) - Tonnes
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)

Incremental PST

Depreciation Assumptions

Declining Balance
Upstream
Pipelines
Downstream

Depreciation expense commencement

Depreciation Flag

Depreciation calculations

Base Capacity
Upstream
Depreciable Base
Depreciation
Cumulative written-down value

Pipelines
Depreciable Base
Depreciation
Cumulative written-down value

Downstream
Depreciable Base
Depreciation
Cumulative written-down value

High Capacity
Upstream
Depreciable Base
Depreciation
Cumulative written-down value

Pipelines
Depreciable Base
Depreciation
Cumulative written-down value

Downstream
Depreciable Base
Depreciation
Cumulative written-down value

Base Case Depreciation
Upstream
Pipelines
Downstream

High Capacity Depreciation
Upstream
Pipelines
Downstream

s13, s17, s21

Employment Assumptions

PROVIDED BY DEETKEN 7 Feb 2012

s13, s17, s21

PST Assumptions

PROVIDED BY DEETKEN 7 Feb 2012

s13, s17, s21

All values expressed in millions $ unless otherwise indicated	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Inputs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Project Financial Inputs																													
Total Revenue																													
Base Case																													
Upstream Operating Costs																													
Upstream CapEx																													
Upstream Depreciation																													
Pipeline Operating Expenditures																													
Pipeline Capital Expenditures																													
Pipeline Depreciation																													
Downstream Operating Expenditures																													
Downstream Capital Expenditures																													
Downstream Depreciation																													
High Case																													
Upstream Operating Costs																													
Upstream CapEx																													
Upstream Depletable Base																													
Upstream Depreciation																													
Pipeline Operating Expenditures																													
Pipeline Capital Expenditures																													
Pipeline Depreciation																													
Downstream Operating Expenditures																													
Downstream Capital Expenditures																													
Downstream Depreciation																													
Combined																													
Upstream Operating Costs																													
Upstream CapEx																													
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Pipeline Operating Expenditures																													
Pipeline Capital Expenditures																													
Pipeline Depreciation																													
Downstream Operating Expenditures																													
Downstream Capital Expenditures																													
Downstream Depreciation																													
Interest Expense																													
Other Inputs																													
LNG Price ($ / MMBtu)																													
Natural Gas Price ($ / MMBtu)																													
Long Term Bond Rate																													
Base Case																													
LNG Volumes (MMBtu)																													
NG Volumes (Millions of MCF)																													
Carbon Emissions (Downstream) - Tonnes																													
High Case																													
LNG Volumes (MMBtu)																													
NG Volumes (Millions of MCF)																													
Carbon Emissions (Downstream) - Tonnes																													
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s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

Australia - Regime Analysis

PRRT Taxable Income Calculation

PRRT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
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RFM Capital Allocation (occurs in first LNG year)

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Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

	##########
	##########
	0
	0

Combined Case

Va = Actual Volume LNG feedstock - mmbtu	##########
Ve = Average Production	##########
Vb = Volume Benchmark (0 or 1)	
Vb 0 (Benchmark Volume = Average)	
Vb 1 (Benchmark = Average to Date)	
Combined Case Volume Coefficient	

Upstream Energy Coefficient (Downstream assumed to be 1)

Mmcf to Mmbtu conversion factor	0.00

Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)
Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

s13, s17, s21

Deductions

Base Case
Carry Forward Pool beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

Deduction
Carry Forward Ending Balance

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

s13, s17, s21

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

PIT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
FRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
FRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

s13, s17, s21

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue

Base Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

[redacted]

Other Inputs

LNG Price ($ / MMBtu)
Natural Gas Price ($/MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRAT Taxable Income Calculation

PRAT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
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Downstream
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Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RFM Capital Balance (total of cost and augmentation)
RFM Capital Allocation (occurs in first LNG year)

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

##########
##########

0
0

Combined Case

Va = Actual Volume LNG feedstock - mmbtu	##########
Ve = Average Production	##########
Vb = Volume Benchmark (0 or 1)	
Vb 0 (Benchmark Volume = Average)	
Vb 1 (Benchmark = Average to Date)	
Combined Case Volume Coefficient	

Upstream Energy Coefficient (Downstream assumed to be 1)

Mmcf to Mmbtu conversion factor 0.00

Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus-price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

Deductions

Base Case
Carry forward pool beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

s13, s17, s21

Deduction
Carry Forward Ending Balance

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

s13, s17, s21

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

s13, s17, s21

s13, s17, s21

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

PIT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue

Base Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Other Expenses (Administrative)

Other Inputs

LNG Price ($ / MMBtu)
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRRT Taxable Income Calculation

PRRT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

##########
##########

0
0

Combined Case

Va = Actual Volume LNG feedstock - mmbtu	##########
Ve = Average Production	##########
Vb = Volume Benchmark (0 or 1)	
Vb 0 (Benchmark Volume = Average)	
Vb 1 (Benchmark = Average to Date)	
Combined Case Volume Coefficient	

Upstream Energy Coefficient (Downstream assumed to be 1)

Mmcf to Mmbtu conversion factor	0.00

Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)	
Residual Profit Methodology	
Cost-plus-price ($/MMBtu)	
Net-back Price ($/MMBtu)	
RPM Price ($/MMBtu)	
Comparable Uncontrolled Price ($/MMBtu)	

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

Deductions

Base Case

Carry Forward Pool beginning balance	
Upstream + Pipeline Capex	
Deductions	
Carry Forward Pool Ending Balance	

Deduction	
Carry Forward Ending Balance	

Carry Forward Beginning Balance	
Increase in GDP Factor Expenditure	
Deductions	
Carry Forward Ending Balance	

Royalty Compound Rate	
Royalty Carry Forward Pool beginning balance	
Total Royalties	
Royalty Deduction	
Royalty Carry Forward Pool Ending Balance	

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

s13, s17, s21

s13, s17, s21

s13, s17, s21

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

PIT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue

Base Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Interest Expense

Other Inputs

LNG Price ($ / MMBtu)
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRAT Taxable Income Calculation

PRAT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

##########
##########

0
0

Combined Case
Ya = Actual Volume LNG feedstock - mmbtu ##########
Ye = Average Production ##########
Yb = Volume Benchmark (0 or 1)
Yb 0 (Benchmark Volume = Average)
Yb 1 (Benchmark = Average to Date)
Combined Case Volume Coefficient

Upstream Energy Coefficient (Downstream assumed to be 1)
Mmcf to Mmbtu conversion factor 0.00
Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)
Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus-price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

Deductions

Base Case
Carry Forward Pool Beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

s13, s17, s21

Deduction
Carry Forward Ending Balance

s13, s17, s21

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

s13, s17, s21

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

s13, s17, s21

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined interest expense

PT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

s13, s17, s21

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue

Base Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Interest Expense

Other Inputs

LNG Price ($ / MMBtu)
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRAT Taxable Income Calculation

PRAT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

##########
##########

0
0

Combined Case

Va = Actual Volume LNG feedstock - mmbtu	##########
Ve = Average Production	##########
Vb = Volume Benchmark (0 or 1)	
Vb 0 (Benchmark Volume = Average)	
Vb 1 (Benchmark = Average to Date)	
Combined Case Volume Coefficient	

Upstream Energy Coefficient (Downstream assumed to be 1)

Mmcf to Mmbtu conversion factor 0.00

Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)
Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus-price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

Deductions

Base Case

Carry Forward Pool beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

s13, s17, s21

Deduction
Carry Forward Ending Balance

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

s13, s17, s21

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

s13, s17, s21

0
0

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

PIT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
PRRT
CIT
CIT - EC Levy
PIT
FST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
PRRT
CIT
CIT - EC Levy
PIT
FST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

s13, s17, s21

All values expressed in millions $ unless otherwise indicated

Inputs

2039

Project Financial Inputs

Total Revenue

Base Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Interest Expense

Other Inputs

LNG Price ($ / MMBtu)
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRRT Taxable Income Calculation

PRRT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

##########
##########

0
0

Combined Case

Va = Actual Volume LNG feedstock - mmbtu	##########
Ve = Average Production	##########
Vb = Volume Benchmark (0 or 1)	
Vb 0 (Benchmark Volume = Average)	
Vb 1 (Benchmark = Average to Date)	

Combined Case Volume Coefficient

Upstream Energy Coefficient (Downstream assumed to be 1)

Mmcf to Mmbtu conversion factor 0.00

Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

s13, s17, s21

Deductions

Base Case

Carry Forward Pool beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

s13, s17, s21

Deduction
Carry Forward Ending Balance

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

s13, s17, s21

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
FV of Tax Take

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

PT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

s13, s17, s21

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue

Base Case
Upstream Operating Costs

Upstream CapEx
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs

Upstream CapEx
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs

Upstream CapEx
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Interest Expense

Other Inputs

LNG Price ($ / MMBtu)
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRRT Taxable Income Calculation

PRRT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs not LNG)

S13, S17, S21

	##########
	##########
	0
	0

Combined Case	
Ya = Actual Volume LNG feedstock - mmbtu	##########
Ye = Average Production	##########
Yb = Volume Benchmark (0 or 1)	
Yb 0 (Benchmark Volume = Average)	
Yb 1 (Benchmark = Average to Date)	
Combined Case Volume Coefficient	
Upstream Energy Coefficient (Downstream assumed to be 1)	
Mmcf to Mmbtu conversion factor	0.00
Base Case	
High Case	
Combined	
Annuity vs Perpetuity (only considered for upstream calculation)	
Upstream	
Asset Base Calculation (Upstream online no pipeline considered)	
Upstream Annuity Calculation - Base Case	
Upstream Annuity Calculation - High Case	
Upstream Annuity Calculation - Combined	
Capex	
Upstream Annuity Calculation - Base Case	
Upstream Annuity Calculation - High Case	
Upstream Annuity Calculation - Combined	
Gas Transfer Price (assume RPM used)	
Advanced Pricing Agreement ($/MMBtu)	
Residual Profit Methodology	
Cost-plus-price ($/MMBtu)	
Net-back Price ($/MMBtu)	
RPM Price ($/MMBtu)	
Comparable Uncontrolled Price ($/MMBtu)	
Combined	
Total Income Subject to PART	
Operating Profit Subject to PART	
Deductions	
Base Case	
Carry Forward Pool beginning balance	
Upstream + Pipeline Capex	
Deductions	
Carry Forward Pool Ending Balance	
Exploration Carry Forward beginning balance	
Exploration Expenditure	
Deduction	
Carry Forward Ending Balance	
Carry Forward Beginning Balance	
Increase in GDP Factor Expenditure	
Deductions	
Carry Forward Ending Balance	
Royalty Compound Rate	
Royalty Carry Forward Pool beginning balance	
Total Royalties	
Royalty Deduction	
Royalty Carry Forward Pool Ending Balance	
No Aquired Exploration Expenditure	
No Starting Base Expenditure	
No Closing-Down Expenditure	
Total Capital Pool	
Total Deductions	
PART Taxable Income	
Taxation Calculations	
Tax Rates	
Calculated Tax Revenue	
Total Tax Take	
Total Annual Tax Take	
Discount Rate	
PV of Tax Take	

S13, S17, S21

S13, S17, S21

S13, S17, S21

S13, S17, S21

S13, S17, S21

s13, s17, s21

Funding Calculations	
Required Funding - Base Case	69
Required Funding - High Case	0
Total	69
Base Capacity	
Leverage	
Interest rate	
Debt term	
Calculations	20
Opening Debt	0
Additions	
IDC	
Repayments	0
Closing Debt	0
Interest	0
Interest Expense	0
High Capacity	
Leverage	
Interest rate	
Debt term	
High Capacity	
Calculations	18
Opening Debt	0
Additions	
IDC	
Repayments	0
Closing Debt	0
Interest	0
Interest Expense	0
Combined Interest expense	0
FIT Calculations	
Base Case	5%
High Case	5%
Selected	5%
BC Tax Calculations	
Year of operations	1
Initial Rate	0
Long term rate	1
Key Outputs	
Nominal	
BC Govt	
Royalties	0
PRRT	0
CIT	6
CIT - BC Levy	4
PIT	4
PST	4
Carbon Tax	1
Total	18
Fed Govt	
Income Tax	8
Total	11
Present Value	
BC Govt	
Royalties	0
PRRT	0
CIT	5
CIT - BC Levy	5
PIT	3
PST	0
Carbon Tax	4
Total	8
Fed Govt	
Income Tax	6
Total	7
End	

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue — s13, s17, s21

Base Case
Upstream Operating Costs
Upstream CapEx
Upstream Depreciation
Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation
Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs
Upstream CapEx
Upstream Depreciable Base
Upstream Depreciation
Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation
Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs
Upstream CapEx
Upstream Depreciation
Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation
Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Interest Expense — s13, s17, s21

Other Inputs

LNG Price ($ / MMBtu) — s13, s17, s21
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRRT Taxable Income Calculation — s13, s17, s21

PRRT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

S13, S17, S21

##########
##########

0
0

Combined Case
Va = Actual Volume LNG feedstock - mmbtu ##########
Ve = Average Production ##########
Vb = Volume Benchmark (0 or 1)
Vb 0 (Benchmark Volume = Average)
Vb 1 (Benchmark = Average to Date)
Combined Case Volume Coefficient

Upstream Energy Coefficient (Downstream assumed to be 1)
Mmcf to Mmbtu conversion factor 0.00
Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)
Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

Deductions

Base Case

Carry Forward Pool beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

S13, S17, S21

Deduction
Carry Forward Ending Balance

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

S13, S17, S21

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

S13, S17, S21

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

FIT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

s13, s17, s21

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue

Base Case
Upstream Operating Costs

Upstream CapEx
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

High Case
Upstream Operating Costs

Upstream CapEx
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Combined
Upstream Operating Costs

Upstream CapEx
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Interest Expense

Other Inputs

LNG Price ($ / MMBtu)
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRRT Taxable Income Calculation

PRRT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

##########
##########

0
0

Combined Case

Va = Actual Volume LNG feedstock - mmbtu	##########
Ve = Average Production	##########
Vb = Volume Benchmark (0 or 1)	
Vb 0 (Benchmark Volume = Average)	
Vb 1 (Benchmark = Average to Date)	
Combined Case Volume Coefficient	

Upstream Energy Coefficient (Downstream assumed to be 1)

Mmcf to Mmbtu conversion factor 0.00

Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

s13, s17, s21

Deductions

Base Case

Carry Forward Pool beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

s13, s17, s21

Deduction
Carry Forward Ending Balance

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

s13, s17, s21

Calculated Tax Revenue

s13, s17, s21

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

PIT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

s13, s17, s21

All values expressed in millions $ unless otherwise indicated

Inputs

Project Financial Inputs

Total Revenue

s13, s17, s21

Base Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

s13, s17, s21

High Case
Upstream Operating Costs

Upstream Capex
Upstream Depreciable Base
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

s13, s17, s21

Combined
Upstream Operating Costs

Upstream Capex
Upstream Depreciation

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Interest Expense

Other Inputs

s13, s17, s21

LNG Price ($ / MMBtu)
Natural Gas Price ($ / MMBtu)
Long Term Bond Rate

Base Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

High Case
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Combined
LNG Volumes (MMBtu)
NG Volumes (Millions of MCF)
Carbon Emissions (Downstream) - Tonnes

Australia - Regime Analysis

PRRT Taxable Income Calculation

PRRT Calculation Amendments

LNG Production Flag
Base Case
High Case
Combined Case

Base Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

High Case
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Combined
Upstream
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

Pipeline
Augmentation on Capital Balance (applied to costs pre LNG)
Total RPM Capital Balance (total of cost and augmentation)
RPM Capital Allocation (occurs in first LNG year)

s13, s17, s21

Downstream
Augmentation on Capital Balance (applied to costs pre LNG)

s13, s17, s21

	##########
	##########
	0
	0

Combined Case

Va = Actual Volume LNG feedstock - mmbtu	##########
Ve = Average Production	##########
Vb = Volume Benchmark (0 or 1)	
Vb 0 (Benchmark Volume = Average)	
Vb 1 (Benchmark = Average to Date)	
Combined Case Volume Coefficient	

Upstream Energy Coefficient (Downstream assumed to be 1)

Mmcf to Mmbtu conversion factor	0.00

Base Case
High Case
Combined

Annuity vs Perpetuity (only considered for upstream calculation)
Upstream

Asset Base Calculation (Upstream online no pipeline considered)
Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined
Capex

Upstream Annuity Calculation - Base Case
Upstream Annuity Calculation - High Case
Upstream Annuity Calculation - Combined

Gas Transfer Price (assume RPM used)

Advanced Pricing Agreement ($/MMBtu)
Residual Profit Methodology
Cost-plus-price ($/MMBtu)
Net-back Price ($/MMBtu)
RPM Price ($/MMBtu)

Comparable Uncontrolled Price ($/MMBtu)

Combined
Total Income Subject to PRRT
Operating Profit Subject to PRRT

Deductions

Base Case

s13, s17, s21

Carry Forward Pool beginning balance
Upstream + Pipeline Capex
Deductions
Carry Forward Pool Ending Balance

s13, s17, s21

Deduction
Carry Forward Ending Balance

Carry Forward Beginning Balance
Increase in GDP Factor Expenditure
Deductions
Carry Forward Ending Balance

Royalty Compound Rate
Royalty Carry Forward Pool beginning balance
Total Royalties
Royalty Deduction
Royalty Carry Forward Pool Ending Balance

No Aquired Exploration Expenditure
No Starting Base Expenditure
No Closing-Down Expenditure

Total Capital Pool
Total Deductions
PRRT Taxable Income

Taxation Calculations
Tax Rates

s13, s17, s21

Calculated Tax Revenue

Total Tax Take

Total Annual Tax Take
Discount Rate
PV of Tax Take

s13, s17, s21

Funding Calculations
Required Funding - Base Case
Required Funding - High Case
Total

Base Capacity
Leverage
Interest rate
Debt term

Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

High Capacity
Leverage
Interest rate
Debt term

High Capacity
Calculations
Opening Debt
Additions
IDC
Repayments
Closing Debt

Interest
Interest Expense

Combined Interest expense

PIT Calculations

Base Case
High Case
Selected

BC Tax Calculations

Year of operations
Initial Rate
Long term rate

Key Outputs

Nominal

BC Govt
Royalties
FRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

Present Value

BC Govt
Royalties
FRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total

Fed Govt
Income Tax
Total

End

s13, s17, s21

Potential Revenues to the BC Government from LNG Development in Northern BC

Ministry of Energy, Mines & Natural Gas

March 2013

Ernst & Young

Contents

1. Background and scope

1.1 Background

The Province of British Columbia ("Province") though the Ministry of Energy, Mines and Natural Gas ("Ministry") is seeking to engage the private sector to develop Liquefied Natural Gas ("LNG") in Northern British Columbia. The Ministry is currently negotiating with a number of potential private partners.

As a result of the potential for significant revenues, and economic activity, from the LNG developments, the Province is working with its advisors to determine an appropriate taxation framework for the LNG Projects. This framework could include using the existing Provincial and Federal royalty regimes and taxation legislation as well as extending this on an appropriate, economic and competitive basis to maximize Provincial revenues while continuing to stimulate project development.

The Province has engaged Ernst & Young ("EY") to develop an indicative range of Provincial revenues[1] that could result from the LNG Projects under two separate potential revenue regimes (the "Cases"):

1. Application of the regime currently implemented in Australia to BC, following a provincial review which determined that the Australian system is the most appropriate regime to consider in the context of taxation of LNG projects

2. A proposed revenue framework reflecting the current applicable revenue framework in BC (including certain assumptions from the Ministry in relation to retention of revenues within the Province), together with a potential new BC LNG revenue framework.

The indicative projections have been based on an assumed taxation and revenue framework, provided by the Province, together with the other assumptions described in this report. This report contains high level analysis in order to provide the Province with an understanding of potential tax and royalty revenue implications associated with the LNG Projects, as discussed further below.

1.2 Project Scope

The Province has engaged Ernst & Young ("EY") to conduct an assessment of projections of Provincial revenues produced by the Province and its advisors to assess their reasonableness, and update these projections as considered appropriate to provide a view on the potential range of revenues the Province could obtain from the LNG under a range of specific circumstances.

The work performed under the engagement is subject to a number of assumptions and caveats, which are described in detail in Section 2.

The scope of the engagement did not include EY providing comments on the appropriateness, or endorsing, any of the proposed methods for taxation of LNG Projects in the Province.

1.2.1 Information provided by the Province

s17

[1] Provincial revenues include BC provincial government revenues which include existing royalties, corporate and personal income taxes and any proposed LNG specific revenue framework.

s17

- Exploration, capital and operating costs;
- LNG, NG and carbon emission volumes;
- Specific assumptions to be used in the calculation of other potential forms of taxation that may accrue to the Province if the LNG projects are developed. These included assumptions for the number of jobs created during the construction and operating period and the percentage of capital and operating expenditure assumed to incur PST such that it was possible to estimate the potential Provincial Income Tax and Provincial Sales Tax that could accrue from the LNG projects; and

s13

1.2.2 Work performed

In order to undertake the engagement EY has:

- Assessed the s13, s17 and considered the methodology and approach used in the creation and functioning of that model including the calculation of the Provincial revenues;
- Assessed select agreed input parameters from the s13, s17 to determine appropriateness of their use, including LNG and NG price forecasts and depreciation rates for capital assets;
- Revised the methodologies and assumptions contained within the s13, s17 s13, s17 as deemed appropriate;
- Developed an updated financial model showing a range of provincial government revenue outcomes based on a number of defined alternative scenarios under the two Cases, which are described in detail in Sections 4 and 5; and
- Developed other deliverables described below.

1.3 Deliverables

The following key deliverables have been agreed with the Province:

- A financial model showing a range of potential Provincial revenue if the 5 LNG projects developed in BC were taxed under the two Cases (the "Model"). s13, s17 s13, s17
- A report (this Report) containing high level analysis of potential direct and indirect revenues for the Province from the LNG Projects over a 20 year operating period, highlighting key considerations and caveats; and
- A high level report for public release providing a summary of the findings and assumptions from the analysis conducted (which was provided to the Province on 15 February 2013).

2. Key Assumptions

2.1 Overall

The analysis is based upon the following key assumptions:

- Cost and operating assumptions for the aggregated 5 LNG projects s13, s17 s13, s17 These cost and operating assumptions include:
  - Aggregate exploration costs and upstream, pipeline and downstream capital and operating costs over the construction and 20-year (2018 - 2037) operating period for the LNG Projects as a whole;
  - The scale of the proposed LNG Projects, and associated LNG volumes, upstream gas volumes and carbon emissions. Specifically, the LNG Projects are forecast, for the purpose of this analysis, to produce an aggregate 82 MTA[2] from 2018 under a Base Capacity scenario, and this is increased to 120 MTA by 2020 under a High Capacity scenario, with resulting incremental capital and operating costs as well as operating volumes under the High Capacity scenario;
  - Timing of costs and volumes;
  - Employment forecasts from the LNG Projects;

  As discussed, s13, s17

  s13, s17

- The initial pricing for LNG and NG has been provided by the Province. The prices are based on the forecasts of crude oil and NG prices from the US Energy Information Administration (EIA) and the Chicago Board of Exchange LNG and NG Futures together with the Province's assumed correlation of crude oil price to LNG prices. EY has updated the price data provided by the Province, including obtaining more recent forecasts (January 2013) from the EIA and adding World Bank forecast prices for LNG and NG (January 2013);
- Due to the complexities of potential corporate structures and the other development activities of the potential private partners, it has been agreed with the Province that the Projects are assumed to be 'ring-fenced' for the purposes of determining potential Provincial revenues. Therefore it has been assumed that profits / losses from other entities owned or other projects developed by a developer may not be applied to the LNG projects within the analysis.s13, s17

  s13, s17

-

  s13, s17

-

[2] Million Tonnes per Annum

- The current Australian tax law extends to BC/Canada for comparative purposes;

- Depreciation assumptions for each of the asset classes (Upstream, Pipeline and Downstream) are likely to be comprised of numerous individual assets with a range of individual asset lives. For the purposes of the analysis, a uniform rate has been applied to all assets within the above classes, applied under a reducing balance approach in accordance with Canadian taxation standards; and

- The analysis has been completed in real 2012 dollars over a 20-year operating period without assuming any inflation assumptions.

In determining the range of potential Provincial revenues we have undertaken a sensitivity analysis on key assumptions. Key drivers in the analysis include:

- Price of LNG and NG;

- Capital and operating costs of the LNG Projects;

- Assumed capital structure of the LNG projects; and

- Depreciation rate of assets for taxation purposes.

Changes in these variables have driven the definition of alternative scenarios, which are discussed in further detail in Section 3.2.

2.2 General tax assumptions

The analysis considers two Cases in order to calculate potential outcomes under differing assumptions.

These Cases are as follows:

1. The "Australia Case", involving the Petroleum Resource Rent Tax ("PRRT") regime implemented in Australia that is currently applicable to LNG projects being applied to the LNG Projects in BC as well as the Australian Corporate Income Tax ("CIT") rate (but maintaining other applicable sources of revenue as currently implemented in BC); and

2. The "BC Case" involving a proposed revenue framework reflecting the current applicable revenue framework in BC s13, s17 s13, s17 together with a potential new BC LNG revenue framework (the "BC Levy").

These cases are considered by the Province to be potential alternative approaches for future implementation in BC (although it is noted that consideration is preliminary and there are likely to be many other potential alternative approaches).

The following is a summary of the taxes considered in the analysis under the two Cases:

	Australia Case
Petroleum Resource Rent Tax ("PRRT")	As currently implemented in Australia
Corporate Income Tax	30% rate on taxable profits
Royalties	As currently implemented in BC
Carbon Tax	As contemplated for implementation in BC using the carbon price in Australia as a proxy. Results are also presented exclusive of carbon tax due to Provincial Carbon Neutrality Policy
Provincial Sales Tax	Incurred on certain expenditures at rate of 7%
Personal Income Tax	Based on current BC rates on project employment assumptions

s13, s17

In relation to the tax revenues assumed to accrue to the Province as opposed to the Federal Government, it is assumed that the Province will receive:

s13, s17

Specific taxation rates applied under each of the Cases are detailed in Section 3.1.

As part of our analysis we have undertaken a range of sensitivity analyses on core assumptions in order to determine an indicative range of potential revenues for the Province. It is stressed that none of the preliminary outputs within the indicative range is necessarily considered more likely than any other, and a multitude of additional scenarios with other combinations of variables could be run, which would impact upon this indicative range. As a result, the outputs and related analysis are indicative based on the assumptions specified in this section, and are not necessarily reflective of actual outcomes.

2.3 PRRT assumptions

s13, s17, s21 Following our assessment, a number of updates have been made to the methodology to improve consistency with the existing Australian legislation and practice.

However, the resulting outputs remain subject to the assumptions and caveats below.

s13, s17, s21

s13, s17, s21

2.4 Financial Model

s13, s17

2.4.2 Disclaimer

The Model has been constructed for a specific purpose and is not to be distributed to third parties without the prior written consent of EY.

Specifically, we note that although we have undertaken an assessment of the Original Model and made adjustments as required, this does not constitute an audit and all pre-existing issues may not have been identified.

Third parties who obtain copies of the Model should be aware of the following:

- The Model may not be suitable for purposes, other than the specific purpose for which it was designed, and the interests of third parties may not have been anticipated;
- The Model was not intended for use by third parties and may not be designed so that it can be readily operated in a correct manner by such parties;
- Material events may have occurred since the completion of the Model, which are not reflected in the Model; and
- Although the Model has been subjected to quality assurance procedures, this may not provide an appropriate degree of assurance for all possible uses of the Model.

Accordingly, third party recipients of this Model use it entirely at their own risk and, in the absence of express written consent, no responsibility is taken or accepted for any losses which may result therefrom, including direct or indirect consequences of computer viruses.

3. Analysis overview

3.1 Detailed assumptions

Key assumptions underlying the Financial Model include the following:

s13, s17

s13, s17

3.2 Scenario analysis

s13, s17

3.2.1 Scenarios

The alternative scenarios considered in this analysis are described below:

s13, s17

4. Analysis Outputs – Australia Case

s13, s17

4.1.1 Results

The following table shows total Provincial revenues that could be earned from the LNG projects under the Australia Case, in real terms ie in current (2012) dollars ("2012$"), over the 20 year operating period of analysis under each of the scenarios:

REAL PROVINCIAL REVENUES ($ billions)

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total BC Provincial Revenues
Less: Carbon Tax
Total BC Provincial Revenues (ex Carbon Tax)

s13, s17, s21

PRESENT VALUE REAL PROVINCIAL REVENUES

s13, s17, s21

BC Govt
Royalties
PRRT
CIT
CIT - BC Levy
PIT
PST
Carbon Tax
Total BC Provincial Revenues
Less: Carbon Tax
Total BC Provincial Revenues (ex Carbon Tax)

Note: table above may not add due to rounding of base data

This table shows that:

s13, s17, s21

The following charts shows the breakdown of potential real Provincial revenue over time under potential low and high scenarios (Scenarios 6 and 9) with Base Capacity assumptions:

s13, s17, s21

s13, s17, s21

These charts follow a similar profile to the Base Capacity scenarios, but with a higher scale of Provincial revenue.

The following chart illustrates the indicative range of annual Provincial Revenues over the assessment period:

s13, s17, s21

5. Analysis Outputs – BC Case

s13, s17

5.1.1 Results

The following table shows total Provincial revenues that could be earned from the LNG projects under the BC Case, in real terms, over the 20 year operating period of analysis under each of the scenarios:

REAL PROVINCIAL REVENUES ($ billions)	
BC Govt	
Royalties	
PRRT	
CIT	
CIT - BC Levy	
PIT	
PST	
Carbon Tax	
Total BC Provincial Revenues	s13, s17, s21
Less: Carbon Tax	
Total BC Provincial Revenues (ex Carbon Tax)	

PRESENT VALUE s13 s17 s21 PROVINCIAL REVENUES	
BC Govt	
Royalties	
PRRT	
CIT	
CIT - BC Levy	
PIT	
PST	
Carbon Tax	
Total BC Provincial Revenues	
Less: Carbon Tax	
Total BC Provincial Revenues (ex Carbon Tax)	

Note: table above may not add due to rounding of base data

This table shows that:

s13, s17, s21

The following chart shows the breakdown of potential Provincial revenue over time under potential low and high scenarios (Scenarios 6 and 9) with Base Capacity assumptions:

s13, s17, s21

s13, s17, s21

The following chart illustrates the range of total Provincial revenue in real $2012:

s13, s17, s21

5.2 Comparison with the Australia Case

The following chart illustrates the indicative range of potential Provincial revenue outcomes in real $2012 under the Australia and BC Cases described in this Report:

s13, s17, s21

s13, s17, s21

Appendix A Price Forecasts

Price forecasts for NG and LNG used for the purposes of the analysis in the Report are based on:

s13, s17, s21

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Grant Thornton

Potential LNG Revenue to the BC Government

Ministry of Energy, Mines and Natural Gas

February 2013

Grant Thornton

February 15, 2013

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Province of British Columbia
Ministry of Energy, Mines and Natural Gas
PO Box 9319, Stn Prov Govt
Victoria, BC V8W 9N3

Attention: Mr. Brian Hansen, Assistant Deputy Minister

Dear Mr. Hansen:

Re: LNG Plant Tax Revenue Impact Review; Grant Thornton Contract #C13CFFS26568

In accordance with the terms of our engagement, we have compiled a projection of estimated tax revenues related to the construction and operation of five liquefied natural gas plants proposed to be located in British Columbia and provide this report summarizing our findings.

If you have any questions which arise from your review of this report, please contact us.

Yours sincerely,

Patti Daum, CA•CBV
Matthew McKenna, CA•CBV
Partners, Advisory Services

Darren Bank, CA
Partner, Tax

/aaw

Grant Thornton

Contents

Introduction and summary of findings

Background

The Ministry of Energy, Mines and Natural Gas (the "Ministry" or the "Province") is currently evaluating proposals for the development of liquefied natural gas infrastructure ("LNG") in British Columbia. As part of the evaluation, the Province is analyzing the potential Provincial revenues under various LNG development scenarios. Grant Thornton LLP ("we", "our" or "Grant Thornton") understands that, at the time of the analysis, the Province had not taken any formal position with respect to the potential revenue framework which may or may not be implemented to facilitate this infrastructure development.

We were engaged by the Province to perform a review of a financial model previously developed for the Province that estimates revenues of the assumed LNG. The purpose of this engagement was to review the model for methodology, approach, selected input parameters, and to assess the appropriateness of the same. Upon the completion of our review, we revised the model as required to compile a range of potential future Provincial revenue from LNG.

A list of defined terms, which are used throughout this report, is included below.

Definitions

The following definitions support our discussion on the revenue impacts of the proposed LNG projects.

Capex – funds used by a company to acquire or upgrade physical or capital assets.

Downstream components of an LNG project – LNG liquefaction and purification plants inclusive of LNG trains, condensate handling facilities, loading facilities for exportation, and a pipeline to transport the gas onshore.

EIA Price Forecast – the US Energy Information Administration that provides summarized market data pertaining to the US natural gas market, including but not limited to prices, supply and consumption. The EIA Price Forecast utilized in this analysis is the 2012 version.

Potential Provincial revenue – includes:

1. Corporate income tax – only the BC portion
2. Personal income taxes (for direct, indirect, and induced employment)
3. Royalties
4. Provincial Sales Tax (PST)
5. New LNG revenue framework

Excluded revenue sources are:

1. Carbon tax
2. Any indirect and induced tax revenues beyond personal income tax

Leverage – the amount of debt used to finance a company's assets

Liquefied Natural Gas – the liquefied state of natural gas which is created by cooling the gas to approximately -160 degrees Celsius; energy companies change the state of natural gas into liquid form mainly for ease of transport overseas

MTA – million tonnes per annum

Opex – operating costs

Royalties – usage-based payments made by one party to another. The Province charges royalties on natural gas.

Starting Base Amounts – the starting base is designed to recognize the value of investments in petroleum interests that are transitioning into the (Australian) Petroleum Resource Rent Tax regime

Upstream – includes processing and delivery to export terminals or domestic gas transmission pipeline in-take

Summary

The total estimated cumulative Provincial revenues are as follows:

Expressed in billions (2011 to 2038[1])	Low	High
Total provincial revenues – Base Case	$130	$180

The revenue estimate above is reflective of a base case scenario of 82 MTA for the assumed five plants. The high and low range is reflective of a range of assumptions utilized in the financial model, as described in the report section titled "Base case assumptions", below.

[1] Pre-project construction and LNG project construction period commences 2011; operating period revenue estimate period is 20 years ending 2038.

Further, Provincial revenue was estimated for a high capacity scenario whereby we assume 120 MTA of capacity for the assumed five plants. Under this scenario, Provincial revenues are estimated at $160 to $270 billion over the period.

The Provincial revenue estimates presented above have been compiled based on sets of assumptions and other information available at the date of this report. Financial estimates are subject to change and such change can have material impacts on the Provincial revenues (for example, world LNG prices, plant configuration, employment costs, etc.).

Base case assumptions

The key assumptions provided to us by the Province included the EIA price forecast, CBOE price forecast, Opex and Capex. We applied a 20% reduction to the EIA price forecast in order to establish the low end of the range of Provincial revenue. The unadjusted EIA price forecast reflects the high end of the range.

We have adjusted the Opex results by 15% on the low end of the range (assuming costs will be 15% higher) and by 10% on the high end (assuming costs will be 10% higher). We have adjusted Capex by 25% on the low end of the range (assuming costs will be 25% higher) and by 10% on the high end (assuming costs will be 10% higher than that forecast by the Province).

Other key assumptions impacting the estimates include the financial structuring of the proponents (on an aggregated basis), the cost of borrowing, the net Provincial tax rate, the Provincial royalty rate and the quantum of MTA capacity. The timing of the operating revenue estimation framework spans 20 years in the model, commencing 2018.

The estimated direct, indirect and induced full-time equivalent jobs resulting from construction and operation were provided by the Province based on another study provided by Grant Thornton LLP.

The model does not project revenue on a stand-alone project-by-project basis. The financial model is an aggregated model summarizing potential revenue for five plants. We have assumed that this aggregated approach (as opposed to a plant-by-plant approach) does not materially impact the results.

Given that the financial model was not prepared on a project-by-project basis, a direct analysis of the development and operating cost modelled to actual projects was not possible. However, we utilized our knowledge and understanding of various infrastructure projects to assess the implied average project cost based on the assumptions provided by the Province. Our experience has been gained from involvement with North American energy infrastructure projects including LNG operations (Canada and United States) and LNG infrastructure projects in Australia.

Scope and information relied upon

Scope of work

The scope of work for this assignment included the following steps (and is described more fully in the section Processes and Methodology):

1. Analyze the Australian tax regime as it pertains to LNG revenue and natural gas in general;

2. Obtain a detailed understanding of the financial model prepared by the Province and its advisors;

3. Gain a sufficient understanding of the possible BC LNG framework as provided by the Province;

4. Analyze the base case scenario information (number of plants, Opex, Capex, revenue estimate, capacity, timing, etc.) as provided by the Province; and

5. Liaise with the Province and incorporate their assumptions and parameters into the model. Make adjustments as necessary to arrive at high and low revenue estimates based on a range of assumed potential outcomes. Please refer above to the definition of Potential Provincial revenue for a description of potential revenue sources.

The scope of work for this assignment has been limited to a review of the projected revenue estimates based on assumptions provided by the Province and its advisors and not a review of a feasibility study and/or business plan of any particular LNG plant(s) and may not reflect assumptions for any particular plant(s). Accordingly, there may be pertinent information in the feasibility studies and/or business plans for the LNG projects which could have a material impact on our analysis.

The revenue estimates do not include any federal government or other Provincial revenues which include indirect and induced tax revenues beyond personal income tax. Further, while carbon tax is not included in the revenue estimates, it was calculated because it is an eligible expense for income tax purposes.

Please note we have not audited any of the underlying information or data contained in this report.

Information relied upon

In completing this review, we relied upon the following documents and information:

1. The aggregated financial model prepared by advisors to the Province, inclusive of various key assumptions as contained at Appendix A to this report, the "Deetkan model";
2. The Grant Thornton LLP Employment Impact Review dated February 2013: http://www.empr.gov.bc.ca/OG/Documents/Grant%20Thornton%20-%20LNG%20Employment%20Impacts.pdf
3. Various correspondence with Grant Thornton LLP tax advisors in Australia, inclusive of information gathered on LG operations, construction and tax regimes and our experience from actual energy infrastructure projects in North America including LNG terminals;
4. Various articles and referenced throughout this document and contained at the following links:
    a. http://www.theaustralian.com.au/national-affairs/new-tax-wont-hit-us-say-gas-and-oil-giants/story-fn59niix-1226457776822
    b. http://www.grantthornton.com.au/Issues-and-Challenges/Carbon_Scheme/FAQ.asp
    c. http://www.ft.com/cms/s/0/62e4f5e8-3f84-11e2-b0ce-00144feabdc0.html#axzz2IrkIODhG
    d. http://www.miningweekly.com/article/bg-group-warns-queensland-lng-project-to-cost-5bn-more-2012-05-04
    e. http://www.deedi.qld.gov.au/documents/energy/gas-market-review-2012.pdf
    f. http://www.ret.gov.au/resources/Documents/resource_taxation/Gas_Transfer_Price_Methodology.pdf
    g. http://www.google.com.au/url?sa=t&rct=j&q=bg%20group%20fid%20gladstone%20irr&source=web&cd=7&ved=0CFMQFjAG&url=http%3A%2F%2Fwww.aemo.com.au%2FGas%2FPlanning%2FGas-Statement-of-Opportunities%2F~%2Fmedia%2FFiles%2FOther%2Fplanning%2FEastern_SouthEastern_Australia_Projections_of_Gas_Demand_for_LNG_Export%2520pdf.ashx&ei=XLoAUePaAuSimQX6iYGgDg&usg=AFQjCNHSdHNc8JHgRrw_CvabJcaSnsSqjA
5. Various correspondence with Provincial officials and their advisors.

Processes and methodology

Summary of process and methodology

To prepare this revenue summary report, we used base case scenario information, analysis and data provided by the Province and its advisors with regard to plant size, capacity, development cost and operating costs, utilizing the timeframe as noted above under Base Case Assumptions. Our process and methodologies are summarized as follows:

1. Given the importance of Australia as a competitor jurisdiction in the Asia Pacific market, an understanding of an Australian-based revenue regime was considered important. As such, based on our Firm's knowledge of Australian LNG taxation, we reviewed the financial model prepared by the Province's advisors for completeness and accuracy in terms of interaction between the Australian royalty regime, Australian Petroleum Resource Rent Tax (PRRT) legislation and the Australian income tax legislation.

2. With consideration to the Australian tax regimes as described above, and using the BC LNG revenue framework provided by the Province as outlined in the Base Case Assumptions, we compiled a range of financial estimates that applied the BC revenue framework to present a range of results reflecting the application of assumptions and scenarios as outlined at Appendix A. The estimation of a range of total potential Provincial revenues required the development of a financial model which included the infrastructure development period for the upstream, pipeline and downstream operations. Upon the completion of the infrastructure development period, the model was evolved to include the operations period.

3. Based on information available to us, we assessed the appropriateness of pricing models upon which to price LNG, and provided commentary thereon. In doing so, we reported on the best practices already adopted and utilized in Australia.

4. Based on the calculated government take through royalties and various forms of taxation based on the assumed inputs as outlined at Appendix A, we assessed the resultant internal rates of returns ("IRR") expected to be generated by the proponents.

5. Finally, we reported on any other factors identified in our analysis.

The aggregated financial model was utilized to produce the various levels of annual expected taxable income from the LNG infrastructure over the revenue estimation period. Utilizing this information we applied various proposed BC revenue framework assumptions to calculate the estimated provincial revenues.

1. As summarized above, the total estimated Provincial revenue for the Base Case over the construction and 20-year operation period assuming 82 MTA capacity ranges from $130 to $180 billion.

