

Northern Shelf Bioregion MPA – Economic Impacts

Prepared for:

BC Ministry of Agriculture

Prepared by:

GSGislason & Associates Ltd.
Vancouver Canada

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Preface

This report was prepared for the BC Ministry of Agriculture one of the partners in the Northern Shelf Bioregion (NSB) planning process.

The purpose of the report is to assess how a Marine Protected Area designation for the NSB will affect the seafood industry and the economy. Twenty individual segments of the seafood industry are analyzed. And separate impacts on seafood harvesters, processors and the distribution sector are presented.

The contractor has benefited greatly from discussions with and information provided by industry, Canada Department of Fisheries & Oceans (DFO), and the Province of British Columbia.

The contractor worked closely with the four-person Marine Planning Team or MPT – Bruce Turris, Grant Dovey, Brian Mose and Mike Atkins – who lead fish harvester organizations.

Notwithstanding this cooperation and assistance, the contractor has final responsibility for the analysis and conclusions of the study.

Summary

- this study estimates the revenue, income and employment impacts from the proposed Northern Shelf Bioregion (NSB) Marine Protected Area in North/Central BC waters. Two scenarios of closures are analyzed (see Exhibit A attached):
 - a draft proposal by the Marine Protected Area Technical Team (MPATT), and
 - an alternative proposal or scenario developed by industry through the Marine Planning Team (MPT)
- the MPT held over 30 meetings from September through January in coastal communities such as Massett, Prince Rupert, Bella Bella, Campbell River and Nanaimo to solicit industry advice
- the contractor developed simple financial statements & employment profiles for 20 different seafood sectors to analyze the socio-economic impacts of the NSB scenario
- Exhibit B following outlines the reduced revenues under the two scenarios:
 - a significant \$83 million lower processed value under the MPATT proposal (which escalates to \$91 million when one include trade margins on locally sold product)
 - a much lower processed value loss of \$19 million under the MPT proposal (which escalates to \$21 million when one includes trade margins on locally sold product)
- over half the lost revenue base comes from the shellfish sector particularly the dive component of geoduck, sea cucumber and red & green urchins
- about half of the reduced revenue base represents a loss in net returns or Earnings Before Interest Taxes Depreciation & Amortization (EBITDA)
- losses would not only occur to seafood businesses but also to the provincial economy and to communities and First Nations
- for example, over 500 full-time equivalent direct industry, indirect supplier & induced retail jobs would be lost under the MPATT proposal
- this study demonstrates the value of socio-economic impact analysis on marine planning. The study also demonstrates the wisdom of having the fishing industry take an active role in providing input to policy measures that affect their livelihood
- this work should be considered a work-in-progress as undoubtedly the NSB concept will evolve. Moreover, the data supporting the financial & economic analysis could be refined perhaps with more formal surveys and targeted research

Exhibit A: Catch-at-Risk Share of Total Coastal Catch Under NSB – Our Analysis

		MPATT Scenario					MPT Scenario				
		Salmon/Herring			Groundfish		Salmon/Herring			Groundfish	
		GN	SN	TR	H&L	Trawl	GN	SN	TR	H&L	Trawl
Salmon	- Chinook	-	-	.16			0	0	.02		
	- Chum	.08	.08	-			.01	.01	0		
	- Coho	-	-	.06			0	0	.01		
	- Pink	.02	.10	-			0	.02	-		
	- Sockeye	.04	.20	.18			.01	.02	.02		
Herring	- Food & Bait			-				0			
	- Roe		-	.11			0	.02			
Groundfish	- Arrowtooth					.01					0
	- Dogfish				-	-				0	0
	- Hake					.01					.02
	- Halibut				.10					.04	
	- Lingcod				.09	.09				.02	.02
	- Pacific Cod				.02	.02				0	0
	- Pollock					.05					.01
	- Rockfish				.12	.08				.02	.02
	- Sablefish				.08	.08				.02	.02
	- Skate				.06	.06				.01	.01
	- Sole					.11					0
Shellfish	- Crab					.10					.02
	- Geoduck					.27					.05
	- Prawn					.12					.03
	- Sea Cucumbers					.30					.07
	- Sea Urchin: Red					.30					.10
	- Sea Urchin: Green					.30					.10
	- Shrimp					.10					.02
Tuna (CDN Zone)						.10					0

Legend: GN – gillnet H&L – hook & line (halibut, sablefish, rockfish & lingcod fleets)
 SN – seine Trawl – hake (midwater) & bottom trawl fleets
 TR – troll

Exhibit B: The NSB Scenarios – Aggregate Fleet Reduced Revenues & Earnings

A) Reduced Revenues

Fleet Groupings	Base Revenues			Reduced Revenues Under MPATT Scenario			Reduced Revenue Under MPT Scenario		
	Ex-Vessel	Processing Margin	Processed Value	Ex-Vessel	Processing Margin	Processed Value	Ex-Vessel	Processing Margin	Processed Value
	(1)	(2)	(3)=(1)+(2)	(4)	(5)	(6)=(4)+(5)	(7)	(8)	(9)=(7)+(8)
	• • • \$ millions • • •								
Salmon Fleets (3)	89.9	54.8	144.7	11.7	7.2	18.9	1.5	0.8	2.3
Herring Fleets (3)	16.2	19.4	35.6	0.2	0.3	0.5	-	0.1	0.1
Groundfish Fleets (6)	144.3	140.8	285.1	10.2	5.4	15.6	3.3	2.9	6.2
Shellfish Fleets (7)	192.9	66.6	259.5	33.5	12.5	46.0	7.3	3.0	10.3
Tuna Fleet (1)	<u>14.1</u>	<u>9.0</u>	<u>23.1</u>	<u>1.4</u>	<u>0.9</u>	<u>2.3</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL FLEETS (20)	457.4	290.6	748.0	57.0	26.3	83.3	12.1	6.8	18.9

B) Reduced Earnings

Fleet Groupings	Base Net Returns or EBITDA			Reduced EBITDA Under MPATT Scenario			Reduced EBITDA Under MPT Scenario		
	Ex-Vessel	Processing	All	Ex-Vessel	Processing	All	Ex-Vessel	Processing	All
	(1)	(2)	(3)=(1)+(2)	(4)	(5)	(6)=(4)+(5)	(7)	(8)	(9)=(7)+(8)
	• • • \$ millions • • •								
Salmon Fleets (3)	23.9	20.4	44.3	5.1	3.0	8.1	0.7	0.3	1.0
Herring Fleets (3)	4.3	3.3	7.6	-	0.1	0.1	-	-	-
Groundfish Fleets (6)	46.2	38.6	84.8	5.3	2.0	7.3	1.9	0.9	2.8
Shellfish Fleets (7)	74.3	30.2	104.5	18.5	5.2	23.7	4.0	1.2	5.2
Tuna Fleet (1)	<u>3.1</u>	<u>2.6</u>	<u>5.7</u>	<u>0.7</u>	<u>0.3</u>	<u>1.0</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL FLEETS (20)	151.8	95.1	246.9	29.6	10.6	40.2	6.6	2.4	9.0

Source: Appendices C through G

Acronyms

DFO	Canada Department of Fisheries and Oceans
DMP	Dockside Monitoring Program
EBITDA	Earnings Before Interest, Taxes, Depreciation & Amortization
EI	Employment Insurance
EM	Electronic Monitoring
F&B	Food & Bait (Herring)
FN	First Nation
FTE	Full Time Equivalent
GDP	Gross Domestic Product
H&L	Hook & Line
IFMP	Integrated Fisheries Management Plan
IUCN	International Union for Conservation of Nature and Natural Resources
kg	kilogram (2.2046 lbs)
LL	Longline
MPA	Marine Protected Area
MPATT	Marine Protected Area Technical Team
MPT	Marine Planning Team
MW	Midwater (Trawl)
NSB	Northern Shelf Bioregion
OECD	Organization for Economic Cooperation and Development
RIAS	Regulatory Impact Analysis Statement
SEIA	Socio-Economic Impact Analysis
TAC	Total Allowable Catch
WCB	WorkSafe BC

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1.0 Introduction

The Northern Shelf Bioregion (NSB) area is a proposed Marine Protected Area or MPA for central and Northern British Columbia coastal waters. The NSB footprint is extensive as it extends from Campbell River on the East side of mid Vancouver Island and Brooks Peninsula on the upper west side of Vancouver Island north to the US border – see map in Exhibit I.

There is a need to estimate the impacts to the seafood industry and the provincial economy from the NSB initiative as it could have significant impacts on fisheries access and catch.

1.1 Study Need and Focus

The study develops a baseline operating and economic profile of the seafood sector in British Columbia and then estimates how these parameters would change under a NSB scenario.

Two scenarios are analyzed:

- an initial scenario drafted by the Marine Protected Area Technical Team (MPATT)
- an alternative scenario drafted by the Marine Planning Team (MPT) consisting of four fishing industry associations leads

The impacts of the scenarios on 20 individual seafood subsectors are estimated. Separate impacts on harvesting, processing and distribution components of the seafood value chain are given.

Socio-economic impact analysis (SEIA) such as this has been identified as a “best practice” to enhance MPA performance (OECD 2017).

1.2 Information Sources

The research program included both primary (interview) and secondary (literature review) research:

- interviews with 49 fishing industry individuals owning or operating 68 fishing vessels that operate in 137 separate fisheries (we also interviewed 9 fish processors/buyers)
- review of several reports or publications and special data tabulations provided by Canada Department of Fisheries & Oceans

The interviews with the fishing industry covered all salmon, herring, groundfish, shellfish and tuna sectors of interest. The interviews addressed the cost structure of harvesting and processing, including wages & employment, as well as impacts of potential NSB closures on businesses.

1.3 The Crucial Role of the MPT & Industry Input

The contractor attended 8 days of industry meetings (four 2-day meetings) in Nanaimo from September through November that the MPT led. The endorsement by the MPT of the contractor’s mission at these and other industry meetings resulted in exceptional cooperation by industry in the contractor’s research.

This assignment could not have been a success without the MPT's support and assistance.

The MPT consulted widely with industry and First Nation groups.