2. The Province requested an estimate of revenue based on 120 MTA capacity (High Capacity) for five plants and the result was $160 to $277 billion. When moving from 82 MTA to 120 MTA, each facility has additional throughput capacity which enhances their potential to capture additional revenue. As a result of this increase in throughput capacity, the individual plant infrastructure cost also increases. We have considered these factors in assessing the potential Provincial revenues under a high capacity assumption. The higher capacity has resulted in additional market supply and as a result we have taken a more conservative view of the potential revenues when producing the low range.

The following paragraphs describe, in more detail, the major categories of work undertaken in the project.

Step 1: Review of the Australian tax regime and impact on forecast LNG revenues

As noted above, Australia is an important competitor jurisdiction in the Asia Pacific market. As such, Australia has an established tax regime in place and the financial model prepared on behalf of the Province assumes that the Australian PRRT law is applied to potential LNG projects. The first stage of the financial model, as prepared by the Province's financial advisors, identified the range of possible provincial government revenues that may be achieved upon the introduction of an Australian equivalent royalty, PRRT and Carbon Tax regime.

With the expertise of our Australian Grant Thornton LLP tax practitioners, we reviewed the model for completeness and accuracy in terms of interaction between the Australian royalty regime, Australian PRRT legislation, and Australian income tax legislation. The focus of this review was to identify any material gaps in expected provincial government tax cash flows relative to those produced by the model, after making any required adjustments.

Where any assumptions have been identified that may give rise to material differences in provincial government revenues and require further consideration, these have been noted below in the section headed Step 2: Model Review.

Where any exogenous factors have been identified that may materially impact on the provincial government revenue collected, these have been noted below in the section headed Other Factors.

Where possible, we have attempted to describe the anecdotal movement in revenues based on our experience and understanding of design of the Australian PRRT regime and the potential impact of existing Canadian federal and British Columbia tax laws.

Background - PRRT

By way of background, the PRRT is a form of Resource Rent Tax, a taxation system designed by two Australian economists in the 1970's. The theory behind a Resource Rent Tax is that it taxes the economic rents of a non-renewable resources project as close to the extraction point as possible. That is, the profits of the project are taxed, not any value added processes after extraction, the theory being that the government shares in the total profits of the project, not in a percentage of extraction (such as a royalty), that can distort investment behaviours.

In the Australian context, largely due to constitutional issues, the states have the ability to impose royalties (the commodity being state property until extraction), whereas the federal government has the ability to tax profits. This has led to a system whereby state royalties are credited against the federal PRRT to ensure there is no distorting effect.

Findings

s13, s17, s21

[2] Announcement 10 May 2010, with effect from 1 July 2012

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

http://www.theaustralian.com.au/national-affairs/new-tax-wont-hit-us-say-gas-and-oil-giants/story-fn59niix-1226457776822

s13, s17, s21

s13, s17, s21

s13, s17, s21

Please see below several announcements in relation to publicly available information identified:

http://www.ft.com/cms/s/0/62e4f5e8-3f84-11e2-b0ce-00144feabdc0.html#axzz2IrkIODhG

http://www.miningweekly.com/article/bg-group-warns-queensland-lng-project-to-cost-5bn-more-2012-05-04

s13, s17, s21

s13, s17, s21

s13, s17, s21

s13, s17, s21

[4] Page 27 http://www.deedi.qld.gov.au/documents/energy/gas-market-review-2012.pdf

s13, s17, s21

A copy of the pricing methodology theory can be found here:

http://www.ret.gov.au/resources/Documents/resource_taxation/Gas_Transfer_Price_Methodology.pdf

s13, s17, s21

[5] Table 5.3
http://www.google.com.au/url?sa=t&rct=j&q=bg%20group%20fid%20gladstone%20irr&source=web&cd=7&ved=0CFMQFjAG&url=http%3A%2F%2Fwww.aemo.com.au%2FGas%2FPlanning%2FGas-Statement-of-

s13, s17, s21

Opportunities%2F~%2Fmedia%2FFiles%2FOther%2Fplanning%2FEastern_SouthEastern_Australia_Projections_of_Gas_Demand_for_LNG_Export%2520pdf.ashx&ei=XLoAUePaAuSimQX6iYGgDg&usg=AFQjCNHSdHNc8JHgRrw_CvabJcaSnsSqjA

s13, s17, s21

Forward-looking statement disclaimer

The financial estimates contained in this report are intended to measure the potential impact created under a given set of assumptions for a particular sector. These estimates relate to future events or future performance and reflect expectations regarding the growth, results of operations, performance, business prospects and opportunities, and industry performance and trends. A number of factors could cause actual events or results to differ materially from the results discussed in the forward-looking estimates.

The estimates are not forecasts and this report is not intended to attribute any probability that those impacts will occur or not occur in future. The estimates are merely to illustrate the potential Provincial revenue impacts under a given set of assumptions, following a systematic approach to analyzing and modelling collected information. Further, the estimates do not reflect the actual or expected total impact on the overall outlook for the BC economy and provincial government revenues, as changes in other sectors will also affect that outlook.

Restrictions and qualifications

Restrictions

This report is not intended for general circulation or publication nor is it to be reproduced or used for any purpose other than that outlined above without our prior written permission in each specific instance. We will not assume any responsibility or liability for losses occasioned to the Province or any third party, as a result of the circulation, publication, reproduction or use of this report contrary to the provisions of this paragraph.

Our analyses are based upon information provided by and/or on behalf of the Province. We assume no responsibility and make no representations with respect to the accuracy or completeness of any information provided by and/or on behalf of the Province. You acknowledge that no reliance shall be placed on draft analyses, conclusions or advice, whether oral or written, issued by us since the same may be subject to further work, revision and other factors which may mean that such drafts are substantially different from any final advice issued.

We reserve the right, but are under no obligation, to review all calculations included in or referred to in this report and, if we consider it necessary, to revise our estimates in the light of any information existing at the date of this report which becomes known to us after the date of this report.

The liability of Grant Thornton LLP and any of our employees or other personnel for any claim in tort or contract related to professional services provided pursuant to our agreement is limited to the amount of professional fees actually paid for those services.

Qualifications

In preparing this report, we have relied upon the documents and information listed herein.

We are not guarantors of the information upon which we have relied in preparing our report, and except as stated, we have not audited or otherwise attempted to verify any of the underlying information or data contained in this report.

Appendix A – Key assumptions

Ministry of Energy, Mines and Natural Gas
Potential LNG Revenue to the BC Government
February 2013

Key BC Model Assumptions

Base case scenario	
Calendar year	
Year #	
NG Price - EIA Forecast	
LNG Price - EIA Forecast	
LNG Volumes (Millions of MMBtu) (provided by Province)	
NG Volumes (Millions of MCF) (provided by Province)	
	s13, s17, s21
Upstream Operating Costs (provided by Province)	
Upstream Cap Ex (provided by Province)	
Upstream Depreciation (provided by Province)	
Pipeline Operating Expenditures (provided by Province)	
Pipeline Capital Expenditures (provided by Province)	
Pipeline Depreciation (provided by Province)	
Downstream Operating Expenditures (provided by Province)	
Downstream Capital Expenditures (provided by Province)	
Downstream Depreciation (provided by Province)	s13, s17, s21
Royalties (provided by Province)	
PRRT (provided by Province)	
Provincial tax leakage (provided by Province)	
Income Tax (provided by Province)	
Provincial income tax rate modeled	
Tax shield on interest expense	
CAPEX eligible for PST (provided by Province)	
PST	
Motor fuel tax (provided by Province)	
New LNG tax (provided by Province)	
Interest on debt	
Term in years	
Debt proportion	
Equity proportion	
Personal income tax - construction - direct (provided by Province)	
Personal income tax - construction - indirect (provided by Province)	
Personal income tax - construction - induced (provided by Province	
Personal income tax - operating - direct (provided by Province)	
Personal income tax - operating - indirect (provided by Province)	
Personal income tax - operatings - induced (provided by Province)	

Key BC Model Assumptions

Base case scenario		
Calendar year		
Year #		
NG Price - EIA Forecast		
LNG Price - EIA Forecast		
LNG Volumes (Millions of MMBtu) (provided by Province)		
NG Volumes (Millions of MCF) (provided by Province)		
	s13, s17, s21	s13, s17, s21
Upstream Operating Costs (provided by Province)		
Upstream Cap Ex (provided by Province)		
Upstream Depreciation (provided by Province)		
Pipeline Operating Expenditures (provided by Province)		
Pipeline Capital Expenditures (provided by Province)		
Pipeline Depreciation (provided by Province)		
Downstream Operating Expenditures (provided by Province)		
Downstream Capital Expenditures (provided by Province)		
Downstream Depreciation (provided by Province)		

Key BC Model Assumptions

Base case scenario
Calendar year
Year #

NG Price - EIA Forecast

LNG Price - EIA Forecast

LNG Volumes (Millions of MMBtu) (provided by Province)

NG Volumes (Millions of MCF) (provided by Province)

s13, s17, s21

Upstream Operating Costs (provided by Province)
Upstream Cap Ex (provided by Province)
Upstream Depreciation (provided by Province)

Pipeline Operating Expenditures (provided by Province)
Pipeline Capital Expenditures (provided by Province)
Pipeline Depreciation (provided by Province)

Downstream Operating Expenditures (provided by Province)
Downstream Capital Expenditures (provided by Province)
Downstream Depreciation (provided by Province)

s13, s17, s21

DISCLAIMER

This financial model (the "Model") has been prepared by Deeken in its role as advisor to the Province of British Columbia. ("BC"). Grant Thornton has relied on information provided by BC in producing the Model changes which include increased flexibility for data inputs and leverage assumptions.

The Model is confidential and contains confidential information . Reproduction, distribution or modification is expressly prohibited.

The Model has not been audited by Grant Thornton. Recipients should carry out their own due diligence and appraisal of its content. All model coding changes are performed at the sole risk of the user.

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Anyone using the Model does so at their own risk and no liability or responsibility is accepted by Grant Thornton for any direct or indirect losses which might result from such use.

Summary

Government Take as a % pre-tax cash flow
Government Take as a % operating income

Royalties
PRRT
Income Tax
Carbon Tax

Total Annual Tax Take
Discount Rate

s13, s17, s21

Present Value of Tax Take

Total Annual Pre-Tax Cash Flow, 2012
Total Annual After-Tax Cash Flow, 2012

Pre-Tax IRR, 2011
After-Tax IRR, 2011

Pre-Tax IRR, 2012
After-Tax IRR, 2012

Inputs

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
NG Price ($ / MMBtu)																		
EIA Forecast																		
CBOE Forecast																		
LNG Price ($ / MMBtu)																		
EIA Forecast																		
CBOE Forecast																		

Pricing Inputs

NG Price - EIA Forecast Change
NG Price - CBOE Forecast Change

NG Price - EIA Forecast
NG Price - CBOE Forecast

LNG Price - EIA Forecast Change
LNG Price - CBOE Forecast Change

LNG Price - EIA Forecast
LNG Price - CBOE Forecast

Project Inputs

s13, s17, s21

s13, s17, s21

Upstream Operating Costs Change
Upstream Cap Ex Change
Upstream Depreciation Change

Upstream Operating Costs
Upstream Cap Ex
Upstream Depreciation

Pipeline Operating Expenditures Change
Pipeline Capital Expenditures Change
Pipeline Depreciation Change

Pipeline Operating Expenditures
Pipeline Capital Expenditures
Pipeline Depreciation

Downstream Operating Expenditures Change
Downstream Capital Expenditures Change
Downstream Depreciation Change

Downstream Operating Expenditures
Downstream Capital Expenditures
Downstream Depreciation

Carbon Emissions (Downstream) - Tonnes
Carbon Emissions (Downstream) - Change

LNG Volumes (MMBtu) Change
NG Volumes (Millions of MCF) Change
Long Term Bond Rate Change
Risk Premium (for RPM capital allowance) Change

LNG Volumes (MMBtu)

2029	2030	2031	2032	2033	2034	2035	2036	2037	2038

s13, s17, s21

NG Volumes (Millions of MCF)

Advanced Pricing Agreement ($/MMBtu)
Comparable Uncontrolled Price ($/MMBtu)

Starting Base Expenditure % over long term bond rate
General Expense Pool Compound Rate % over long term bond rate
Royalty Compound Rate % over long term bond rate

Discount rate for total annual tax take

Royalty Rate
PRRT
Income Tax
Carbon Tax ($ / Tonne)

Upstream + Pipeline Capex

Debt Inputs

Amount of initial debt
Interest on debt
Term

Portion of downstream equity financed by debt

s13, s17, s21

s13, s17, s21

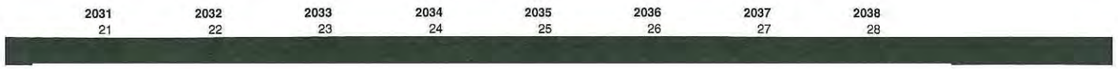
s13, s17, s21

Page 102 redacted for the following reason:
- -
s13, s17, s21

All values expressed in millions $ unless otherwise indicated	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Inputs																				
Project Financial Inputs																				
Total Revenue																				
s13, s17, s21																				
Upstream Operating Costs																				
Upstream Cap Ex																				
Upstream Depreciation																				
Pipeline Operating Expenditures																				
Pipeline Capital Expenditures																				
Pipeline Depreciation																				
Downstream Operating Expenditures																				
Downstream Capital Expenditures																				
Downstream Depreciation																				
Interest expenditure																				
Pre-Tax Cash Flow																				
Operating Income																				
Other Inputs																				
Carbon Emissions (Downstream) - Tonnes																				
LNG Price ($ / MMBtu)																				
Natural Gas Price ($ / MMBtu)																				
LNG Volumes (MMBtu)																				
NG Volumes (Millions of MCF)																				
Long Term Bond Rate																				
Risk Premium (for RPM capital allowance)																				
Australia - Regime Analysis																				
PRRT Taxable Income Calculation																				
Gas Transfer Price (assume RPM used)																				
Advanced Pricing Agreement ($/MMBtu)																				
Residual Profit Methodology																				
Cost-plus-price ($/MMBtu)																				
Net-back Price ($/MMBtu)																				
RPM Price ($/MMBtu)																				
Comparable Uncontrolled Price ($/MMBtu)																				
Total Income Subject to PRRT																				
Operating Profit Subject to PRRT																				
Deductions																				
Starting Base Expenditure																				
Carry Forward Pool beginning balance																				
Upstream + Pipeline Capex																				
Deductions																				
Carry Forward Pool Ending Balance																				
General Expense Pool Compound Rate																				
Carry Forward Pool beginning balance																				
Upstream + Pipeline Capex																				
Deductions																				
Carry Forward Pool Ending Balance																				
s13, s17, s21																				
Deduction																				
Carry Forward Ending Balance																				
s13, s17, s21																				
Deductions																				
Carry Forward Ending Balance																				
Royalty Compound Rate																				
Royalty Carry Forward Pool beginning balance																				
Total Royalties																				
Royalty Deduction																				
Royalty Carry Forward Pool Ending Balance																				
No Aquired Exploration Expenditure																				
No Closing-Down Expenditure																				

s13, s17, s21

s13, s17, s21



s13, s17, s21

Pages 105 through 106 redacted for the following reasons:
- -
s13, s17, s21

Long term debt

Period counter - year
Period

Amount of initial debt
Interest on debt
Term

	Opening balance
+	**Advances**
	Interest expense
-	**Principal payment**
	Ending balance

s13, s17, s21

Tax shield

Interest expense
Tax rate

Page 108 redacted for the following reason:
- -
s13, s17, s21

Leverage

Period counter - year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Period	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Debt : Equity																				
Reported total liabilities																				
Liability adjustments																				
Reported equity																				
Equity adjustments																				
Debt to Equity																				

s13, s17, s21

Page 110 redacted for the following reason:
- -
s13, s17, s21

Draft Indicative Assessment of Projections – Abridged Summary

Taxation of Liquefied Natural Gas Projects in BC

8 February 2013

PLEASE NOTE

s13, s17, s21

Pages 112 through 117 redacted for the following reasons:
- -
s13, s17, s21

Grant Thornton

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Background

Company A	has ownership of the production licence and has ownership of the natural gas being produced therefrom.
Company A	hires Company B to extract and process the natural gas for them on their behalf.
Company B	incurs large amounts of capital costs to build the processing facility and charges Company A a processing fee (toll fee).
Company C	builds storage facilities which will store Company A's gas before sale. Company C charges Company A a storage fee.
Company D	is an offshore gas marketer who acquires the gas from Company A and resells it for a profit. Company D may also acquire unprocessed natural gas (before it is a marketable petroleum product) from Company A and resell it for a profit.

Questions

s13, s17, s21

s13, s17, s21

Response

s13, s17, s21

s13, s17, s21

Section 58 of the PRRT legislation provides that:

> *Where:*
>
> ***(a)*** *under a transaction, a person has incurred eligible real expenditure in relation to a petroleum project;*
>
> ***(b)*** *the Commissioner, having regard to any connection between the parties to the transaction or to any other relevant circumstances is satisfied that the transaction was not an arm's length transaction;*
>
> ***(c)*** *the amount of the expenditure referred to in paragraph (a) was more than the amount (in this section referred to as the* ***reduced expenditure****) that could reasonably have been expected to have been the amount of that expenditure if the transaction were an arm's length transaction; and*
>
> ***(d)*** *the Commissioner determines that this section should apply in relation to the person in relation to the transaction;*

then, for the purposes of the application of this Act in relation to the person in relation to the transaction, the amount of the expenditure referred to in paragraph (a) shall be taken to be equal to the reduced expenditure.

Grant Thornton

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Regarding point 6)

I think we are assuming that your assumed starting base for a project is treated similarly to operating losses, meaning they can be transferred between projects to minimize tax exposure. We would appreciation if this is the case, and if so, we are ok.

s13, s17, s21

Pages 123 through 124 redacted for the following reasons:
- -
s13, s17, s21

Kitimat Poised to See Resurgence in Exports

By Dan Schrier

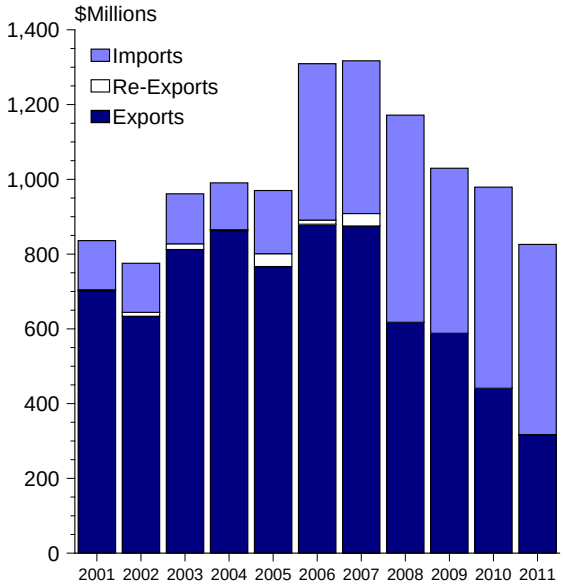
Kitimat, a town with a population of around 9,100 located in B.C.'s northwest, has long punched above its weight in terms of being a source for exports from the province. Since its inception Kitimat has been home to the Alcan Smelter (now Rio Tinto Alcan), a major aluminum producer. Until recently, it was also the location of a large pulp and paper mill and it once housed a methanol plant as well. In its peak years, close to $1 billion worth of merchandise exports were shipped through the Port of Kitimat.

However, the Methanex methanol and ammonia plant was permanently closed in 2005 and the Eurocan pulp and paper mill shut down for good in January 2010. The closure of the pulp and paper mill in particular was a large blow for the municipality as over 500 jobs were lost to the community.

The volume of goods shipped through the Port of Kitimat has slumped over the last four years, first as a consequence of the global economic downturn, which affected demand for the goods produced in Kitimat and more recently, due to the shutdown of the pulp and paper mill and the closure of two pot lines in the aluminum smelter in preparation for modernization of the plant.

While the closures of the Methanex plant and the Eurocan mill have been tough for Kitimat, their former sites could play a major role in Kitimat's resurgence. The Eurocan site has been purchased by a partnership comprised of Apache Canada Ltd., EOG Resources Canada Inc., and Encana Corporation who together own Kitimat LNG, which plans to build a liquefied natural gas (LNG) facility on the Haisla First Nation's land adjacent to Kitimat. The Eurocan site is expected to be used as a staging area, with a workers' camp and an area for loading and unloading materials to be used in the construction of the liquefaction plant. The former Methanex site was purchased by Royal Dutch Shell, which plans to build yet another LNG plant on the site.

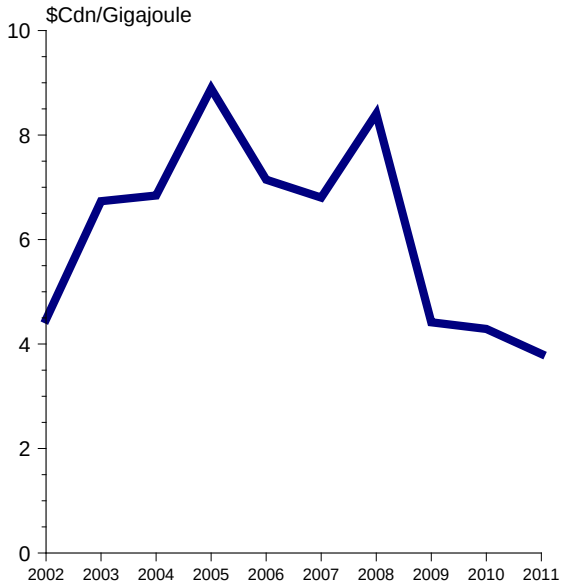
The value of goods exported from the Port of Kitimat has fallen the last four years



Source: Statistics Canada

The Kitimat LNG project is expected to begin construction in 2012 and has already received approval from the National Energy Board to export LNG. The plant is expected to be operational by 2015, with an initial annual production of five million tonnes and plans to eventually double that. The primary market for the LNG will be Asia, where prices for LNG are far higher compared to those in North America.

The price of exported natural gas has slumped in recent years with growth in supply



Source: National Energy Board

Natural gas prices in North America spiked in 2005 when hurricanes Rita and Katrina disrupted the supply from the U.S. Gulf of Mexico, then fell for a couple of years before jumping again in 2008 when record oil prices created demand for alternative energy supplies. In more recent years, the price of natural gas has dropped significantly as new discoveries have increased the North American supply of gas and created somewhat of a glut on the market.

In particular, major discoveries of shale gas reserves, such as the one in the Horn River Basin in Northeast British Columbia, combined with technological improvements in extraction methods that have made it more economical to extract shale gas, have boosted the supply of gas in North America such that it exceeds demand. Normally, an excess domestic supply, combined with demand elsewhere, would result in the product being exported; however, in order for natural gas to be shipped overseas it must first be liquefied. Currently there is only one natural gas liquefaction facility in North America. The Kenai LNG plant in Alaska was scheduled to terminate operations at the end of December 2011, but it appears it may resume shipments in 2012. Regardless of whether or not the plant does resume operation, it is much smaller in scale than the one planned by Kitimat LNG and is nowhere near large enough to deal with the large volume of potential exports.

The dearth of gas liquefaction facilities in North America coupled with the bountiful supply of gas served as the impetus for the development of an LNG export facility in Kitimat. However, the Kitimat LNG project isn't the only LNG facility planned for Kitimat. As noted above, Shell is also planning to build an LNG plant and there is also a third project planned for the area.

The Shell project as planned could be even larger than the Kitimat LNG facility. The purchase of the vacated industrial site in Kitimat is a good indication that Shell and its partners are serious about proceeding with the project. Just last month, it was announced that PetroChina Co. Ltd. has committed to partner with Shell in a shale gas operation in B.C., which should reduce Shell's development costs and makes it that more likely that the Kitimat facility will proceed.

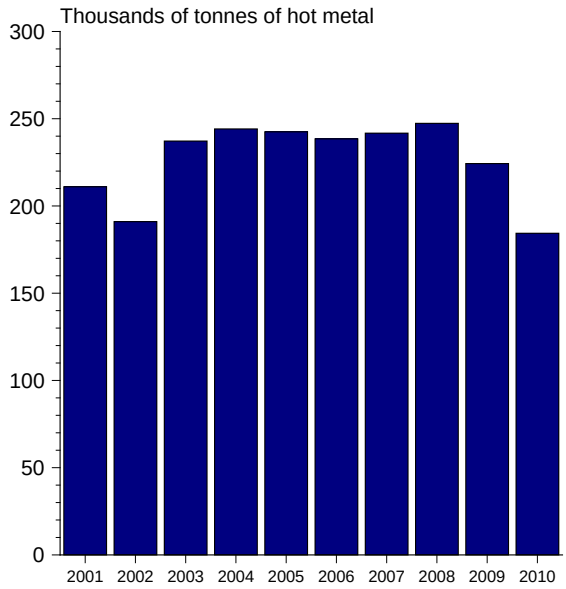
The third proposed LNG plant by the Douglas Channel Energy Partnership would be a small-scale floating terminal on the Douglas Channel within the District of Kitimat and the Haisla Nation territory. Initial production would be 700,000 tonnes per year, increasing to 900,000 tonnes. The National Energy Board has approved the company's application for an export license and the expectation is that production of LNG could start early in 2014.

While Kitimat appears poised to become a hub for LNG production, those are not the only major projects potentially on the horizon for the community. For example, there is the much publicized proposal by Enbridge Inc. to construct a pipeline from Alberta to Kitimat and to build a marine terminal in Kitimat for the export of oil to Asia. Unlike the LNG projects, which have generally been positively received, the Enbridge Northern Gateway Pipeline proposal has garnered a great deal of protest, with opinion, even in Kitimat, split between those who see it as a huge economic opportunity and those who believe it poses too much of a risk to the environment. The proposal will have to clear a number of hurdles including an environmental review process if it is to proceed.

In addition to the potential of new industry being developed in Kitimat, there has also been positive news with regard to the main industry currently operating in the municipality, the Rio Tinto Alcan aluminum smelter. After years of delays, it appears that the company is ready to proceed with modernization of the existing smelter. The project will boost the smelter's current production capacity from around 282,000 tonnes per year to approximately 420,000 tonnes annually. While there will be a reduction in employment associated with the modernization due to gains in efficiency, it will ensure that the smelter remains operating well into the future, which will secure around 1,000 well-paying jobs in the community.

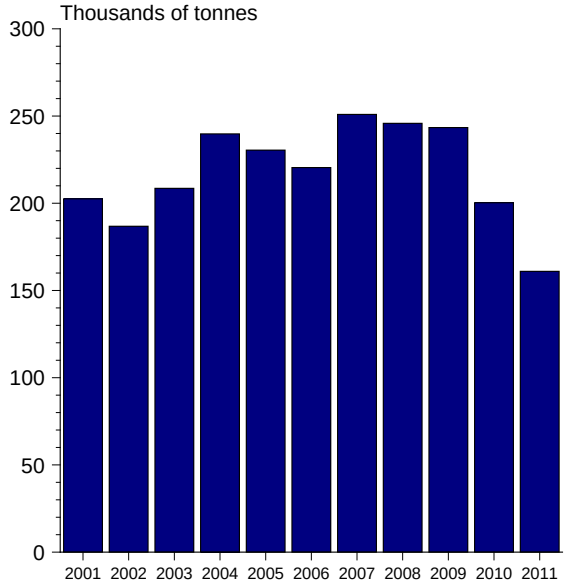
The project has already started with the decommissioning and demolition of two pot lines to make way for construction of the new facility. The closure of the lines is reflected in the drop in production at the smelter and also can be seen in the reduction in B.C.'s exports of unwrought aluminum over the last couple of years.

Production at the Kitimat Smelter dropped in 2010 as a result of the closure of two potlines in preparation for re-modernization



Source: Rio Tinto Alcan

The drop in production is mirrored by the dip in BC's exports of unwrought aluminum



Source: Statistics Canada

The Kitimat smelter has always had a competitive advantage due to the availability of inex-

pensive hydro power, but over the years that advantage has been eroded due to out of date smelting technology. With the modernization of the plant, the Kitimat smelter will become one of the most efficient and lowest-cost smelters in the world and will have the additional benefit of cutting greenhouse gas emissions approximately in half.[1]

Once the modernized smelter is in full production, there should be a substantial increase in B.C.'s aluminum exports. The LNG facilities offer the potential for a major jump in exports as well, which puts Kitimat in a position of becoming one of the top exporting centres in the province. The Port of Kitimat is already the third largest in the province, behind only Port Metro Vancouver and the Port of Prince Rupert. The expansion in aluminum production and the possible addition of new industry in Kitimat and the surrounding area could herald a major resurgence in exports for the community and its port.

[1] Rio Tinto Alcan, "Rio Tinto Alcan Works Modernization."
http://investnorthwestbc.ca/major-projects-and-investment-opportunities/map-view/kitimat/rio-tinto-alcan-kitimat-works-modernization

BRITISH COLUMBIA LOCAL AREA ECONOMIC DEPENDENCIES: 2006

AUTHOR: GARRY HORNE

MARCH 2009

BRITISH COLUMBIA
The Best Place on Earth

BCStats

Funding for this project was made possible through the Labour Market Information initiative under the Canada-British Columbia Labour Market Agreement (LMA), which is administered for BC by the Ministry of Advanced Education and Labour Market Development.

Table of Contents

Preface

This report was prepared to provide up-to-date consistent information on the local economies in the rural areas of the province of British Columbia and to help in the estimation of the economic impacts of changes in those local economies. It is the latest in a series of reports that use data from the Canadian Census and other sources.

A number of people in BC Stats were particularly helpful in the preparation of this report. These include Chris McIntosh, Paul Gosh, Natalie Work, Pat Bluemel and Don McRae.

An early draft of this report was reviewed by interested personnel in BC Stats and their comments helped to shape the final product. However, any errors, incoherence, or other shortcomings that remain are the full responsibility of the author.

Abstract

This report presents economic information about 63 local areas in the province of British Columbia. Specifically, it provides tables and maps that identify and quantify the sources of income that support the local economies in each of these areas. In addition, it presents ratios that can be used to estimate the impacts on employment and income resulting from changes in these sources. The local areas cover the entire province with the exception of the Greater Vancouver Regional District (GVRD).

The results in the report rely on an economic base perspective and detailed information from the 2006 Census of Canada, and other sources. Changes in the results during the period 1991 - 1996 - 2001 – 2006 are presented and discussed. Use of the tables in this report for estimating economic impacts is illustrated by a number of examples. Appendices provide additional analysis and information that may be useful for regional studies.

1. Introduction

This report is the latest in a series of reports that have utilized Census and other economic data to focus on local areas throughout the province of British Columbia. This report is based primarily on data resulting from the 2006 Canadian Census. Similar earlier reports were based on results from the 1991 [1][1], 1996 [2] and 2001 [3] Censuses.

The fundamental geographical unit used for this study is the Census Subdivision (CSD). There were 836 such areas defined in British Columbia at the time of the 2006 Census; of these 517 were Indian Reserves. The local areas defined in this study are typically aggregates of several CSD's, often a town and its surrounding "catchment" area. The body of this report identifies and reports on the same 63 local areas as the previous three studies. These local areas are like the pieces of a jigsaw puzzle in the sense that they cover the entire province without any overlap. Needless to say, particularly in the north, some of these local areas are very large but sparsely populated. The precise components of each local area are tabulated in Appendix F and a map showing their location is found in Appendix G.

As in previous studies we have not presented results for most of the GVRD, primarily because some of the methodological assumptions made in this work do not seem appropriate for a major metropolitan area like Vancouver.

There are two kinds of results that come out of a study like this, which may be thought of as *descriptive* and *operational*. The descriptive measures use the statistics available to describe each community in terms of its dependence on various basic sectors, its diversity, its vulnerability to downturns in the forest sector, and so on. In addition, now that we have four consecutive studies carried out with pretty much the same methodology and local area definitions, we are in a good position to describe and comment on changes and trends in those measures and what they can tell us about the various local economies in British Columbia over the last 15 years.

On the other hand, the operational results present numbers for each community that can be used to estimate the impacts of anticipated or proposed changes in the basic sectors. They are presented in this report as an aid to answering "what if…?" questions. In this report some fresh examples of the use of these numbers are presented.

---

[1] Numbers in square brackets denote references that can be found listed on Page 56 of this report.

This report is organized in the same way as previous efforts – the primary focus is on the results, what they mean, and how to use them. Readers interested in methodological issues, or on how the various data sources were used to arrive at the results reported here, are referred to earlier reports and/or the appendices of this report where some of these issues are discussed in appropriate detail.

Chapter 2 presents and discusses the descriptive results as described above. Chapter 3 presents tables of employment impact ratios and discusses how this information can be used. Chapter 4 describes and discusses the changes that appear to have occurred over time. Appendices to the report describe methodological issues and discuss in some detail the more challenging aspects of this work.

Readers of previous reports in this series will find familiar material in this report, but the tables and examples have all been updated to reflect the 2006 data. There are also a few new sections that have not appeared in previous reports: The calculation of location quotients as another way to characterize local industrial specialization (Section 2.5); Shift/Share analysis as an approach to estimating change in local economies (Section 4.4); and a discussion of the accuracy of the dependency results given that they are based on a 20% sample (Appendix D).

2. The Descriptive Results for 2006

2.1 Income Dependencies

The fundamental premise of this work is that the economy of a community can be represented by income flows that can be classified as *basic* or *nonbasic*, depending on from the source of the income. Below, the concepts of basic and nonbasic incomes are defined. A graphical presentation of the model is displayed in Figure 2.1.

2.1.1 Basic Income

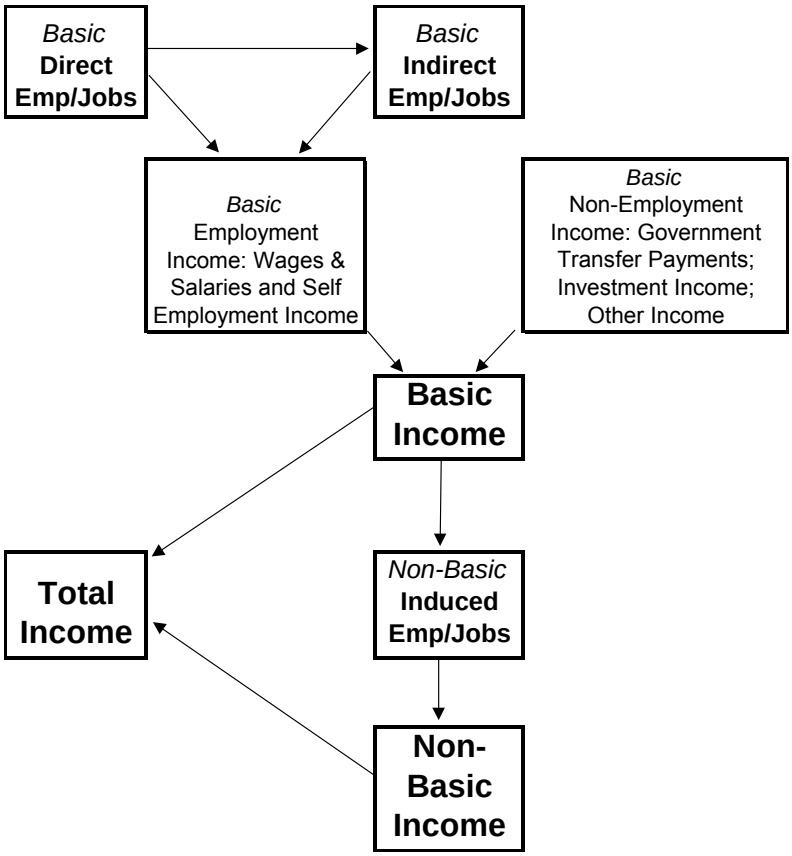
Basic income is defined as income that flows into the community from the outside world, in the form of either *employment* income or *non-employment* income.

Basic employment income flows into a community in the form of wages and salaries or self-employed income, from the following three sources:

1) From jobs producing goods and services that are exported elsewhere,
2) From jobs producing goods and services for the tourist sector (outsiders who spend money in the community that was earned elsewhere), or

3) From jobs in the public sector, for example, health care workers, teachers, government employees, etc., who receive their employment income from senior governments, and not directly from the local residents.

Figure 2.1 Simplified Model Flow Diagram



Jobs that are considered to generate basic employment income are found in the following 10 sectors[2]:

- Forestry and associated manufacturing
- Mining and associated manufacturing, including Oil & Gas
- Fishing and Trapping and associated manufacturing
- Agriculture and Food & Beverage Manufacturing
- Tourism
- High Technology
- Public Sector
- Construction
- Film Production and Sound Recording

[2] See Appendix A.3 for the list of industry groupings (NAICS) that are included in each of these basic industries.

- Other, which includes any direct basic activities that could not be allocated to any of the other categories[3]

Basic non-employment income is all non-employment income that flows into the community. In the model this is aggregated into two groups:

1) Transfer Payments from senior governments, such as Income Assistance payments, Old Age Security, Guaranteed Income Supplements, Canada Pension Plan, Employment Insurance benefits, Federal Child Tax benefits and other income from government sources.

2) Other Non-Employment Income that includes investment income, such as dividends and interest; retirement pensions, superannuation, annuities, alimony, etc.

These 10 industrial groupings, plus the two groups of non-employment income, are the 12 categories used to delineate the community economic dependencies.

2.1.2 Nonbasic Income (Also called Nonbasic Employment Income or Induced Employment Income)

Nonbasic income is employment income generated from jobs in the community that provide goods and services to individuals who live in the community. These jobs are often referred to as nonbasic jobs or induced employment. Examples of these include much of retail trade, local transportation services, local financial services, and personal services – e.g., local dry cleaners, barbershops and hairdressers.

Nonbasic activities, and the people engaged in them, are just as important to a modern community as the basic activities – indeed, it's arguable that they are the "glue" that holds a community together and makes it differ from a work-camp where individuals come to work and leave whenever they are not working. Nevertheless, there is a real sense that the nonbasic sector is dependent on a healthy basic sector, because without the latter the former would not exist. It is this view that makes the income dependencies presented in this section of the report different from a simple percentage breakdown of income by source for each community.

Income dependencies for the 63 local areas in 2006 are displayed in Table 2.1. The premise of Table 2.1 is that each dollar of basic community income is uniquely allocated either to one of the basic industries or to a non-employment income source. Thus the industry definitions for the column headings of this table are quite broadly defined to include not only resource extraction, but also any downstream processing that occurs locally, and also any indirect activities that are purchased locally. In

[3] See Appendix C.3 for more information.

Table 2.1 non-employment income is displayed in two columns -- government transfer payments, and Other Non-Employment Income.

Map 2.1, Dominant Basic Income Sources, shows the basic sector that provides the most basic income in each local area. While this depiction indicates the leading basic sector in each area it can be potentially misleading because it does not distinguish between areas that have one dominant sector and those that have two or more significant industries. Invermere, for example, has an apparent tie between Tourism and the Public Sector - the latter "wins" only by examining the dependencies to more decimal places (16.12 relative to 16.13) with Forestry and Construction not very far behind. Local areas that do not have a dominant sector should score well on the Diversity Index – see Table 2.3, Map 2.5, and the accompanying discussion later in this chapter.

The remaining maps in this section show the dependence of each area in British Columbia on a particular sector for the major sectors of Forestry & Wood Processing (2.2), Mining & Mineral Processing (occasionally referred to as Underground Resources) (2.3), and Tourism (2.4). The darker the shading, the more dependent the area is on that sector.