MPT Meetings Through Mid January 2020*	
No. of Meetings	34
No. of Attendees	683

Locations: Richmond, Nanaimo, Massett, Queen Charlotte City, Prince Rupert, Bella Bella, Port Hardy, Alert Bay, Campbell River, Nanaimo and Richmond

The MPT also had 4 Webex meetings with environmental organizations (David Suzuki Foundation, Canada Parks and Wilderness Society, World Wildlife Fund and Nature United). The MPT has met directly with several First Nation organizations.

The MPT scenario in the analysis reflects the knowledge, input and recommendations of the fishing industry at these extensive meetings. Industry input resulted in the opening of locations to fishing under the MPT scenario that were closed under the Draft MPATT scenario – these locations were deemed crucial fishing locations e.g., Celestial Reef off Haida Gwaii for coho & Robson Bight in Johnstone Strait for sockeye.

In contrast, under the MPT scenario several locations that were open under the MPATT scenario were now closed to fishing.

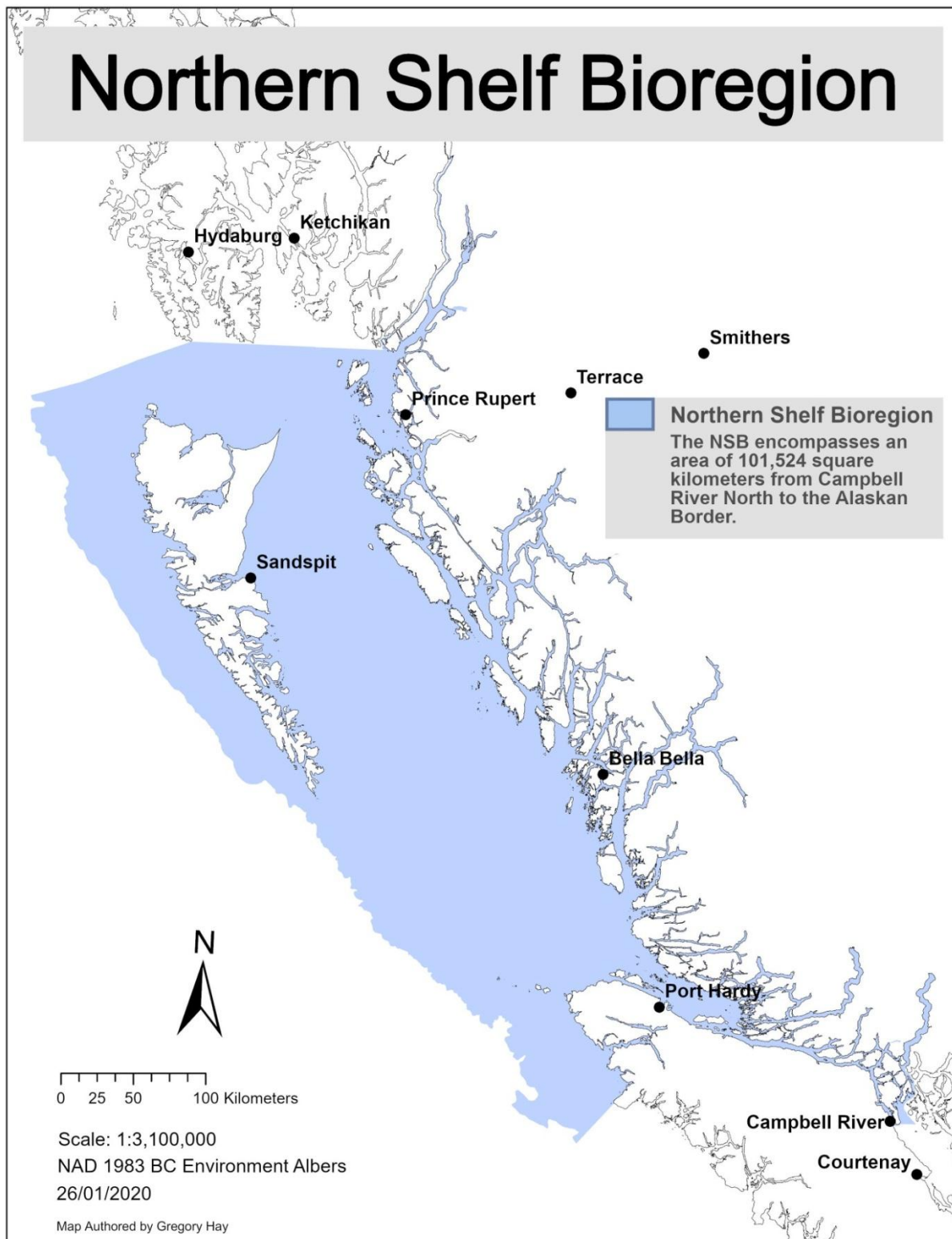
Finally, we note that the many MPT meetings in coastal communities and with First Nations helped communicate the nature of the proposed MPA and its potential ramifications on people, businesses and communities. The Northern Shelf Bioregion initiative was not well known or understood before the MPT undertook its extensive consultation exercise.

I.4 Report Outline

The next section outlines our approach and then our results are presented in the following section.

To make the report as accessible as possible, we have kept the main text relatively short and focused on reporting key findings. The results for individual fleet segments are provided in Appendices.

Exhibit 1: The Northern Shelf Bioregion



2.0 Approach and Methodology

The wild commercial fishery of British Columbia is a renewable resource harvesting, processing and food distribution industry that produces a variety of protein products that are distributed throughout the world. The industry is diverse in terms of the species harvested, harvesting gear employed, products and domestic and export markets served.

2.1 The Value Chain for BC Seafood

It is useful to analyze the commercial industry in terms of several activities – fishing, handling, processing, selling, wholesaling and retailing – which constitute a “value chain” between the aquatic environment and the final consumer of products. Each activity increases the value of the fish from the initial price paid to fishermen to the final retail price paid by consumers.

Fishing. The fish harvesting sector targets 40 or more species using a variety of gear on vessels of different sizes and scale of operation. Seine, gillnet, troll, longline, trawl, trap, dive and other gear can be used.

Commercial fishing vessels can participate in more than one type of fishery.

This study addresses the following 20 harvesting sectors or fleets.

Fishing Fleets				
Salmon	Herring	Groundfish	Shellfish	Tuna
<ul style="list-style-type: none">• seine• gillnet• troll	<ul style="list-style-type: none">• roe seine• roe gillnet• food seine	<ul style="list-style-type: none">• halibut longline• sablefish longline & trap• rockfish hook & line• lingcod hook & line• hake trawl• other trawl	<ul style="list-style-type: none">• crab trap• geoduck dive• prawn trap• sea cucumber dive• red sea urchin dive• green sea urchin dive• shrimp trawl	<ul style="list-style-type: none">• hook & line

Fish Handling, Processing and Sales. We consider fish handling, processing and sales as one aggregate. Fish handling involves tendering or packing fish to port, offloading and trucking or transport.

Fish processors convert or package raw fish into a variety of fresh, frozen, smoked, live and other products. Roe is an important product line for some species.

Plants sell finished product, sometimes through brokers, into the distribution chain.

Fish Distribution. The distribution function has both wholesaling and retailing components.

Fish processors manufacture food products and retailers sell them to end users or consumers. In between these functions are distributors or wholesalers that move the product from plant to market. Wholesaling activities can include transportation to and placement in cold storage, secondary

processing, repackaging and labeling, and marketing and transportation to retailers. The two main end use markets for fish are restaurants (food service) and retail.

Note also that it is important to express prices at each activity level on a comparable weight basis. For this study we express all prices in dollars per round (whole fish weight) kilogram.

2.2 The Analysis Framework

In socio-economic impact assessment one develops a base case scenario or assessment of economic and social activity/well-being in the absence of the program, regulations or policy, in this case the creation of an MPA, and then develops the alternative scenario with the initiative. The impacts then are the difference between the “with” and “without” scenarios i.e., impact analysis focuses on incremental effects.

MPATT vs MPT Scenario. As noted earlier there are two alternative or NSB scenarios – the Draft MPATT scenario and the proposed MPT scenario.

The implication of each scenario on catch opportunities by fleet were analyzed in two steps: 1) having DFO conduct an overlay analysis of proposed closures on the geographic distribution of recent catch, and 2) making necessary adjustments to this initial catch-at-risk first to reflect inadequacies in the underlying DFO data (e.g., some DFO catch data was only available at the subarea level), and second to reflect logistical considerations in fishing (e.g., the need for a buffer zone around the MPA footprint).

The process is described in Appendix A. The results are summarized in Exhibit 2.

Impact Indicators. The two typical business indicators used are gross revenues and net returns or EBITDA (Earnings Before Interest, Taxes, Depreciation & Amortization).

Indicators of direct impacts on the economy are:

- Gross Domestic Product or GDP (the combined return to capital and labour in the economy),
- Labour Income or Wages & Benefits, and
- Employment (expressed in Full Time Equivalents or FTEs).

We also provide an indication of Total Economic Impacts (Direct plus Indirect Supplier plus Induced Consumer Responding) using a simple multiplier.

For social indicators, we describe the important contribution of the fishery to employment in coastal communities and First Nations employment.

Financial Revenue & Costs – The Starting Point. Using data from existing reports and information plus structured interviews with industry, we developed simple Income Statements for harvesting and processing components of the seafood value chain for each of the 20 fishing fleets – see Income Statements in Appendices C through G.

Exhibit 2: Catch-at-Risk Share of Total Coastal Catch Under NSB – Our Analysis

		MPATT Scenario					MPT Scenario				
		Salmon/Herring			Groundfish		Salmon/Herring			Groundfish	
		GN	SN	TR	H&L	Trawl	GN	SN	TR	H&L	Trawl
Salmon	- Chinook	-	-	.16			0	0	.02		
	- Chum	.08	.08	-			.01	.01	0		
	- Coho	-	-	.06			0	0	.01		
	- Pink	.02	.10	-			0	.02	-		
	- Sockeye	.04	.20	.18			.01	.02	.02		
Herring	- Food & Bait			-				0			
	- Roe	-	.11				0	.02			
Groundfish	- Arrowtooth					.01					0
	- Dogfish				-	-				0	0
	- Hake					.01					.02
	- Halibut				.10					.04	
	- Lingcod				.09	.09				.02	.02
	- Pacific Cod				.02	.02				0	0
	- Pollock					.05					.01
	- Rockfish				.12	.08				.02	.02
	- Sablefish				.08	.08				.02	.02
	- Skate				.06	.06				.01	.01
	- Sole					.11					0
Shellfish	- Crab					.10					.02
	- Geoduck					.27					.05
	- Prawn					.12					.03
	- Sea Cucumbers					.30					.07
	- Sea Urchin: Red					.30					.10
	- Sea Urchin: Green					.30					.10
	- Shrimp					.10					.02
Tuna (CDN Zone)						.10					0

Legend: GN – gillnet H&L – hook & line (halibut, sablefish, rockfish & lingcod fleets)
 SN – seine Trawl – hake (midwater) & bottom trawl fleets
 TR – troll

Appendix B provides details on prices, ex-vessel & processed, active vessels and crew complements by fleet.