Table 2.1
Percent Income Dependencies (After-Tax Incomes, 2006)

	Forest	Mining & Min Proc	Fish-ing	Agric & Food	Tourism	High Tech	Public Sector	Const	Film Prod	Other	Trans. Pay-ments	Other non-emp inc
VANCOUVER ISLAND/COAST												
1 Gulf Islands	2	0	1	3	7	3	18	10	1	5	17	33
2 Victoria	1	1	0	1	6	4	39	6	0	6	13	23
3 Sooke-Port Renfrew	4	1	1	0	8	2	35	12	0	5	13	19
4 Duncan	14	1	1	2	4	1	27	9	0	4	18	20
5 Lake Cowichan	23	0	0	1	4	0	20	11	0	3	22	15
6 Ladysmith	14	0	1	1	4	0	26	7	0	7	18	22
7 Nanaimo	8	1	1	1	3	1	28	8	0	8	19	21
8 Parksville-Qualicum	5	1	1	1	7	2	17	10	0	5	22	30
9 Alberni	21	0	3	2	9	0	22	5	0	3	18	16
10 Courtenay-Comox	9	2	2	3	6	0	30	7	0	3	18	21
11 Campbell River	23	5	2	2	7	0	21	6	0	3	17	14
12 Bute Inlet	5	0	12	2	10	0	20	7	0	5	16	22
13 Powell River	22	3	2	1	3	0	22	6	0	2	19	19
14 Alert Bay	13	0	9	1	5	4	32	4	0	2	19	11
15 Port Hardy	32	2	7	2	5	1	22	4	0	2	14	9
16 Central Coast	4	0	8	1	7	0	50	3	0	2	16	8
MAINLAND/SOUTHWEST (Excluding GVRD)												
17 Hope-Fraser Canyon	7	2	0	2	7	0	30	6	0	6	22	18
18 Chilliwack	5	1	0	6	3	1	28	11	0	9	18	16
19 Kent-Harrison	5	0	1	7	9	0	26	9	0	6	21	17
20 Matsqui-Abbottsford	6	1	0	11	1	1	25	11	0	13	17	13
21 Pitt Meadows-Maple Ridge	6	2	0	3	2	3	29	11	1	18	13	12
22 Mission	9	2	0	4	2	1	28	14	1	14	16	10
23 Sunshine Coast	14	2	1	1	3	2	20	10	1	4	18	22
24 Squamish	5	1	0	1	27	2	20	15	1	6	8	14
25 Lillooet	21	3	0	2	7	0	27	7	0	4	15	14
THOMPSON-OKANAGAN												
26 Princeton	26	5	0	2	3	0	17	6	0	4	22	15
27 Oliver-Osoyoos	4	2	0	10	6	0	16	7	0	5	27	24
28 Penticton	5	2	0	3	6	0	24	9	0	7	22	22
29 Ashcroft	11	10	0	8	6	0	23	7	0	6	18	12
30 Merritt	23	7	0	3	6	0	22	9	0	1	18	12
31 Kamloops	9	6	0	1	6	1	27	8	0	9	16	16
32 North Thompson	30	2	0	3	7	0	16	6	0	2	20	13
33 Peachland	5	3	0	3	5	2	19	14	0	9	18	21
34 Kelowna	4	2	0	3	7	2	23	12	0	9	17	20
35 Vernon	9	2	0	2	5	1	22	10	0	9	20	20
36 Spallumcheen	11	2	0	7	3	0	18	11	0	9	21	18
37 Salmon Arm	11	3	0	2	4	1	18	11	0	8	20	20
38 Golden	26	2	0	1	14	0	16	12	0	7	14	9
39 Revelstoke	18	2	0	1	9	0	21	9	0	14	14	12

Table 2.1 (cont)
Percent Income Dependencies (After-Tax Incomes, 2006)

	Forest	Mining & Min Proc	Fish-ing	Agric. & Food	Tourism	High Tech	Public Sector	Const	Film Prod	Other	Trans. Pay-ments	Other non-emp inc
KOOTENAY												
40 Fernie	6	44	0	0	8	0	13	6	0	2	11	9
41 Cranbrook-Kimberley	12	6	0	1	7	0	26	9	0	7	17	16
42 Invermere	13	12	0	2	16	0	16	13	0	3	11	13
43 Castlegar-Arrow Lakes	23	4	0	1	5	1	22	9	0	4	17	14
44 Nelson	9	2	0	1	7	4	28	10	0	5	18	17
45 Creston	8	5	0	7	4	0	19	6	0	1	26	24
46 Grand Forks-Greenwood	23	2	0	4	3	0	17	7	0	4	24	18
47 Trail-Rossland	4	19	0	0	4	1	24	6	0	6	17	18
CARIBOO												
48 Williams Lake	27	5	0	2	4	0	22	7	0	3	16	12
49 Quesnel	45	2	0	2	3	0	18	4	0	2	15	10
50 Prince George	28	2	0	1	4	1	28	7	0	7	12	10
51 McBride-Valemount	33	0	0	1	11	0	21	5	0	3	16	11
NORTH COAST												
52 Queen Charlotte Island	14	0	7	1	11	1	31	4	0	2	18	12
53 Prince Rupert	5	1	16	1	8	0	32	3	0	8	18	9
54 Kitimat-Terrace	14	22	1	0	4	0	26	5	0	3	14	10
55 Hazelton	18	3	1	1	2	0	40	2	0	2	25	5
56 Stewart	3	8	4	0	7	0	52	7	0	3	12	3
NECHAKO												
57 Smithers-Houston	31	9	0	2	5	0	23	5	0	2	13	9
58 Burns Lake	37	3	0	3	3	0	26	3	0	2	14	9
59 Vanderhoof	42	8	0	3	3	0	20	3	0	1	12	7
60 Stikine	4	11	1	0	7	1	48	15	0	4	6	2
NORTHEAST												
61 Dawson Creek	12	20	0	3	5	0	21	10	0	8	12	8
62 Fort St. John	6	37	0	3	5	0	14	11	0	8	8	7
63 Fort Nelson	27	23	0	0	8	0	17	4	0	11	5	4

2.2 The Diversity of Local Economies

Though a community with one dominant industry may be better off than one with a number of smaller industries, there is an intuitive appeal to the notion that a diversified economic base will provide more community stability in volatile economic times.

To address this issue and quantify it for application in British Columbia, the local area economic dependencies were used to construct a diversity index (DI) using the following formula:

$$DI = 100 \times \frac{SDMAX - SD}{SDMAX}$$

where:

SD is the standard deviation of the 11 dependency values[4] for each local area,

SDMAX is the standard deviation for the least diversified case possible – an area that is 100% dependent on a single sector.

Observe that the diversity index would be zero if the area were entirely dependent on one sector (because SD = SDMAX for this case). At the other extreme, the diversity index would be 100 if a local area were equally dependent on each of the defined sectors (because then SD = 0)[5]. In practice the calculated diversity indices for B. C. communities tend to lie between 50 and 80.

The calculated diversity indices are given in Table 2.3 and displayed geographically in Map 2.5. The local areas having the most and least diversified economies in 2006 (by this measure) are tabulated in Table 2.2.

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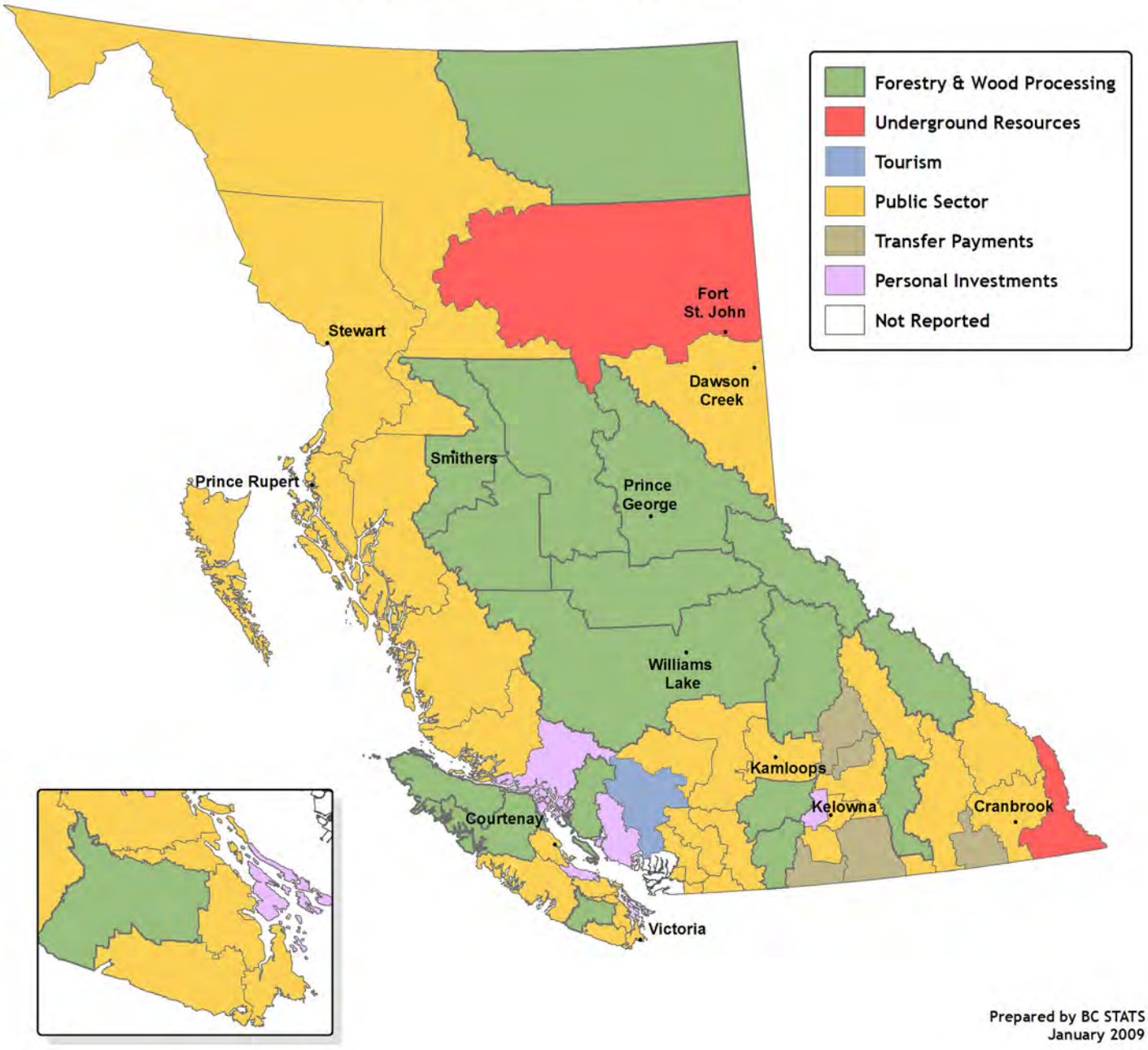
[4] For the purpose of calculating the diversity index Film Prod was considered part of Other to make comparisons with Diversity Indexes for earlier time periods more meaningful.

[5] Readers familiar with the Herfindahl Index of Concentration (HI) should note that the measures are equivalent in the sense that DI will be high when HI is low and vice versa, if allowance is made for the fact that in our case only basic income sources are used for the calculation rather than all industries.

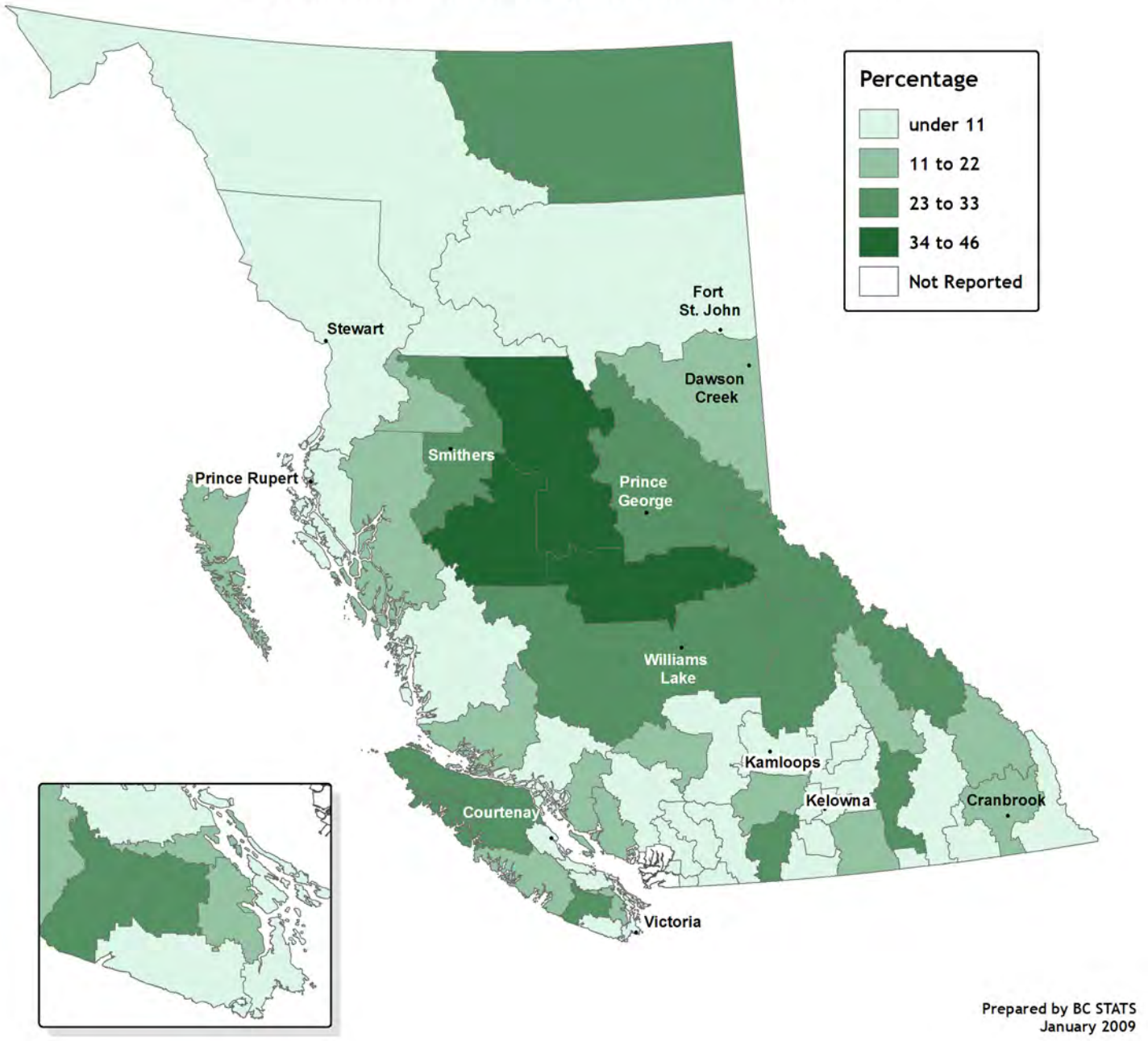
Table 2.2 Local Areas with Most and Least Diversified Economies, 2006

Most Diversified Areas		Least Diversified Areas	
Invermere	79	Stewart	51
Ashcroft	77	Central Coast	52
Dawson Creek	76	Stikine	54
Bute Inlet	75	Quesnel	56
Peachland	75	Hazelton	57
Spallumcheen	75	Fernie	59
Salmon Arm	75	Vanderhoof	59
Revelstoke	75		

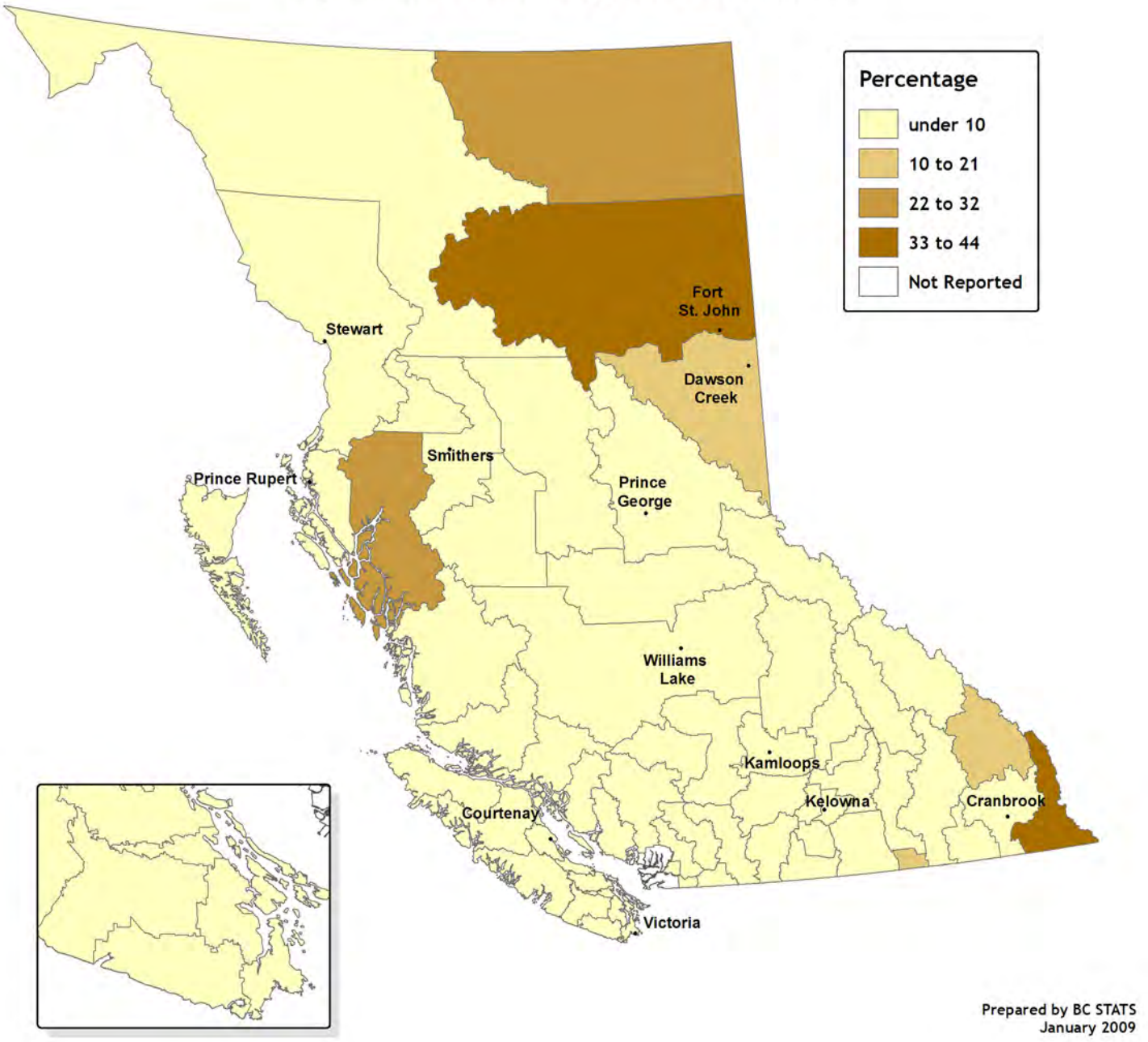
Map 2.1
Dominant Basic Income Sources



Map 2.2
Dependence on Forestry and Wood Processing



Map 2.3
Dependence on Underground Resources



Map 2.4
Dependence on Tourism

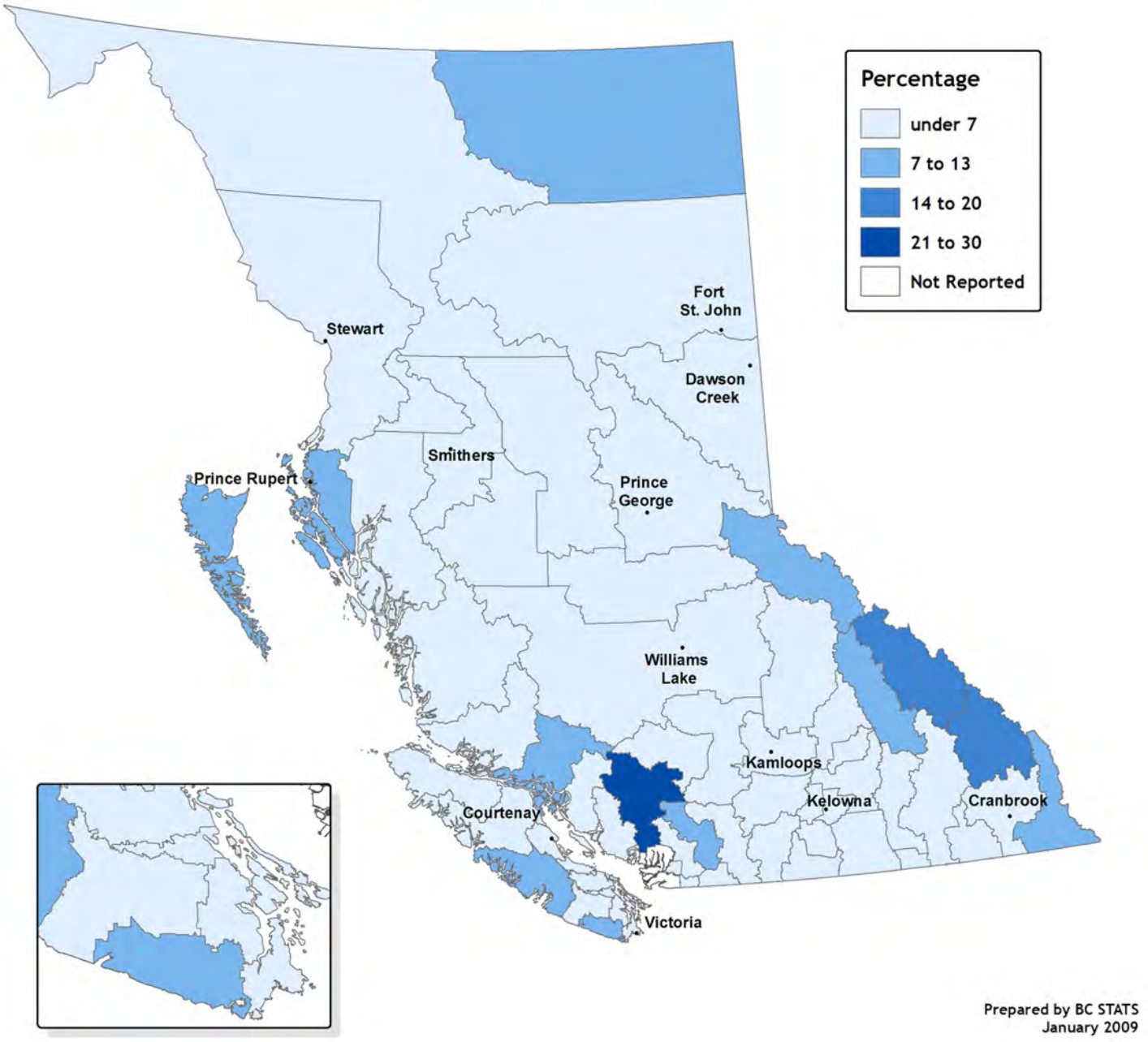
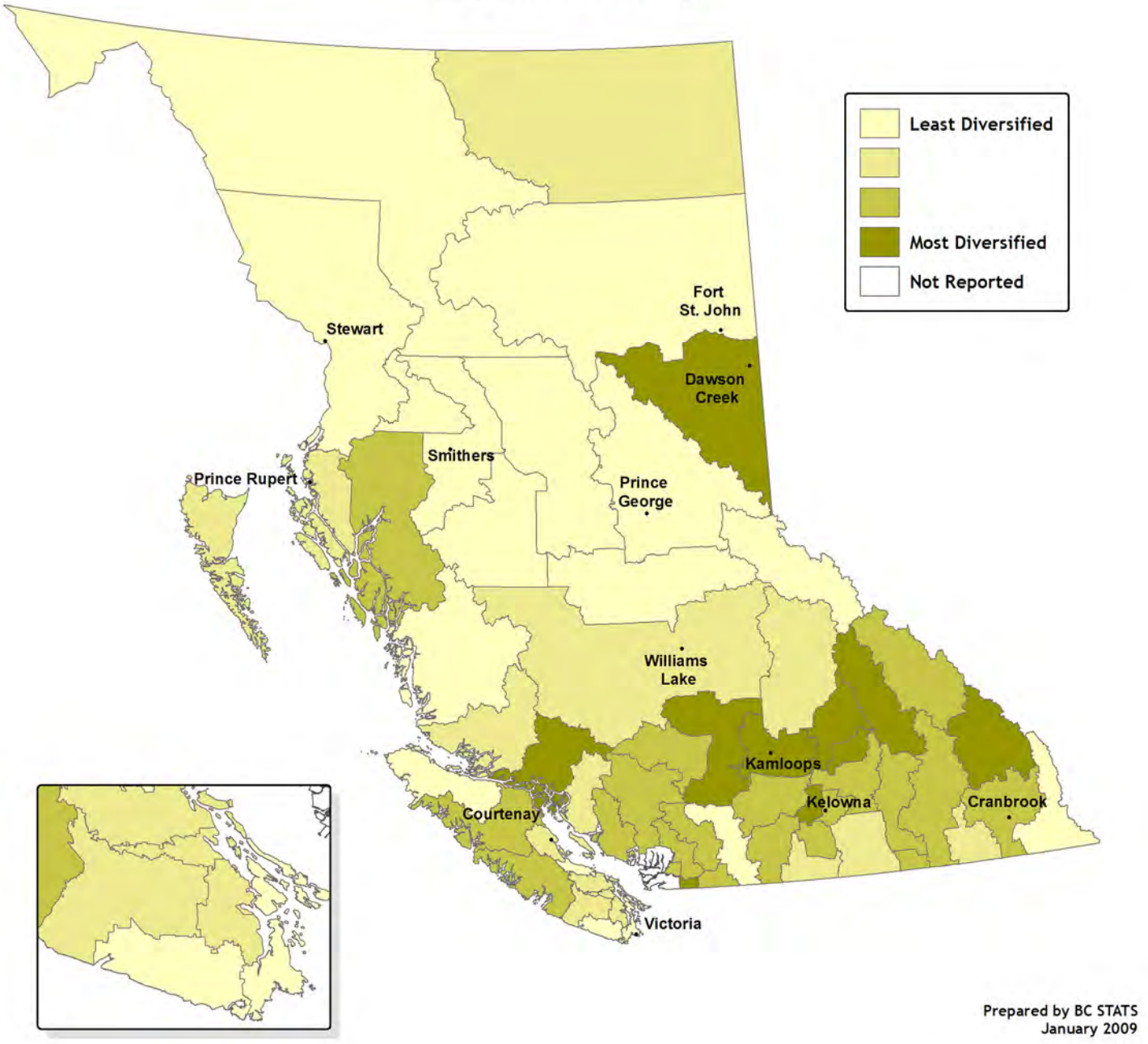


Table 2.3
2006 Diversity Indices

VANCOUVER ISLAND/COAST	DI
1 Gulf Islands	67
2 Victoria	60
3 Sooke-Port Renfrew	65
4 Duncan	69
5 Lake Cowichan	69
6 Ladysmith	69
7 Nanaimo	69
8 Parksville-Qualicum	67
9 Alberni	71
10 Courtenay-Comox	68
11 Campbell River	73
12 Bute Inlet	75
13 Powell River	69
14 Alert Bay	68
15 Port Hardy	67
16 Central Coast	52
MAINLAND/SOUTHWEST	
17 Hope-Fraser Canyon	67
18 Chilliwack	71
19 Kent-Harrison	71
20 Matsqui-Abbottsford	74
21 Pitt Meadows-Maple Ridge	71
22 Mission	72
23 Sunshine Coast	73
24 Squamish	71
25 Lillooet	70
THOMPSON-OKANAGAN	
26 Princeton	70
27 Oliver-Osoyoos	69
28 Penticton	70
29 Ashcroft	77
30 Merritt	72
31 Kamloops	74
32 North Thompson	68
33 Peachland	75
34 Kelowna	73
35 Vernon	73
36 Spallumcheen	75
37 Salmon Arm	75
38 Golden	73
39 Revelstoke	75

KOOTENAY	DI
40 Fernie	59
41 Cranbrook-Kimberley	73
42 Invermere	79
43 Castlegar-Arrow Lakes	72
44 Nelson	71
45 Creston	69
46 Grand Forks-Greenwood	69
47 Trail-Rossland	71
CARIBOO	
48 Williams Lake	69
49 Quesnel	56
50 Prince George	66
51 McBride-Valemount	65
NORTH COAST	
52 Queen Charlotte Islands	69
53 Prince Rupert	69
54 Kitimat-Terrace	70
55 Hazelton	57
56 Stewart	51
NECHAKO	
57 Smithers-Houston	67
58 Burns Lake	60
59 Vanderhoof	59
60 Stikine	54
NORTHEAST	
61 Dawson Creek	76
62 Fort St. John	66
63 Fort Nelson	69

Map 2.5
Regional Diversity



2.3 The Vulnerability of Local Areas to the Forest Sector

British Columbia is particularly dependent on the forest sector as a driver of local economies in many parts of the province. To examine this issue, and put some numbers to it, the Forest Vulnerability Index (FVI) was developed using Income Dependency (Table 2.1) and Diversity (Table 2.2) data. The magnitude of the FVI indicates the vulnerability of each local area to potential downturns in the forest sector – a community is vulnerable if its forest sector dependence is high and its diversity is low.

The first step in calculating the FVI is to multiply each local area's income dependence on Forestry by (100 – its Diversity Index). The larger this product is, the more vulnerable the local area is assumed to be. The remainder of the procedure is just to normalize the products so that 100 is the largest and 0 is the smallest. If we call the products F_i, and let F_{max} be the largest of them and F_{min} be the smallest, then this normalization can be effected by the formula

$$FVI_i = 100 \times \frac{F_i - F_{min}}{F_{max} - F_{min}}$$

Observe that FVI_i will be zero when $F_i = F_{min}$ and will be 100 when $F_i = F_{max}$.

The advantages of this index are that the data on which it is based is readily available from this study, and the calculations are mechanical, transparent and free of regional biases.

However, the FVI does have shortcomings, principally:

- No use is made of "on-the-ground" information – for example, standing timber inventories, or mills whose timber supply is being depleted, or changes in market demands for particular products;
- The definition of the local areas may have combined some communities that should be considered separately for this index to be most meaningful. However, see Appendix B where this difficulty is at least partially resolved.

It is worth emphasizing that a high FVI value **does not mean** that the wood-based manufacturing facilities in that area are more likely to shut down than in other areas. Rather, a high value means that if forest sector activity in the area declines then the area will experience greater economic difficulties than other areas in the province would under the same circumstances.

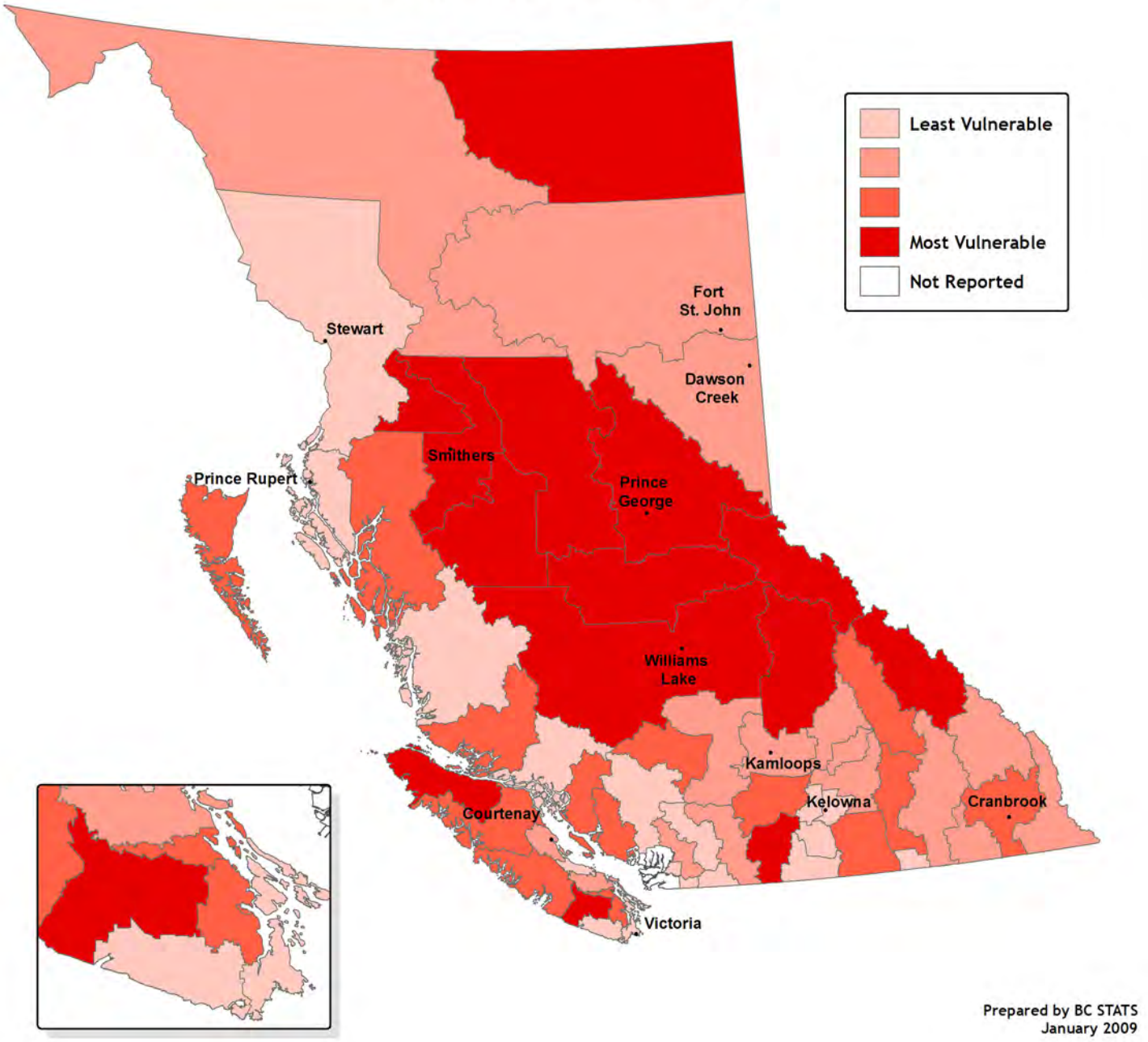
The Forest Vulnerability Indices are shown in Table 2.4 and displayed in Map 2.6. Consideration and discussion of the ways in which FVI has changed over the years may be found in Chapter 4 of this report.

Table 2.4
2006 Forest Vulnerability Indices

VANCOUVER ISLAND/COAST	
1 Gulf Islands	2
2 Victoria	0
3 Sooke-Port Renfrew	5
4 Duncan	20
5 Lake Cowichan	35
6 Ladysmith	20
7 Nanaimo	11
8 Parksville-Qualicum	7
9 Alberni	29
10 Courtenay-Comox	13
11 Campbell River	31
12 Bute Inlet	5
13 Powell River	32
14 Alert Bay	19
15 Port Hardy	51
16 Central Coast	7
MAINLAND/SOUTHWEST	
17 Hope-Fraser Canyon	10
18 Chilliwack	6
19 Kent-Harrison	5
20 Matsqui-Abbottsford	6
21 Pitt Meadows-Maple Ridge	7
22 Mission	12
23 Sunshine Coast	18
24 Squamish	6
25 Lillooet	31
THOMPSON-OKANAGAN	
26 Princeton	38
27 Oliver-Osoyoos	5
28 Penticton	6
29 Ashcroft	11
30 Merritt	30
31 Kamloops	11
32 North Thompson	48
33 Peachland	5
34 Kelowna	4
35 Vernon	11
36 Spallumcheen	12
37 Salmon Arm	13
38 Golden	35
39 Revelstoke	21

KOOTENAY	
40 Fernie	12
41 Cranbrook-Kimberley	15
42 Invermere	13
43 Castlegar-Arrow Lakes	31
44 Nelson	12
45 Creston	11
46 Grand Forks-Greenwood	34
47 Trail-Rossland	4
CARIBOO	
48 Williams Lake	41
49 Quesnel	100
50 Prince George	46
51 McBride-Valemount	56
NORTH COAST	
52 Queen Charlotte Islands	20
53 Prince Rupert	6
54 Kitimat-Terrace	20
55 Hazelton	38
56 Stewart	7
NECHAKO	
57 Smithers-Houston	50
58 Burns Lake	73
59 Vanderhoof	86
60 Stikine	8
NORTHEAST	
61 Dawson Creek	13
62 Fort St. John	9
63 Fort Nelson	41

Map 2.6
Forest Sector Vulnerability



2.4 Tourism

A particular challenge in this work is just how to estimate numbers of tourism jobs, considering that while some of these are quite clear (resorts and campgrounds, back-country guiding, whale-watching, etc.) others are aggregated with resident services (e.g. restaurants, retail outlets, local transportation services).

Counting just the clearly tourism jobs yields an underestimate; on the other hand, counting all food services and retail employees as tourist-related results in an over-estimate because it ignores the fact that residents also make use of these services.

Table 2.5 makes use of the local area database[6] to address this issue. It provides, for each local area, the ratio of total direct tourism employment to direct employment in accommodation services. In many applications the latter number is easier to estimate. For example, it may be known that a new hotel under construction will employ 100 people. If this were the case in the Squamish area, the direct tourism ratio would suggest that there would be another 165 workers in other industries (food services, retail, and transportation) that could be rightly considered as direct tourist workers.[7]

It is important to realize that the ratios in Table 2.5 are different in nature from any of the ratios provided in Chapter 3. When tourists come to an area they spend money in a variety of ways. Table 2.5 is offered here just as a way of estimating the total local employment generated by that spending from an estimate of the accommodation employment. All of these jobs would still be considered "direct" tourism jobs in the nomenclature of this study. On the other hand, indirect tourism jobs result from any local spending by the tourist industry itself, and induced (or nonbasic) jobs arise from the local spending of incomes earned by both direct and indirect tourism workers.

As an aside, and comment on Table 2.5, it looks like those areas that are known for their tourism (Invermere, McBride-Valemount, Squamish) exhibit low direct tourism ratios. This is probably because of the nature of comprehensive resorts that provide not only accommodation but also food, transportation, and retail (gift shops) services. Consequently, visitors may not spend as much of their money in the rest of the community.

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[6] Appendix A.5 explains how this database is created from existing data.

[7] Note that Table 2.5 provides estimates of the total number of tourism workers but does not say which industry those workers are actually in (e.g. food services, transportation, etc.). That information is in the model, but not in this report. If it's important to know, call BC Stats.

Table 2.5
2006 Direct Tourism Ratios*

VANCOUVER ISLAND/COAST	
1 Gulf Islands	4.13
2 Victoria	5.03
3 Sooke-Port Renfrew	3.81
4 Duncan	5.06
5 Lake Cowichan	4.31
6 Ladysmith	4.32
7 Nanaimo	4.36
8 Parksville-Qualicum	4.41
9 Alberni	3.80
10 Courtenay-Comox	4.30
11 Campbell River	4.29
12 Bute Inlet	2.55
13 Powell River	4.41
14 Alert Bay	3.17
15 Port Hardy	4.15
16 Central Coast	3.72
MAINLAND/SOUTHWEST	
17 Hope-Fraser Canyon	4.01
18 Chilliwack	4.58
19 Kent-Harrison	3.02
20 Matsqui-Abbottsford	4.83
21 Pitt Meadows-Maple Ridge	4.78
22 Mission	4.68
23 Sunshine Coast	4.59
24 Squamish	2.65
25 Lillooet	3.10
THOMPSON-OKANAGAN	
26 Princeton	4.42
27 Oliver-Osoyoos	4.80
28 Penticton	4.91
29 Ashcroft	2.79
30 Merritt	3.50
31 Kamloops	4.28
32 North Thompson	2.92
33 Peachland	5.17
34 Kelowna	5.11
35 Vernon	5.04
36 Spallumcheen	4.33
37 Salmon Arm	4.24
38 Golden	3.59
39 Revelstoke	3.48
KOOTENAY	
40 Fernie	2.88
41 Cranbrook-Kimberley	4.37
42 Invermere	3.11
43 Castlegar-Arrow Lakes	3.97
44 Nelson	3.77
45 Creston	4.00
46 Grand Forks-Greenwood	4.27
47 Trail-Rossland	4.39
CARIBOO	
48 Williams Lake	4.06
49 Quesnel	4.42
50 Prince George	4.42
51 McBride-Valemount	3.16
NORTH COAST	
52 Queen Charlotte Islands	3.91
53 Prince Rupert	3.62
54 Kitimat-Terrace	4.61
55 Hazelton	3.86
56 Stewart	3.21
NECHAKO	
57 Smithers-Houston	4.31
58 Burns Lake	3.86
59 Vanderhoof	4.33
60 Stikine	3.03
NORTHEAST	
61 Dawson Creek	4.42
62 Fort St. John	4.12
63 Fort Nelson	3.20

*Total direct tourism employment Divided by employment in Accommodation services

2.5 Location Quotients

A location quotient is another way of estimating the level of industrial specialization within local areas or regions. In simple terms, it measures the concentration of certain industry sectors in the area relative to the provincial economy. The analysis in this section was inspired by similar work carried out by Doug Elliott of QED Systems for the province of Saskatchewan in 2007.

Using employment as our basic variable of economic activity, the location quotient for any particular industry I and geographical area A is defined to be:

$$LQ[A;I] = (EMP[A;I]/EMP[A]) \div (EMP[P;I]/EMP[P])$$

where:

EMP[A;I] is the employment in industry I in area A

EMP[A] is the total employment in area A

EMP[P;I] is the employment in industry I in British Columbia

EMP[P] is the total employment in the province

Table 2.7 displays the location quotients for the nine basic employment sectors (Other was omitted from this calculation) and 63 local areas. Because we have calculated location quotients only for the basic sectors, a low LQ value only means that the local area is not very active in the particular industry. On the other hand, a high value indicates that the industry is very active in this area relative to the rest of the province. The highest values for each industry in Table 2.7 are displayed in Table 2.6.