Exhibit 3 summarizes the financial results for 5 fleet aggregate – salmon, herring, groundfish, shellfish & tuna – for the year 2018. We label the results in Exhibit 3 as total BC commercial fishery results but the figures exclude a few smaller fisheries such as herring spawn-on-kelp, special use herring and euphausiid.

Note the following:

- Management Fee – each fishing operation, like any business, entails a management function. This is true even for owner-operator situations. Accordingly, we ascribed 10% of fleet revenues as a “management fee” to account for this critical business role.
- Share of Fixed Vessel Costs – many vessels operate in more than one fishery so one can not allocate the total fixed costs – Repairs and Maintenance, Insurance etc. – to any one fishery. We portioned a share of fixed costs ranging from 20% e.g., green sea urchin to 100% e.g., roe herring gillnet punts depending on the situation to the fishery of interest.
- Payroll Burden – the buyer of the fish from the harvester is deemed to be the employer of record and is liable for the employer’s portion of Employment Insurance (EI) and WorkSafe BC assessments – we used a payroll burden rate of 8.5% on crew wages
- Earnings Before Interest Taxes & Amortization (EBITDA) – is the gross return to capital, both tangible such as vessels and in-tangible such as licences & quota. It includes interest payments, depreciation and before tax-profit
- Handling, Processing , Sales – include packing, offloading, and trucking/transport which can be significant e.g., such handling costs for North Coast-caught geoduck transported to Greater Vancouver approach 10% of the processed sales price
- Employment – much of fishing and processing is seasonal so the number of jobs can be much greater than the number of Full Time Equivalents (FTE) positions. We converted the fleet management plus the handling/processing/sales functions into FTEs using a deemed annual wage per FTE. For fishing jobs, we estimated 20 weeks fishing as one FTE to account for the intensive nature of the activity (Note: handling/processing/sales wages & FTEs include the administrative or overhead component as well as the production component of employment)

The results in Exhibit 3 should be viewed as a reasonable representation of financial circumstances of the industry in 2018.

Detailed formal financial surveys of commercial fishing and processing operations were beyond the scope, timeline and budget for the assignment.

Exhibit 3: NSB Baseline Financial Scenarios – Total BC Commercial Fishery 2018

	Salmon	Herring ¹	Groundfish	Shellfish	Tuna	All
Activity						
Catch tonnes	14,787	19,022	141,121	12,720	2,715	190,365
No. Vessels ²	932	155	325	576	120	2,108
Total Crew Jobs ²	2,460	555	1,203	1,811	360	6,389
Fishing \$000						
Ex-Vessel Revenues	89,852	16,175	144,233	192,938	14,118	457,316
Less: Management Fee	8,985	1,617	14,423	19,294	1,412	45,731
Fuel	8,431	2,154	10,462	9,960	1,800	32,807
Crew Wages	29,706	5,280	41,273	59,869	4,324	140,452
Other Variable	5,881	1,635	10,797	13,637	612	32,562
Share of Fixed ³	12,927	1,210	21,005	15,862	2,880	53,884
Net Return or EBITDA	23,922	4,278	46,272	74,316	3,091	151,879
Handling, Processing, Sales \$000						
Sales Revenue	144,599	35,574	285,008	259,558	23,078	747,817
Less: Ex-Vessel Payment	89,852	16,175	144,233	192,938	14,118	457,316
Payroll Burden ⁴	2,525	449	3,508	5,089	368	11,939
Plant/Other Labour	16,087	6,555	56,975	17,913	1,901	99,431
Other	15,704	9,062	41,734	13,435	4,073	84,008
Net Return or EBITDA	20,431	3,334	38,557	30,183	2,619	95,124
Employment FTEs⁵						
Fishing Fleet - Management	120	22	192	257	19	610
- Crew	1,084	86	575	1,068	108	2,921
Handling, Processing, Sales	<u>322</u>	<u>131</u>	<u>1,140</u>	<u>358</u>	<u>38</u>	<u>1,989</u>
Subtotal	1,526	239	1,907	1,683	165	5,520

¹ Herring includes roe herring seine, roe herring gillnet and herring food & bait

² The sum of vessels & crew over the 20 fleets e.g., vessels that participate in two fisheries, for example, are counted twice

³ The sum of fixed cost allocations over the 20 fleets – for each fleet a portion of fixed costs are allocated to the fishery of interest to account for vessels participating in multiple fisheries

⁴ EI & WCB assessments on vessel crew wages

⁵ Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Source: The first Exhibit in Appendices C through G

3.0 NSB – Financial & Economic Impacts

The Northern Shelf Bioregion initiative will have ramifications for the fishing industry and the economy of British Columbia.