Table 2.6
Local Areas with Highest Values for LQ

Industry	Local Areas
Forestry	Quesnel (3.57), Vanderhoof (3.40), Burns Lake (2.93)
Underground Resources	Fernie (8.93), Fort St. John (8.40), Fort Nelson (5.63)
Fishing	Prince Rupert (21.35), Alert Bay (15.88), Central Coast (13.65)
Agriculture & Food Proc.	Oliver-Osoyoos (5.10), Matsqui-Abbotsford (3.91), Spallumcheen (3.52)
Tourism	Squamish (2.85), Invermere (2.15), Golden (1.99)
High Tech	Nelson (2.64), Victoria (2.59), Gulf Islands (2.44)
Public Sector	Victoria (1.49), Stewart (1.36), Central Coast (1.33)
Construction	Peachland (1.75), Gulf Islands (1.56), Parksville-Qualicum (1.51)
Film Prod.	Sunshine Coast (3.52), Gulf Islands (3.47), Pitt Meadows-Maple Ridge (3.33)

Table 2.7
2006 Location Quotients (based on employment)

	Forestry	Mining & Min Proc	Fish-ing	Agric. & Food	Tourism	High Tech	Public Sector	Const	Film Prod
VANCOUVER ISLAND/COAST									
1 Gulf Islands	0.31	0.25	2.00	0.92	1.60	2.44	0.76	1.56	3.47
2 Victoria	0.12	0.13	0.43	0.34	1.07	2.59	1.49	0.73	1.47
3 Sooke-Port Renfrew	0.34	0.21	1.75	0.37	1.28	1.41	1.16	1.28	0.00
4 Duncan	1.26	0.36	1.29	0.96	0.75	0.50	1.08	1.09	0.60
5 Lake Cowichan	1.94	0.28	0.57	0.56	0.96	0.02	0.82	1.30	0.00
6 Ladysmith	1.35	0.16	1.67	0.86	0.85	0.17	1.10	0.94	0.72
7 Nanaimo	0.88	0.42	1.66	0.35	0.74	1.15	1.21	1.17	1.65
8 Parksville-Qualicum	0.66	0.45	1.61	0.47	1.59	1.14	0.83	1.51	0.21
9 Alberni	1.68	0.14	5.23	0.58	1.50	0.11	0.78	0.68	0.22
10 Courtenay-Comox	0.73	0.41	2.97	0.88	1.16	0.38	1.10	0.96	0.53
11 Campbell River	1.87	1.22	3.59	0.59	1.20	0.12	0.77	0.64	0.71
12 Bute Inlet	0.59	0.26	10.56	1.14	1.50	0.04	0.75	0.99	1.29
13 Powell River	1.93	0.67	3.80	0.57	0.74	0.25	0.90	0.87	0.37
14 Alert Bay	1.04	0.00	15.88	0.29	0.81	1.08	1.00	0.44	0.00
15 Port Hardy	2.54	0.29	9.99	0.43	0.85	0.43	0.67	0.40	0.00
16 Central Coast	0.40	0.00	13.65	0.46	0.92	0.00	1.33	0.29	0.00
MAINLAND/SOUTHWEST (Excluding GVRD)									
17 Hope-Fraser Canyon	0.73	1.06	0.00	0.58	1.46	0.00	1.15	0.75	1.40
18 Chilliwack	0.65	0.40	0.20	1.96	0.72	0.85	1.08	1.27	0.98
19 Kent-Harrison	0.56	0.00	1.08	2.17	1.46	0.61	0.95	0.95	0.00
20 Matsqui-Abbottsford	0.73	0.35	0.30	3.91	0.27	0.88	0.93	1.23	1.47
21 Pitt Meadows-Maple Ridge	0.65	0.53	0.35	0.95	0.36	2.11	1.21	1.38	3.33
22 Mission	1.05	0.49	0.40	1.60	0.32	0.56	1.06	1.51	2.16
23 Sunshine Coast	1.28	0.65	2.29	0.41	0.77	1.26	0.87	1.48	3.52
24 Squamish	0.38	0.28	0.24	0.30	2.85	0.94	0.60	1.29	2.44
25 Lillooet	1.79	0.70	0.67	0.37	1.24	0.00	0.93	0.80	0.00
THOMPSON-OKANAGAN									
26 Princeton	2.28	1.65	0.34	1.11	1.00	0.04	0.63	0.84	0.00
27 Oliver-Osoyoos	0.44	0.39	0.00	5.10	1.17	0.15	0.65	0.99	0.57
28 Penticton	0.65	0.69	0.12	1.47	1.44	0.24	0.95	1.09	0.84
29 Ashcroft	1.01	2.14	0.41	2.73	1.07	0.00	0.78	0.67	0.00
30 Merritt	1.84	1.27	0.00	1.26	1.01	0.19	0.79	0.83	0.73
31 Kamloops	0.93	1.47	0.04	0.63	1.20	0.44	1.02	0.98	0.80
32 North Thompson	2.43	0.45	0.38	1.47	1.33	0.07	0.57	0.72	0.00
33 Peachland	0.58	0.90	0.07	1.04	1.08	1.36	0.85	1.75	1.26
34 Kelowna	0.46	0.63	0.03	1.28	1.26	1.64	0.92	1.44	0.68
35 Vernon	1.02	0.65	0.11	1.10	1.00	1.08	0.95	1.27	0.50
36 Spallumcheen	1.17	0.49	0.00	3.52	0.52	0.40	0.76	1.31	0.47
37 Salmon Arm	1.30	0.74	0.00	1.12	0.99	0.88	0.79	1.45	1.07
38 Golden	1.85	0.67	0.34	0.20	1.99	0.00	0.49	1.26	0.55
39 Revelstoke	1.71	0.47	0.00	0.57	1.72	0.30	0.71	0.96	0.78

Table 2.7 (cont)
2006 Location Quotients (based on employment)

	Forestry	Mining & Min Proc	Fish-ing	Agric. & Food	Tourism	High Tech	Public Sector	Const	Film Prod
KOOTENAY									
40 Fernie	0.58	8.93	0.00	0.22	1.26	0.10	0.47	0.67	0.00
41 Cranbrook-Kimberley	1.12	1.67	0.11	0.42	1.36	0.03	0.92	1.02	0.70
42 Invermere	1.14	1.49	0.27	0.47	2.15	0.04	0.49	1.40	0.00
43 Castlegar-Arrow Lakes	2.12	0.92	0.00	0.26	1.01	0.87	0.79	1.02	0.00
44 Nelson	1.05	0.59	0.00	0.38	1.22	2.64	0.93	1.12	1.42
45 Creston	0.96	1.65	0.02	3.11	0.94	0.12	0.80	0.80	0.00
46 Grand Forks-Greenwood	2.21	0.77	0.00	2.06	0.75	0.00	0.71	0.82	0.97
47 Trail-Rossland	0.49	5.06	0.00	0.12	0.94	0.81	0.98	0.82	0.40
CARIBOO									
48 Williams Lake	2.25	1.30	0.20	1.11	0.82	0.00	0.77	0.80	0.47
49 Quesnel	3.57	0.56	0.15	0.90	0.51	0.00	0.67	0.48	0.29
50 Prince George	2.41	0.60	0.04	0.31	0.66	0.66	0.99	0.69	0.32
51 McBride-Valemount	2.50	0.32	0.00	0.98	1.55	0.00	0.60	0.63	0.72
NORTH COAST									
52 Queen Charlotte Island	1.18	0.00	9.56	0.30	1.41	0.36	0.97	0.44	0.00
53 Prince Rupert	0.43	0.34	21.35	0.40	1.15	0.01	0.92	0.35	0.52
54 Kitimat-Terrace	1.29	4.60	1.19	0.18	0.73	0.14	0.92	0.57	0.48
55 Hazelton	1.68	0.58	1.55	1.11	0.37	0.27	1.32	0.28	1.02
56 Stewart	0.40	1.49	7.22	0.00	0.86	0.00	1.36	0.60	0.00
NECHAKO									
57 Smithers-Houston	2.33	2.03	0.62	0.88	0.81	0.24	0.78	0.50	0.00
58 Burns Lake	2.93	0.55	0.00	1.10	0.71	0.00	0.82	0.39	0.00
59 Vanderhoof	3.40	0.97	0.18	0.97	0.52	0.00	0.74	0.27	0.32
60 Stikine	0.43	2.60	1.63	0.00	0.76	0.50	1.26	1.03	0.00
NORTHEAST									
61 Dawson Creek	0.94	4.66	0.07	1.44	0.80	0.10	0.74	0.89	0.57
62 Fort St. John	0.58	8.40	0.17	0.93	0.74	0.10	0.53	0.91	0.37
63 Fort Nelson	1.93	5.63	0.00	0.11	1.13	0.02	0.55	0.42	0.93

3. The Employment Impact Ratios for 2006

3.1 General Introduction

As in previous reports, in this section we present three tables of employment ratios. Each table provides ratios for a number of important industries in the 63 local areas defined in this study. There are separate tables for Indirect only, for Indirect plus Induced where the social safety net is a factor, and for Indirect plus Induced where the short-term mitigation effects of the safety net can be ignored.

All of these ratios are of the form:

$$\text{Ratio} = \frac{\text{Total Employment attributable to the Activity which generates the Direct Employment}}{\text{Direct Employment}}$$

The **indirect ratios** are entirely concerned with additional employment generated in the community because of other spending associated with the direct employment. For example, an industrial plant may have 100 direct employees. However, the plant may also make other local purchases which lead to related employment – e.g. they may purchase some supplies from local retail stores, they may consult with local accountants or lawyers, or they may contract with local tradesmen for special jobs that their employees are not trained to handle. All of these hired services generate indirect employment. Strictly speaking, of course, it is not the direct employees themselves that generate the indirect employment but the other non-wage spending by the industry employing the direct workers. Nevertheless, we assume that the ratio remains constant even if the scale of plant changes – more or less direct employment means a bigger or smaller plant and more or less indirect employment. Table 3.1 shows indirect employment ratios for selected industries for the 63 local areas of this study.

The **induced ratios** are based on the same formula, but in addition to the indirect employment they assign some portion of the nonbasic employment in the community to the income source generating the direct employment. This is done in a very simple proportional way. Suppose, for example, that our allocation procedures have identified 1000 nonbasic jobs in a given community, and that Industry X's share of the after-tax basic income is 20%. The model will then assign 20% of the 1000, or 200, nonbasic jobs to Industry X, increasing the employment impact ratio accordingly.

The **social safety net** (specifically, transfer payments like employment insurance and income assistance) comes into the picture because when there are major changes in a community's industrial structure, estimation of the total impacts of those changes depends on how the income changes translate into changes in spending, because it is spending by local residents that supports the nonbasic sector. In the case of a mill closure

for example, if it is assumed that employment income drops to zero and is not replaced with anything, then we have to assume that spending also drops to zero with a correspondingly drastic effect on the nonbasic sector. However, if, as normally happens in the short-run at least, employment income is to some extent replaced by transfer payments then the effect is not nearly so dramatic. Tables 3.2 and 3.3 provide ratios for these two most extreme assumptions – where everyone who loses a job begins to receive employment insurance (3.2 – with safety net) and conversely, where spending drops to zero with lost jobs (3.3 – No Safety Net). The Safety Net case may also be thought of as the No-Migration case where everyone stays put and waits to see what will happen next – this is the likely Short-Run scenario. The No Safety Net case is comparable in reality to a scenario where everyone who loses their job moves away from the community to seek work elsewhere – from the community's perspective their income and spending have dropped to zero. The No-Safety Net case is also what is more likely to happen in the long run. Finally, it should be noted that while all of the terminology and examples described in this paragraph are expressed in terms of shutdowns and job losses, there is a precisely comparable set of examples which relate to the opening of new employment opportunities – if the new jobs are filled by in-migrants to the community the impact on spending (and thus the nonbasic sector) will be greater than if they are filled by individuals in the community who were subsisting on transfer payments.[8]

All of the ratios in this report deal with employment rather than income. There is a comparable set of income ratios which have not been published but which can be computed by the model, or manually with appropriate income data. Here's an example: let the direct employment be DE and the other related employment be OE, and the relevant employment impact ratio be 1.3.

$$\text{Then} \quad \frac{DE + OE}{DE} = 1.3 \quad \text{or} \quad \frac{OE}{DE} = 0.3$$

Let's assume we know that the average income of the DE is $40,000 and the average income of the OE is $30,000. We are interested in estimating the corresponding income ratio IR.

$$IR = \frac{(40000 \times DE) + (30000 \times OE)}{(40000 \times DE)} = 1 + 0.75 \times \frac{OE}{DE} = 1 + .75 \times .3 = 1.225$$

The trickiest part in this of course is having estimates of the relevant average incomes.

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[8] From a social and humane perspective it may be preferable to bring new industry to a community to provide jobs for the people who already live there, but from the perspective of the community's economics it is better if the new jobs are filled by new people moving to the community, so that it grows.

Employment impact ratios have been published in this report rather than income ratios because they seem to be more useful. Most people can relate more easily to a community's change in employment levels than to the comparable change in income levels.

The ratios that are presented in the tables in the following section are commonly referred to as multipliers and, indeed, they are used as multipliers in the illustrative examples that follow in Section 3.3. However, we have chosen to call the table entries ratios rather than multipliers to emphasize that, while they are definitely *ratios* (a *ratio* is just one number divided by another), their application as multipliers to make predictions requires a few more assumptions. When we use a multiplier to predict the impacts of a change we are assuming that even though everything else is changing, the multiplier somehow remains the same. There is an intuitive logic to this, and some supporting empirical evidence, but it is largely an assumption that the multiplier persists in the face of other economic changes. There are probably cases where, while the ratio is always a ratio, the ratio may not be a good multiplier.

The industry set (the columns) in these tables is different from the set used in the tables of Chapter 2. This is because the purposes are different. In the case of dependencies it was important to capture all sources of basic income somewhere in the table (the numbers in each row must sum to 100%), and with this in mind it seemed reasonable to aggregate vertically integrated industries like Forestry (logging, pulp and paper, and all wood-based manufacturing), Mining and Mineral Processing, or Agriculture and Food Processing. However, in the case of impact ratios, it is equally important not to aggregate industries that are distinct and that may have quite different ratios – for example: Logging, and Pulp and Paper are quite distinct activities and consequently have quite different ratios. Aggregating them would produce a hybrid multiplier that would not be accurate for either activity.

Section 3.2 presents the tables of employment impact ratios, and section 3.3 provides a number of examples illustrating their use as multipliers. Changes in the ratios over time are presented and discussed in Section 4.3.

3.2 The Employment Impact Ratios

Table 3.1
2006 Indirect Employment Ratios ((Direct + Indirect)/Direct)

	Log-ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour-ism	Public Sector	Const.
VANCOUVER ISLAND/COAST									
1 Gulf Islands	1.25	N.A.	1.30	1.38	1.02	1.13	1.07	1.11	1.28
2 Victoria	1.26	1.63	1.30	1.39	1.04	1.13	1.07	1.16	1.30
3 Sooke-Port Renfrew	1.22	1.61	1.29	1.37	1.07	1.13	1.06	1.16	1.30
4 Duncan	1.22	1.58	1.28	1.37	1.07	1.13	1.05	1.14	1.29
5 Lake Cowichan	1.19	1.58	1.28	1.34	1.00	1.12	1.05	1.15	1.26
6 Ladysmith	1.22	1.61	1.30	1.36	1.16	1.13	1.06	1.13	1.29
7 Nanaimo	1.25	1.63	1.30	1.39	1.06	1.13	1.06	1.13	1.30
8 Parksville-Qualicum	1.20	1.61	1.30	1.35	1.04	1.13	1.06	1.12	1.30
9 Alberni	1.19	1.52	1.25	1.31	1.23	1.11	1.05	1.12	1.25
10 Courtenay-Comox	1.18	1.60	1.29	1.34	1.10	1.12	1.06	1.14	1.29
11 Campbell River	1.21	1.59	1.29	1.35	1.23	1.12	1.06	1.13	1.29
12 Bute Inlet	1.18	N.A.	1.21	1.29	1.00	1.10	1.06	1.11	1.22
13 Powell River	1.16	1.54	1.25	1.30	1.00	1.11	1.06	1.11	1.26
14 Alert Bay	1.18	N.A.	1.26	N.A.	1.00	1.11	1.05	1.14	1.24
15 Port Hardy	1.23	1.61	1.30	1.37	1.01	1.12	1.06	1.14	1.29
16 Central Coast	1.14	N.A.	1.15	N.A.	N.A.	1.09	1.04	1.12	1.18
MAINLAND/SOUTHWEST (Excluding GVRD)									
17 Hope-Fraser Canyon	1.15	N.A.	1.27	1.31	N.A.	1.11	1.07	1.13	1.25
18 Chilliwack	1.25	1.64	1.30	1.40	1.11	1.13	1.07	1.14	1.30
19 Kent-Harrison	1.24	1.63	1.30	N.A.	1.25	1.13	1.08	1.16	1.30
20 Matsqui-Abbottsford	1.24	1.64	1.30	1.40	1.24	1.13	1.07	1.13	1.30
21 Pitt Meadows-Maple Ridge	1.26	1.64	1.31	1.40	1.17	1.13	1.07	1.13	1.31
22 Mission	1.25	1.63	1.31	1.39	1.22	1.13	1.07	1.13	1.30
23 Sunshine Coast	1.23	1.61	1.30	1.36	1.00	1.13	1.07	1.12	1.30
24 Squamish	1.19	1.60	1.29	1.34	1.03	1.13	1.07	1.13	1.29
25 Lillooet	1.19	N.A.	1.28	1.34	N.A.	1.12	1.08	1.13	1.26
THOMPSON-OKANAGAN									
26 Princeton	1.16	N.A.	1.26	1.31	1.19	1.11	1.06	1.10	1.21
27 Oliver-Osoyoos	1.19	1.60	1.29	1.35	1.26	1.12	1.06	1.11	1.28
28 Penticton	1.24	1.63	1.30	1.39	1.19	1.13	1.07	1.13	1.29
29 Ashcroft	1.17	1.56	1.27	1.32	N.A.	1.11	1.06	1.13	1.26
30 Merritt	1.17	1.56	1.27	1.32	1.24	1.11	1.05	1.14	1.25
31 Kamloops	1.25	1.64	1.30	1.40	1.09	1.13	1.07	1.14	1.30
32 North Thompson	1.19	1.58	1.29	1.33	1.00	1.12	1.06	1.13	1.27
33 Peachland	1.22	1.62	1.30	1.37	1.10	1.13	1.07	1.11	1.30
34 Kelowna	1.26	1.64	1.30	1.40	1.11	1.13	1.07	1.12	1.31
35 Vernon	1.24	1.63	1.30	1.39	1.14	1.13	1.07	1.12	1.30
36 Spallumcheen	1.20	1.61	1.29	1.36	1.23	1.12	1.07	1.10	1.29
37 Salmon Arm	1.21	1.61	1.30	1.37	1.20	1.13	1.07	1.12	1.30
38 Golden	1.18	N.A.	1.25	1.30	N.A.	1.11	1.05	1.12	1.23
39 Revelstoke	1.19	N.A.	1.27	1.32	1.13	1.11	1.06	1.12	1.26

Table 3.1 (cont)
2006 Indirect Employment Ratios ((Direct + Indirect)/Direct)

	Log-ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour-ism	Public Sector	Const.
KOOTENAY									
40 Fernie	1.18	N.A.	1.29	1.34	1.25	1.12	1.08	1.11	1.28
41 Cranbrook-Kimberley	1.22	1.61	1.30	1.36	1.00	1.12	1.07	1.13	1.29
42 Invermere	1.18	1.48	1.24	1.32	1.00	1.11	1.05	1.13	1.26
43 Castlegar-Arrow Lakes	1.19	1.59	1.29	1.35	1.20	1.12	1.07	1.11	1.29
44 Nelson	1.21	1.61	1.30	1.36	1.15	1.13	1.06	1.13	1.30
45 Creston	1.16	1.57	1.27	1.32	1.24	1.11	1.06	1.11	1.24
46 Grand Forks-Greenwood	1.18	1.57	1.27	1.33	N.A.	1.11	1.06	1.11	1.24
47 Trail-Rossland	1.15	1.53	1.26	1.31	1.07	1.12	1.06	1.10	1.27
CARIBOO									
48 Williams Lake	1.19	1.60	1.29	1.35	1.00	1.12	1.07	1.14	1.28
49 Quesnel	1.19	1.51	1.25	1.34	1.00	1.12	1.06	1.13	1.27
50 Prince George	1.24	1.63	1.31	1.39	1.04	1.13	1.07	1.14	1.30
51 McBride-Valemount	1.20	1.60	1.28	1.35	N.A.	1.12	1.06	1.11	1.26
NORTH COAST									
52 Queen Charlotte Islands	1.19	N.A.	1.28	N.A.	1.00	1.11	1.05	1.14	1.25
53 Prince Rupert	1.21	1.59	1.28	1.34	1.23	1.12	1.07	1.13	1.26
54 Kitimat-Terrace	1.21	1.60	1.29	1.35	1.22	1.12	1.05	1.13	1.28
55 Hazelton	1.12	N.A.	1.24	1.26	1.00	1.10	1.05	1.13	1.22
56 Stewart	1.08	N.A.	N.A.	1.23	N.A.	N.A.	1.03	1.11	1.17
NECHAKO									
57 Smithers-Houston	1.20	N.A.	1.29	1.35	1.03	1.12	1.06	1.13	1.29
58 Burns Lake	1.14	1.50	1.26	1.28	N.A.	1.10	1.04	1.12	1.21
59 Vanderhoof	1.16	1.44	1.22	1.29	N.A.	1.10	1.05	1.12	1.23
60 Stikine	1.08	N.A.	1.25	1.27	1.00	N.A.	1.04	1.14	1.24
NORTHEAST									
61 Dawson Creek	1.18	1.58	1.27	1.33	1.20	1.11	1.06	1.12	1.23
62 Fort St. John	1.14	1.55	1.26	1.29	1.18	1.11	1.07	1.11	1.26
63 Fort Nelson	1.18	N.A.	1.27	1.33	1.19	1.11	1.07	1.13	1.21

Table 3.2
2006 Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
No Migration (with Safety Net)

	Log-ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour-ism	Public Sector	Const.
VANCOUVER ISLAND/COAST									
1 Gulf Islands	1.39	N.A.	1.37	1.41	1.09	1.18	1.12	1.22	1.37
2 Victoria	1.36	1.84	1.40	2.00	1.18	1.20	1.13	1.30	1.42
3 Sooke-Port Renfrew	1.37	1.66	1.37	2.08	1.14	1.12	1.10	1.26	1.38
4 Duncan	1.45	1.95	1.44	1.65	1.17	1.19	1.11	1.26	1.42
5 Lake Cowichan	1.42	2.01	1.42	1.37	1.06	1.18	1.10	1.25	1.36
6 Ladysmith	1.32	1.92	1.47	1.39	1.20	1.17	1.11	1.22	1.39
7 Nanaimo	1.48	2.05	1.51	1.63	1.19	1.19	1.14	1.28	1.45
8 Parksville-Qualicum	1.35	1.85	1.39	1.53	1.19	1.17	1.10	1.20	1.39
9 Alberni	1.31	1.71	1.36	1.41	1.25	1.16	1.09	1.19	1.31
10 Courtenay-Comox	1.48	1.89	1.39	1.67	1.19	1.20	1.11	1.26	1.39
11 Campbell River	1.39	1.89	1.38	1.58	1.26	1.20	1.10	1.22	1.38
12 Bute Inlet	1.23	N.A.	1.27	1.30	1.04	1.13	1.09	1.16	1.27
13 Powell River	1.26	1.82	1.31	1.48	1.13	1.16	1.10	1.19	1.34
14 Alert Bay	1.30	N.A.	1.33	N.A.	1.26	1.14	1.09	1.22	1.30
15 Port Hardy	1.37	1.70	1.38	1.54	1.05	1.20	1.10	1.22	1.37
16 Central Coast	1.17	N.A.	1.16	N.A.	N.A.	1.10	1.06	1.16	1.21
MAINLAND/SOUTHWEST (Excluding GVRD)									
17 Hope-Fraser Canyon	1.31	N.A.	1.38	1.63	N.A.	1.14	1.12	1.24	1.35
18 Chilliwack	1.38	1.71	1.45	1.66	1.22	1.21	1.13	1.27	1.44
19 Kent-Harrison	1.29	1.66	1.42	N.A.	1.26	1.17	1.12	1.23	1.37
20 Matsqui-Abbottsford	1.38	1.94	1.45	1.69	1.39	1.22	1.14	1.27	1.47
21 Pitt Meadows-Maple Ridge	1.55	2.01	1.51	1.83	1.41	1.27	1.15	1.30	1.48
22 Mission	1.39	1.90	1.50	1.85	1.51	1.21	1.13	1.28	1.46
23 Sunshine Coast	1.40	1.97	1.44	1.68	1.10	1.19	1.12	1.23	1.41
24 Squamish	1.28	1.85	1.39	1.54	1.10	1.17	1.13	1.22	1.39
25 Lillooet	1.27	N.A.	1.35	1.42	N.A.	1.20	1.10	1.19	1.32
THOMPSON-OKANAGAN									
26 Princeton	1.30	N.A.	1.43	1.43	1.20	1.14	1.09	1.18	1.29
27 Oliver-Osoyoos	1.26	1.73	1.47	1.70	1.27	1.16	1.10	1.18	1.36
28 Penticton	1.38	1.77	1.41	1.58	1.28	1.17	1.11	1.24	1.40
29 Ashcroft	1.23	1.60	1.40	1.47	N.A.	1.15	1.09	1.19	1.33
30 Merritt	1.31	1.76	1.40	1.53	1.26	1.15	1.09	1.22	1.34
31 Kamloops	1.43	2.00	1.50	1.73	1.20	1.19	1.14	1.27	1.44
32 North Thompson	1.26	1.60	1.39	1.47	1.05	1.14	1.09	1.18	1.32
33 Peachland	1.41	1.96	1.55	1.66	1.23	1.20	1.13	1.24	1.45
34 Kelowna	1.42	1.85	1.45	1.71	1.25	1.19	1.14	1.25	1.44
35 Vernon	1.39	1.75	1.48	1.62	1.25	1.18	1.13	1.23	1.42
36 Spallumcheen	1.30	1.67	1.46	1.58	1.32	1.18	1.12	1.20	1.40
37 Salmon Arm	1.32	1.75	1.43	1.65	1.33	1.18	1.11	1.21	1.40
38 Golden	1.24	N.A.	1.38	1.39	N.A.	1.14	1.08	1.18	1.28
39 Revelstoke	1.27	N.A.	1.39	1.43	1.16	1.13	1.09	1.21	1.33

Table 3.2 (cont)
2006 Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
No Migration (with Safety Net)

	Log-ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour-ism	Public Sector	Const.
KOOTENAY									
40 Fernie	1.25	N.A.	1.39	1.49	1.37	1.14	1.11	1.16	1.34
41 Cranbrook-Kimberley	1.34	1.89	1.51	1.56	1.08	1.19	1.12	1.25	1.40
42 Invermere	1.29	1.53	1.38	1.51	1.25	1.18	1.10	1.23	1.34
43 Castlegar-Arrow Lakes	1.28	1.92	1.41	1.48	1.29	1.19	1.11	1.21	1.39
44 Nelson	1.30	1.85	1.41	1.47	1.24	1.16	1.11	1.23	1.40
45 Creston	1.22	1.59	1.36	1.44	1.24	1.14	1.09	1.17	1.29
46 Grand Forks-Greenwood	1.27	1.60	1.45	1.52	N.A.	1.15	1.10	1.19	1.32
47 Trail-Rossland	1.24	1.82	1.37	1.53	1.14	1.21	1.11	1.22	1.38
CARIBOO									
48 Williams Lake	1.32	1.87	1.43	1.51	1.07	1.16	1.10	1.22	1.36
49 Quesnel	1.33	1.78	1.46	1.52	1.06	1.17	1.10	1.21	1.36
50 Prince George	1.42	2.00	1.53	1.60	1.16	1.19	1.13	1.27	1.44
51 McBride-Valemount	1.26	1.62	1.35	1.36	N.A.	1.12	1.09	1.15	1.29
NORTH COAST									
52 Queen Charlotte Islands	1.28	N.A.	1.35	N.A.	1.07	1.17	1.09	1.21	1.32
53 Prince Rupert	1.30	1.81	1.37	1.75	1.25	1.20	1.12	1.22	1.32
54 Kitimat-Terrace	1.31	1.82	1.39	1.45	1.43	1.17	1.10	1.22	1.36
55 Hazelton	1.18	N.A.	1.30	1.36	1.03	1.11	1.07	1.18	1.25
56 Stewart	1.09	N.A.	N.A.	1.25	N.A.	N.A.	1.04	1.12	1.18
NECHAKO									
57 Smithers-Houston	1.34	N.A.	1.47	1.55	1.10	1.17	1.11	1.22	1.38
58 Burns Lake	1.21	1.53	1.34	1.38	N.A.	1.13	1.06	1.17	1.26
59 Vanderhoof	1.23	1.52	1.30	1.54	N.A.	1.14	1.07	1.16	1.28
60 Stikine	1.11	N.A.	1.31	1.33	1.05	N.A.	1.07	1.20	1.31
NORTHEAST									
61 Dawson Creek	1.29	1.79	1.47	1.48	1.22	1.15	1.10	1.19	1.34
62 Fort St. John	1.28	1.78	1.40	1.51	1.28	1.18	1.12	1.21	1.43
63 Fort Nelson	1.30	N.A.	1.42	1.49	1.21	1.15	1.11	1.20	1.28

Table 3.3
2006 Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
Migration (No Safety Net/No Public Sector Impacts)

	Log-ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour-ism	Public Sector	Const.
VANCOUVER ISLAND/COAST									
1 Gulf Islands	1.59	N.A.	1.50	1.46	1.22	1.27	1.20	1.40	1.53
2 Victoria	1.55	2.13	1.57	2.30	1.36	1.31	1.23	1.50	1.63
3 Sooke-Port Renfrew	1.52	1.73	1.50	2.30	1.26	1.11	1.17	1.40	1.52
4 Duncan	1.67	2.26	1.67	1.90	1.34	1.29	1.21	1.46	1.62
5 Lake Cowichan	1.63	2.32	1.64	1.42	1.15	1.29	1.18	1.43	1.54
6 Ladysmith	1.50	2.17	1.66	1.43	1.27	1.24	1.18	1.38	1.56
7 Nanaimo	1.78	2.46	1.82	1.96	1.43	1.29	1.27	1.54	1.70
8 Parksville-Qualicum	1.51	2.06	1.53	1.70	1.33	1.25	1.17	1.34	1.53
9 Alberni	1.43	1.86	1.48	1.54	1.28	1.23	1.14	1.29	1.40
10 Courtenay-Comox	1.68	2.15	1.58	1.89	1.34	1.32	1.19	1.44	1.56
11 Campbell River	1.56	2.12	1.53	1.77	1.30	1.33	1.18	1.37	1.54
12 Bute Inlet	1.30	N.A.	1.36	1.32	1.10	1.17	1.14	1.24	1.33
13 Powell River	1.42	2.05	1.41	1.66	1.27	1.23	1.16	1.33	1.46
14 Alert Bay	1.46	N.A.	1.46	N.A.	1.42	1.19	1.15	1.35	1.41
15 Port Hardy	1.50	1.86	1.51	1.69	1.13	1.32	1.16	1.35	1.49
16 Central Coast	1.21	N.A.	1.16	N.A.	N.A.	1.13	1.08	1.21	1.25
MAINLAND/SOUTHWEST (Excluding GVRD)									
17 Hope-Fraser Canyon	1.50	N.A.	1.56	1.85	N.A.	1.19	1.20	1.42	1.52
18 Chilliwack	1.61	1.84	1.70	1.95	1.43	1.36	1.24	1.50	1.68
19 Kent-Harrison	1.37	1.73	1.56	N.A.	1.29	1.24	1.18	1.34	1.49
20 Matsqui-Abbottsford	1.60	2.32	1.70	2.01	1.66	1.38	1.26	1.53	1.76
21 Pitt Meadows-Maple Ridge	1.88	2.44	1.83	2.21	1.71	1.52	1.31	1.58	1.80
22 Mission	1.64	2.27	1.79	2.20	1.80	1.35	1.25	1.53	1.75
23 Sunshine Coast	1.62	2.28	1.67	1.94	1.27	1.30	1.20	1.41	1.59
24 Squamish	1.43	2.06	1.56	1.72	1.22	1.24	1.23	1.36	1.54
25 Lillooet	1.39	N.A.	1.46	1.53	N.A.	1.32	1.14	1.27	1.41
THOMPSON-OKANAGAN									
26 Princeton	1.44	N.A.	1.59	1.59	1.22	1.20	1.13	1.32	1.40
27 Oliver-Osoyoos	1.37	1.90	1.61	1.87	1.30	1.21	1.15	1.29	1.47
28 Penticton	1.56	2.00	1.60	1.79	1.45	1.24	1.19	1.41	1.57
29 Ashcroft	1.31	1.65	1.54	1.61	N.A.	1.20	1.13	1.30	1.44
30 Merritt	1.46	1.96	1.57	1.71	1.29	1.21	1.16	1.35	1.49
31 Kamloops	1.67	2.34	1.76	2.03	1.41	1.30	1.25	1.49	1.67
32 North Thompson	1.36	1.63	1.49	1.57	1.13	1.17	1.12	1.26	1.39
33 Peachland	1.67	2.33	1.84	1.97	1.46	1.34	1.26	1.46	1.72
34 Kelowna	1.67	2.19	1.72	2.02	1.48	1.30	1.26	1.48	1.69
35 Vernon	1.61	1.97	1.73	1.88	1.44	1.28	1.22	1.42	1.63
36 Spallumcheen	1.47	1.76	1.69	1.82	1.48	1.26	1.21	1.36	1.58
37 Salmon Arm	1.50	1.97	1.63	1.88	1.52	1.26	1.19	1.36	1.58
38 Golden	1.33	N.A.	1.49	1.50	N.A.	1.18	1.13	1.27	1.36
39 Revelstoke	1.39	N.A.	1.55	1.58	1.21	1.16	1.15	1.34	1.46

Table 3.3 (cont)
2006 Indirect and Induced Employment Ratios ((Direct + Indirect + Induced)/Direct)
Migration (No Safety Net/No Public Sector Impacts)

	Log-ging	Pulp& Paper	Wood Mfg.	Mining	High Tech	Agr.	Tour-ism	Public Sector	Const.
KOOTENAY									
40 Fernie	1.35	N.A.	1.50	1.61	1.48	1.17	1.16	1.25	1.44
41 Cranbrook-Kimberley	1.53	2.18	1.73	1.79	1.22	1.29	1.20	1.44	1.59
42 Invermere	1.42	1.58	1.51	1.66	1.37	1.30	1.18	1.35	1.46
43 Castlegar-Arrow Lakes	1.43	2.16	1.60	1.66	1.44	1.30	1.18	1.36	1.55
44 Nelson	1.44	2.11	1.60	1.64	1.39	1.21	1.19	1.42	1.57
45 Creston	1.30	1.63	1.47	1.56	1.26	1.18	1.13	1.25	1.37
46 Grand Forks-Greenwood	1.41	1.65	1.62	1.69	N.A.	1.21	1.15	1.32	1.45
47 Trail-Rossland	1.39	2.08	1.56	1.75	1.27	1.38	1.20	1.40	1.56
CARIBOO									
48 Williams Lake	1.47	2.07	1.59	1.68	1.18	1.21	1.16	1.35	1.50
49 Quesnel	1.47	1.98	1.63	1.70	1.14	1.25	1.16	1.36	1.49
50 Prince George	1.65	2.33	1.78	1.87	1.35	1.29	1.24	1.48	1.68
51 McBride-Valemount	1.34	1.66	1.44	1.38	N.A.	1.13	1.12	1.23	1.34
NORTH COAST									
52 Queen Charlotte Islands	1.42	N.A.	1.45	N.A.	1.18	1.25	1.16	1.32	1.43
53 Prince Rupert	1.45	2.02	1.51	1.94	1.28	1.34	1.19	1.36	1.43
54 Kitimat-Terrace	1.46	2.04	1.56	1.60	1.59	1.24	1.16	1.36	1.50
55 Hazelton	1.26	N.A.	1.39	1.46	1.08	1.13	1.11	1.25	1.30
56 Stewart	1.10	N.A.	N.A.	1.28	N.A.	N.A.	1.05	1.14	1.20
NECHAKO									
57 Smithers-Houston	1.51	N.A.	1.65	1.74	1.22	1.24	1.18	1.36	1.52
58 Burns Lake	1.29	1.57	1.44	1.48	N.A.	1.19	1.09	1.25	1.32
59 Vanderhoof	1.31	1.62	1.38	1.63	N.A.	1.19	1.10	1.23	1.36
60 Stikine	1.23	N.A.	1.40	1.43	1.14	N.A.	1.12	1.30	1.41
NORTHEAST									
61 Dawson Creek	1.43	1.99	1.64	1.64	1.24	1.20	1.17	1.33	1.50
62 Fort St. John	1.45	2.02	1.59	1.71	1.44	1.29	1.21	1.36	1.63
63 Fort Nelson	1.40	N.A.	1.53	1.61	1.22	1.21	1.17	1.29	1.38

3.3 Applications

3.3.1 General Introduction

Several examples that illustrate the ways in which the ratios can be used as multipliers to estimate impacts are presented in the following sections.

Please note that the examples given are entirely fictitious, with places and industry changes selected essentially at random, and the numbers used have been pulled out of thin air.

3.3.2 Simple Example

Suppose that a shellfish farming operation has been approved for the Port Hardy area. It is expected to employ 25 people directly once it is fully operational. What are the local economic implications?

Shellfish farming is considered part of Agriculture in the North American Industry Classification System (NAICS). Therefore, the relevant employment ratios are those for Agriculture in the Port Hardy area, namely,

Indirect: 1.12

Indirect plus Induced (with Safety Net): 1.20

Indirect plus Induced (no Safety Net): 1.32

The indirect ratio (used as a multiplier) tells us that there will be another 0.12 x 25 = 3 jobs created in the Port Hardy area by the shell-fish farming operation spending money in local businesses. If we assume that no new people move to the community because of these new job opportunities (both direct and indirect - in other words that the new jobs are filled by laid off fishermen or loggers), then the incremental spending caused by this boost in incomes will result in another 1.20 – 1.12 = .08 x 25 = 2 jobs in the nonbasic sector – maybe one fulltime position in the local supermarket and another fulltime position in a fast-food restaurant.

However, if all the new workers come from outside the community, so that all of their spending is new, the effects are larger:
1.32 – 1.12 = .20 x 25 = 5 new jobs in the nonbasic sector.

Probably, the impacts on the nonbasic sector will lie between the extremes of 2 and 5 because some of the new hires will be people from elsewhere with relevant experience and some will be unemployed locals.

3.3.3 Example which examines two industries simultaneously

Assume that the Squamish area is losing logging employment because of a depleted timber supply in the area and, at the same time, is experiencing considerable growth in tourism because of its natural beauty and the announcement of the 2010 Winter Olympics.

To be specific, suppose that our crystal ball tells us that next year there will be 150 fewer logging positions, and, because of increased tourism

opportunities, there will be another 300 people employed in jobs that directly support the tourist industry. What will be the net effects of these changes on the area?

First, find the relevant multipliers from Tables 3.1, 3.2 and 3.3. They are displayed for convenience in Table 3.4.

Table 3.4 Employment Impact Ratios for Squamish Area

	Logging	Tourism
Indirect	1.19	1.07
Indirect plus Induced (SN)	1.28	1.13
Indirect plus Induced (NSN)	1.43	1.23

Since we don't know precisely how the displaced loggers will react (retire?, move away?, go on EI?, change professions?…?) or where the new tourist workers will come from, let's assume that the true Indirect plus Induced multipliers in each case correspond to 50% SN and 50% NSN, or 1.355 for Logging and 1.18 for Tourism – i.e., and average of estimates.

With these simplifying assumptions the 150 jobs lost in logging will have a negative employment impact of 150 x 1.355 = 203 jobs. On the other hand, the 300 new jobs in Tourism will have a total positive employment impact of 300 x 1.18 = 354 jobs. Therefore, the net effect of both expected changes will be an increase in employment of 354 – 203 = 151 jobs.

It should be noted that the jobs gained and the jobs lost are not in the same industries, and that the skills required in the new jobs may not be held by the displaced workers, necessitating considerable employment flux in the area – such things need to be considered, but they are outside the scope of this simple economic model.

Before we leave this example, there are a couple more questions that might be asked. One would be: can we use the multipliers to figure out the trade-off between direct jobs in Logging and those in Tourism? Or, put another way, how many tourist workers does it take to replace one logger, assuming that our trade-off condition is that total employment in the area remains the same?

For simplicity, assume that the midpoint multipliers are used: 1.355 for Logging and 1.18 for Tourism. Assume that one direct job is lost in Logging. Then the total employment declines by 1.355. Assume that x direct jobs in Tourism are required to restore employment equilibrium. Then, 1.18 x = 1.355 or x = 1.355/1.18 = 1.15.

So this analysis suggests that it takes roughly 1.15 jobs in tourism to replace each logging job lost.

3.3.4 Example where both Employment Income and Non-Employment Income are Considered

When reading this section, it might be helpful to refer to Figure 2.1 on page 5, the graphical presentation of the basic and non-basic sectors.

To measure the impact on the number of jobs in a community resulting from an influx of non-employment income (transfer payments, investment income, etc.), an alternative methodology is required to that used in previous examples that measured the impact of an influx of basic sector jobs. An extra step is required to estimate the nonbasic income that would be generated from the expenditure of non-employment income and then convert that non-basic income into non-basic jobs.

This next example shows how to calculate the economic impact of a decrease of 20 logging jobs in the Nelson area at the same time as an increase of 50 typical senior citizens in the same area receiving non-employment income.

Consider first the impacts of the reduction in logging employment. The employment ratios for the logging industry in the Nelson area given in Tables 3.1, 3.2 and 3.3, are reproduced below.

Indirect 1.21

Indirect plus Induced (with Safety Net/No migration) 1.30

Indirect plus Induced (No Safety Net/with migration) 1.44

What this means is that the direct job loss of 20 will lead to an estimated loss of

$$20 \times (1.21 - 1) = 4.2 \text{ indirect jobs}$$

Even under the assumption that all displaced workers stay in the community and draw employment insurance, there could be an additional loss of

$$20 \times (1.30 - 1.21) = 1.8 \text{ induced jobs}$$

If the situation persists and all displaced workers leave the Nelson area to seek employment elsewhere, there could be an additional loss of

$$20 \times (1.44 - 1.30) = 2.8 \text{ induced jobs}$$

as a result of reduced spending in the community. Thus, with a loss of 20 direct jobs in the basic sector, the community would lose either 6 indirect and induced jobs under the safety net assumption or 7 jobs with no safety net.

Now let us consider the economic gains associated with the in-migration of 50 seniors. It is assumed they would bring with them basic non-employment income, such as OAP and CPP benefits, investment income, etc. and their spending of that income on goods and services in the community would create "induced" jobs. To determine how many

induced jobs would be created, we first need to estimate the non-basic income their expenditures would generate.

To do that, it is necessary to estimate the after-tax incomes of these people. Data from the 2006 Census[9] suggests an average annual after-tax income for British Columbians, age 65 and over, of $26,220[10]. Thus, if Nelson gains 50 seniors, the total increase in basic after-tax income would be:

50 x $26,220 = $1,311,000

We also need two additional pieces of information on the Nelson area - the nonbasic income ratio (non-basic income divided by basic income), and the average nonbasic after-tax income in the community. Fortunately, that information is available from the database developed for this project and the results are compiled in Tables 3.5 and 3.6.

Table 3.5 indicates that the nonbasic income ratio for the Nelson Area is 0.164. This means that for every dollar generated from activities in the basic sector, be it from employment income or non-employment income, an additional $0.164 of nonbasic income is generated.

Multiplying the basic income of the seniors ($1,311,000) by the nonbasic income ratio (0.164), we find that the corresponding increase in nonbasic after-tax income resulting from the spending of these seniors is:

0.164 x $1,311,000 = $215,004

Using the community average of nonbasic after-tax income in the Nelson Area of $20,624, (found in Table 3.6), we can assume that the $215,004 nonbasic income generated by the seniors demand for goods and services would create:

$215,004/$20,624 = 10.4 induced jobs, or 0.21 of an induced job per senior (i.e. 10.4/50= 0.21).

Thus to replace all the jobs lost from the loss of 20 direct jobs in the forest sector, plus the 4.2 indirect jobs and 2.8 induced jobs, for a total of 27 jobs, it would take 128 seniors to move into Nelson and start spending their non-employment income.

27 jobs lost / 0.21 jobs created per senior = 128 seniors

Note that this example assumed that all the new induced jobs resulting from the influx of seniors are filled by in-migrants (no safety net). To

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[9] The specific reference for this is 2006 Census Statistics Canada 97-563-XCB2006013

[10] Here as elsewhere in this work we assume that local spending equals after-tax income. In fact, of course, senior citizens may be drawing funds from accumulated wealth and spending more than their incomes. The counter-argument would be that seniors are no longer accumulating assets and may spend significant amounts of time outside the local area, which would make their local spending less than their income.

apply another twist to the non-employment income economic impact calculation, below we look at the same example of 50 seniors moving into Nelson, but this time under the safety-net assumption, that is, all the new induced jobs are filled by workers who previously lived in the community but were unemployed and receiving EI.

3.3.5 Example Incorporating the Safety Net Assumption

To determine the impact of this assumption, it is necessary to first calculate how many induced jobs the 10.4 ex-unemployed would have supported through the expenditure of their income from employment insurance.

We assume an average EI benefit of $10,000 per year. Thus the 10.4 unemployed would have generated a total of

10.4 x $10,000 = $104,000 basic non-employment income

With the non-basic income ratio equal to 0.164, the nonbasic income generated would be $17,056

0.164 x $104,000 = $17,056

Given an average nonbasic income of $20,624, the 10.4 unemployed would have generated less than 1 induced job (0.83)

$17,056/$20,624 = 0.83 induced jobs

So if the safety net assumption is used, there will be a net of 9.6 induced jobs generated when 50 seniors move into the area

10.4 jobs - 0.83 jobs = 9.6 jobs,

instead of the 10.4 jobs generated under the no-safety net assumption.

While these calculations suggest that a sufficient number of seniors would keep the community as a whole viable, it is unknown if the loggers and indirect employees would have the appropriate skills to fill the new non-basic positions – or that they would be willing to take the jobs, given the reduction in average income levels.

Table 3.5
2006 Nonbasic Income Ratios* Based on After-Tax Income

VANCOUVER ISLAND/COAST	
1 Gulf Islands	0.206
2 Victoria	0.224
3 Sooke-Port Renfrew	0.149
4 Duncan	0.199
5 Lake Cowichan	0.172
6 Ladysmith	0.166
7 Nanaimo	0.262
8 Parksville-Qualicum	0.162
9 Alberni	0.106
10 Courtenay-Comox	0.175
11 Campbell River	0.156
12 Bute Inlet	0.076
13 Powell River	0.150
14 Alert Bay	0.128
15 Port Hardy	0.128
16 Central Coast	0.063
MAINLAND/SOUTHWEST	
17 Hope-Fraser Canyon	0.163
18 Chilliwack	0.235
19 Kent-Harrison	0.118
20 Matsqui-Abbottsford	0.257
21 Pitt Meadows-Maple Ridge	0.312
22 Mission	0.253
23 Sunshine Coast	0.206
24 Squamish	0.197
25 Lillooet	0.091
THOMPSON-OKANAGAN	
26 Princeton	0.128
27 Oliver-Osoyoos	0.124
28 Penticton	0.174
29 Ashcroft	0.105
30 Merritt	0.126
31 Kamloops	0.234
32 North Thompson	0.072
33 Peachland	0.267
34 Kelowna	0.268
35 Vernon	0.235
36 Spallumcheen	0.179
37 Salmon Arm	0.173
38 Golden	0.108
39 Revelstoke	0.142
KOOTENAY	
40 Fernie	0.112
41 Cranbrook-Kimberley	0.191
42 Invermere	0.138
43 Castlegar-Arrow Lakes	0.170
44 Nelson	0.164
45 Creston	0.093
46 Grand Forks-Greenwood	0.117
47 Trail-Rossland	0.178
CARIBOO	
48 Williams Lake	0.137
49 Quesnel	0.131
50 Prince George	0.225
51 McBride-Valemount	0.065
NORTH COAST	
52 Queen Charlotte Islands	0.126
53 Prince Rupert	0.147
54 Kitimat-Terrace	0.139
55 Hazelton	0.076
56 Stewart	0.024
NECHAKO	
57 Smithers-Houston	0.159
58 Burns Lake	0.073
59 Vanderhoof	0.072
60 Stikine	0.111
NORTHEAST	
61 Dawson Creek	0.162
62 Fort St. John	0.216
63 Fort Nelson	0.154

*Total nonbasic income divided by total basic income

Table 3.6
Average Nonbasic After-Tax Income, 2006

VANCOUVER ISLAND/COAST		
1	Gulf Islands	$27,692
2	Victoria	$28,110
3	Sooke-Port Renfrew	$24,744
4	Duncan	$23,624
5	Lake Cowichan	$19,783
6	Ladysmith	$23,098
7	Nanaimo	$23,087
8	Parksville-Qualicum	$26,560
9	Alberni	$21,477
10	Courtenay-Comox	$23,215
11	Campbell River	$22,686
12	Bute Inlet	$15,325
13	Powell River	$22,266
14	Alert Bay	$17,977
15	Port Hardy	$22,648
16	Central Coast	$21,199
MAINLAND/SOUTHWEST		
17	Hope-Fraser Canyon	$19,669
18	Chilliwack	$25,020
19	Kent-Harrison	$21,728
20	Matsqui-Abbottsford	$24,142
21	Pitt Meadows-Maple Ridge	$27,661
22	Mission	$24,088
23	Sunshine Coast	$24,905
24	Squamish	$32,796
25	Lillooet	$18,039
THOMPSON-OKANAGAN		
26	Princeton	$20,230
27	Oliver-Osoyoos	$22,767
28	Penticton	$24,362
29	Ashcroft	$19,866
30	Merritt	$19,538
31	Kamloops	$25,392
32	North Thompson	$17,916
33	Peachland	$27,164
34	Kelowna	$27,891
35	Vernon	$26,919
36	Spallumcheen	$21,064
37	Salmon Arm	$22,562
38	Golden	$24,870
39	Revelstoke	$23,780
KOOTENAY		
40	Fernie	$25,901
41	Cranbrook-Kimberley	$24,022
42	Invermere	$27,769
43	Castlegar-Arrow Lakes	$24,887
44	Nelson	$20,624
45	Creston	$19,994
46	Grand Forks-Greenwood	$17,476
47	Trail-Rossland	$21,826
CARIBOO		
48	Williams Lake	$21,886
49	Quesnel	$20,328
50	Prince George	$25,829
51	McBride-Valemount	$17,542
NORTH COAST		
52	Queen Charlotte Island	$20,918
53	Prince Rupert	$24,828
54	Kitimat-Terrace	$22,154
55	Hazelton	$16,875
56	Stewart	$21,979
NECHAKO		
57	Smithers-Houston	$24,161
58	Burns Lake	$18,315
59	Vanderhoof	$21,157
60	Stikine	$25,814
NORTHEAST		
61	Dawson Creek	$27,033
62	Fort St. John	$31,050
63	Fort Nelson	$38,633

4. Discussion of Changes 1991 – 1996 – 2001 – 2006

4.1 Dependencies

Appendix E shows all of the dependencies estimated for the 63 local areas of this report for each of the census years 1991, 1996, 2001 and 2006. Not all sectors were calculated in each year, so these results have been aggregated to a common sectoral basis. Readers are cautioned in viewing these tables that some of the shifts from Other Non-Employment Income (ONEI) to Transfer Payments (TRAN) in the interval from 1991 to 1996 may be at least partly result from the way that the data relating to non-employment income was interpreted for these two years. For the major purposes of this study the more relevant statistic is probably the total non-employment income dependency, i.e. TRAN + ONEI and this statistic has remained fairly stable for most communities over the study period.

A natural question to ask is just how the dependencies have changed across all communities in the province over the period studied. One way to answer this is just to compute the mean dependency across all 63 local areas for each period. The results of this calculation are shown in Table 4.1.

Table 4.1 – Mean Income Dependencies for all 63 Local Areas

Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	15	5	1	2	6	25	14	17	15
2001	18	4	1	3	7	25	12	18	12
1996	21	4	2	3	7	24	12	16	10
1991	18	6	1	3	5	19	15	13	20

Perhaps not too surprisingly, averaged across the whole province, these figures show considerable stability. Community dependence on Forestry appears to have grown from 1991 to 1996, then fell back again to 1991 levels in 2001 and continued that decline in 2006. Mining and mineral processing dropped by 33% from 1991 to 1996, but seems to have recovered somewhat in 2006. Fishing and trapping increased in 1996 but then fell back to its 1991 level in 2001 and 2006. Dependence on Agriculture and food processing remained very steady over the first decade but dropped in 2006. Community' dependence on Tourism grew about 40% from 1991 to 1996, remained stable through 2001, but dropped about 15% in 2006. Dependence on public sector activities grew over the first decade, from 19% in 1991 to 25% in 2001, but seems to have stabilized at 25% in 2006.

Each reader of this report will have their own particular places of interest and will want to interpret the changes in those places in their own way and according to their own knowledge of the local situation. Table 4.2 shows where the largest changes have taken place in the province.

Table 4.2 Selected Areas and Sectors where the Largest Dependency Changes have taken place

Area	Sector	2006	2001	1996	1991
Stewart	Mining & Min Proc	8	4	11	43
Stewart	Public Sector	52	41	35	22
Squamish	Tourism	27	29	26	14
Port Hardy	Min & Min Proc	2	1	5	13
Port Hardy	Forestry	32	59	51	37
Hazelton	Forestry	18	29	37	39
Stewart	Forestry	3	9	25	18
Fort St. John	Min & Min Proc	37	32	26	23
Prince Rupert	Fishing & Trap.	16	11	15	18
Queen Charlottes	Public Sector	31	30	32	36
Matsqui-Abbotsford	Agric & Food	11	11	10	7
McBride-Valemount	Agric. & Food	1	2	4	6
Stewart	Tourism	7	5	7	8
Stewart	Fishing & Trap.	4	3	3	1

When interpreting Table 4.2, or any other changes in dependencies for that matter, it is important to remember that the dependency is the share of income that a particular sector provides for a community. However, it does not follow automatically that just because the dependency has increased (or decreased) the absolute amount of income provided by that sector has increased (or decreased); only that its share of income ***relative to other sectors*** has increased (or decreased). Since the dependencies have to add up to 100% in each year it should not be too surprising that the same communities often occur more than once in Table 4.2 – where one sector has increased (or decreased) significantly, others must also have changed to maintain the 100% total, even if, in absolute terms, they have not changed at all.

By the same reasoning, the dependency figures alone, and changes in them, do not say anything about the changing economic health of the

community. To use the pie analogy, the dependencies tell us the relative size of the pie pieces provided by each basic sector, but these figures alone say nothing about whether the pie has gotten bigger or smaller – whether the community has gotten more prosperous in 2006 than it was in 1991 or vice versa.

Nevertheless, some of the changes in Table 4.2 are striking and worthy of comment. They put numbers to what knowledgeable people knew already. The drop in mining dependence in the Port Hardy area coincides with a mine closure. The increase in Tourism dependence in the Squamish area is no doubt due to the development of Whistler as a world-class tourist destination. The Stewart area has seen more economic changes than any other area in the province over the 15 year period, with significant declines in Mining and Forestry.

There have been some changes in the dominant basic sector for some local areas between 1996 and 2006. These can be seen in Map 4.1.

4.2 Diversity and Forest Vulnerability

4.2.1 Diversity Indices

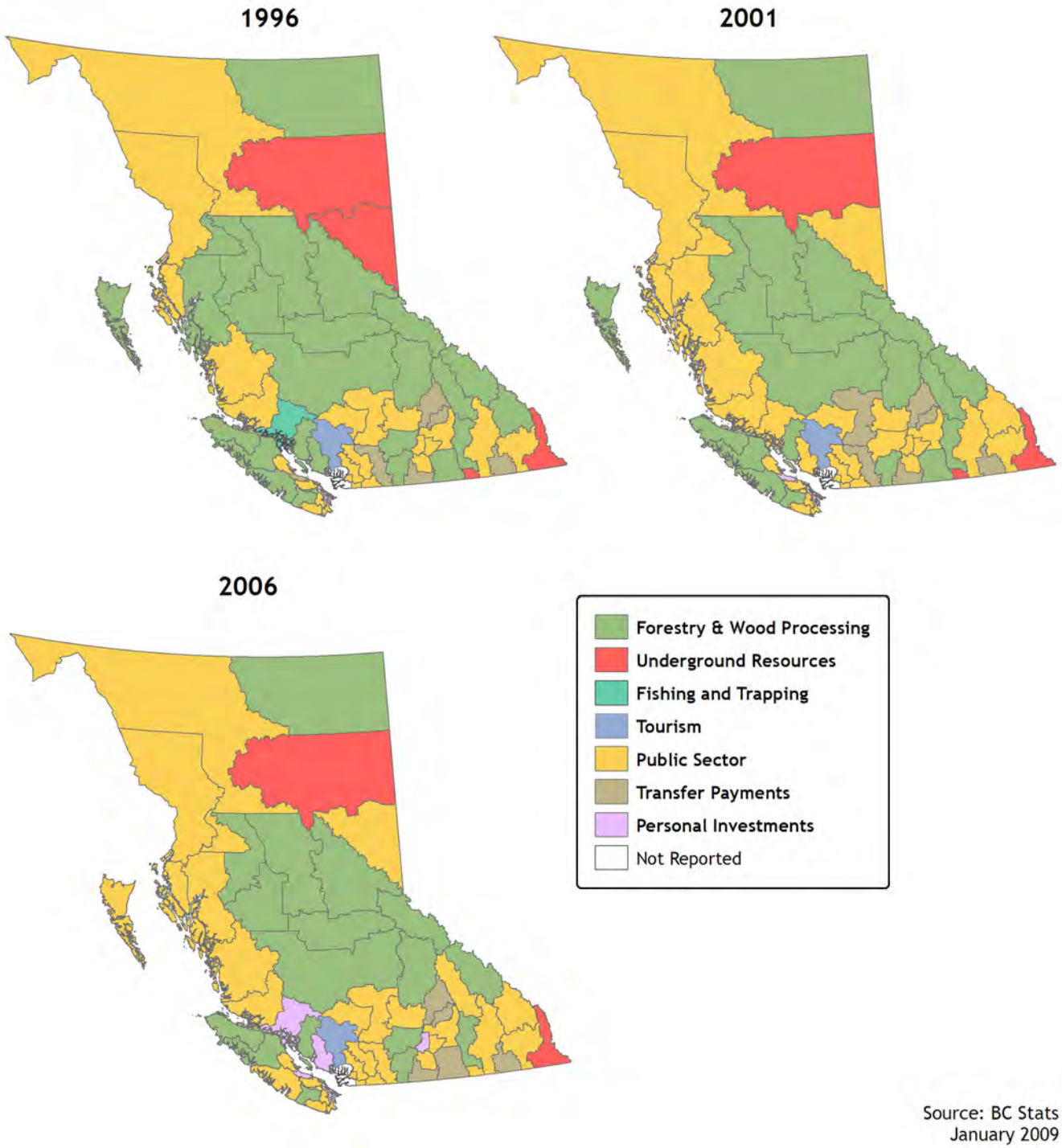
Table 4.3 displays for each local area the diversity indices for each of the years being compared. The mean values for diversity in the three years are: 69 in 2006, 67 in 2001, and 67 in 1996.

Many communities maintained or slightly improved their diversity between 2001 and 2006. Particularly noteworthy for increases were the Port Hardy area, up by 15; the North Thompson area, up by 7; and the Queen Charlottes, which increased by 7. Diversity index improvements of 6 were experienced by Lake Cowichan and Alberni between 2001 and 2006.

A few communities have actually decreased in diversity despite the general increase. These include the Central Coast area (down by 8), Stewart (down by 8) and the Hope-Fraser Canyon, Stikine, and Fort St. John areas each of which declined by 4.

A final caveat here is that while, in general, diversity is probably good it is no guarantee of prosperity. A one-industry town that loses its industry probably has increasing diversity as it struggles to avoid becoming a ghost town.

Map 4.1
Dominant Basic Income Sources



Source: BC Stats
January 2009

Table 4.3
Diversity Indices - 2006 - 2001 – 1996

VANCOUVER ISLAND/COAST	2006	2001	1996
1 Gulf Islands	67	66	66
2 Victoria	60	58	59
3 Sooke-Port Renfrew	65	60	61
4 Duncan	69	69	70
5 Lake Cowichan	69	63	64
6 Ladysmith	69	69	71
7 Nanaimo	69	69	72
8 Parksville-Qualicum	67	67	71
9 Alberni	71	65	63
10 Courtenay-Comox	68	68	70
11 Campbell River	73	70	66
12 Bute Inlet	75	75	76
13 Powell River	69	67	65
14 Alert Bay	68	65	67
15 Port Hardy	67	52	52
16 Central Coast	52	60	60
MAINLAND/SOUTHWEST			
17 Hope-Fraser Canyon	67	71	71
18 Chilliwack	71	70	68
19 Kent-Harrison	71	71	70
20 Matsqui-Abbottsford	74	73	74
21 Pitt Meadows-Maple Ridge	71	70	71
22 Mission	72	72	73
23 Sunshine Coast	73	72	72
24 Squamish	71	69	71
25 Lillooet	70	67	64
THOMPSON-OKANAGAN			
26 Princeton	70	65	72
27 Oliver-Osoyoos	69	66	68
28 Penticton	70	68	69
29 Ashcroft	77	76	77
30 Merritt	72	68	70
31 Kamloops	74	72	74
32 North Thompson	68	61	64
33 Peachland	75	73	77
34 Kelowna	73	73	73
35 Vernon	73	72	74
36 Spallumcheen	75	75	75
37 Salmon Arm	75	73	73
38 Golden	73	72	72
39 Revelstoke	75	73	74

KOOTENAY	2006	2001	1996
40 Fernie	59	61	57
41 Cranbrook-Kimberley	73	74	73
42 Invermere	79	74	73
43 Castlegar-Arrow Lakes	72	69	67
44 Nelson	71	69	68
45 Creston	69	68	70
46 Grand Forks-Greenwood	69	69	70
47 Trail-Rossland	71	66	67
CARIBOO			
48 Williams Lake	69	67	68
49 Quesnel	56	57	56
50 Prince George	66	64	65
51 McBride-Valemount	65	68	61
NORTH COAST			
52 Queen Charlotte Islands	69	62	59
53 Prince Rupert	69	66	69
54 Kitimat-Terrace	70	70	71
55 Hazelton	57	59	56
56 Stewart	51	59	62
NECHAKO			
57 Smithers-Houston	67	63	64
58 Burns Lake	60	60	58
59 Vanderhoof	59	56	56
60 Stikine	54	58	48
NORTHEAST			
61 Dawson Creek	76	74	72
62 Fort St. John	66	70	75
63 Fort Nelson	69	68	56

4.2.2 Forest Vulnerability over the last decade

Table 4.4 displays forest vulnerability indices (FVI) for each local area for each of the three years, 2006, 2001, and 1996. As discussed in Section 2.3 the FVI is a normalized index – the most vulnerable place by this measure is set to 100 and the least vulnerable to zero and the other areas fall into place between these two extremes. In 2006 the most vulnerable area was Quesnel and the least vulnerable was Victoria. It was decided that comparisons between years would be more meaningful if these same "goal posts" were maintained, even for the other years. Thus, the figures given in Table 4.4 differ slightly from those given in Table 2.4 of the 2004 report and Table 3.4.4 of the 1999 report though their relative position is the same.

The mean FVI over the 63 areas is 22 in 2006, was 25 in 2001, and 29 in 1996. Thus, the composite vulnerability of communities in B. C. has steadily declined since 1996.

Individual areas showed a lot more variation. Between 2001 and 2006 there were major declines in forest vulnerability on Vancouver Island: Port Hardy, down by 66, as well as Lake Cowichan (22), Alberni (24), and Campbell River (12). Declines were evident in other areas along the Pacific coast: Powell River (11), the Central Coast area (18), the Queen Charlotte Islands (41) and Prince Rupert (31). Areas in the interior of the province that showed significant declines in Forest Vulnerability included Ashcroft (10), Hazelton (22), Smithers-Houston (13) and Vanderhoof (10).

Despite the general decline in Forest Vulnerability across the province, a number of areas actually saw increases in this index between 2001 and 2006. The largest increases were in the McBride-Valemount area, up by 9, and Quesnel (8).

Table 4.4
Forest Vulnerability Indices - 2006 - 2001 - 1996

		2006	2001	1996
1	Gulf Islands	2	1	0
2	Victoria	0	0	1
3	Sooke-Port Renfrew	5	4	11
4	Duncan	20	26	29
5	Lake Cowichan	35	57	59
6	Ladysmith	20	29	34
7	Nanaimo	11	15	16
8	Parksville-Qualicum	7	12	11
9	Alberni	29	53	67
10	Courtenay-Comox	13	16	17
11	Campbell River	31	43	59
12	Bute Inlet	5	5	12
13	Powell River	32	43	58
14	Alert Bay	19	13	28
15	Port Hardy	51	117	122
16	Central Coast	7	25	51
17	Hope-Fraser Canyon	10	19	23
18	Chilliwack	6	7	7
19	Kent-Harrison	5	8	14
20	Matsqui-Abbottsford	6	9	7
21	Pitt Meadows-Maple	7	9	9
22	Mission	12	16	15
23	Sunshine Coast	18	26	27
24	Squamish	6	16	19
25	Lillooet	31	33	51
26	Princeton	38	47	32
27	Oliver-Osoyoos	5	9	8
28	Penticton	6	7	6
29	Ashcroft	11	21	17
30	Merritt	30	38	40
31	Kamloops	11	13	13
32	North Thompson	48	77	64
33	Peachland	5	5	7
34	Kelowna	4	5	4
35	Vernon	11	13	17
36	Spallumcheen	12	15	16
37	Salmon Arm	13	13	15
38	Golden	35	34	37
39	Revelstoke	21	28	28
40	Fernie	12	15	16
41	Cranbrook-Kimberley	15	17	21
42	Invermere	13	22	28
43	Castlegar-Arrow Lakes	31	37	49
44	Nelson	12	19	19
45	Creston	11	14	15
46	Grand Forks-Greenwood	34	38	36
47	Trail-Rossland	4	4	8
48	Williams Lake	41	50	50
49	Quesnel	100	92	100
50	Prince George	46	55	57
51	McBride-Valemount	56	47	76
52	Queen Charlotte Islands	20	61	71
53	Prince Rupert	6	37	33
54	Kitimat-Terrace	20	27	34
55	Hazelton	38	60	80
56	Stewart	7	16	48
57	Smithers-Houston	50	63	65
58	Burns Lake	73	72	86
59	Vanderhoof	86	96	101
60	Stikine	8	2	13
61	Dawson Creek	13	20	18
62	Fort St. John	9	9	12
63	Fort Nelson	41	49	100

4.3 Employment Impact Ratios

The employment impact ratios for a particular industry in a particular place can be expected to change somewhat as the area grows (or declines) in population and also as a result of technological changes or restructuring in the industry. For example, if services that were formerly done "in-house" are contracted out, then the apparent ratios will increase even if total employment does not change.

However, at the same time, there is a certain amount of trepidation associated with examining changes in the ratios at different time periods, as we are about to do. The reason for this is that in order to recommend use of the ratios as employment multipliers they have to be reasonably stable over time and in the face of other changes. How can we use the ratios to predict the effects of changes in direct basic employment if those ratios themselves change in unpredictable ways as a result of the same kind of changes? The answer to this may be that we need a more complex model.

The average employment impact ratios for each of the four years studied are displayed in Table 4.5 for selected industries.

Table 4.5 Average Employment Ratios for 2006, 2001, 1996 and 1991

	Indirect				Indirect + Induced (No Safety Net)			
Sector	**2006**	**2001**	**1996**	**1991**	**2006**	**2001**	**1996**	**1991**
Logging	1.19	1.17	1.22	1.27	1.47	1.42	1.48	1.61
Pulp & Paper	1.59	1.67	1.48	1.38	2.01	2.09	1.86	1.82
Wood Mfg.	1.28	1.28	1.21	1.17	1.57	1.58	1.47	1.47
Mining	1.34	1.30	1.37	1.17	1.73	1.62	1.66	1.54
Agriculture	1.12	1.14	1.12	1.06	1.25	1.28	1.24	1.23
Tourism	1.06	1.07	1.06	1.01	1.18	1.19	1.16	1.13
Public Sector	1.13	1.13	1.07	1.01	1.36	1.36	1.27	1.25
Construction	1.27	1.25	1.23	1.20	1.51	1.49	1.43	1.47

With only logging as a notable exception, almost all of the ratios have trended upward over the study period. Part of this may be due to greater modeling efforts to capture indirect and nonbasic activities attributable to the major basic sectors.[11] To the extent that the changes are real, the

[11] See, for example, the discussion in Appendix A.8.

easiest interpretation is that these industries have reduced their own labour force (per unit of output) but at the cost of a greater reliance on the purchase of off-site services.

In the case of logging, the inclusion of transportation of raw fiber as part of direct in 1996 and subsequent analyses (so-called "truck logging" in the interior, and barging on the coast) is certainly part of the reason for the change since 1991, but it does not explain the continuation of the downward trend in the ratios between 1996 and 2001. It may be that the logging industry, in its efforts to reduce costs, has found ways to reduce expenditures on outside services that exceed any reductions in its own workforce. The ratios for this sector for 2006 have increased from those of 2001 but not quite back to the levels of 1996.

4.4 Shift/Share Analysis

If a particular industry is growing or declining in a particular local area, an automatic question that arises is whether or not the decline is "natural" in the sense that it is also growing or declining in other areas as well. Shift/share analysis attempts to answer this question by breaking down the change in employment by industry group into three components. The analysis that follows was inspired by work carried out by David Elliott of QED Systems for the province of Saskatchewan in 2007. This work, in turn, was based on research done for the Ontario Ministry of Municipal Affairs by economist Dr. Emanuel Carvalho from the University of Waterloo.

1. The first component is growth or decline arising from general employment growth. If employment is generally increasing in the province as a whole, one would expect it to be increasing in the region and the sector as well. This is referred to as the provincial effect (PE) and it is calculated for a particular sector as follows:

   $PE_{SECT} = EMP01_{SECT} \times \Delta BCEMP$

   where: $EMP01_{SECT}$ is the 2001 employment level in the sector in the local area and $\Delta BCEMP$ is the percentage change in overall employment between 2001 and 2006 in BC as a whole.

2. The second component is growth or decline arising from the nature of the industry. If employment in a particular industry is expanding or declining generally in the province as a whole, one would expect it to be expanding or declining in that sector in the local area as well. This is referred to as the industry effect (IE) and is calculated for a particular industry as follows:

   $IE_{SECT} = EMP01_{SECT} \times [\Delta BCEMP_{SECT} - \Delta BCEMP]$

where: $EMP01_{SECT}$ is the 2001 employment level in the sector in the local area, $\Delta BCEMP_{SECT}$ is the change in employment in the sector between 2001 and 2006 in BC, and $\Delta BCEMP$ is the percentage change in overall employment between 2001 and 2006 in British Columbia.

3. The third component is the residual, and is the growth or decline arising from the specifics of the industry within the local area. This is referred to as the local effect (LE) and is the most interesting for analysis purposes. It is calculated as follows:

   $LE_{SECT} = EMP01_{SECT} \times [\Delta EMP_{SECT} - \Delta BCEMP_{SECT}]$

   where: $EMP01_{SECT}$ is the 2001 employment level in the sector in the local area, ΔEMP_{SECT} is the percentage change in that sector's employment between 2001 and 2006 in the local area and $\Delta BCEMP_{SECT}$ is the percentage change in that sector's employment between 2001 and 2006 in BC as a whole.

Let's see how this plays out for a couple of randomly selected local areas.

Table 4.6a Shift/Share Components for Employment Growth, 2001 - 2006

Local Area: 47 Trail-Rossland						
Industry	**2001 Emp**	**Prov. Effect**	**Industry Effect**	**Local Effect**	**Total**	**2006 Emp**
Forestry, Logging & wood-based Manufacturing	416	28	-84 76		20	436
Mining, Min. Proc. Inc Oil & Gas	2198	147	315	-1138	-676	1522
Fishing, Trap. & Fish Process.	0	0	0 0		0	0
Agriculture & Food Process.	41	3	-1 8		9	50
Tourism	737	49	-34	202	217	954
High Tech	14	1	3	102	106	120
Public Sector	2620	175	-89	-113	-28	2592
Construction	519	35	228	-3	260	779
Film Prod. & Sound Recording	23	2	2	-14	-11	13

The provincial effects are all positive because overall provincial employment increased over the period under study, and this increase could be expected to manifest itself in all areas and all industries. The industry effects differ substantially by industry because provincial employment increased (mining and construction) or decreased (forestry

and public sector). Finally, the local effects are the residual: the number that's needed to explain the actual change in local employment in each industry. Large local effects, either positive or negative, indicate that the change in local employment in the particular industry cannot be easily explained by overall provincial employment changes or by changes in the industry. Thus, for example, the large negative local effect (-1138) for Mining & Mineral Processing for Trail-Rossland shows that the employment change in this industry for this area is at significant odds with what could expected given overall provincial employment growth and growth in this industry in particular. On the other hand, the large positive local effect for Tourism (+202) shows that Trail-Rossland has exceeded expectations for employment growth in this industry.

Table 4.6b Shift/Share Components for Employment Growth, 2001 - 2006

Local Area: 45 Creston						
Industry	2001 Emp	Prov. Effect	Industry Effect	Local Effect	Total	2006 Emp
Forestry, Logging & wood-based Manufacturing	706	47	-143	-24	-119	587
Mining, Min. Proc. Inc Oil & Gas	173	12	25	134	171	344
Fishing, Trap. & Fish Process.	9	1	2	-10	-8	1
Agriculture & Food Process.	696	47	-22	162	186	882
Tourism	717	48	-33	-75	-60	657
High Tech	0	0	0	12	12	12
Public Sector	1560	104	-53	-138	-87	1473
Construction	475	32	209	-193	48	523
Film Prod. & Sound Recording	24	2	2	-28	-24	0

In Creston the local effects are generally smaller than they were for Trail-Rossland. The largest positive local effect is for Agriculture & Food Processing (+162). This indicates that the increased employment in this sector in Creston is essentially a local phenomenon. At the other extreme the large negative local effect for Construction (-193) shows that even though employment in Construction increased in Creston between 2001 and 2006 it did not reach the level that might have been expected given the increases in overall provincial employment growth and provincial employment growth in this sector in particular.

Table 4.7 displays the local effects for all the local areas.

Table 4.7 Shift/Share Analysis: Local Effects for all Local Areas

		Forestry	Mining & Min Proc	Fishing	Agric. & Food	Tourism	High Tech	Public Sector	Const	Film Prod
VANCOUVER ISLAND/COAST										
1	Gulf Islands	83	34	15	-124	108	-36	-200	-202	-69
2	Victoria	390	-35	-14	178	746	-399	-976	446	194
3	Sooke-Port Renfrew	121	35	-6	-22	462	97	109	247	-28
4	Duncan	-206	59	174	8	15	-222	349	365	-10
5	Lake Cowichan	-74	0	-11	29	38	-14	-13	196	0
6	Ladysmith	16	-20	-2	92	236	-233	290	110	-2
7	Nanaimo	98	397	73	-112	-545	-110	1075	538	85
8	Parksville-Qualicum	-87	54	-96	-196	428	207	88	-97	-15
9	Alberni	-540	41	160	-91	237	9	-40	355	0
10	Courtenay-Comox	-240	1	-1	-107	202	50	113	301	-54
11	Campbell River	-201	80	-13	-81	75	0	260	-375	-45
12	Bute Inlet	5	-93	-6	17	-14	-7	-61	-36	11
13	Powell River	-167	-60	67	-77	-283	22	217	-76	-1
14	Alert Bay	28	0	-99	-13	-100	8	-122	-27	-3
15	Port Hardy	-734	35	40	-85	-376	43	-242	111	-13
16	Central Coast	-179	0	-62	-3	-42	0	-124	-118	-7
MAINLAND/SOUTHWEST (Excluding GVRD)										
17	Hope-Fraser Canyon	-163	23	0	12	-439	0	141	-119	-24
18	Chilliwack	439	83	-7	-197	150	278	887	607	72
19	Kent-Harrison	33	-39	46	85	-86	-34	-45	29	-19
20	Matsqui-Abbottsford	350	240	88	711	151	30	176	-537	44
21	Pitt Meadows-Maple Ridge	-19	-22	-66	120	221	-133	405	-495	28
22	Mission	157	21	-30	-109	-185	-70	305	255	-127
23	Sunshine Coast	-110	99	-150	0	-203	1	265	297	58
24	Squamish	-551	4	35	123	-226	51	20	55	-29
25	Lillooet	47	45	-20	-72	23	0	-131	-41	0
THOMPSON-OKANAGAN										
26	Princeton	96	108	-5	69	2	2	-83	31	0
27	Oliver-Osoyoos	-139	-39	0	-137	-107	14	56	144	-1
28	Penticton	229	-153	12	96	459	-94	-224	338	-11
29	Ashcroft	-71	74	2	61	-196	-4	-4	-37	0
30	Merritt	108	-21	0	-22	-44	19	-165	111	4
31	Kamloops	560	-107	4	-135	944	81	9	-130	36
32	North Thompson	-323	-10	16	8	-223	5	-104	-27	0
33	Peachland	251	-112	-26	-42	-32	25	-208	779	16
34	Kelowna	326	224	19	-66	1740	-26	1150	1383	22
35	Vernon	360	253	13	74	-35	234	512	380	12
36	Spallumcheen	29	-88	-21	75	10	12	3	-146	-32
37	Salmon Arm	453	-32	-43	-52	-275	90	259	-1	16
38	Golden	137	37	16	-42	-154	-8	31	154	9
39	Revelstoke	55	73	-14	86	-454	19	72	69	-32

Table 4.7 Shift/Share Analysis: Local Effects for all Local Areas (cont.)

	Forestry	Mining & Min Proc	Fishing	Agric. & Food	Tourism	High Tech	Public Sector	Const	Film Prod
KOOTENAY									
40 Fernie	-55	-473	-15	-173	-340	-23	-142	68	0
41 Cranbrook-Kimberley	30	-449	4	-51	-131	-24	-102	-128	28
42 Invermere	-8	175	16	14	14	4	-22	-264	-23
43 Castlegar-Arrow Lakes	92	-221	-28	9	297	46	-218	-334	-20
44 Nelson	-192	13	0	-16	-404	151	-608	-343	-5
45 Creston	-24	134	-10	162	-75	12	-138	-193	-28
46 Grand Forks-Greenwood	170	75	-16	27	-400	-33	-153	-56	21
47 Trail-Rossland	76	-1138	0	8	202	102	-113	-3	-14
CARIBOO									
48 Williams Lake	-219	531	22	35	-702	-49	-545	-497	3
49 Quesnel	462	52	18	-62	-537	1	-355	-149	-1
50 Prince George	601	303	-47	-159	471	18	399	-1061	-59
51 McBride-Valemount	112	27	0	25	-182	-21	-2	3	6
NORTH COAST									
52 Queen Charlotte Island	-219	-25	79	13	179	17	-49	-80	0
53 Prince Rupert	-942	50	-35	77	74	2	-535	-60	15
54 Kitimat-Terrace	-326	-574	-19	57	-296	12	-472	-637	-9
55 Hazelton	-312	-18	-90	73	-35	8	-59	-66	0
56 Stewart	-82	-11	51	0	-1	0	-8	-67	0
NECHAKO									
57 Smithers-Houston	-185	245	26	-51	-41	-128	-308	-97	-21
58 Burns Lake	159	24	-34	15	-34	0	12	-114	0
59 Vanderhoof	44	-108	2	8	6	-24	-275	-370	10
60 Stikine	16	32	2	-1	-69	5	2	-125	-3
NORTHEAST									
61 Dawson Creek	-80	60	-24	153	140	9	-15	207	-2
62 Fort St. John	188	-7	10	-216	-391	17	-352	-343	-2
63 Ft. Nelson	130	114	0	-6	29	-2	7	-128	14

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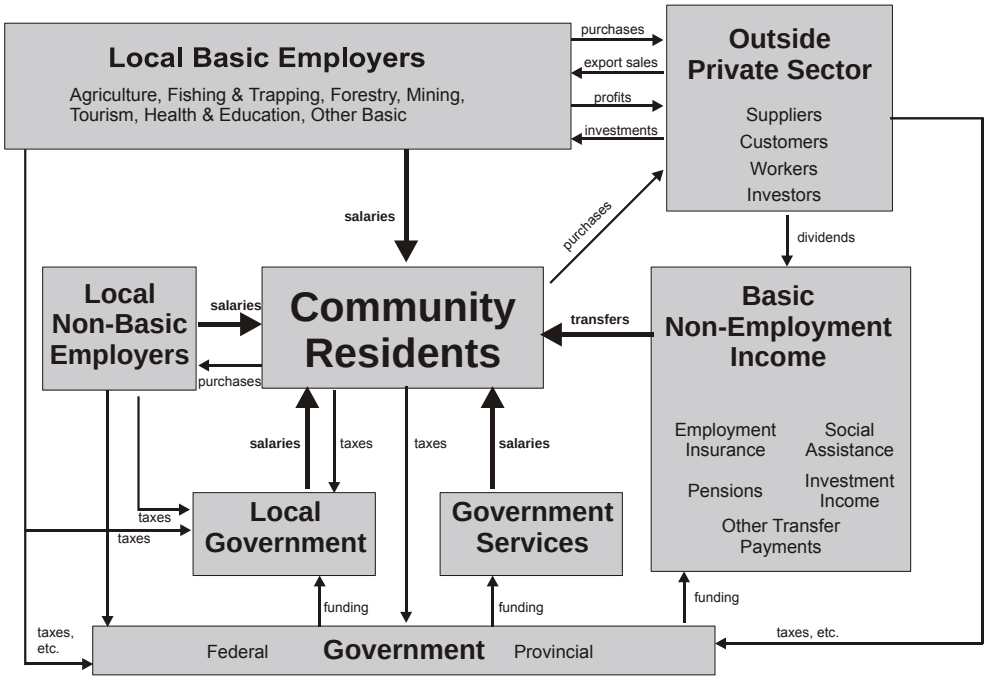
Appendix A – Methodology and Related Issues

A.1 Overview

The methodology that has been used to produce the results of this report and its predecessors is referred to as the economic base method. Its fundamental premise is that the economy of a community can be represented by income flows that can be classified as *basic* or *nonbasic*, depending on the source of the income. Basic income is assumed to flow into a community from the outside world, usually in response to goods and services being produced and exported from the community. Outsiders may also visit the community as tourists and spend money that they have earned elsewhere. Incomes earned by public servants are also considered basic because, even though their services are provided locally, the money used to provide these incomes is independent of the local tax base. Similarly, transfer payments from senior governments – pensions, employment insurance payments, and income assistance – are also considered basic. Finally, investment income has been classified as basic as well.

On the other hand, nonbasic income is paid to individuals in a community for goods and services they provide to other individuals in the community, where the relevant commodities are actually purchased by individuals in the community. It is the latter consideration that excludes most public community services (mainly health care services and public education) from the nonbasic category. In modern Canadian

Figure A.1 -- Community Economic Interactions



life these services are provided from general taxpayer revenues and are not paid for directly by the users.

Figure A.1 provides a good, albeit complex, depiction of the many interactions between the economic components of a community from the perspective of economic base methodology. Each of the arrows in this diagram represents a flow of dollars. Community residents are at the centre of the diagram and receive income from a variety of sources. They, in turn, use these incomes to make purchases and pay taxes. To the extent that they make purchases from the outside world, they need sufficient salaries from basic employers, or other outside sources, to enable them to make the expenditures.

If we assume initially that the components in the diagram are in some kind of rough equilibrium we can consider what happens internally when external changes occur. For example, if basic employment declines then basic incomes will decline. In the short run, transfers will increase as displaced workers begin to draw employment insurance, but not enough to offset the loss in basic salaries. One of the key assumptions underlying economic base impact assessment models is that the purchases by community residents will then decline, both from the outside private sector and from local nonbasic businesses. The latter decline will in turn further reduce the total wages paid to community residents who work in the nonbasic sectors. An implicit assumption here is that the spending split between local purchases and imports will remain the same: the relative self-sufficiency of the community does not change.

The same kind of reasoning can be used to examine situations where basic income into a community increases.[12] As basic income increases, local spending will increase and nonbasic employment will rise to meet these increased demands.

There has often been misunderstanding of the economic base model and it is an easy model to misuse. The key to proper application of the model is in the correct allocation of activities to the basic and nonbasic sectors. Many activities are relatively easy to allocate. For example, in British Columbia, virtually all resource-based activity is basic since all products of this activity are exported, usually from the province, and certainly from the local area. On the other hand, many local services are almost entirely nonbasic – they exist in smaller communities only to serve the

[12] This may come about through an increase in basic employment or, as an alternative example, through the inflow of a significant number of wealthy seniors.

needs of the resident population. Banking services, dry-cleaning, and hair-cutting establishments are in this category.[13]

However, there are definitely activities that are demanded in varying amounts by local residents, by local basic business, by local nonbasic business, and by tourists. Transportation is probably the best example of this. Local residents ride buses, hire taxis, and buy gasoline and other related automotive services, as do tourists. Trucking firms serve local businesses of all sorts, bringing products in for retail stores to sell, and taking products out for export. Similarly, retail sales are made primarily to local residents in most communities, but tourism affects retail sales and even some businesses purchase significant amounts of supplies from retail establishments. The greatest challenge in this project has been to accurately allocate these "mixed" services as basic or nonbasic, and if basic to assign them to the correct industry.

The remainder of this Appendix discusses in some detail some of the methods that have been used to produce the results presented in Chapters 2 and 3. Section A.2 identifies and discusses the various data sources used as raw material for this work. Section A.3 defines the basic industries identified in this report in terms of the North American Industrial Classification System (NAICS) used by the 2006 Census.

Sections A.4, A.5, and A.6 discuss particular aspects of the allocation process alluded to above. Because the premise is that local spending drives the nonbasic sector and it seems logical that spending is more likely to be correlated with after-tax income than with gross income, a simple formula for estimating after-tax incomes has been derived and used for this work. It is presented and discussed briefly in Section A.7.