3.1 Losses to Fishing Business

Revenue Losses. The fishing industry will see production and associated revenue losses from the loss of fishing grounds or space. Individuals fish where they do not only because these locations are highly production but also because, in some cases such as groundfish, they can fish and avoid bycatch. That is, the NSB closures will confer increased unit costs as well as increased bycatch concerns on industry.

The loss of production translates into lost revenues throughout the value chain. Lost fishing ex-vessel and processing revenues by the 20 fleets for each of the MPATT and MPT scenarios are displayed in Exhibit 4.

In total overall 20 sectors, revenue losses to fishing enterprises and processing businesses totaled:

- \$83.3 million – \$57.0 million lost vessel revenues and of \$26.3 million lost processing margins – under the MPATT scenario
- \$18.9 million – \$12.1 million lost vessel revenues and \$6.8 million lost processing margins – under the MPT scenario

Under the MPT scenario that industry developed revenues losses were decreased by 77%.

The majority of revenue losses were felt in the shellfish sector, more particularly the dive sector comprising geoduck, sea cucumber and urchin (red and green) fisheries. The salmon sector also suffered significant losses.

The loss estimates may be underestimates as the industry noted that many of the grounds lost were the better quality grounds, such as prime geoduck grounds, the product from which they received higher prices.

Earnings Losses. The loss in revenues as well as increased unit fishing costs from moving off productive fishing rounds result in reduced net returns or EBITDA (Exhibit 5).

The total earnings lost over all 20 fleet segments amount to:

- \$40.2 million under the MPATT scenario (\$29.6 million fishing and \$10.6 processing)
- \$9.0 million under the MPT scenario (\$6.6 million fishing and \$2.4 million processing)

Again the industry-driven MPT scenario results in greatly reduced losses.

Asset Values. The trading or market price for fishing licences and quota should reflect the discounted value future earnings.

Exhibit 4: The NSB Scenarios – Reduced Industry Revenues

		Base Revenue			Reduced Revenues Under MPATT Scenario			Reduced Revenues Under MPT Scenario		
		Ex-Vessel	Processing Margin	Processed Value	Ex-Vessel	Processing Margin	Processed Value	Ex-Vessel	Processing Margin	Processed Value
		(1)	(2)	(3)=(1)+(2)	(4)	(5)	(6)=(4)+(5)	(7)	(8)	(9)=(7)+(8)
Fleet										
• • • \$ millions • • •										
Salmon	- Seine	41.3	30.1	71.4	7.6	5.3	12.9	0.8	0.5	1.3
	- Gillnet	29.5	17.5	47.0	1.4	0.9	2.3	0.3	0.2	0.5
	- Troll	<u>19.1</u>	<u>7.2</u>	<u>26.3</u>	<u>2.7</u>	<u>1.0</u>	<u>3.7</u>	<u>0.4</u>	<u>0.1</u>	<u>0.5</u>
	Subtotal	89.9	54.8	144.7	11.7	7.2	18.9	1.5	0.8	2.3
Herring	- Roe Seine	1.7	2.8	4.5	0.2	0.3	0.5	-	0.1	0.1
	- Roe Gillnet	12.6	13.6	26.2	-	-	-	-	-	-
	- F&B Seine	<u>1.9</u>	<u>3.0</u>	<u>4.9</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
	Subtotal	16.2	19.4	35.6	0.2	0.3	0.5	-	0.1	0.1
Groundfish	- Halibut LL	44.7	12.9	57.6	4.4	1.3	5.7	1.7	0.5	2.2
	- Sablefish Trap/LL	25.5	6.5	32.0	2.1	0.5	2.6	0.5	0.2	0.7
	- Rockfish H&L	6.2	1.4	7.6	0.7	0.2	0.9	0.1	0.1	0.2
	- Lingcod H&L	4.8	1.9	6.7	0.4	0.2	0.6	0.1	-	0.1
	- Hake MW Trawl	27.6	79.8	107.4	0.3	0.8	1.1	0.5	1.6	2.1
	- Other Trawl	<u>35.5</u>	<u>38.3</u>	<u>73.8</u>	<u>2.3</u>	<u>2.4</u>	<u>4.7</u>	<u>0.4</u>	<u>0.5</u>	<u>0.9</u>
	Subtotal	144.3	140.8	285.1	10.2	5.4	15.6	3.3	2.9	6.2
Shellfish	- Crab Trap	66.6	20.5	87.1	6.7	2.0	8.7	1.3	0.4	1.7
	- Geoduck Dive	51.7	12.7	64.4	14.0	3.4	17.4	2.6	0.6	3.2
	- Prawn Trap	50.5	15.0	65.5	6.1	1.8	7.9	1.5	0.5	2.0
	- Sea Cucumbers Dive	13.0	5.9	18.9	3.9	1.8	5.7	0.9	0.4	1.3
	- Sea Urchin: Red Dive	7.1	9.9	17.0	2.1	3.0	5.1	0.7	1.0	1.7
	- Sea Urchin: Green Dive	1.5	1.2	2.7	0.4	0.4	0.8	0.2	0.1	0.3
	- Shrimp Trawl	<u>2.5</u>	<u>1.4</u>	<u>3.9</u>	<u>0.3</u>	<u>0.1</u>	<u>0.4</u>	<u>0.1</u>	<u>-</u>	<u>0.1</u>
	Subtotal	192.9	66.6	259.5	33.5	12.5	46.0	7.3	3.0	10.3
Tuna	- Tuna H&L	14.1	9.0	23.1	1.4	0.9	2.3	-	-	-
TOTAL		457.4	290.6	748.0	57.0	26.3	83.3	12.1	6.8	18.9

Source: Appendices C through G

Based on a conservative investment multiplier of 8 this annual lost fleet earnings of \$29.6 million under the MPATT scenario translates into a reduction in the value of fishing licences/quota of \$237 million.