Probably the most significant change in the results from previous studies is the widespread increase in the numbers of people employed in the business services sector. Furthermore, it is, initially at least, unclear for whom these people are working. The demands by local basic businesses and by local residents, at least as reckoned by the methods of this study, don't seem to justify the supply. Section A.8 discusses this issue in more detail and presents a logical model development that somewhat ameliorates the situation.

While this study has kept essentially the same industry set as previous studies to facilitate comparisons over time, the film production and sound recording industry has been getting a lot of attention over the last few years, so it was decided to isolate this industry in the basic sector to

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[13] In some places tourists may make some use of these businesses, and part of the procedure in this study is to properly allocate that share of activity to Tourism (this procedure is explained in detail in A.5), but for the most part and in most places these activities are expected to serve local residents.

see how it compares with traditional sectors in the various parts of the province.

A.2 Data Sources

As stated repeatedly in this report, the principal source of data used for this study is the 2006 Canadian Census, specifically, the long form which is received by 20% of households, randomly selected. BC Stats purchased data from Statistics Canada for each of the 63 local areas specifically to meet the needs of this study. The Census subdivisions that comprise each of these areas are listed in Appendix F.

Besides geography, there are two other data dimensions of interest. One is the precise specification of the economic variables themselves, and the other is the set of industries that provide the employment and incomes used in this study. With respect to the former, while there are other possibilities, it was decided that the best variables to use for this study were (i) total employment income for each industry in each local area, and (ii) the total number of individuals who contributed to that income total. This means that some individuals who only worked part-time, or part of a year, will be in the count and their income will be in the total. This, in turn, means that incomes developed from this study may be less than comparable full-year, full-time incomes for some industries, and that employment may consequently be over-estimated. This is not ideal, but in situations like this there is no perfect solution and it was decided that this approach was nevertheless better than any of the alternatives.

The industry set used was to the 4-digit North American Industrial Classification System (NAICS) level and consisted altogether of 438 categories, including the rollups to 3- and 2-digit levels. Starting with 2001, the industries have been classified according to NAICS rather than SIC (Standard Industrial Classification). The NAICS industries used for each of the basic sectors of this study are shown in Table A.3.1.

Other data sources used in this study include:

- British Columbia Visitor Study, Tourism BC, data collected in 1995/96, a series of reports, one for each of the tourism regions, published in 1998.
- 2004 British Columbia Input Output Model (BCIOM).
- British Columbia Survey of Household Spending, 2006.
- Income Statistics for British Columbia, 2004 tax year.
- Visitor '89, A Travel Survey of Visitors to British Columbia, B. C. Ministry of Tourism.

A.3 NAICS Industry Definitions

Table A.3.1 on the next page references the column headings used in Chapter 2 to the North American Industry Classification System (NAICS) industrial categories as used by Statistics Canada in conjunction with the 2006 Census. Additional information on the NAICS categories is available found from Statistics Canada Catalogue No. 12-501-XIE *North American Industry Classification System – Canada 2007*, Ministry of Industry, 2007. Current information about NAICS can also be found at www.naics.com/search.htm.

Table A.3.1 NAICS Industry Definitions for the Basic Sectors of Table 2.1[14]

	NAICS Definition
Forestry FOR	113 Forestry and Logging 1153 Support activities for forestry 3211 Sawmills and wood preservation 3212 Veneer, plywood and engineered wood product manufacturing 3219 Other wood product manufacturing 322 Paper manufacturing 337 Furniture and related product manufacturing
Mining & Min Proc MIN	211 Oil and gas extraction 212 Mining (except oil and gas) 213 Support activities for mining and oil and gas extraction 219 Mining – unspecified 324 Petroleum and coal products manufacturing 331 Primary metal manufacturing
Fishing F&T	114 Fishing, hunting and trapping 3117 Seafood product preparation and packaging
Agric. & Food AGF	111-112 Farms (including aquaculture) 1150 Support activities for farms 3111 Animal food manufacturing 3112 Grain and oilseed milling 3113 Sugar and confectionary product manufacturing 3114 Fruit and vegetable preserving and specialty food manufacturing 3115 Dairy product manufacturing 3116 Meat product manufacturing 3119 Other food manufacturing 312 Beverage and tobacco product manufacturing
Tourism TOU	7211 Traveler accommodation 7212 RV (recreational vehicle) parks and recreational campgrounds + parts of Retail trade, Food services, Transportation services and Personal services
High Tech HITEC	3254 Pharmaceutical and medicine manufacturing 3259 Other chemical product manufacturing 3333 Commercial and service industry machinery manufacturing 334 Computer and electronic product manufacturing 3359 Other electrical equipment and component manufacturing 3364 Aerospace product and parts manufacturing 3391 Medical equipment and supplies manufacturing + some high-tech **services** if these seem to be autonomous
Public Sector PUB	621 Ambulatory health care services 622 Hospitals 623 Nursing and residential care facilities 61 Educational services 9111 Defense services 9112 Other federal services (9112 to 9119) 624 Social assistance 912 Provincial and territorial public administration 913 Local, municipal and regional public administration 914 Aboriginal public administration
Const. CON	23 Construction
Film Prod FILM	512 Motion picture and sound recording industries

[14] Any direct basic activities that could not be allocated to one of the above categories were allocated to the Other (OTH) category. A discussion of the components of the Other category is contained in Appendix C.3.

A.4 Indirect Allocation

The idea behind indirect allocation is relatively easy to explain even though the subsequent working out of the details for particular cases gets quite a bit more complicated. The BC Input Output Model (BCIOM) provides information on how much each industry in the BC economy depends on other industries as a result of direct purchases. For example, industry A, in order to produce its own output, buys goods and services from industries B, C, D, etc. The BCIOM estimates total impacts and therefore considers subsequent "rounds" of purchasing by industries B, C, D, etc. Here, however, we are only concerned with the first round of purchases – these are called "direct" purchases in this study. The BCIOM can also tell us how many indirect jobs are associated with a given level of output from each industry.

To continue with a more concrete example consider the mining industry. According to the 2004 BCIOM there were 11,409 people employed in this industry. Direct purchases of goods and services by this industry produces activity in other industries, and that activity can be translated into employment. Thus, for example, the BCIOM tells us that all mining activity in BC in 2004 produced 658 indirect jobs in Wholesale Trade, 84 indirect jobs in Trucking, 343 indirect jobs in High Tech Services, etc.

Now suppose that we are looking at a community that has a mine employing 500 people. If we assume that this is a typical mine (so the average provincial linkages and relationships apply) and that direct purchases are made locally, then plausible estimates of indirect employment associated with the mine would be:

$$\text{Wholesale Trade: } \frac{500 \times 658}{11{,}409} = 29$$

$$\text{Trucking: } \frac{500 \times 84}{11{,}409} = 4$$

That's all there is to it, in principle. The BCIOM has been used to develop a matrix that relates the number of jobs in each driven industry to the total number of jobs in each driver industry. Industries have been allocated to the "driver" and "driven" categories somewhat arbitrarily, but again the idea is simple enough: driver industries are those that export all or virtually all their products outside the local area; driven industries on the other hand provide goods and services (mostly the latter) to the driver industries. Government is considered a driver industry even though it may not export its product. This is because the funds that support government come from outside the area.

A.5 Tourism

The tourism industry is unique in a number of ways. From the economic base perspective it is definitely a basic industry because of the funds it

brings into a community, but unlike most "exporting" industries it is primarily a service industry. Furthermore, it is not a well-defined industry in NAICS. While Accommodation Services may be considered as 100% attributable to tourism, many other tourism-related businesses are servicing local residents as well as tourists – these businesses include restaurants, rental car agencies, taxis, and retail stores. The view taken in this study is that parts of these other businesses are within the Tourism industry, and parts are not. Establishing just how much of these industries are part of Tourism is a challenge. This section of Appendix A describes briefly how those allocations have been made.

The tourism allocation procedure has not been changed significantly from that used and described in the 1999 report [2]. It is explained in more detail in Section 2.4 of that report. Indeed, the tourism surveys used in the previous study have not been updated in the intervening period, so they have again been used in this study, lacking any new or better information.

Briefly, the tourism allocation procedure begins by assuming that all employment in Accommodation Services is allocated to Tourism. This figure can be considered as a proxy for the amount of Tourism in each local area.

The BCIOM database can be used to provide estimates of the number of jobs per million dollars of expenditure in each industry. This estimate for Accommodation Services (in 2004) is 15.6 jobs per million dollars of revenue by the industry. Thus, if we know the number of jobs in Accommodation Services from the Census for a particular local area we can divide this estimate by 15.6 to estimate the annual expenditure by tourists on accommodation in the local area.

We can then use information from the British Columbia Visitor Studies on the distribution of spending by tourists in various parts of the province to estimate the expenditures by tourists on other activities. For example, the survey revealed that in the Cariboo region tourists on average spent 18% on Accommodation, 32% on Food & Beverages, 18% on Transportation, 3% on Souvenirs and Gifts, 5% on Outdoor Activities, 4% on Attractions and Cultural Events, and 20% on other undefined expenses. These "relative spending" proportions can be used to estimate total expenditures on each of these categories from our estimate of the total expenditure on Accommodation.

In principle, there is only one more step to the procedure. With estimates of total tourist spending on each of these other categories in hand, we can again use "jobs per million dollars of expenditure" estimates (from the BCIOM) to turn the expenditure estimates into employment estimates for these other tourist activities.

When tourists purchase goods the total expenditure does not normally contribute to jobs in the local economy because in most cases the goods themselves are imported to the area. In these cases only the trade (i.e., retail and wholesale) margins associated with the sale of the product to the final purchaser remains in the community. For this reason we must first apply the appropriate margins to expenditures on goods by tourists. The updated BCIOM information on trade margins is displayed in Table A.5.1

Table A.5.1 Trade Margins (2004 BCIOM)

Type of item purchased	Retail	Wholesale
Groceries	0.224	0.091
Gasoline	0.098	0.053
Souvenirs & Gifts	0.370	0.096

In the above table, the numbers mean that, for example, of each dollar spent by tourists on gasoline, 9.8 cents goes to the retail activity, 5.3 cents goes to the wholesale activity, and the remainder is assumed to leave the local area.

A.6 The Use of Household Spending Data

The Survey of Household Spending Survey (SHS) is an annual survey carried out by Statistics Canada to estimate how Canadian households spend their money. It collects detailed information from a representative sample of Canadian households, and publishes the results by province.

As noted earlier, in this study we are particularly concerned with an accurate allocation of some activities that are likely to be employed by both tourists and residents. We can use the HSS data to provide an independent estimate of residents' expenditures on some industries and using BCIOM multipliers can turn these estimates into employment estimates.

We thus have four separate pieces of information about local employment in some of the driven/nonbasic sectors of the local economy:

1. An estimate of the employment generated by tourist spending, using the methodology described in A.5. Call this E1.
2. An estimate of the employment generated by the driver industries, using the methodology described in A.4. Call this E2.
3. An estimate of the employment generated by the spending of local residents using the SHS data. Call this E3.
4. The estimate of the actual employment in the sector, provided by the Census. Call this E4.

In an ideal world we would find that E1 + E2 + E3 = E4. However, because reality is always more complicated than our assumptions about it, the general case is that this equation does not hold.

Simply put, what happens then is as follows:

- If E4 > (E1 + E2 + E3), then we assume that E1, E2, and E3 are valid estimates of what they purport to be and that the excess employment E4 – (E1 + E2 + E3) is "Other Basic";
- If E4 < (E1 + E2 + E3), then we revise our estimates as follows:

$$E1 = \frac{E1 \times E4}{E1 + E2 + E3} \qquad E2 = \frac{E2 \times E4}{E1 + E2 + E3} \qquad E3 = \frac{E3 \times E4}{E1 + E2 + E3}$$

These new estimates are guaranteed to add up to the observed employment level.

This procedure has been used in this study for the sectors Retail Trade, Wholesale Trade, and Personal Services, although in the latter sector E1 is zero because industries generally don't make demands on the personal services sector.[15]

A.7 Estimating After-tax Income

The income figures from the 2006 Census data are before-tax incomes. A method to reliably and easily convert before-tax incomes into after-tax incomes is required because it seems reasonable to believe that after-tax incomes are a better proxy for spending, and it is spending that drives the nonbasic part of the local economy.

Considerable thought and effort went into developing a reasonable equation for estimating after-tax income from before-tax income for a previous study [2]. That work was described in Section 2.5 of that report. This time around no additional effort was put into a possible revision of the form of the equation used. However, more recent income statistics [5] permitted a re-evaluation of the equation's parameters.

The resulting equation is:

After-tax income = Before-tax income x (1 - [0.3262 - 13,733/ Before-tax income + 33,865]) for any individual.

A related issue is the after-tax income associated with transfer payments and other non-employment income. Unfortunately, the above formula cannot be used in these cases for two reasons:

[15] Another way to estimate residents' spending on indirect and nonbasic services is to make use of the personal expenditures estimates in the BCIOM – this approach has also been used in some sectors to provide another estimate for E3.

(1) while we have an estimate of the total amount of these incomes received in each community, we do not have a count on the number of people who receive them and so cannot calculate the amount received per person; and

(2) people who receive employment income can also receive non-employment income - Canadians are taxed on their total income, not separately on each of its components.

Fortunately, the income statistics available from Canada Customs and Revenue Agency [5] has the information we need to estimate nominal effective tax rates for these two types of non-employment income. The results of this analysis are effective tax rates of 8.8% on Transfer Payments and 18.1% on Other Non-employment Income, and these estimates have been used in this 2006 model.

A.8 Second Order Effects

One of the most surprising results of the initial testing of the 2001 model during its development was that there appeared to be a great deal of surplus employment in business services in virtually every local area. While some increase in these activities could be accounted for by software developers and other business specialists who can live almost anywhere so long as they have good communication links to their clients, the increase seemed to be more than could be reasonably accounted for by this explanation.

To address this issue, it was decide to allow indirect industries (like Wholesale Trade, Transportation, Finance Insurance and Real Estate, Utilities, etc.) to generate activities in each other - Prior to this, only the direct basic industries could generate indirect effects, as described in A.4. Fortunately, the BC Input Output Model has the necessary information to permit this.

The 1991 and 1996 models looked only at specific first-order impacts (e.g. sawmills on wholesale trade) and allocated an appropriate portion of the indirect activity to the driver industry. With the change implemented for the 2001 model, and continued here, the first-order impact of wholesale trade on business services is taken into consideration as well, and an appropriate portion of this is allocated back to sawmills; this is a second-order effect from the perspective of the sawmill, but potentially still could be provided locally.

This change did not make a big difference. It reduced the dependency on the Other Basic category by 1 - 3% in most areas and produced corresponding increases in the dependencies for other sectors. Employment impact ratios increased by about 0.02 as a result of including these effects.

Appendix B – Sub-Areas within some of the Local Areas

In the body of this report, income dependencies and other statistics of interest are presented for the same 63 local areas that were used in the previous reports. The main reason for this is that it facilitates comparison over time. However, because the model uses data at the Census Subdivision (CSD) level, it is possible to develop these same statistics for smaller communities within some of the local areas defined in the main report. This appendix reports on the results of that endeavor.

Table B.1 - Percent Income Dependencies – After-tax Incomes, 2006

	For	Min	F&T	Agr	Tour	Hi-Tech	Pub	Con	Oth	Tran	ONEI
54 Kitimat-Terrace	14	22	1	0	4	0	26	5	3	14	10
Kitimat	17	41	0	0	2	0	15	2	4	9	10
Terrace	11	6	1	0	4	0	35	6	6	18	12
41 Cranbrook-Kimberley	12	6	0	1	7	0	26	9	7	17	16
Cranbrook	12	5	0	1	5	0	28	9	9	17	15
Kimberley	13	7	0	1	8	0	21	10	2	18	20
47 Trail-Rossland	4	19	0	0	4	1	24	6	6	17	18
Trail	3	20	0	0	3	0	23	5	6	19	20
Rossland	4	18	0	0	5	2	30	10	5	12	15
57 Smithers-Houston	31	9	0	2	5	0	23	5	2	13	9
Smithers/Telkwa	20	10	0	2	6	1	28	6	3	13	9
Houston	58	7	0	1	3	0	12	3	0	10	6
15 Port Hardy	32	2	7	2	5	1	22	4	2	14	9
Port McNeill	47	1	6	0	5	1	22	2	2	8	6
Port Alice	29	0	5	3	4	0	16	5	1	22	14
Port Hardy	18	2	12	3	7	0	25	5	3	16	9
11 Campbell River	23	5	2	2	7	0	21	6	3	17	14
Gold River	33	1	1	0	5	1	20	5	2	14	19
Tahsis/Zeballos	30	0	3	2	1	0	38	1	1	15	8
Campbell River	23	5	2	2	7	0	21	6	3	17	14
10 Courtenay-Comox	9	2	2	3	6	0	30	7	3	18	21
Courtenay	12	2	2	3	6	0	26	8	4	19	19
Comox	6	1 2		2	4	1	36	5	2	16	24
Denman/Hornby	6	1 2		3	1	1	17	12	3	23	32

Note that the dependencies for Film Production and Sound Recording have been omitted from the Table B.1. This is because they are all zero for the listed CSDs.

The diversity and forest vulnerability indices discussed in Sections 2.2 and 2.3 have also been calculated for the smaller areas defined in this appendix. They are displayed in Table B.2.

The diversity results make sense. In general, a larger area can be expected to show greater diversity. Thus, for example, both Kitimat and Terrace are less diverse than the combined Kitimat-Terrace area.

The forest vulnerability indices demonstrate how much some smaller communities in the province are vulnerable to forest industry fluctuations. These indices are calibrated to those developed for the 63 local areas defined for this report. As discussed in Section 2.3, the most vulnerable area (the Quesnel area) and least vulnerable area (Victoria) were arbitrarily set to 100 and 0, respectively. Values greater than 100 just mean that the area is even more vulnerable than the Quesnel area, and a negative value would just mean that the area is less vulnerable than the Victoria area.

Table B.2 Diversity and Forest Vulnerability Indices

	Diversity Index	Forest Vulnerability Index
54 Kitimat-Terrace	70	20
Kitimat	60	33
Terrace	66	17
41 Cranbrook-Kimberley	73	15
Cranbrook	72	16
Kimberley	73	16
47 Trail-Rossland	71	4
Trail	69	3
Rossland	70	4
57 Smithers-Houston	67	50
Smithers/Telkwa	71	28
Houston	45	160
15 Port Hardy	67	51
Port McNeill	53	110
Port Alice	67	47
Port Hardy	74	22
11 Campbell River	73	31
Gold River	65	57
Tahsis/Zeballos	56	64
Campbell River	73	30
10 Courtenay-Comox	68	13
Courtenay	71	16
Comox	61	10
Denman/Hornby	65	9

Appendix C – Some Additional Industries

C.1 Disaggregation of the Public Sector

The income dependencies in Table 2.1 of this report focus primarily on the dependence of local economies on industrial sectors like Forestry, Fishing, Mining and Tourism. However, as can be seen in that table, a significant part of virtually every community's economic dependence is on what is broadly called the "Public Sector". In this report, that single term covers all levels of government and the services provided by those governments, including education, health, policing and municipal services.

For some purposes it may be of interest to know which services and levels of government contribute to this aggregate called "Public Sector". Table C.1 displays, for each of the 63 designated local areas the disaggregation of Public Sector into individual dependencies on Health, Education, Local Government, and Other (i.e. provincial and federal) Government. The final column of Table C.1 is the sum of the first four columns and just a repeat of the Public Sector column in Table 2.1.

The results are not too surprising. Other government is quite important in the Victoria area and its neighbor the Sooke-Port Renfrew area from which many provincial government employees commute. Federal institutions in the Comox, Chilliwack, and Kent-Harrison areas make those communities particularly dependent on Other Government.

Table C.1.1
Percent Income Dependencies (After-tax Incomes, 2006)

	Health	Education	Local Gov	Other Gov	Public Admin
VANCOUVER ISLAND/COAST					
1 Gulf Islands	6	6 1 4			18
2 Victoria	10	8	3	18	39
3 Sooke-Port Renfrew	8	6 2		19	35
4 Duncan	9	7 2 9			27
5 Lake Cowichan	5	5 5 6			20
6 Ladysmith	7	8 3 8			26
7 Nanaimo	11	8	3 7		28
8 Parksville-Qualicum	6	5 2 4			17
9 Alberni	7	6 4 5			22
10 Courtenay-Comox	9	6 1		13	30
11 Campbell River	7	7 2 5			21
12 Bute Inlet	6	8 1 6			20
13 Powell River	9	7 3 4			22
14 Alert Bay	5	8	11	8	32
15 Port Hardy	5	7 2 7			22
16 Central Coast	12	17 12		9	50
MAINLAND/SOUTHWEST (Excluding GVRD)					
17 Hope-Fraser Canyon	10	8	5 7		30
18 Chilliwack	8	7 2		10	28
19 Kent-Harrison	3	8 5		11	26
20 Matsqui-Abbottsford	9	8 2 6			25
21 Pitt Meadows-Maple Ridge	10	8	4 7		29
22 Mission	8	8 3 8			28
23 Sunshine Coast	7	7 2 4			20
24 Squamish	5	6 4 5			20
25 Lillooet	8	8 5 5			27
THOMPSON-OKANAGAN					
26 Princeton	7	5 1 3			17
27 Oliver-Osoyoos	8	4 1 3			16
28 Penticton	10	5	2 7		24
29 Ashcroft	5	10	4	4	23
30 Merritt	4	8 3 7			22
31 Kamloops	10	7	3 7		27
32 North Thompson	4	6 1 5			16
33 Peachland	9	4 1 4			19
34 Kelowna	11	6	2 5		23
35 Vernon	9	7 2 5			22
36 Spallumcheen	8	6 1 3			18
37 Salmon Arm	8	6 2 3			18
38 Golden	4	5 1 5			16
39 Revelstoke	8	5 3 5			21

Table C.1.1
Percent Income Dependencies (After-tax Incomes, 2006)

	Health	Educa-tion	Local Gov	Other Gov	Public Admin
KOOTENAY					
40 Fernie	4	5	3	2	13
41 Cranbrook-Kimberley	10	7	2	7	26
42 Invermere	6	5	2	3	16
43 Castlegar-Arrow Lakes	8	8	1	5	22
44 Nelson	10	9	2	7	28
45 Creston	8	6	1	4	19
46 Grand Forks-Greenwood	6	5	2	4	17
47 Trail-Rossland	12	6	3	3	24
CARIBOO					
48 Williams Lake	6	7	2	7	22
49 Quesnel	6	6	1	5	18
50 Prince George	9	8	2	8	28
51 McBride-Valemount	6	10	2	3	21
NORTH COAST					
52 Queen Charlotte Island	6	10	6	9	31
53 Prince Rupert	7	9	4	11	32
54 Kitimat-Terrace	8	9	3	6	26
55 Hazelton	11	12	9	8	40
56 Stewart	12	16	16	8	52
NECHAKO					
57 Smithers-Houston	6	8	1	8	23
58 Burns Lake	5	12	3	6	26
59 Vanderhoof	4	9	2	5	20
60 Stikine	2	20	14	12	48
NORTHEAST					
61 Dawson Creek	7	7	2	5	21
62 Fort St. John	3	6	1	4	14
63 Fort Nelson	2	7	4	4	17

C.2 Employment Impact Ratios for some Additional Industries

The set of industries for which employment impact ratios are provided in Chapter 3 of this report are essentially identical to the set that was used in the previous three reports. That set was selected, somewhat arbitrarily, as being of most use to economists wanting to estimate the impact of changes likely to occur in British Columbia.

However, there are a number of other industries for which employment impact ratios may be of interest. Unfortunately, the tables in Chapter 3 are limited in size. The purpose of this section of Appendix C is to display the same set of employment impact ratios for all local areas in tables identical to those of Chapter 3, for the additional industries Sawmills, Other Wood Manufacturing, Fishing, Miscellaneous Manufacturing, Mineral Processing, and Film Production & Sound Recording.

Miscellaneous manufacturing is an aggregation of rubber products, plastic products, leather and clothing manufacturing, printing & publishing, heavy equipment manufacturing, electrical product manufacturing, clay products, glass & nonmetallic mineral products, chemical products, and beverage producers. The heterogeneity of this mix makes these particular employment impact ratios indicative at best in any particular application.

Where none of the employment impact ratios in this publication seem quite appropriate, because either geographical or industrial circumstances which differ from the assumptions behind the tables in this report, the basic model can often still be used to develop useful information on a case-specific basis. Contact BC Stats for further information if this seems to be the case.

Table C.2.1
2006 Indirect Employment Ratios – Auxiliary

	Saw Mills	Other W Mfg.	Fish-ing	Misc Mfg.	Mineral Proc.	Film Prod.
VANCOUVER ISLAND/COAST						
1 Gulf Islands	1.31	1.29	1.79	1.18	1.35	1.33
2 Victoria	1.31	1.30	1.83	1.18	1.36	1.34
3 Sooke-Port Renfrew	1.30	1.29	1.75	1. 18	N.A.	N.A.
4 Duncan	1.29	1.28	1.77	1. 19	N.A.	1.32
5 Lake Cowichan	1.29	1.26	1.67	1. 25	1.32	N.A.
6 Ladysmith	1.30	1.29	1.74	1. 17	N.A.	1.31
7 Nanaimo	1.31	1.30	1.82	1.19	1.36	1.34
8 Parksville-Qualicum	1.30	1.29	1.71	1.19	1.34	1.31
9 Alberni	1.26	1.23	1.60	1. 14	N.A.	1.28
10 Courtenay-Comox	1.29	1.28	1.66	1. 17	N.A.	1.29
11 Campbell River	1.29	1.28	1.72	1.16	1.33	1.31
12 Bute Inlet	N.A.	1.21	1.52	1.10	N.A.	1.27
13 Powell River	1.27	1.24	1.54	1. 15	N.A.	1.27
14 Alert Bay	1.27	1.23	1.58	N.A.	N.A.	N.A.
15 Port Hardy	1.30	1.28	1.77	1. 17	N.A.	N.A.
16 Central Coast	1.15	N.A.	1.46	N.A.	N.A.	N.A.
MAINLAND/SOUTHWEST (Excluding GVRD)						
17 Hope-Fraser Canyon	1.27	1.26	N.A.	1.21	1.32	1.26
18 Chilliwack	1.32	1.30	1.85	1.19	1.36	1.34
19 Kent-Harrison	1.31	1.29	1.82	1. 18	N.A.	N.A.
20 Matsqui-Abbottsford	1.32	1.30	1.85	1.19	1.36	1.34
21 Pitt Meadows-Maple Ridge	1.32	1.30	1.86	1.20	1.36	1.35
22 Mission	1.31	1.30	1.85	1.20	1.36	1.34
23 Sunshine Coast	1.30	1.29	1.74	1. 18	N.A.	1.32
24 Squamish	1.30	1.28	1.66	1.20	1.34	1.30
25 Lillooet	1.29	1.28	1.71	1. 22	N.A.	N.A.
THOMPSON-OKANAGAN						
26 Princeton	1.27	1.25	N.A.	1.30	N.A.	N.A.
27 Oliver-Osoyoos	1.30	1.28	N.A.	1.22	N.A.	1.31
28 Penticton	1.31	1.29	1.82	1.21	1.35	1.33
29 Ashcroft	1.28	1.25	1.63	1. 18	1.31	N.A.
30 Merritt	1.28	1.25	N.A.	1.17	N.A.	1.28
31 Kamloops	1.32	1.30	1.85	1.22	1.36	1.34
32 North Thompson	1.29	1.26	1.65	1. 11	1.32	N.A.
33 Peachland	1.31	1.29	N.A.	1.23	1.35	1.32
34 Kelowna	1.32	1.30	1.86	1.22	1.36	1.35
35 Vernon	1.31	1.29	1.82	1.20	1.36	1.34
36 Spallumcheen	1.30	1.28	N.A.	1.18	N.A.	1.30
37 Salmon Arm	1.30	1.29	N.A.	1.18	N.A.	1.32
38 Golden	1.27	1.24	1.62	1. 14	N.A.	1.27
39 Revelstoke	1.28	1.24	N.A.	1.20	N.A.	1.28

Table C.2.1 (cont)
2006 Indirect Employment Ratios – Auxiliary

	Saw Mills	Other W Mfg.	Fish-ing	Misc Mfg.	Mineral Proc.	Film Prod.
KOOTENAY						
40 Fernie	1.29	1.27	N.A.	1.15	N.A.	N.A.
41 Cranbrook-Kimberley	1.30	1.28	1.75	1.19	1.34	1.32
42 Invermere	1.24	1.22	1.63	1.17	N.A.	N.A.
43 Castlegar-Arrow Lakes	1.30	1.27	N.A.	1.30	1.33	N.A.
44 Nelson	1.30	1.29	N.A.	1.19	1.35	1.32
45 Creston	1.28	1.25	N.A.	1.22	N.A.	N.A.
46 Grand Forks-Greenwood	1.28	1.26	N.A.	1.20	1.32	1.29
47 Trail-Rossland	1.26	1.25	N.A.	1.35	1.30	1.28
CARIBOO						
48 Williams Lake	1.29	1.28	1.72	1.17	1.34	1.30
49 Quesnel	1.25	1.25	1.71	1.16	1.31	1.30
50 Prince George	1.31	1.30	1.84	1.23	1.36	1.34
51 McBride-Valemount	1.29	1.27	N.A.	N.A.	N.A.	1.30
NORTH COAST						
52 Queen Charlotte Islands	1.28	N.A.	1.63	N.A.	N.A.	N.A.
53 Prince Rupert	1.29	1.27	1.69	1.17	1.33	1.29
54 Kitimat-Terrace	1.29	1.28	1.73	1.26	1.34	1.31
55 Hazelton	1.25	1.21	1.46	1.15	N.A.	1.24
56 Stewart	N.A.	N.A.	1.45	N.A.	N.A.	N.A.
NECHAKO						
57 Smithers-Houston	1.29	1.28	1.71	1.15	N.A.	N.A.
58 Burns Lake	1.26	1.22	N.A.	1.26	N.A.	N.A.
59 Vanderhoof	1.22	1.21	1.59	1.14	N.A.	1.26
60 Stikine	1.25	N.A.	1.52	1.11	N.A.	N.A.
NORTHEAST						
61 Dawson Creek	1.28	1.26	N.A.	1.21	N.A.	1.27
62 Fort St. John	1.27	1.26	1.60	1.17	1.30	1.24
63 Fort Nelson	1.28	1.26	N.A.	1.15	N.A.	1.27

Table C.2.2
2006 Indirect and Induced Employment Ratios – Auxiliary
No Migration (with Safety Net)

	Saw Mills	Other W Mfg.	Fish-ing	Misc Mfg.	Mineral Proc.	Film Prod.
VANCOUVER ISLAND/COAST						
1 Gulf Islands	1.42	1.35	1.89	1.26	1.38	1.44
2 Victoria	1.38	1.40	1.97	1.29	1.53	1.44
3 Sooke-Port Renfrew	1.43	1.36	1.86	1.	27	N.A.	N.A.
4 Duncan	1.50	1.40	1.90	1.	29	N.A.	1.40
5 Lake Cowichan	1.46	1.36	1.72	1.	29	1.35	N.A.
6 Ladysmith	1.50	1.40	1.84	1.	27	N.A.	1.41
7 Nanaimo	1.59	1.46	1.98	1.32	1.40	1.44
8 Parksville-Qualicum	1.39	1.37	1.81	1.30	1.37	1.33
9 Alberni	1.37	1.32	1.67	1.	21	N.A.	1.30
10 Courtenay-Comox	1.43	1.37	1.78	1.	24	N.A.	1.38
11 Campbell River	1.38	1.36	1.83	1.24	1.36	1.36
12 Bute Inlet	N.A.	1.27	1.59	1.12	N.A.	1.28
13 Powell River	1.34	1.29	1.64	1.	21	N.A.	1.29
14 Alert Bay	1.38	1.24	1.64	N.A.	N.A.	N.A.
15 Port Hardy	1.39	1.30	1.85	1.	21	N.A.	N.A.
16 Central Coast	1.16	N.A.	1.49	N.A.	N.A.	N.A.
MAINLAND/SOUTHWEST (Excluding GVRD)						
17 Hope-Fraser Canyon	1.45	1.36	N.A.	1.35	1.34	1.28
18 Chilliwack	1.50	1.44	2.12	1.33	1.56	1.45
19 Kent-Harrison	1.49	1.37	1.90	1.	24	N.A.	N.A.
20 Matsqui-Abbottsford	1.46	1.43	2.01	1.34	1.62	1.48
21 Pitt Meadows-Maple Ridge	1.59	1.45	2.03	1.41	1.63	1.52
22 Mission	1.55	1.43	2.13	1.35	1.50	1.51
23 Sunshine Coast	1.58	1.35	1.89	1.	25	N.A.	1.42
24 Squamish	1.42	1.38	1.80	1.31	1.37	1.39
25 Lillooet	1.30	1.35	1.74	1.	26	N.A.	N.A.
THOMPSON-OKANAGAN						
26 Princeton	1.50	1.33	N.A.	1.31	N.A.	N.A.
27 Oliver-Osoyoos	1.63	1.34	N.A.	1.28	N.A.	1.32
28 Penticton	1.50	1.39	1.88	1.30	1.47	1.41
29 Ashcroft	1.45	1.29	1.66	1.	24	1.33	N.A.
30 Merritt	1.42	1.33	N.A.	1.22	N.A.	1.36
31 Kamloops	1.57	1.46	1.94	1.34	1.68	1.43
32 North Thompson	1.39	1.31	1.68	1.	14	1.33	N.A.
33 Peachland	1.59	1.49	N.A.	1.35	1.39	1.40
34 Kelowna	1.56	1.44	1.95	1.35	1.82	1.45
35 Vernon	1.53	1.44	1.93	1.32	1.39	1.40
36 Spallumcheen	1.45	1.47	N.A.	1.31	N.A.	1.33
37 Salmon Arm	1.46	1.40	N.A.	1.28	N.A.	1.37
38 Golden	1.40	1.37	1.64	1.	15	N.A.	1.31
39 Revelstoke	1.40	1.34	N.A.	1.27	N.A.	1.30

Table C.2.2 (cont)
2006 Indirect and Induced Employment Ratios – Auxiliary
No Migration (with Safety Net)

	Saw Mills	Other W Mfg.	Fish-ing	Misc Mfg.	Mineral Proc.	Film Prod.
KOOTENAY						
40 Fernie	1.40	1.29	N.A.	1.18	N.A.	N.A.
41 Cranbrook-Kimberley	1.53	1.38	1.82	1.29	1.47	1.36
42 Invermere	1.41	1.24	1.66	1.23	N.A.	N.A.
43 Castlegar-Arrow Lakes	1.43	1.36	N.A.	1.39	1.58	N.A.
44 Nelson	1.43	1.36	N.A.	1.26	1.63	1.41
45 Creston	1.39	1.30	N.A.	1.29	N.A.	N.A.
46 Grand Forks-Greenwood	1.49	1.40	N.A.	1.27	1.33	1.30
47 Trail-Rossland	1.41	1.27	N.A.	1.54	1.54	1.30
CARIBOO						
48 Williams Lake	1.45	1.40	1.84	1.23	1.36	1.36
49 Quesnel	1.48	1.42	1.76	1.23	1.33	1.32
50 Prince George	1.55	1.44	1.99	1.35	1.52	1.39
51 McBride-Valemount	1.36	1.33	N.A.	N.A.	N.A.	1.31
NORTH COAST						
52 Queen Charlotte Islands	1.35	N.A.	1.71	N.A.	N.A.	N.A.
53 Prince Rupert	1.39	1.29	1.79	1.25	1.39	1.31
54 Kitimat-Terrace	1.43	1.35	1.83	1.36	1.59	1.35
55 Hazelton	1.32	1.24	1.50	1.16	N.A.	1.25
56 Stewart	N.A.	N.A.	1.46	N.A.	N.A.	N.A.
NECHAKO						
57 Smithers-Houston	1.48	1.38	1.79	1.16	N.A.	N.A.
58 Burns Lake	1.35	1.26	N.A.	1.27	N.A.	N.A.
59 Vanderhoof	1.30	1.26	1.60	1.17	N.A.	1.30
60 Stikine	1.31	N.A.	1.57	1.11	N.A.	N.A.
NORTHEAST						
61 Dawson Creek	1.49	1.45	N.A.	1.55	N.A.	1.30
62 Fort St. John	1.43	1.37	1.73	1.26	1.34	1.28
63 Fort Nelson	1.43	1.41	N.A.	1.16	N.A.	1.28

Table C.2.3
2006 Indirect and Induced Employment Ratios – Auxiliary Migration (No Safety Net/No Public Sector Impacts)

		Saw Mills	Other W Mfg.	Fish-ing	Misc Mfg.	Mineral Proc.	Film Prod.
VANCOUVER ISLAND/COAST							
1	Gulf Islands	1.60	1.45	2.05	1.44	1.43	1.63
2	Victoria	1.50	1.57	2.21	1.48	1.76	1.61
3	Sooke-Port Renfrew	1.60	1.48	2.03	1.	41	N.A.	N.A.
4	Duncan	1.74	1.60	2.10	1.	47	N.A.	1.52
5	Lake Cowichan	1.69	1.52	1.81	1.	35	1.40	N.A.
6	Ladysmith	1.70	1.59	2.02	1.	43	N.A.	1.56
7	Nanaimo	1.92	1.75	2.27	1.57	1.48	1.62
8	Parksville-Qualicum	1.55	1.50	1.99	1.45	1.41	1.37
9	Alberni	1.49	1.44	1.77	1.	33	N.A.	1.32
10	Courtenay-Comox	1.63	1.53	1.97	1.	36	N.A.	1.53
11	Campbell River	1.54	1.50	2.00	1.38	1.40	1.45
12	Bute Inlet	N.A.	1.36	1.70	1.15	N.A.	1.30
13	Powell River	1.45	1.38	1.80	1.	30	N.A.	1.32
14	Alert Bay	1.55	1.26	1.73	N.A.	N.A.	N.A.
15	Port Hardy	1.53	1.33	1.97	1.	29	N.A.	N.A.
16	Central Coast	1.16	N.A.	1.52	N.A.	N.A.	N.A.
MAINLAND/SOUTHWEST (Excluding GVRD)							
17	Hope-Fraser Canyon	1.66	1.52	N.A.	1.55	1.39	1.31
18	Chilliwack	1.76	1.68	2.50	1.57	1.83	1.64
19	Kent-Harrison	1.64	1.49	2.03	1.	35	N.A.	N.A.
20	Matsqui-Abbottsford	1.73	1.68	2.29	1.60	1.94	1.73
21	Pitt Meadows-Maple Ridge	1.93	1.73	2.36	1.71	1.98	1.84
22	Mission	1.85	1.67	2.53	1.61	1.76	1.80
23	Sunshine Coast	1.82	1.46	2.13	1.	39	N.A.	1.59
24	Squamish	1.59	1.53	2.01	1.47	1.41	1.54
25	Lillooet	1.32	1.47	1.79	1.	34	N.A.	N.A.
THOMPSON-OKANAGAN							
26	Princeton	1.67	1.46	N.A.	1.34	N.A.	N.A.
27	Oliver-Osoyoos	1.79	1.43	N.A.	1.39	N.A.	1.35
28	Penticton	1.70	1.56	1.98	1.46	1.67	1.52
29	Ashcroft	1.59	1.34	1.71	1.	34	1.36	N.A.
30	Merritt	1.59	1.46	N.A.	1.32	N.A.	1.49
31	Kamloops	1.85	1.72	2.10	1.55	1.97	1.58
32	North Thompson	1.50	1.40	1.72	1.	18	1.35	N.A.
33	Peachland	1.89	1.77	N.A.	1.57	1.47	1.55
34	Kelowna	1.85	1.68	2.11	1.60	2.15	1.63
35	Vernon	1.78	1.69	2.13	1.54	1.45	1.50
36	Spallumcheen	1.68	1.70	N.A.	1.51	N.A.	1.37
37	Salmon Arm	1.66	1.59	N.A.	1.46	N.A.	1.46
38	Golden	1.51	1.49	1.69	1.	18	N.A.	1.39
39	Revelstoke	1.56	1.49	N.A.	1.37	N.A.	1.32

Table C.2.3 (cont)
2006 Indirect and Induced Employment Ratios – Auxiliary
Migration (No Safety Net/No Public Sector Impacts)

	Saw Mills	Other W Mfg.	Fish-ing	Misc Mfg.	Mineral Proc.	Film Prod.
KOOTENAY						
40 Fernie	1.52	1.31	N.A.	1.22	N.A.	N.A.
41 Cranbrook-Kimberley	1.76	1.53	1.93	1.46	1.70	1.42
42 Invermere	1.54	1.26	1.72	1.34	N.A.	N.A.
43 Castlegar-Arrow Lakes	1.62	1.50	N.A.	1.56	1.78	N.A.
44 Nelson	1.63	1.48	N.A.	1.39	1.85	1.56
45 Creston	1.51	1.38	N.A.	1.40	N.A.	N.A.
46 Grand Forks-Greenwood	1.66	1.56	N.A.	1.39	1.36	1.33
47 Trail-Rossland	1.62	1.30	N.A.	1.76	1.77	1.34
CARIBOO						
48 Williams Lake	1.61	1.56	2.03	1.35	1.39	1.46
49 Quesnel	1.65	1.58	1.83	1.36	1.36	1.35
50 Prince George	1.81	1.68	2.23	1.57	1.77	1.48
51 McBride-Valemount	1.46	1.42	N.A.	N.A.	N.A.	1.32
NORTH COAST						
52 Queen Charlotte Islands	1.45	N.A.	1.85	N.A.	N.A.	N.A.
53 Prince Rupert	1.55	1.33	1.95	1.40	1.49	1.34
54 Kitimat-Terrace	1.59	1.48	1.98	1.52	1.77	1.42
55 Hazelton	1.42	1.29	1.55	1.17	N.A.	1.27
56 Stewart	N.A.	N.A.	1.47	N.A.	N.A.	N.A.
NECHAKO						
57 Smithers-Houston	1.66	1.54	1.92	1.18	N.A.	N.A.
58 Burns Lake	1.45	1.31	N.A.	1.29	N.A.	N.A.
59 Vanderhoof	1.39	1.33	1.63	1.21	N.A.	1.36
60 Stikine	1.40	N.A.	1.64	1.12	N.A.	N.A.
NORTHEAST						
61 Dawson Creek	1.66	1.61	N.A.	1.73	N.A.	1.36
62 Fort St. John	1.62	1.54	1.92	1.41	1.39	1.33
63 Fort Nelson	1.54	1.53	N.A.	1.18	N.A.	1.31

C.3 Major Components of the "Other" Category

The income dependencies displayed in Table 2.1 add up to 100% because they cover the complete range of basic sources of income in each local area. While most of these income sources are well-defined, there is a catch-all category called Other Basic which has been used to capture all basic sources of income that do not seem to fit into any of the other categories. In most local areas this is quite small, between 5% and 10%. However, in a few cases, Other Basic is quite a bit larger and it may be natural to wonder exactly what constitutes this Other. The purpose of this section is to try to answer this question by digging further into the database.

Other Basic is largest at 18% in the Pitt Meadows-Maple Ridge Area. Analysis reveals that approximately 40% of this is the result of miscellaneous non-resource-based manufacturing – e.g., primarily Heavy Equipment Manufacturing, Printing & Publishing, and Plastic Products. Excess capacity in Wholesale Trade (which includes Warehousing and Storage in this study) accounts for 19% of Other, and Communications makes up another 6% of Other in this area.

Other Basic is second largest in the province at 14% in the Revelstoke Area. Virtually all of this is made up of Transportation with Rail Transport alone accounting for 60%.

The Mission Area also has a dependence of 14% on Other Basic. The major components allocated to Other in this case were Heavy Equipment Manufacturing (24%) and Truck Transport (8%)

The Matsqui-Abbotsford Area shows a dependence of 13% on Other Basic. The major components of this are Heavy Equipment Manufacturing (18%), Wholesale Trade (15%) and Truck Transport (11%).

The Fort Nelson Area has a dependence of 11% on Other Basic. Truck transportation is the largest component of this at 37%, followed by Other Transportation (33%), and Utilities (21%).

Note that in the above analysis we have identified situations where the local capacity in industries like Wholesale Trade, utilities, communications, or various types of transportation seems to exceed that which would be required by local businesses and the local population. In these cases, the "products" of the industries in question are assumed to be "exported" from the region and that portion of the industry is allocated to the Other Basic category.

Appendix D – The Statistics of the 20% Sample

D.1 Introduction

The principal data source for the calculations and estimates of this report is the 2006 Canadian Census. While all individuals in Canada are expected to contribute their information to the Census data collection, only 20% of households fill out the "long form" that has questions relating to employment and income. Thus, all of the raw data used for this study is subject to some uncertainty because of the 20% sample on which it is based.

The purpose of this appendix is to use statistical methods to shed some light on this matter and answer questions regarding the reliability of the employment estimates and resulting dependencies that are presented in the report.

We are concerned here with "sampling without replacement" and the hypergeometric distribution is the statistical distribution that describes this situation.

The standard deviation σ for the hypergeometric distribution is given by the formula

$$\sigma = [n\,a\,b\,(a + b - n)\,/(a + b)^2\,(a + b - 1)]^{1/2}$$

where a = number of successes in the population, b = number of failures in the population (total population is a+b), and n is the sample size, or number of trials, and the Central Limit Theorem can be invoked to declare that 95% of the time (19 times out of 20) any sample value will lie within +/- 2σ of the mean value.

Let us first examine how this works for a typical public opinion survey where normally the sample size is 1000 people. We consider various population sizes and a range of possible outcomes (the survey might for example be asking respondents which party they plan to vote for in the next provincial election). Then our formula can be used to produce the results in the following table.

Table D.1 Always Sample 1000

	Outcome					
Population	**1%**	**2%**	**5%**	**10%**	**25%**	**50%**
1000	0.0	0.0	0.0	0.0	0.0	0.0
2000	0.4	0.6	1.0	1.3	1.9	2.2
5000	0.6	0.8	1.2	1.7	2.4	2.8
10000	0.6	0.8	1.3	1.8	2.6	3.0
20000	0.6	0.9	1.3	1.8	2.7	3.1
50000	0.6	0.9	1.4	1.9	2.7	3.1
100000	0.6	0.9	1.4	1.9	2.7	3.1
1000000	0.6	0.9	1.4	1.9	2.7	3.2

1. The entries in the above table are to be interpreted as per the following example: if the population is 50000 and the outcome is 10% then our 95% confidence interval for a sample of 1000 is from 8.1% to 11.9% - i.e., 10% - 1.9% = 8.1%; and 10% + 1.9% = 11.9%.
2. Observe that the top row is all zeros. This is not surprising since the population is 1000 and our sample is also 1000, so there should be no uncertainty in the result.
3. There is symmetry in the formula, such that a 75% column in the above table is identical to the 25% column, and a 90% column would look like the 10% column, etc. The 50% column is always the worst case in absolute terms.
4. Observe how the table entries level off as the population rises – this verifies the somewhat counter-intuitive notion that a given sample size will produce the same degree of certainty in the result regardless of the size of the population. (To survey the entire country we don't have to take a bigger sample than we would use for the city of Victoria if we want comparable accuracy in our results).

Now let's return to the situation at hand and look at what happens when, instead of always sampling 1000, we always sample 20% of the population. Using the same formula as given above (and a computer to ease the calculation burden) we can construct a table similar to the one above, but for the case of a 20% sample.

Table D.2 Always Sample 20% of the Population

	Outcome					
Population	**1%**	**2%**	**5%**	**10%**	**25%**	**50%**
500	1.8	2.5 3.9		5.4	7.8	9.0
1000	1.3	1.8 2.	8	3.8	5.5	6.3
2000	0.9	1.3 1.	9	2.7	3.9	4.5
5000	0.6	0.8 1.	2	1.7	2.4	2.8
10000	0.4	0.6 0.	9	1.2	1.7	2.0
20000	0.3	0.4 0.	6	0.8	1.2	1.4
50000	0.2	0.3 0.	4	0.5	0.8	0.9
100000	0.1	0.2 0.	3	0.4	0.5	0.6
1000000	0.0	0.1 0.	1	0.1	0.2	0.2

1. The entries in this table can be interpreted in exactly the same way as in the previous table.
2. An additional row for a 500 population is included, which is relevant here (for subsequent discussion of dependencies), but was clearly not relevant for the previous table (how do you take a sample of 1000 ***without replacement*** from a population of 500?).
3. Observe that the 5000 row is identical in the two tables – because 20% of 5000 is 1000.
4. Unlike the previous table, the results continue to improve in accuracy as population rises (not because of population itself, but because population determines sample size), and results deteriorate for populations less than 5000.

So what does this all mean for our employment by industry estimates and the resulting economic dependencies[16]? For this purpose, "Population" in the above tables is re-interpreted as total employment in the area under study, and the % dependencies relate to the Outcomes in the above table.

[16] Strictly speaking of course the economic dependencies are based on incomes, not employment, but the former are fairly closely correlated with the latter, so I think it is fair to apply statistical reasoning based on the employment numbers to the dependencies.

D.2 A Specific Example

Suppose we are interested in a particular place where the total employment is 2925 and the employment attributable to certain key industries is as shown in the following table.

Table D.3 Specific Example

Industry	Employment	%	% Dependency
Forestry	671[17]	23	33
Fishing & Trapping	169	6	4
Agriculture & Food	29	1	1
Tourism	310	10	7
…	…	…	…
Total	2925	100	100

The first % column in the above table is the actual calculated share of employment in the specified industry (e.g. 671/2925 = 23%). These are the %'s that correspond to the outcomes in the previous tables. The % Dependency column results after incomes are taken into account.

In view of the previous discussion what can we say about the reliability of these numbers, given that they result from a 20% sample? To estimate the 95% range for the estimates in the above table we can either interpolate in Table D.2 or go back to the original formula for σ. Either way, we can construct Table D.4.

Table D.4 Total Employment = 2925

Industry	2σ, %	% Emp Range	Emp Range	Dependency Range
Forestry	3.11	20 – 26	580 – 762	29 – 37
Fishing & Trapping	1.72	4.3 – 7.7	119 – 219	3 – 5
Agriculture & Food	0.73	0.3 – 1.7	8 – 50	0 – 2
Tourism	2.28	8 – 12	243 – 377	6 – 8

The first column in Table D.4 corresponds to the values in Table D.2 for the specific situation under study. The second column results from

[17] You might wonder how we can get an estimate like 671 from a 20% sample (wouldn't we just multiply the sample result by 5?) But we can, primarily because of allocation calculations that are imbedded in the final estimates.

applying these values to the %'s in Table D.3. The third column just turns the % ranges back into absolute numbers. Finally, the fourth column is the likely effect on the dependencies.

Observe that there is quite a bit of uncertainty in the dependencies and an even greater range in the absolute employment estimates.

Before leaving this example and trying to draw a few general conclusions from all this work, it is interesting to examine what the case would be if we were studying another place where the absolute employment numbers in Table D.3 were increased ten-fold. – i.e. total employment was 29250, employment attributable to forestry was 6710, etc.

We create a table like Table D.4 for the case where total employment is 29,250 – i.e., table D.5.

Table D.5 Total Employment = 29,250

Industry	2σ, %	% Emp Range	Emp Range	Dependency Range
Forestry	0.98	22 – 24	6423 – 6997	31 – 34
Fishing & Trapping	0.54	5.5 – 6.5	1532 – 1848	3.7 – 4.3
Agriculture & Food	0.23	.8 – 1.2	223 – 357	.8 – 1.2
Tourism	0.72	9.3 – 10.7	2889 – 3311	6.5 – 7.5

Observe that, because our estimates are based on a much larger sample, the 2σ,% figures have decreased (compared to Table D.4), and the % ranges have narrowed. However, observe also that the 95% range of the employment estimates is wider in absolute terms than it was for Table D.4, although not by a factor of 10.

D.3 Summary and Conclusions

1. We can estimate a 95% range for the results of this type of analysis using well-known statistical methods and the fact that all of our estimates are based on a 20% sample of the population.
2. Even though one might think that always taking a 20% sample would assure a uniform degree of accuracy for places of all sizes, this is not the case. Larger places tend to be over-sampled (for our purposes) – samples greater than 1000 don't add much accuracy; whereas smaller places are under-sampled leading to considerable uncertainty in the resulting estimates. This type of uncertainty in the results is particularly true for small industries in small places.

Appendix E – Dependency Changes From 1991 to 2006

In these tables the following abbreviations are used: FOR = Forestry & related manufacturing, MIN = Mining, oil & gas & related processing, F&T = Fishing & trapping & related processing, AGF = Agriculture & food processing, TOU = Tourism, PUB = Public sector including health services and education, OTH = All other basic industries, TRAN = Transfer payments from government, ONEI = Other Non-Employment Income. The precise components of each can be found in Appendix A.3.

1 Gulf Islands

Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	2	0	1	3 7		18	19	17	33
2001	1	0	1	2 7		18	18	20	32
1996	1	0	2	2 7		19	17	21	31
1991	3	1	2	2 6		18	17	8	43

2 Victoria

Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	1	1	0	1 6		39	16	13	23
2001	1	0	0	1 6		41	14	16	20
1996	1	0	0	1 7		41	15	16	19
1991	2	1	0	1 3		33	17	8	35

3 Sooke-Port Renfrew

Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	4	1	1	0 8		35	19	13	19
2001	3	0	2	1 6		42	18	18	11
1996	6	0	1	1 7		41	15	17	11
1991	8	2	3	1 4		32	22	5	23

4 Duncan

Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	14	1	1	2	4	27	14	18	20
2001	18	1	0	2	4	26	11	19	18
1996	20	1	1	3	3	24	12	19	16
1991	19	2	1	3	3	20	15	12	25

5 Lake Cowichan

Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	23	0	0	1	4	20	14	22	15
2001	31	0	0	1	5	22	5	23	14
1996	33	0	1	1	4	18	9	23	11
1991	35	1	1	1	3	16	10	15	20

6 Ladysmith

Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	14	0	1	1	4	26	14	18	22
2001	19	0	1	2	3	25	11	22	17
1996	24	0	1	1	7	21	14	19	14
1991	16	1	0	0	3	12	13	11	44

7 Nanaimo									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	8	1	1	1 3		28	18	19	21
2001	11	0	1	1 5		28	16	21	18
1996	13	1	1	1 4		26	21	20	14
1991	11	2	1	1 3		20	22	16	25
8 Parksville-Qualicum									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	5	1	1	1 7		17	16	22	30
2001	8	1	1	1 7		18	11	25	27
1996	8	0	2	1 8		19	15	24	22
1991	9	1	2	1 5		15	15	12	40
9 Alberni									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	21	0	3	2 9		22	8	18	16
2001	31	0	2	2 8		22	5	18	12
1996	36	0	3	1 7		21	6	16	9
1991	31	1	4	1 4		15	7	14	21
10 Courtenay-Comox									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	9	2	2	3	6	30	10	18	21
2001	11	1	2	3	6	30	9	20	18
1996	13	1	3	2	5	28	13	20	16
1991	11	2	2	2	3	26	15	14	26
11 Campbell River									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	23	5	2	2	7	21	9	17	14
2001	29	4	2	2	7	20	8	16	11
1996	36	6	3	1	7	17	10	13	7
1991	33	6	4	0	5	15	9	13	15
12 Bute Inlet									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	5	0	12	2	10	20	12	16	22
2001	5	3	12	3	11	22	9	18	17
1996	11	0	21	3	14	14	9	15	12
1991	9	2	13	1	10	14	20	13	18
13 Powell River									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	22	3	2	1	3	22	9	19	19
2001	27	2	1	1	4	19	6	21	17
1996	34	3	1	1	6	20	7	17	11
1991	35	3	2	1	3	16	8	11	21

14 Alert Bay									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	13	0	9	1 5		32	10	19	11
2001	8	0	15	1	8	32	5	24	6
1996	18	0	19	0	3	31	9	12	8
1991	11	0	17	0	5	27	14	13	13
15 Port Hardy									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	32	2	7	2 5		22	7	14	9
2001	49	1	4	2 8		19	2	10	5
1996	51	5	5	1 7		16	5	7	3
1991	37	13	5	1 6		15	3	11	9
16 Central Coast/Ocean Falls									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	4	0	8	1 7		50	5	16	8
2001	13	0	7	1 6		39	6	22	5
1996	26	0	8	1 9		38	6	9	4
1991	21	0	5	1 6		22	9	25	11
17 Hope-Fraser Canyon									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	7	2	0	2	7	30	12	22	18
2001	14	2	0	1	11	22	13	25	11
1996	17	1	0	0	16	21	12	22	10
1991	15	2	0	1	7	21	17	15	23
18 Chilliwack									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	5	1	0	6	3	28	22	18	16
2001	6	1	0	7	4	28	18	21	15
1996	5	0	0	7	3	32	19	20	12
1991	6	2	0	6	2	26	17	13	27
19 Kent-Harrison									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	5	0	1	7	9	26	15	21	17
2001	6	1	0	6	12	28	12	21	13
1996	10	0	0	9	14	30	9	18	10
1991	9	0	0	7	10	19	16	15	23
20 Matsqui-Abbotsford									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	6	1	0	11	1	25	26	17	13
2001	8	1	0	11	2	26	23	18	12
1996	6	1	0	10	2	25	28	18	11
1991	5	3	0	7	1	19	25	19	22

21 Pitt Meadows-Maple Ridge									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	6	2	0	3	2	29	33	13	12
2001	7	2	0	3	2	29	32	14	10
1996	7	1	1	3	2	27	37	15	8
1991	6	5	1	3	1	22	33	12	18
22 Mission									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	9	2	0	4	2	28	30	16	10
2001	12	1	0	6	3	27	23	18	10
1996	12	1	0	5	2	26	26	19	8
1991	15	2	0	6	1	22	23	13	18
23 Sunshine Coast									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	14	2	1	1	3	20	17	18	22
2001	19	1	2	1	5	21	11	20	19
1996	20	2	2	1	5	19	14	19	19
1991	20	2	4	1	4	14	15	11	30
24 Squamish									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	5	1	0	1	27	20	23	8	14
2001	12	1	0	0	29	21	20	9	7
1996	14	0	0	1	25	20	23	9	7
1991	15	2	0	1	14	17	26	12	13
25 Lillooet									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	21	3	0	2	7	27	11	15	14
2001	20	0	1	3	6	32	13	16	9
1996	29	0	0	2	7	30	11	14	7
1991	25	3	0	3	5	19	16	13	16
26 Princeton									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	26	5	0	2	3	17	10	22	15
2001	28	1	0	1	5	18	8	25	14
1996	24	14	0	1	8	18	7	18	11
1991	19	16	0	4	5	17	7	13	18
27 Oliver-Osoyoos									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	4	2	0	10	6	16	12	27	24
2001	6	1	0	12	6	17	7	33	18
1996	6	1	0	12	7	19	7	30	18
1991	4	3	0	13	4	14	13	14	37

28 Penticton									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	5	2	0	3 6		24	16	22	22
2001	5	2	0	3 6		26	12	25	20
1996	5	2	0	4 6		25	14	25	18
1991	4	3	0	4 4		18	18	12	36
29 Ashcroft									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	11	10	0	8 6		23	13	18	12
2001	18	8	0	6 8		18	9	22	12
1996	15	10	0	7 8		23	11	18	8
1991	13	11	0	4 6		19	13	13	21
30 Merritt									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	23	7	0	3 6		22	10	18	12
2001	24	5	0	4 6		27	7	20	8
1996	27	6	0	6 7		22	9	18	6
1991	19	7	0	5 3		17	15	16	17
31 Kamloops									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	9	6	0	1 6		27	19	16	16
2001	10	6	0	2 6		29	16	18	13
1996	11	7	0	2 6		27	21	16	10
1991	10	7	0	2 2		21	23	15	20
32 North Thompson									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	30	2	0	3 7		16	8	20	13
2001	39	1	0	2 8		15	6	17	11
1996	36	2	0	3 8		16	7	17	10
1991	37	2	0	4 5		16	8	15	14
33 Peachland									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	5	3	0	3 5		19	25	18	21
2001	5	3	0	3 6		22	20	21	19
1996	7	2	0	3 6		20	31	16	14
1991	5	6	0	3 3		19	27	14	23
34 Kelowna									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	4	2	0	3 7		23	23	17	20
2001	5	1	0	5 6		24	21	20	18
1996	4	1	0	4 6		21	27	20	16
1991	4	3	0	4 3		15	24	12	35

35 Vernon									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	9	2	0	2	5	22	20	20	20
2001	10	1	0	3	6	24	18	23	16
1996	14	1	0	3	5	23	20	21	13
1991	10	4	0	3	3	17	20	14	29

36 Spallumcheen									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	11	2	0	7	3	18	20	21	18
2001	13	2	0	9	3	19	18	23	14
1996	14	1	0	13	4	18	16	23	12
1991	15	2	0	9	2	15	18	15	24

37 Salmon Arm									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	11	3	0	2	4	18	21	20	20
2001	11	2	0	3	6	18	17	24	19
1996	12	1	0	4	4	19	16	24	19
1991	15	2	0	4	2	16	18	13	29

38 Golden									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	26	2	0	1	14	16	19	14	9
2001	25	1	0	1	17	16	18	14	8
1996	27	3	0	1	13	20	16	13	7
1991	33	2	0	1	7	17	16	13	12

39 Revelstoke									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	18	2	0	1	9	21	23	14	12
2001	21	0	0	0	16	17	20	15	11
1996	22	4	0	0	10	20	20	14	9
1991	16	3	0	0	6	16	29	11	17

40 Fernie									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	6	44	0	0	8	13	9	11	9
2001	8	41	0	1	9	15	6	12	8
1996	8	46	0	1	6	15	5	12	7
1991	7	50	0	1	3	14	4	10	11

41 Cranbrook-Kimberley									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	12	6	0	1	7	26	16	17	16
2001	14	9	0	1	8	25	11	18	14
1996	17	10	0	1	5	25	13	18	10
1991	13	10	0	1	3	21	17	12	22

42 Invermere									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	13	12	0	2	16	16	17	11	13
2001	18	2	0	1	17	18	15	14	15
1996	21	2	0	2	19	17	10	14	13
1991	21	5	0	2	17	17	10	10	20
43 Castlegar-Arrow Lakes									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	23	4	0	1	5	22	14	17	14
2001	25	6	0	0	3	23	12	18	13
1996	30	3	0	1	4	21	11	18	10
1991	25	7	0	1	3	18	10	13	22
44 Nelson									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	9	2	0	1	7	28	18	18	17
2001	13	2	0	1	7	30	13	19	15
1996	13	2	0	1	6	31	14	20	13
1991	11	5	0	1	4	24	18	15	22
45 Creston									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	8	5	0	7	4	19	7	26	24
2001	10	2	0	7	5	23	7	29	16
1996	11	1	0	6	5	22	11	26	18
1991	11	3	0	6	3	20	13	14	30
46 Grand Forks-Greenwood									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	23	2	0	4	3	17	10	24	18
2001	25	1	0	4	6	20	7	23	13
1996	25	3	0	4	7	17	10	25	10
1991	23	6	0	3	3	18	12	11	23
47 Trail-Rossland									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	4	19	0	0	4	24	13	17	18
2001	4	29	0	0	3	23	8	18	15
1996	6	28	0	0	4	23	9	18	12
1991	3	29	0	1	3	20	10	10	25
48 Williams Lake									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	27	5	0	2	4	22	10	16	12
2001	30	2	0	3	6	24	9	16	9
1996	31	3	0	4	7	22	11	14	8
1991	27	4	0	4	6	20	11	15	13

49 Quesnel									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	45	2	0	2	3	18	6	15	10
2001	43	1	0	2	5	21	5	16	8
1996	45	1	0	2	5	17	8	15	6
1991	39	2	0	3	3	16	7	16	13
50 Prince George									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	28	2	0	1	4	28	15	12	10
2001	31	1	0	1	4	28	14	13	8
1996	33	1	0	1	4	24	19	12	6
1991	30	3	0	1	3	18	19	14	11
51 McBride-Valemount									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	33	0	0	1	11	21	8	16	11
2001	30	0	0	2	15	18	9	16	10
1996	39	0	0	4	8	18	9	16	7
1991	33	1	0	6	6	14	16	13	11
52 Queen Charlotte Islands									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	14	0	7	1	11	31	7	18	12
2001	33	0	4	1	7	30	8	11	6
1996	34	0	6	0	8	32	4	9	6
1991	26	1	3	0	6	36	8	12	8
53 Prince Rupert									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	5	1	16	1	8	32	10	18	9
2001	23	0	11	0	6	30	6	18	5
1996	22	0	15	0	8	28	8	13	5
1991	17	0	18	0	5	19	14	16	10
54 Kitimat-Terrace									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	14	22	1	0	4	26	8	14	10
2001	19	20	0	0	5	26	10	13	7
1996	24	17	0	1	5	22	13	11	5
1991	21	14	1	1	4	21	13	15	11
55 Hazelton									
Year	FOR	MIN	F&T	AGF	TOU	PUB	OTH	TRAN	ONEI
2006	18	3	1	1	2	40	4	25	5
2001	29	3	1	1	3	32	3	24	5
1996	36	2	2	1	7	35	5	10	3
1991	39	0	1	2	3	20	12	13	9

56 Stewart									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	3	8	4	0	7	52	10	12	3
2001	9	7	3	0	5	41	8	22	5
1996	25	9	3	0	7	37	12	5	2
1991	18	20	1	0	8	22	18	9	6
57 Smithers-Houston									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	31	9	0	2	5	23	8	13	9
2001	34	5	0	3	5	26	7	12	7
1996	36	3	0	3	7	22	11	12	6
1991	26	9	0	3	5	19	14	13	11
58 Burns Lake									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	37	3	0	3	3	26	5	14	9
2001	37	1	0	2	5	25	6	15	10
1996	41	1	0	4	4	23	6	12	7
1991	33	1	0	3	4	23	10	13	14
59 Vanderhoof									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	42	8	0	3	3	20	4	12	7
2001	44	5	0	2	2	21	6	14	5
1996	46	6	0	5	4	19	4	12	4
1991	35	6	0	5	4	18	9	13	10
60 Stikine									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	4	11	1	0	7	48	21	6	2
2001	2	4	1	0	8	42	23	14	6
1996	6	11	0	1	10	55	6	9	3
1991	5	43	1	1	8	23	12	6	2
61 Dawson Creek									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	12	20	0	3	5	21	18	12	8
2001	16	17	0	5	4	25	12	15	6
1996	14	25	0	5	6	21	10	13	5
1991	13	21	0	6	3	21	14	12	10
62 Fort St. John									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	6	37	0	3	5	14	20	8	7
2001	7	32	0	4	6	19	17	10	5
1996	11	26	0	5	7	19	18	11	4
1991	8	23	0	7	4	18	19	13	9

63 Fort Nelson									
Year	**FOR**	**MIN**	**F&T**	**AGF**	**TOU**	**PUB**	**OTH**	**TRAN**	**ONEI**
2006	27	23	0	0	8	17	16	5	4
2001	31	19	0	1	8	17	14	6	4
1996	46	4	0	0	9	15	17	7	2
1991	29	14	0	1	6	19	15	13	6

Appendix F – Census Components of the 63 Local Areas

LA: **Local Area**
CSD: **Census Sub-division**
SGC: **Standard Geographic Code**

CSD Type:	**C**	**City**	**RDA**	**Regional District Electoral Area**
	T	**Town**	**IR**	**Indian Reserve**
	VL	**Village**	**IGD**	**Indian Government District**
	DM	**District Municipality**	**S-E**	**Indian Settlement**
	NL	**Nisga'a Land**	**NVL**	**Nisga'a Village**

LA	Local Area Name	CSD NAME	SGC	CSD Type
1	Gulf Islands	Capital F	5917027	RDA
1	Gulf Islands	Capital G	5917029	RDA
1	Gulf Islands	Galiano Island 9	5917805	IR
1	Gulf Islands	Mayne Island 6	5917806	IR
2	Victoria	North Saanich	5917005	DM
2	Victoria	Sidney	5917010	T
2	Victoria	Central Saanich	5917015	DM
2	Victoria	Saanich	5917021	DM
2	Victoria	Oak Bay	5917030	DM
2	Victoria	Victoria	5917034	C
2	Victoria	Esquimalt	5917040	DM
2	Victoria	Colwood	5917041	C
2	Victoria	Metchosin	5917042	DM
2	Victoria	Langford	5917044	C
2	Victoria	View Royal	5917047	T
2	Victoria	Highlands	5917049	DM
2	Victoria	Cole Bay 3	5917801	IR
2	Victoria	Union Bay 4	5917802	IR
2	Victoria	East Saanich 2	5917803	IR
2	Victoria	South Saanich 1	5917804	IR
2	Victoria	Becher Bay 1	5917809	IR
2	Victoria	Esquimalt	5917811	IR
2	Victoria	New Songhees 1A	5917812	IR
3	Sooke-Port Renfrew	Sooke	5917052	DM
3	Sooke-Port Renfrew	Capital H (Part 1)	5917054	RDA
3	Sooke-Port Renfrew	Capital H (Part 2)	5917056	RDA
3	Sooke-Port Renfrew	Gordon River 2	5917815	IR
3	Sooke-Port Renfrew	Pacheena 1	5917816	IR
3	Sooke-Port Renfrew	T'Sou-ke 1 (Sooke 1)	5917817	IR
3	Sooke-Port Renfrew	T'Sou-ke 2 (Sooke 2)	5917818	IR
4	Duncan	North Cowichan	5919008	DM
4	Duncan	Duncan	5919012	C
4	Duncan	Cowichan Valley A	5919043	RDA
4	Duncan	Cowichan Valley B	5919046	RDA

LA	Local Area Name	CSD NAME	SGC	CSD Type
4	Duncan	Cowichan Valley C	5919049	RDA
4	Duncan	Cowichan Valley E	5919051	RDA
4	Duncan	Halalt 2	5919801	IR
4	Duncan	Squaw-hay-one 11	5919802	IR
4	Duncan	Tsussie 6	5919803	IR
4	Duncan	Cowichan 9	5919806	IR
4	Duncan	Cowichan 1	5919807	IR
4	Duncan	Malahat 11	5919815	IR
4	Duncan	Est-Patrolas 4	5919820	IR
4	Duncan	Tzart-Lam 5	5919821	IR
5	Lake Cowichan	Lake Cowichan	5919016	T
5	Lake Cowichan	Cowichan Valley F	5919033	RDA
5	Lake Cowichan	Cowichan Valley I	5919035	RDA
5	Lake Cowichan	Claoose 4	5919805	IR
5	Lake Cowichan	Cowichan Lake	5919812	IR
5	Lake Cowichan	Malachan 11	5919814	IR
5	Lake Cowichan	Wyah 3	5919819	IR
6	Ladysmith	Cowichan Valley D	5919013	RDA
6	Ladysmith	Cowichan Valley G	5919015	RDA
6	Ladysmith	Cowichan Valley H	5919017	RDA
6	Ladysmith	Ladysmith	5919021	T
6	Ladysmith	Chemainus 13	5919804	IR
6	Ladysmith	Kil-pah-las 3	5919808	IR
6	Ladysmith	Kuper Island 7	5919809	IR
6	Ladysmith	Lyacksun 3	5919810	IR
6	Ladysmith	Shingle Point 4	5919811	IR
6	Ladysmith	Oyster Bay 12	5919816	IR
6	Ladysmith	Portier Pass 5	5919817	IR
6	Ladysmith	Theik 2	5919818	IR
7	Nanaimo	Nanaimo	5921007	C
7	Nanaimo	Lantzville	5921008	DM
7	Nanaimo	Nanaimo A	5921010	RDA
7	Nanaimo	Nanaimo B	5921014	RDA
7	Nanaimo	Nanaimo C	5921016	RDA
7	Nanaimo	Nanaimo River 3	5921801	IR
7	Nanaimo	Nanaimo River 2	5921802	IR
7	Nanaimo	Nanaimo River 4	5921803	IR
7	Nanaimo	Nanaimo Town 1	5921804	IR
7	Nanaimo	Nanoose	5921805	IR
8	Parksville-Qualicum	Parksville	5921018	C
8	Parksville-Qualicum	Qualicum Beach	5921023	T
8	Parksville-Qualicum	Nanaimo E	5921030	RDA
8	Parksville-Qualicum	Nanaimo F	5921032	RDA

LA	Local Area Name	CSD NAME	SGC	CSD Type
8	Parksville-Qualicum	Nanaimo G	5921034	RDA
8	Parksville-Qualicum	Nanaimo H	5921036	RDA
8	Parksville-Qualicum	Qualicum	5921806	IR
9	Alberni	Port Alberni	5923008	C
9	Alberni	Ucluelet	5923019	DM
9	Alberni	Tofino	5923025	DM
9	Alberni	Alberni-Clayoquot B	5923033	RDA
9	Alberni	Alberni-Clayoquot D	5923035	RDA
9	Alberni	Alberni-Clayoquot E	5923037	RDA
9	Alberni	Alberni-Clayoquot F	5923039	RDA
9	Alberni	Alberni-Clayoquot A	5923047	RDA
9	Alberni	Alberni-Clayoquot C	5923049	RDA
9	Alberni	Ahahswinis 1	5923801	IR
9	Alberni	Alberni 2	5923802	IR
9	Alberni	Anacla 12	5923803	IR
9	Alberni	Clakamucus 2	5923804	IR
9	Alberni	Elhlateese 2	5923805	IR
9	Alberni	Hesquiat 1	5923806	IR
9	Alberni	Ittatsoo 1	5923807	IR
9	Alberni	Marktosis 15	5923808	IR
9	Alberni	Numukamis 1	5923809	IR
9	Alberni	Macoah 1	5923810	IR
9	Alberni	Openit 27	5923812	IR
9	Alberni	Opitsat 1	5923813	IR
9	Alberni	Sachsa 4	5923814	IR
9	Alberni	Stuart Bay 6	5923815	IR
9	Alberni	Tsahaheh 1	5923816	IR
9	Alberni	Keeshan 9	5923821	IR
9	Alberni	Klehkoot 2	5923822	IR
9	Alberni	Esowista 3	5923823	IR
9	Alberni	Refuge Cove 6	5923824	IR
9	Alberni	Tin Wis 11	5923825	IR
10	Courtenay-Comox	Comox	5925005	T
10	Courtenay-Comox	Courtenay	5925010	C
10	Courtenay-Comox	Cumberland	5925014	VL
10	Courtenay-Comox	Comox-Strathcona A	5925018	RDA
10	Courtenay-Comox	Comox-Strathcona K	5925019	RDA
10	Courtenay-Comox	Comox-Strathcona B	5925022	RDA
10	Courtenay-Comox	Comox-Strathcona C	5925024	RDA
10	Courtenay-Comox	Comox 1	5925801	IR
10	Courtenay-Comox	Pentledge 2	5925802	IR
11	Campbell River	Gold River	5925025	VL
11	Campbell River	Zeballos	5925029	VL

LA	Local Area Name	CSD NAME	SGC	CSD Type
11	Campbell River	Tahsis	5925030	VL
11	Campbell River	Campbell River	5925034	C
11	Campbell River	Sayward	5925039	VL
11	Campbell River	Comox-Strathcona D	5925042	RDA
11	Campbell River	Comox-Strathcona H	5925046	RDA
11	Campbell River	Comox-Strathcona G	5925049	RDA
11	Campbell River	Ahaminaquus 12	5925803	IR
11	Campbell River	Campbell River 11	5925804	IR
11	Campbell River	Chenahkint 12	5925805	IR
11	Campbell River	Houpsitas 6	5925806	IR
11	Campbell River	Nuchatl 2	5925808	IR
11	Campbell River	Nuchatl 1	5925809	IR
11	Campbell River	Quinsam 12	5925812	IR
11	Campbell River	Village Island 1	5925813	IR
11	Campbell River	Yuquot 1	5925814	IR
11	Campbell River	Oclucje 7	5925833	IR
11	Campbell River	Tsa Xana 18	5925835	IR
11	Campbell River	Ehatis 11	5925836	IR
11	Campbell River	Homalco 9	5925840	IR
12	Bute Inlet	Comox-Strathcona I	5925052	RDA
12	Bute Inlet	Comox-Strathcona J	5925054	RDA
12	Bute Inlet	Aupe 6	5925815	IR
12	Bute Inlet	Aupe 6A	5925816	IR
12	Bute Inlet	Cape Mudge 10	5925817	IR
12	Bute Inlet	Squirrel Cove 8	5925818	IR
12	Bute Inlet	Tatpo-oose 10	5925819	IR
12	Bute Inlet	Tork 7	5925820	IR
12	Bute Inlet	Matsayno 5	5925825	IR
12	Bute Inlet	Saaiyouck 6	5925830	IR
13	Powell River	Powell River	5927008	C
13	Powell River	Powell River A	5927010	RDA
13	Powell River	Powell River B	5927012	RDA
13	Powell River	Powell River C	5927016	RDA
13	Powell River	Powell River D	5927018	RDA
13	Powell River	Powell River E	5927020	RDA
13	Powell River	Sliammon 1	5927802	IR
13	Powell River	Harwood Island 2	5927805	IR
13	Powell River	Sechelt (Part)	5927806	IGD
14	Alert Bay	Alert Bay	5943008	VL
14	Alert Bay	Mount Waddington A	5943037	RDA
14	Alert Bay	Alert Bay 1	5943801	IR
14	Alert Bay	Alert Bay 1A	5943802	IR
14	Alert Bay	Dead Point 5	5943807	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
14	Alert Bay	Gwayasdums 1	5943808	IR
14	Alert Bay	Hopetown 10A	5943809	IR
14	Alert Bay	Karlukwees 1	5943810	IR
14	Alert Bay	Quaee 7	5943813	IR
14	Alert Bay	Apsagayu 1A	5943820	IR
14	Alert Bay	Compton Island 6	5943824	IR
14	Alert Bay	Mahmalillikullah 1	5943828	IR
15	Port Hardy	Port McNeill	5943012	T
15	Port Hardy	Port Alice	5943017	VL
15	Port Hardy	Port Hardy	5943023	DM
15	Port Hardy	Mount Waddington B	5943027	RDA
15	Port Hardy	Mount Waddington C	5943031	RDA
15	Port Hardy	Mount Waddington D	5943033	RDA
15	Port Hardy	Fort Rupert 1	5943804	IR
15	Port Hardy	Quattishe 1	5943805	IR
15	Port Hardy	Tsulquate 4	5943806	IR
15	Port Hardy	Kippase 2	5943815	IR
15	Port Hardy	Quatsino Subdivision 18	5943816	IR
15	Port Hardy	Thomas Point 5	5943817	IR
15	Port Hardy	Glen-Gla-Ouch 5	5943832	IR
15	Port Hardy	Hope Island 1	5943836	IR
16	Central Coast	Central Coast A	5945006	RDA
16	Central Coast	Central Coast C	5945010	RDA
16	Central Coast	Central Coast D	5945012	RDA
16	Central Coast	Central Coast E	5945014	RDA
16	Central Coast	Bella Bella 1	5945801	IR
16	Central Coast	Bella Coola 1	5945802	IR
16	Central Coast	Katit 1	5945803	IR
17	Hope-Fraser Canyon	Hope	5909009	DM
17	Hope-Fraser Canyon	Fraser Valley A	5909014	RDA
17	Hope-Fraser Canyon	Fraser Valley B	5909016	RDA
17	Hope-Fraser Canyon	Aywawwis 15	5909801	IR
17	Hope-Fraser Canyon	Boothroyd 5A	5909802	IR
17	Hope-Fraser Canyon	Boothroyd 8A (Part)	5909803	IR
17	Hope-Fraser Canyon	Chawathil 4	5909804	IR
17	Hope-Fraser Canyon	Inkahtsaph 6	5909805	IR
17	Hope-Fraser Canyon	Kopchitchin 2	5909806	IR
17	Hope-Fraser Canyon	Ohamil 1	5909807	IR
17	Hope-Fraser Canyon	Puckatholetchin 11	5909808	IR
17	Hope-Fraser Canyon	Saddle Rock 9	5909809	IR
17	Hope-Fraser Canyon	Lukseetsissum 9	5909810	IR
17	Hope-Fraser Canyon	Ruby Creek 2	5909811	IR
17	Hope-Fraser Canyon	Schkam 2	5909812	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
17	Hope-Fraser Canyon	Sho-ook 5	5909813	IR
17	Hope-Fraser Canyon	Skawahlook 1	5909814	IR
17	Hope-Fraser Canyon	Speyum 3	5909815	IR
17	Hope-Fraser Canyon	Spuzzum 1	5909816	IR
17	Hope-Fraser Canyon	Tuckkwiowhum 1	5909817	IR
17	Hope-Fraser Canyon	Yale Town 1	5909818	IR
17	Hope-Fraser Canyon	Kahmoose 4	5909819	IR
17	Hope-Fraser Canyon	Chaumox 11	5909820	IR
17	Hope-Fraser Canyon	Boston Bar 1A	5909836	IR
17	Hope-Fraser Canyon	Swahliseah 14	5909840	IR
17	Hope-Fraser Canyon	Stullawheets 8	5909841	IR
17	Hope-Fraser Canyon	Peters 1	5909843	IR
17	Hope-Fraser Canyon	Bucktum 4	5909847	IR
17	Hope-Fraser Canyon	Kuthlalth 3	5909870	IR
17	Hope-Fraser Canyon	Albert Flat 5	5909876	IR
18	Chilliwack	Chilliwack	5909020	C
18	Chilliwack	Fraser Valley D	5909034	RDA
18	Chilliwack	Fraser Valley E	5909036	RDA
18	Chilliwack	Kwawkwawapilt 6	5909821	IR
18	Chilliwack	Skowkale 10	5909822	IR
18	Chilliwack	Skowkale 11	5909823	IR
18	Chilliwack	Skwah 4	5909824	IR
18	Chilliwack	Skwali 3	5909825	IR
18	Chilliwack	Skway 5	5909826	IR
18	Chilliwack	Soowahlie 14	5909827	IR
18	Chilliwack	Squiaala 7	5909828	IR
18	Chilliwack	Squiaala 8	5909829	IR
18	Chilliwack	Tzeachten 13	5909830	IR
18	Chilliwack	Yakweakwioose 12	5909831	IR
18	Chilliwack	Aitchelitch 9	5909835	IR
18	Chilliwack	Cheam 1	5909837	IR
18	Chilliwack	Schelowat 1	5909838	IR
18	Chilliwack	Popkum 1	5909844	IR
18	Chilliwack	Skwahla 2	5909849	IR
19	Kent-Harrison	Harrison Hot Springs	5909027	VL
19	Kent-Harrison	Kent	5909032	DM
19	Kent-Harrison	Fraser Valley C	5909048	RDA
19	Kent-Harrison	Seabird Island	5909832	IR
19	Kent-Harrison	Scowlitz 1	5909833	IR
19	Kent-Harrison	Tseatah 2	5909834	IR
19	Kent-Harrison	Chehalis 5	5909839	IR
19	Kent-Harrison	Douglas 8	5909842	IR
19	Kent-Harrison	Skookumchuck 4	5909845	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
19	Kent-Harrison	Franks 10	5909846	IR
19	Kent-Harrison	Tipella 7	5909848	IR
19	Kent-Harrison	Baptiste Smith 1A	5909852	IR
19	Kent-Harrison	Sachteen 2	5909855	IR
19	Kent-Harrison	Sachteen 2A	5909860	IR
19	Kent-Harrison	Samahquam 1	5909865	IR
19	Kent-Harrison	Baptiste Smith 1B	5909875	IR
20	Matsqui-Abbottsford	Abbotsford	5909052	C
20	Matsqui-Abbottsford	Fraser Valley H	5909064	RDA
20	Matsqui-Abbottsford	Upper Sumas 6	5909877	IR
20	Matsqui-Abbottsford	Matsqui Main 2	5909878	IR
21	Pitt Meadows-Maple Ridge	Pitt Meadows	5915070	DM
21	Pitt Meadows-Maple Ridge	Maple Ridge	5915075	DM
21	Pitt Meadows-Maple Ridge	Katzie 1	5915830	IR
21	Pitt Meadows-Maple Ridge	Langley 5	5915835	IR
21	Pitt Meadows-Maple Ridge	Whonnock 1	5915840	IR
22	Mission	Mission	5909056	DM
22	Mission	Fraser Valley F	5909060	RDA
22	Mission	Fraser Valley G	5909062	RDA
22	Mission	Holachten 8	5909879	IR
22	Mission	Lakahahmen 11	5909880	IR
22	Mission	Skweahm 10	5909881	IR
22	Mission	Squawkum Creek 3	5909882	IR
23	Sunshine Coast	Gibsons	5929005	T
23	Sunshine Coast	Sechelt	5929011	DM
23	Sunshine Coast	Sunshine Coast A	5929018	RDA
23	Sunshine Coast	Sunshine Coast B	5929022	RDA
23	Sunshine Coast	Sunshine Coast D	5929024	RDA
23	Sunshine Coast	Sunshine Coast E	5929026	RDA
23	Sunshine Coast	Sunshine Coast F	5929028	RDA
23	Sunshine Coast	Chekwelp 26	5929801	IR
23	Sunshine Coast	Chekwelp 26A	5929802	IR
23	Sunshine Coast	Sechelt (Part)	5929803	IGD
23	Sunshine Coast	Schaltuuch 27	5929804	IR
24	Squamish	Squamish	5931006	DM
24	Squamish	Pemberton	5931012	VL
24	Squamish	Squamish-Lillooet C	5931017	RDA
24	Squamish	Whistler	5931020	DM
24	Squamish	Squamish-Lillooet D	5931021	RDA
24	Squamish	Cheakamus 11	5931801	IR
24	Squamish	Kowtain 17	5931802	IR
24	Squamish	Mount Currie 1	5931803	IR
24	Squamish	Mount Currie 10	5931804	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
24	Squamish	Nequatque 1	5931805	IR
24	Squamish	Seaichem 16	5931806	IR
24	Squamish	Stawamus 24	5931807	IR
24	Squamish	Waiwakum 14	5931808	IR
24	Squamish	Yekwaupsum 18	5931809	IR
24	Squamish	Nequatque 3A	5931810	IR
24	Squamish	Mount Currie 2	5931811	IR
24	Squamish	Nesuch 3	5931812	IR
24	Squamish	Mount Currie 8	5931837	IR
24	Squamish	Mount Currie 6	5931838	IR
24	Squamish	Nequatque 2	5931840	IR
25	Lillooet	Lillooet	5931026	DM
25	Lillooet	Squamish-Lillooet A	5931032	RDA
25	Lillooet	Squamish-Lillooet B	5931034	RDA
25	Lillooet	Bridge River 1	5931813	IR
25	Lillooet	Cayoosh Creek 1	5931814	IR
25	Lillooet	Chilhil 6	5931815	IR
25	Lillooet	Fountain 1	5931816	IR
25	Lillooet	Fountain 3	5931817	IR
25	Lillooet	Fountain 10	5931818	IR
25	Lillooet	Fountain 11	5931819	IR
25	Lillooet	Fountain 12	5931820	IR
25	Lillooet	Lillooet 1	5931821	IR
25	Lillooet	Fountain Creek 8	5931822	IR
25	Lillooet	McCartney's Flat 4	5931823	IR
25	Lillooet	Seton Lake 5	5931824	IR
25	Lillooet	Necait 6	5931826	IR
25	Lillooet	Nesikep 6	5931827	IR
25	Lillooet	Pashilqua 2	5931828	IR
25	Lillooet	Pavilion 1	5931829	IR
25	Lillooet	Seton Lake 5A	5931830	IR
25	Lillooet	Slosh 1	5931831	IR
25	Lillooet	Towinock 2	5931832	IR
25	Lillooet	Mission 5	5931833	IR
25	Lillooet	Slosh 1A	5931839	IR
25	Lillooet	Fountain 1B	5931842	IR
26	Princeton	Princeton	5907024	T
26	Princeton	Okanagan-Similkameen H	5907055	RDA
27	Oliver-Osoyoos	Osoyoos	5907005	T
27	Oliver-Osoyoos	Keremeos	5907009	VL
27	Oliver-Osoyoos	Oliver	5907014	T
27	Oliver-Osoyoos	Okanagan-Similkameen A	5907022	RDA
27	Oliver-Osoyoos	Okanagan-Similkameen B	5907026	RDA