The reduced earnings from the NSB affect both fleet Income Statements and Balance Sheet positions – both losses are significant.

3.2 Loss to the Economy

The reduced output from the fishery also impacts the economy. We estimate that the Province loses \$91 million in sales from the MPATT scenario of closures but a much lower \$21 million in sales from the MPT scenario of closures (these figures include wholesale & retail trade margins on fish sold in BC as well as fishing & processing components).

There are attendant impacts on provincial Gross Domestic Product or GDP, Labour Income, and Employment.

	Direct Impacts*				Total Impacts*			
	Output • • • \$ millions • • •	GDP • • • \$ millions • • •	Labour Income • • • \$ millions • • •	FTEs	Output • • • \$ millions • • •	GDP • • • \$ millions • • •	Labour Income • • • \$ millions • • •	FTEs
Impact – MPATT Scenario								
Base	823	552	290	6,365	1,150	775	405	8,910
Less: MPATT	732	478	258	5,975	1,025	670	360	8,365
Reduced Activity	91	74	32	390	125	105	45	545
Impact – MPT Scenario								
Base	823	552	290	6,365	1,150	775	405	8,910
Less: MPT	802	534	282	6,280	1,120	750	395	8,790
Reduced Activity	21	18	8	85	30	25	10	120

* includes trade margins on BC seafood production consumed in-province (assumed that 10% of seafood production is consumed in BC)

Note: we use a simple multiplier of 1.40 to account for indirect supplier and induced consumer responding impacts for Total Impacts.

Close to 500 full-time equivalent jobs, including multiplier effects, would be lost under the draft MPATT proposal.

3.3 Community Impacts

Approximately 70% of BC seafood is processed in the Lower Mainland region of Greater Vancouver.

Exhibit 5: The NSB Scenarios – Aggregate Fleet Reduced Revenues & Earnings

A) Reduced Revenues

Fleet Groupings	Base Revenues			Reduced Revenues Under MPATT Scenario			Reduced Revenue Under MPT Scenario		
	Ex-Vessel	Processing Margin	Processed Value	Ex-Vessel	Processing Margin	Processed Value	Ex-Vessel	Processing Margin	Processed Value
	(1)	(2)	(3)=(1)+(2)	(4)	(5)	(6)=(4)+(5)	(7)	(8)	(9)=(7)+(8)
	• • • \$ millions • • •								
Salmon Fleets (3)	89.9	54.8	144.7	11.7	7.2	18.9	1.5	0.8	2.3
Herring Fleets (3)	16.2	19.4	35.6	0.2	0.3	0.5	-	0.1	0.1
Groundfish Fleets (6)	144.3	140.8	285.1	10.2	5.4	15.6	3.3	2.9	6.2
Shellfish Fleets (7)	192.9	66.6	259.5	33.5	12.5	46.0	7.3	3.0	10.3
Tuna Fleet (1)	<u>14.1</u>	<u>9.0</u>	<u>23.1</u>	<u>1.4</u>	<u>0.9</u>	<u>2.3</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL FLEETS (20)	457.4	290.6	748.0	57.0	26.3	83.3	12.1	6.8	18.9

B) Reduced Earnings

Fleet Groupings	Base Net Returns or EBITDA			Reduced EBITDA Under MPATT Scenario			Reduced EBITDA Under MPT Scenario		
	Ex-Vessel	Processing	All	Ex-Vessel	Processing	All	Ex-Vessel	Processing	All
	(1)	(2)	(3)=(1)+(2)	(4)	(5)	(6)=(4)+(5)	(7)	(8)	(9)=(7)+(8)
	• • • \$ millions • • •								
Salmon Fleets (3)	23.9	20.4	44.3	5.1	3.0	8.1	0.7	0.3	1.0
Herring Fleets (3)	4.3	3.3	7.6	-	0.1	0.1	-	-	-
Groundfish Fleets (6)	46.2	38.6	84.8	5.3	2.0	7.3	1.9	0.9	2.8
Shellfish Fleets (7)	74.3	30.2	104.5	18.5	5.2	23.7	4.0	1.2	5.2
Tuna Fleet (1)	<u>3.1</u>	<u>2.6</u>	<u>5.7</u>	<u>0.7</u>	<u>0.3</u>	<u>1.0</u>	<u>-</u>	<u>-</u>	<u>-</u>
TOTAL FLEETS (20)	151.8	95.1	246.9	29.6	10.6	40.2	6.6	2.4	9.0

Source: Appendices C through G

However, much of the packing, unloading of fish and truck transport of seafood occurs in much smaller coastal communities of Prince Rupert, Port Hardy, Ucluelet and others. These communities also provide fuel, food and other services to the fleet. For example, Shearwater on the Central Coast is an important supply station for shellfish dive operators during the late fall and winter periods.