LA	Local Area Name	CSD NAME	SGC	CSD Type
27	Oliver-Osoyoos	Okanagan-Similkameen C	5907028	RDA
27	Oliver-Osoyoos	Okanagan-Similkameen G	5907053	RDA
27	Oliver-Osoyoos	Lower Similkameen 2	5907801	IR
27	Oliver-Osoyoos	Osoyoos 1	5907802	IR
27	Oliver-Osoyoos	Chopaka 7 & 8	5907805	IR
27	Oliver-Osoyoos	Blind Creek 6	5907806	IR
27	Oliver-Osoyoos	Chuchuwayha 2	5907807	IR
27	Oliver-Osoyoos	Alexis 9	5907808	IR
27	Oliver-Osoyoos	Ashnola 10	5907809	IR
28	Penticton	Summerland	5907035	DM
28	Penticton	Penticton	5907041	C
28	Penticton	Okanagan-Similkameen D	5907047	RDA
28	Penticton	Okanagan-Similkameen E	5907049	RDA
28	Penticton	Okanagan-Similkameen F	5907051	RDA
28	Penticton	Penticton 1	5907803	IR
29	Ashcroft	Lytton	5933015	VL
29	Ashcroft	Ashcroft	5933019	VL
29	Ashcroft	Cache Creek	5933024	VL
29	Ashcroft	Clinton	5933028	VL
29	Ashcroft	Thompson-Nicola E (Bonaparte Plateau)	5933032	RDA
29	Ashcroft	Thompson-Nicola I (Blue Sky Country)	5933037	RDA
29	Ashcroft	Hamilton Creek 2	5933803	IR
29	Ashcroft	Bonaparte 3	5933812	IR
29	Ashcroft	Canoe Creek 1	5933814	IR
29	Ashcroft	Halhalaeden 14A	5933815	IR
29	Ashcroft	Chuchhriaschin 5	5933816	IR
29	Ashcroft	Halhalaeden 14	5933818	IR
29	Ashcroft	High Bar 1	5933819	IR
29	Ashcroft	Inkluckcheen 21	5933820	IR
29	Ashcroft	Canoe Creek 2	5933821	IR
29	Ashcroft	Chuchhriaschin 5A	5933822	IR
29	Ashcroft	Kitzowit 20	5933823	IR
29	Ashcroft	Skuppah 2A	5933824	IR
29	Ashcroft	Inklyuhkinatko 2	5933825	IR
29	Ashcroft	Kanaka Bar 1A	5933826	IR
29	Ashcroft	Kanaka Bar 2	5933827	IR
29	Ashcroft	Basque 18	5933828	IR
29	Ashcroft	Klahkamich 17	5933829	IR
29	Ashcroft	Klahkowit 5	5933830	IR
29	Ashcroft	Kleetlekut 22	5933831	IR
29	Ashcroft	Klickkumcheen 18	5933832	IR
29	Ashcroft	Kumcheen 1	5933834	IR
29	Ashcroft	Leon Creek 2	5933835	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
29	Ashcroft	Lower Hat Creek 2	5933836	IR
29	Ashcroft	Lytton 4A	5933839	IR
29	Ashcroft	Lytton 4E	5933840	IR
29	Ashcroft	Lytton 9A	5933841	IR
29	Ashcroft	Lytton 9B	5933842	IR
29	Ashcroft	Ashcroft 4	5933844	IR
29	Ashcroft	105 Mile Post 2	5933845	IR
29	Ashcroft	Oregon Jack Creek 5	5933846	IR
29	Ashcroft	Nickel Palm 4	5933848	IR
29	Ashcroft	Nickeyeah 25	5933850	IR
29	Ashcroft	Nicomen 1	5933851	IR
29	Ashcroft	Nohomeen 23	5933852	IR
29	Ashcroft	Nuuautin 2	5933853	IR
29	Ashcroft	Paska Island 3	5933854	IR
29	Ashcroft	Papyum 27	5933855	IR
29	Ashcroft	Papyum 27A	5933856	IR
29	Ashcroft	Pemynoos 9	5933857	IR
29	Ashcroft	Seah 5	5933858	IR
29	Ashcroft	Shackan 11	5933859	IR
29	Ashcroft	Siska Flat 3	5933860	IR
29	Ashcroft	Kloklowuck 7	5933861	IR
29	Ashcroft	Siska Flat 5A	5933862	IR
29	Ashcroft	Siska Flat 5B	5933863	IR
29	Ashcroft	Siska Flat 8	5933864	IR
29	Ashcroft	Skuppah 4	5933865	IR
29	Ashcroft	Skwayaynope 26	5933866	IR
29	Ashcroft	Spences Bridge 4	5933867	IR
29	Ashcroft	Spintlum Flat 3	5933868	IR
29	Ashcroft	Staiyahanny 8	5933869	IR
29	Ashcroft	Nkaih 10	5933870	IR
29	Ashcroft	Spences Bridge 4C	5933871	IR
29	Ashcroft	Marble Canyon 3	5933872	IR
29	Ashcroft	Stryen 9	5933873	IR
29	Ashcroft	Tsaukan 12	5933874	IR
29	Ashcroft	Upper Hat Creek 1	5933875	IR
29	Ashcroft	Upper Nepa 6	5933876	IR
29	Ashcroft	Yawaucht 11	5933878	IR
29	Ashcroft	Zacht 5	5933879	IR
29	Ashcroft	Cameron Bar 13	5933890	IR
29	Ashcroft	Inkluckcheen 21B	5933894	IR
29	Ashcroft	Shawniken 4B	5933895	IR
29	Ashcroft	Nekliptum 1	5933896	IR
29	Ashcroft	Boothroyd 8A (Part)	5933897	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
30	Merritt	Merritt	5933006	C
30	Merritt	Thompson-Nicola M	5933008	RDA
30	Merritt	Thompson-Nicola N	5933012	RDA
30	Merritt	Coldwater 1	5933801	IR
30	Merritt	Douglas Lake 3	5933802	IR
30	Merritt	Hamilton Creek 7	5933804	IR
30	Merritt	Joeyaska 2	5933805	IR
30	Merritt	Nicola Lake 1	5933806	IR
30	Merritt	Nicola Mameet 1	5933807	IR
30	Merritt	Nooaitch 10	5933808	IR
30	Merritt	Paul's Basin 2	5933809	IR
30	Merritt	Zoht 4	5933811	IR
31	Kamloops	Logan Lake	5933035	DM
31	Kamloops	Thompson-Nicola J (Copper Desert Country)	5933039	RDA
31	Kamloops	Kamloops	5933042	C
31	Kamloops	Thompson-Nicola P (Rivers and the Peaks)	5933044	RDA
31	Kamloops	Chase	5933054	VL
31	Kamloops	Thompson-Nicola L	5933060	RDA
31	Kamloops	Skeetchestn	5933817	IR
31	Kamloops	Spatsum 11	5933847	IR
31	Kamloops	Kamloops 1	5933880	IR
31	Kamloops	Neskonlith 1 (Neskainlith 1)	5933883	IR
31	Kamloops	Sahhaltkum 4	5933884	IR
31	Kamloops	Neskonlith 2	5933885	IR
32	North Thompson	Thompson-Nicola A (Wells Gray Country)	5933068	RDA
32	North Thompson	Thompson-Nicola B (Thompson Headwaters)	5933070	RDA
32	North Thompson	Thompson-Nicola O (Lower North Thompson)	5933072	RDA
32	North Thompson	Whispering Pines 4	5933877	IR
32	North Thompson	Nekalliston 2	5933886	IR
32	North Thompson	North Thompson 1	5933887	IR
32	North Thompson	Louis Creek 4	5933888	IR
32	North Thompson	Squaam 2	5933889	IR
33	Peachland	Peachland	5935018	DM
33	Peachland	Central Okanagan J	5935020	RDA
33	Peachland	Tsinstikeptum 9	5935802	IR
33	Peachland	Tsinstikeptum 10	5935803	IR
34	Kelowna	Kelowna	5935010	C
34	Kelowna	Central Okanagan	5935012	RDA
34	Kelowna	Lake Country	5935016	DM
34	Kelowna	Duck Lake 7	5935801	IR
35	Vernon	Lumby	5937005	VL
35	Vernon	Coldstream	5937010	DM

LA	Local Area Name	CSD NAME	SGC	CSD Type
35	Vernon	Vernon	5937014	C
35	Vernon	North Okanagan B	5937017	RDA
35	Vernon	North Okanagan C	5937021	RDA
35	Vernon	North Okanagan D	5937022	RDA
35	Vernon	North Okanagan E	5937023	RDA
35	Vernon	Okanagan (Part) 1	5937801	IR
35	Vernon	Priest's Valley 6	5937803	IR
36	Spallumcheen	Spallumcheen	5937024	DM
36	Spallumcheen	Armstrong	5937028	C
36	Spallumcheen	Enderby	5937033	C
36	Spallumcheen	North Okanagan F	5937041	RDA
36	Spallumcheen	Enderby 2	5937802	IR
36	Spallumcheen	Harris 3	5937805	IR
37	Salmon Arm	Salmon Arm	5939032	C
37	Salmon Arm	Columbia-Shuswap C	5939037	RDA
37	Salmon Arm	Columbia-Shuswap D	5939039	RDA
37	Salmon Arm	Columbia-Shuswap E	5939043	RDA
37	Salmon Arm	Columbia-Shuswap F	5939044	RDA
37	Salmon Arm	Sicamous	5939045	DM
37	Salmon Arm	Chum Creek 2	5939801	IR
37	Salmon Arm	Hustalen 1	5939802	IR
37	Salmon Arm	North Bay 5	5939803	IR
37	Salmon Arm	Okanagan (Part) 1	5939804	IR
37	Salmon Arm	Quaaout 1	5939805	IR
37	Salmon Arm	Salmon River 1	5939806	IR
37	Salmon Arm	Scotch Creek 4	5939807	IR
37	Salmon Arm	Switsemalph 3	5939808	IR
37	Salmon Arm	Switsemalph 6	5939809	IR
37	Salmon Arm	Switsemalph 7	5939810	IR
38	Golden	Golden	5939007	T
38	Golden	Columbia-Shuswap A	5939011	RDA
39	Revelstoke	Revelstoke	5939019	C
39	Revelstoke	Columbia-Shuswap B	5939023	RDA
40	Fernie	Elkford	5901003	DM
40	Fernie	Sparwood	5901006	DM
40	Fernie	Fernie	5901012	C
40	Fernie	East Kootenay A	5901017	RDA
40	Fernie	East Kootenay B	5901019	RDA
40	Fernie	Tobacco Plains 2	5901801	IR
41	Cranbrook-Kimberley	Cranbrook	5901022	C
41	Cranbrook-Kimberley	Kimberley	5901028	C
41	Cranbrook-Kimberley	East Kootenay C	5901035	RDA

LA	Local Area Name	CSD NAME	SGC	CSD Type
41	Cranbrook-Kimberley	East Kootenay E	5901037	RDA
41	Cranbrook-Kimberley	Isidore's Ranch 4	5901802	IR
41	Cranbrook-Kimberley	Kootenay 1	5901803	IR
41	Cranbrook-Kimberley	Cassimayooks (Mayook) 5	5901805	IR
41	Cranbrook-Kimberley	Bummers Flat 6	5901807	IR
42	Invermere	Invermere	5901039	DM
42	Invermere	Radium Hot Springs	5901040	VL
42	Invermere	Canal Flats	5901043	VL
42	Invermere	East Kootenay F	5901046	RDA
42	Invermere	East Kootenay G	5901048	RDA
42	Invermere	Columbia Lake 3	5901804	IR
42	Invermere	Shuswap	5901806	IR
43	Castlegar-Arrow Lakes	Castlegar	5903045	C
43	Castlegar-Arrow Lakes	Nakusp	5903050	VL
43	Castlegar-Arrow Lakes	Central Kootenay I	5903056	RDA
43	Castlegar-Arrow Lakes	Central Kootenay J	5903058	RDA
43	Castlegar-Arrow Lakes	Central Kootenay K	5903060	RDA
44	Nelson	Salmo	5903011	VL
44	Nelson	Nelson	5903015	C
44	Nelson	Slocan	5903019	VL
44	Nelson	Kaslo	5903023	VL
44	Nelson	Silverton	5903027	VL
44	Nelson	New Denver	5903032	VL
44	Nelson	Central Kootenay D	5903039	RDA
44	Nelson	Central Kootenay E	5903041	RDA
44	Nelson	Central Kootenay F	5903043	RDA
44	Nelson	Central Kootenay G	5903047	RDA
44	Nelson	Central Kootenay H	5903052	RDA
45	Creston	Creston	5903004	T
45	Creston	Central Kootenay A	5903010	RDA
45	Creston	Central Kootenay B	5903013	RDA
45	Creston	Central Kootenay C	5903017	RDA
45	Creston	Creston 1	5903807	IR
46	Grand Forks-Greenwood	Grand Forks	5905032	C
46	Grand Forks-Greenwood	Midway	5905037	VL
46	Grand Forks-Greenwood	Greenwood	5905042	C
46	Grand Forks-Greenwood	Kootenay Boundary C	5905050	RDA
46	Grand Forks-Greenwood	Kootenay Boundary D	5905052	RDA
46	Grand Forks-Greenwood	Kootenay Boundary E	5905054	RDA
47	Trail-Rossland	Fruitvale	5905005	VL
47	Trail-Rossland	Montrose	5905009	VL
47	Trail-Rossland	Trail	5905014	C
47	Trail-Rossland	Warfield	5905018	VL

LA	Local Area Name	CSD NAME	SGC	CSD Type
47	Trail-Rossland	Rossland	5905023	C
47	Trail-Rossland	Kootenay Boundary A	5905026	RDA
47	Trail-Rossland	Kootenay Boundary B	5905030	RDA
48	Williams Lake	One Hundred Mile House	5941005	DM
48	Williams Lake	Williams Lake	5941009	C
48	Williams Lake	Cariboo D	5941010	RDA
48	Williams Lake	Cariboo E	5941012	RDA
48	Williams Lake	Cariboo F	5941014	RDA
48	Williams Lake	Cariboo G	5941015	RDA
48	Williams Lake	Cariboo H	5941016	RDA
48	Williams Lake	Cariboo L	5941017	RDA
48	Williams Lake	Cariboo J	5941039	RDA
48	Williams Lake	Cariboo K	5941041	RDA
48	Williams Lake	Alkali Lake 1	5941801	IR
48	Williams Lake	Canim Lake 1	5941802	IR
48	Williams Lake	Canim Lake 4	5941803	IR
48	Williams Lake	Canoe Creek 3	5941804	IR
48	Williams Lake	Deep Creek 2	5941805	IR
48	Williams Lake	Dog Creek 1	5941806	IR
48	Williams Lake	Dog Creek 2	5941807	IR
48	Williams Lake	Lohbiee 3	5941808	IR
48	Williams Lake	Soda Creek 1	5941810	IR
48	Williams Lake	Johny Sticks 2	5941811	IR
48	Williams Lake	Williams Lake 1	5941812	IR
48	Williams Lake	Canim Lake 2	5941813	IR
48	Williams Lake	Alexis Creek 14	5941817	IR
48	Williams Lake	Alexis Creek 16	5941818	IR
48	Williams Lake	Alexis Creek 24	5941819	IR
48	Williams Lake	Alexis Creek 25	5941820	IR
48	Williams Lake	Anahim's Flat 1	5941821	IR
48	Williams Lake	Anahim's Meadow 2	5941822	IR
48	Williams Lake	Anahim's Meadow 2A	5941823	IR
48	Williams Lake	Andy Cahoose Meadow 16	5941824	IR
48	Williams Lake	Cahoose 8	5941826	IR
48	Williams Lake	Charley Boy's Meadow 3	5941827	IR
48	Williams Lake	Chilco Lake 1	5941828	IR
48	Williams Lake	Chilco Lake 1A	5941829	IR
48	Williams Lake	Garden 2	5941830	IR
48	Williams Lake	Tanakut 4	5941831	IR
48	Williams Lake	Garden 2A	5941832	IR
48	Williams Lake	Louis Squinas Ranch 14	5941834	IR
48	Williams Lake	Puntzi Lake 2	5941838	IR
48	Williams Lake	Redstone Flat 1	5941839	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
48	Williams Lake	Squinas 2	5941840	IR
48	Williams Lake	Stone 1	5941841	IR
48	Williams Lake	Alexis Creek 17	5941842	IR
48	Williams Lake	Seymour Meadows 19	5941843	IR
48	Williams Lake	Agats Meadow 8	5941844	IR
48	Williams Lake	Thomas Squinas Ranch 2A	5941845	IR
48	Williams Lake	Toby's Meadow 4	5941846	IR
48	Williams Lake	Alexis Creek 6	5941847	IR
48	Williams Lake	Alexis Creek 21	5941848	IR
48	Williams Lake	Baptiste Meadow 2	5941849	IR
48	Williams Lake	Toosey 1	5941850	IR
48	Williams Lake	Towdystan Lake 3	5941851	IR
48	Williams Lake	Tsunnia Lake 5	5941853	IR
48	Williams Lake	Ulkatcho 13	5941854	IR
48	Williams Lake	Windy Mouth 7	5941855	IR
48	Williams Lake	Alexis Creek 34	5941856	IR
48	Williams Lake	Casimiel Meadows 15A	5941857	IR
48	Williams Lake	Cahoose 10	5941858	IR
48	Williams Lake	Blackwater Meadow 11	5941859	IR
48	Williams Lake	Cahoose 12	5941860	IR
48	Williams Lake	Betty Creek 18	5941861	IR
48	Williams Lake	Salmon River Meadow 7	5941862	IR
48	Williams Lake	Tzetzi Lake 11	5941863	IR
48	Williams Lake	Sandy Harry 4	5941868	IR
48	Williams Lake	Fishtrap 19	5941871	IR
48	Williams Lake	Swan Lake 3	5941872	IR
48	Williams Lake	Alkali Lake 4A	5941873	IR
48	Williams Lake	Little Springs 8	5941874	IR
48	Williams Lake	Little Springs 18	5941875	IR
48	Williams Lake	Lezbye 6	5941876	IR
48	Williams Lake	Michel Gardens 36	5941879	IR
48	Williams Lake	Ulkatcho 14A	5941880	IR
49	Quesnel	Quesnel	5941013	C
49	Quesnel	Cariboo A	5941019	RDA
49	Quesnel	Cariboo B	5941021	RDA
49	Quesnel	Wells	5941025	DM
49	Quesnel	Cariboo C	5941026	RDA
49	Quesnel	Cariboo I	5941027	RDA
49	Quesnel	Quesnel 1	5941809	IR
49	Quesnel	Alexandria 3A	5941814	IR
49	Quesnel	Alexandria 1	5941815	IR
49	Quesnel	Alexandria 3	5941816	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
49	Quesnel	Baezaeko River 25	5941825	IR
49	Quesnel	Kluskus 1	5941833	IR
49	Quesnel	Coglistiko River 29	5941835	IR
49	Quesnel	Baezaeko River 26	5941836	IR
49	Quesnel	Nazco 20	5941837	IR
49	Quesnel	Trout Lake Alec 16	5941852	IR
49	Quesnel	Sundayman's Meadow 3	5941864	IR
49	Quesnel	Tatelkus Lake 28	5941865	IR
49	Quesnel	Euchinico Creek 17	5941866	IR
49	Quesnel	Kushya Creek 7	5941867	IR
49	Quesnel	Alexandria 1A	5941870	IR
49	Quesnel	Baezaeko River 27	5941881	IR
50	Prince George	Prince George	5953023	C
50	Prince George	Mackenzie	5953033	DM
50	Prince George	Fraser-Fort George A	5953038	RDA
50	Prince George	Fraser-Fort George C	5953042	RDA
50	Prince George	Fraser-Fort George D	5953044	RDA
50	Prince George	Fraser-Fort George E	5953046	RDA
50	Prince George	Fraser-Fort George F	5953048	RDA
50	Prince George	Fraser-Fort George G	5953050	RDA
50	Prince George	Fort George (Shelley) 2	5953801	IR
50	Prince George	McLeod Lake 1	5953802	IR
50	Prince George	Parsnip 5	5953804	IR
51	McBride-Valemount	Valemount	5953007	VL
51	McBride-Valemount	McBride	5953012	VL
51	McBride-Valemount	Fraser-Fort George H	5953019	RDA
52	Queen Charlotte Islands	Masset	5947023	VL
52	Queen Charlotte Islands	Queen Charlotte	5947026	VL
52	Queen Charlotte Islands	Skeena-Queen Charlotte D	5947027	RDA
52	Queen Charlotte Islands	Port Clements	5947030	VL
52	Queen Charlotte Islands	Skeena-Queen Charlotte E	5947032	RDA
52	Queen Charlotte Islands	Masset 1	5947803	IR
52	Queen Charlotte Islands	Skidegate 1	5947804	IR
53	Prince Rupert	Port Edward	5947007	DM
53	Prince Rupert	Prince Rupert	5947012	C
53	Prince Rupert	Skeena-Queen Charlotte A	5947016	RDA
53	Prince Rupert	Skeena-Queen Charlotte C	5947021	RDA
53	Prince Rupert	Kulkayu (Hartley Bay) 4	5947806	IR
53	Prince Rupert	Dolphin Island 1	5947807	IR
53	Prince Rupert	Lax Kw'alaams 1	5947809	IR
53	Prince Rupert	S1/2 Tsimpsean 2	5947810	IR
54	Kitimat-Terrace	Kitimat	5949005	DM
54	Kitimat-Terrace	Terrace	5949011	C

LA	Local Area Name	CSD NAME	SGC	CSD Type
54	Kitimat-Terrace	Kitimat-Stikine C (Part 1)	5949013	RDA
54	Kitimat-Terrace	Kitimat-Stikine E	5949018	RDA
54	Kitimat-Terrace	Kitimat-Stikine C (Part 2)	5949020	RDA
54	Kitimat-Terrace	Kitasoo 1	5949802	IR
54	Kitimat-Terrace	Kitamaat 2	5949803	IR
54	Kitimat-Terrace	Kitsumkaylum 1	5949804	IR
54	Kitimat-Terrace	Kshish 4	5949805	IR
54	Kitimat-Terrace	Kulspai 6	5949807	IR
54	Kitimat-Terrace	Kitselas 1	5949844	IR
55	Hazelton	Hazelton	5949022	VL
55	Hazelton	New Hazelton	5949024	DM
55	Hazelton	Kitimat-Stikine B	5949028	RDA
55	Hazelton	Coryatsaqua (Moricetown) 2	5949810	IR
55	Hazelton	Hagwilget 1	5949811	IR
55	Hazelton	Gitanmaax 1	5949812	IR
55	Hazelton	Kispiox 1	5949813	IR
55	Hazelton	Gitsegukla 1	5949814	IR
55	Hazelton	Gitanyow 1	5949815	IR
55	Hazelton	Gitwangak 1	5949816	IR
55	Hazelton	Moricetown 1	5949817	IR
55	Hazelton	Sik-e-dakh 2	5949818	IR
55	Hazelton	Babine 17	5949819	IR
55	Hazelton	Bulkley River 19	5949820	IR
56	Stewart	Stewart	5949032	DM
56	Stewart	Nisga'a	5949035	NL
56	Stewart	Kitimat-Stikine A	5949039	RDA
56	Stewart	Kitimat-Stikine D	5949041	RDA
56	Stewart	Telegraph Creek 6	5949826	IR
56	Stewart	Telegraph Creek 6A	5949827	IR
56	Stewart	Kluachon Lake 1	5949830	IR
56	Stewart	Gitzault 24	5949831	IR
56	Stewart	Iskut 6	5949832	IR
56	Stewart	New Aiyansh	5949834	NVL
56	Stewart	Aiyansh (Kitladamas) 1	5949836	NVL
56	Stewart	Gitwinksihlkw	5949838	NVL
56	Stewart	Laxgalts'ap	5949840	NVL
56	Stewart	Gingolx	5949842	NVL
56	Stewart	Guhthe Tah 12	5949843	IR
57	Smithers-Houston	Granisle	5951032	VL
57	Smithers-Houston	Houston	5951034	DM
57	Smithers-Houston	Telkwa	5951038	VL
57	Smithers-Houston	Smithers	5951043	T
57	Smithers-Houston	Bulkley-Nechako A	5951051	RDA

LA	Local Area Name	CSD NAME	SGC	CSD Type
57	Smithers-Houston	Bulkley-Nechako G	5951053	RDA
57	Smithers-Houston	Babine 6	5951828	IR
57	Smithers-Houston	Babine 25	5951829	IR
57	Smithers-Houston	Jean Baptiste 28	5951830	IR
57	Smithers-Houston	Tadinlay 15	5951845	IR
57	Smithers-Houston	Nedoats 11	5951846	IR
58	Burns Lake	Burns Lake	5951022	VL
58	Burns Lake	Bulkley-Nechako B	5951028	RDA
58	Burns Lake	Bulkley-Nechako E	5951031	RDA
58	Burns Lake	Burns Lake 18	5951815	IR
58	Burns Lake	Cheslatta 1	5951818	IR
58	Burns Lake	Omineca 1	5951819	IR
58	Burns Lake	Palling 1	5951820	IR
58	Burns Lake	Duncan Lake 2	5951821	IR
58	Burns Lake	Francois Lake 7	5951822	IR
58	Burns Lake	Skins Lake 16A	5951823	IR
58	Burns Lake	Skins Lake 16B	5951824	IR
58	Burns Lake	Tatla West 11	5951825	IR
58	Burns Lake	Uncha Lake 13A	5951826	IR
58	Burns Lake	Woyenne 27	5951827	IR
58	Burns Lake	Tatla't East 2	5951833	IR
58	Burns Lake	Isaac (Gale Lake) 8	5951835	IR
58	Burns Lake	Maxan Lake 4	5951837	IR
58	Burns Lake	Poison Creek 17A	5951844	IR
58	Burns Lake	Babine Lake 21B	5951847	IR
59	Vanderhoof	Vanderhoof	5951007	DM
59	Vanderhoof	Fraser Lake	5951009	VL
59	Vanderhoof	Fort St. James	5951013	DM
59	Vanderhoof	Bulkley-Nechako C	5951015	RDA
59	Vanderhoof	Bulkley-Nechako D	5951017	RDA
59	Vanderhoof	Bulkley-Nechako F	5951019	RDA
59	Vanderhoof	Ye Koo Che 3	5951801	IR
59	Vanderhoof	Nautley (Fort Fraser) 1	5951802	IR
59	Vanderhoof	Nak'azdli (Necoslie 1)	5951803	IR
59	Vanderhoof	Sowchea 3	5951804	IR
59	Vanderhoof	Binche 2 (Pinchie 2)	5951805	IR
59	Vanderhoof	Seaspunkut 4	5951806	IR
59	Vanderhoof	Stellaquo (Stella) 1	5951807	IR
59	Vanderhoof	Tsay Cho 4	5951808	IR
59	Vanderhoof	Stony Creek 1	5951809	IR
59	Vanderhoof	Tache 1	5951810	IR
59	Vanderhoof	Tacla Lake (Ferry Landing) 9	5951811	IR
59	Vanderhoof	North Tacla Lake 7	5951812	IR

LA	Local Area Name	CSD NAME	SGC	CSD Type
59	Vanderhoof	Laketown 3	5951813	IR
59	Vanderhoof	Dzitline Lee 9	5951814	IR
59	Vanderhoof	Kuz Che 5	5951816	IR
59	Vanderhoof	Bihl' k'a 18	5951817	IR
59	Vanderhoof	Williams Prairie Meadow 1A	5951840	IR
59	Vanderhoof	North Tacla Lake 7A	5951841	IR
59	Vanderhoof	Bihlk'a 6	5951842	IR
60	Stikine	Stikine Region	5957022	RDA
60	Stikine	Dease Lake 9	5957801	IR
60	Stikine	Unnamed 10	5957802	IR
60	Stikine	Five Mile Point 3	5957803	IR
60	Stikine	Good Hope Lake	5957804	S-E
60	Stikine	Tahltan 1	5957805	IR
60	Stikine	Lower Post	5957813	S-E
60	Stikine	Liard River 3	5957814	IR
61	Dawson Creek	Tumbler Ridge	5955003	DM
61	Dawson Creek	Pouce Coupe	5955005	VL
61	Dawson Creek	Chetwynd	5955010	DM
61	Dawson Creek	Dawson Creek	5955014	C
61	Dawson Creek	Peace River D	5955021	RDA
61	Dawson Creek	Peace River E	5955023	RDA
61	Dawson Creek	East Moberly Lake 169	5955801	IR
61	Dawson Creek	West Moberly Lake 168A	5955802	IR
62	Fort St.John	Hudson's Hope	5955025	DM
62	Fort St.John	Taylor	5955030	DM
62	Fort St.John	Fort St. John	5955034	C
62	Fort St.John	Peace River B	5955040	RDA
62	Fort St.John	Peace River C	5955042	RDA
62	Fort St.John	Blueberry River 205	5955803	IR
62	Fort St.John	Doig River 206	5955804	IR
62	Fort St.John	Fort Ware 1	5955807	IR
62	Fort St.John	Halfway River 168	5955808	IR
62	Fort St.John	Ingenika Point	5955812	S-E
63	Fort Nelson	Fort Nelson	5959005	T
63	Fort Nelson	Northern Rockies A	5959011	RDA
63	Fort Nelson	Northern Rockies B	5959013	RDA
63	Fort Nelson	Fontas 1	5959805	IR
63	Fort Nelson	Fort Nelson 2	5959806	IR
63	Fort Nelson	Kahntah 3	5959809	IR
63	Fort Nelson	Prophet River 4	5959810	IR

Appendix G – Local Area Map and Names

VANCOUVER ISLAND/COAST
1 Gulf Islands
2 Victoria
3 Sooke-Port Renfrew
4 Duncan
5 Lake Cowichan
6 Ladysmith
7 Nanaimo
8 Parksville-Qualicum
9 Alberni
10 Courtenay-Comox
11 Campbell River
12 Bute Inlet
13 Powell River
14 Alert Bay
15 Port Hardy
16 Central Coast

MAINLAND/SOUTHWEST (Excluding GVRD)
17 Hope-Fraser Canyon
18 Chilliwack
19 Kent-Harrison
20 Matsqui-Abbottsford
21 Pitt Meadows-Maple Ridge
22 Mission
23 Sunshine Coast
24 Squamish
25 Lillooet

THOMPSON-OKANAGAN
26 Princeton
27 Oliver-Osoyoos
28 Penticton
29 Ashcroft
30 Merritt
31 Kamloops
32 North Thompson
33 Peachland
34 Kelowna
35 Vernon
36 Spallumcheen
37 Salmon Arm
38 Golden
39 Revelstoke

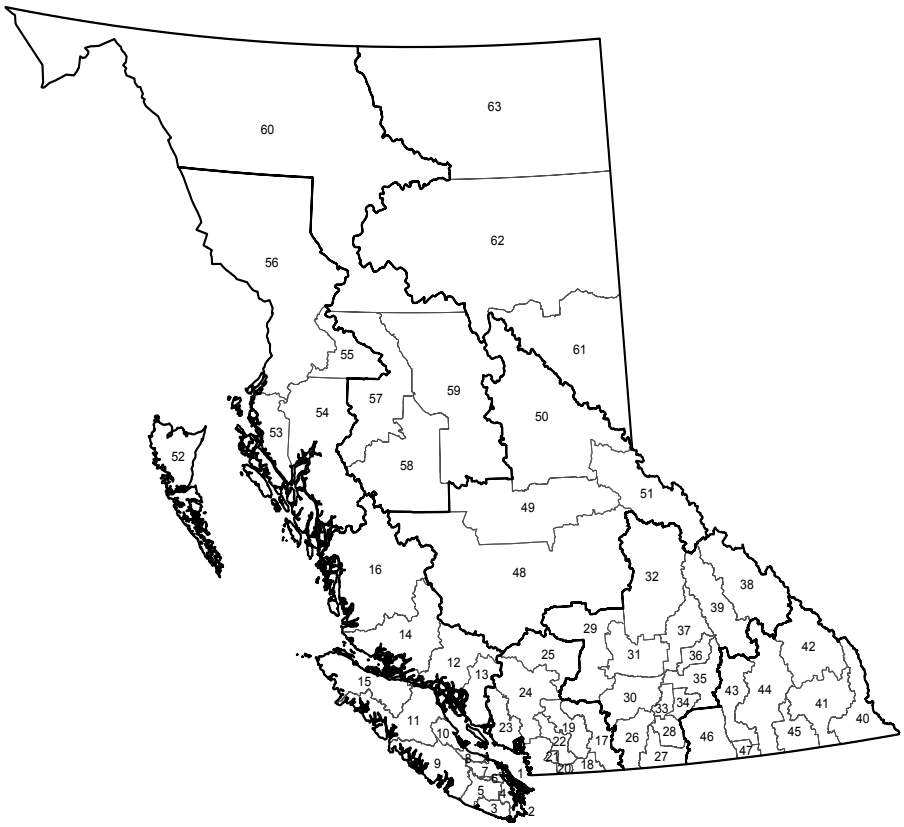
KOOTENAY
40 Fernie
41 Cranbrook-Kimberley
42 Invermere
43 Castlegar-Arrow Lakes
44 Nelson
45 Creston
46 Grand Forks-Greenwood
47 Trail-Rossland

CARIBOO
48 Williams Lake
49 Quesnel
50 Prince George
51 McBride-Valemount

NORTH COAST
52 Queen Charlotte Islands
53 Prince Rupert
54 Kitimat-Terrace
55 Hazelton
56 Stewart

NECHAKO
57 Smithers-Houston
58 Burns Lake
59 Vanderhoof
60 Stikine

NORTHEAST
61 Dawson Creek
62 Fort St. John
63 Fort Nelson



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The British Columbia Input–Output Model

What are input-output models?

Input-output models are based on statistical information about the flow of goods and services among various industries. This information provides a comprehensive and detailed representation of the economy for a given year.

An input-output model consists of three components:

1. A table showing the cost of inputs–goods and services, labour and capital–consumed by each industry in the production process. This is called the *input*, or use, matrix.
2. A table showing which goods and services are produced by each industry. This is called the *output*, or make, matrix.
3. A table showing which goods and services are available for consumption by final users. This is called the *final demand* matrix. The final demand matrix includes goods and services that are locally produced, as well as those that are imported from other regions.

These data, together with supplementary information (e.g., tax rates by commodity) are combined into a single model of the economy which can be used to determine how much additional production is generated either by a change in the demand for one or more commodities (goods or services), or by a change in the output of an industry.

How are input-output models used?

Input-output models are used to assess the total economic impact associated with a change in industry output or a change in the demand for one or more commodities. These models use known information about inter-industry relationships to trace through all of the changes in the output of supplier industries that are required to support an initial increase in an industry's output, or an increase in commodity expenditures. This process is commonly referred to as shocking the model.

If a change in demand is met by increasing or decreasing imports from other jurisdictions, there is no net effect on domestic production. All of the benefits or costs associated with employment generation or loss, and other economic effects, will occur outside the region. Therefore, it is important to identify whether or not a change in the demand for a good or service is met inside or outside a region.

The British Columbia Input-Output Model

The British Columbia Input-Output model (BCIOM) can be viewed as a snapshot of the BC economy. It is derived from Interprovincial Input-Output tables developed by Statistics Canada and includes details on 727 commodities, 300 industries and 170 "final demand" categories, plus a set of computer algorithms to do the calculations required for the solution of the model. It can be used to predict how an increase or a decrease in demand for the products of one industry will have an impact

on other industries and therefore on the entire economy. At present, the model reflects the structure of the economy in 2006.

Both indirect (i.e., the economic impact on industries supplying goods and services used in production) and induced (i.e., the economic impact associated with additional spending by workers) effects are estimated in the model, which also generates estimates of tax revenues associated with a change in the demand for one or more commodities, or a change in the output of an industry. These tax revenue estimates include personal and corporate income taxes, as well as taxes on commodities.

At present, estimates of the value of goods and services imported from other provinces and countries are only calculated for direct expenditures.

Although the structure of the model is based on 2006 data, tax revenue and employment estimates generated by the model are based on more up-to-date information.

Tax revenue estimates reflect the current (as of August 2010) tax structure and existing tax rates. Provincial government revenues include the provincial portion of the Harmonized Sales Tax.

Employment estimates generated by the model are calculated using information on average earnings in 2009.

Limitations and caveats associated with input-output analysis

Input-output analysis is based on various assumptions about the economy and the inter-relationships between industries. The major assumptions are listed below.

Input-output models are linear. *They assume that a given change in the demand for a commodity or for the outputs of a given industry will translate into a proportional change in production*.

Input-output models do not take into account the amount of time required for changes to happen. *Economic adjustments resulting from a change in demand are assumed to happen immediately*.

It is assumed that there are no capacity constraints and that an increase in the demand for labour will result in an increase in employment (rather than simply re-deploying workers).

It is assumed that consumers spend an average of 80% of their personal income on goods and services. The remaining 20% of personal income is consumed by taxes, or goes into savings. (This assumption can be changed if there is evidence to suggest doing so in particular applications.).

The BCIOM is derived from a "snapshot" of the structure of the BC economy in 2006. *It is assumed that relationships between industries are relatively stable over time*, so that the 2006 structure of the economy can be used to estimate the economic impact associated with a particular project.

At present, the BCIOM does not distinguish between regional effects. It will not, for example, differentiate between the economic impact of a plant located in one region of the province and a similar plant elsewhere in BC.

Access to the Model

The BCIOM has been developed and is maintained by BC Stats in the Ministry of Citizens' Services. BC Stats will run the model for clients who wish to assess the economic impact of particular projects. Charges associated with using the model include two components:

- $700 for the first model run, and $300/run if additional runs (based on the same input data) are required;

- $760/day for consultation time, which includes input data development and preparation of a report summarizing the results of the analysis.

A typical model simulation usually costs $1,500 (plus applicable taxes). Higher charges would apply in more complex situations.

For more information about the model, or to use the BCIOM contact:

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