The commercial fishery serves as an important customer base to many community businesses. The continued existence of certain infrastructure such as fuel docks is tied to the economic health of the commercial fishery.

Moreover, the mid Vancouver Island region from Nanaimo north to Campbell River provides a major share of the fishing workforce far beyond its contribution to provincial population from coastal centres.

Simply put, the fishery is an important component of the economic fabric of many coastal communities. Reductions in fishing activity, for whatever reason, can have disproportionate impacts on these local economies.

3.4 First Nations Impacts

We estimate that First Nation (FN) comprise over 30% of the commercial fishing workforce and over 40% of the fish handling, processing and sales employment base. These FN shares would be higher in salmon and herring fisheries and much higher in processing plants in Prince Rupert, Pt. Hardy, Quadra Island, Ucluelet and other non-Greater Vancouver locations.

The federal government, such as through the Pacific Integrated Commercial Fisheries Initiative (PICFI), has created targeted programs to First Nations to increase participation in commercial fishing businesses.

Reduced access to fish and fisheries can have negative impacts on First Nation participation and earnings from the commercial fishery and on the efficacy of First Nation economic development initiatives.

4.0 Conclusions

The Northern Shelf Bioregion Marine Protected Area could have profound effects on the commercial fishery, and the people, businesses and communities dependent on continued access to fish resources. This is especially true if the initial MPATT proposal, admittedly a draft, proceeds. Close to \$100 million of industry revenues potentially is at risk.

The Marine Planning Team (MPT) expended enormous time and energy to consult with industry, First Nations, environmental organizations and others on the NSB design network of locations and proposed restrictions.

This effort bore fruit in that industry developed an alternative suite of NSB restrictions that substantially reduces the harm to the fishing industry but also hopefully still meets the goals of the marine planning exercise. This active involvement of industry in NSB planning and design, in our opinion, provides a blueprint for future MPA design processes.

We also see the socio-economic work in the report as providing benefits beyond the NSB planning exercise. The information can be used in a variety of policy forums. And work could continue, for example in assessing the revenue, cost and employment base of value chain participants, to enhance planning for future initiatives.

Finally, we view this report as one step in the NSB planning initiative. Hopefully, observers see value in the socio-economic impact work and consider such analysis as an integral component of the marine planning toolkit for the future.

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Appendix A

Commercial Catch-at-Risk Under the NSB

Appendix A: Assessing Lost Catch Under the NSB

The NSB will result in restricted or closed areas to commercial fishing. It is important in undertaking the economic impact analysis to identify the amount of catch-at-risk from the initiative i.e., the amount of historical catch in areas which now cannot be accessed under the NSB scenarios.

As discussed in the text, our approach involved assessing two NSB scenarios of restricting:

- the initial MPATT scenario of fishing areas
- the industry MPT scenarios

The Draft MPATT scenario was first released to stakeholders in February 2019. The MPT proposal was developed through extensive interactive workshops with industry in the fall of 2019. The Draft MPATT scenario is also under review by the governance partners (First Nations, Province of BC & Canada).

The MPT used the web-based tool SeaSketch on a spatial dataset provided by DFO for external use – the DFO data was provided on a 1 km x 1 km grid of planning units – in developing their scenario.

Each scenario represents a suite of sites or locations with restrictions on commercial fishing specified by type of fishery. DFO did overlay analysis on each scenario, within the confines or constraints of the geographic resolution of logbook data, to determine the level of historical catch in particular areas. We call catch-at-risk the catch caught in those areas under the draft scenarios.

The catch-at-risk under each scenario then is translated into lost value, increased production costs and impacts on the economy. These indicators then are compared under both the MPATT and MPT scenarios to the base pre-NSB situation (using 2018 as the base year for analysis).

A.1 DFO Logbook Results re Catch-at-Risk

The resolution of spatial data representing fishing events varies by fishery based on factors such as gear, fisheries operations and logbook requirements. That is, the level of geographic detail on completed logbooks provided to DFO can vary by fishery depending on its nature.

The State of Logbook Data. DFO has provided the following guidance for interpretation of logbooks by fishery class:

- salmon (seine, gillnet, troll) – logbooks only have catch records at the sub-area level; DFO assumes that catch is evenly distributed within the subarea in their analysis
- herring (roe seine, roe gillnet, food & bait) – no logbook records are available; there are broad catch locations in the Herring Integrated Fisheries Management Plan (IFMP) which are provided by the catch monitoring service provider
- groundfish (halibut, sablefish, rockfish, lingcod, groundfish trawl, hake midwater trawl) – have mandatory Dockside Monitoring at point of landing and mandatory at-sea monitoring program using human observer or a camera-based Electronic Monitoring (EM) program; for fixed gear such as longlines, the catch event is recorded as a single geographic point event; for mobile gear such as trawl, the catch is evenly distributed along the geographic line from beginning to end of fishing event

- shellfish dive (geoduck, sea cucumber, red sea urchin, green sea urchin) – logbook points are the location of catch
- crab by trap – logbook points are associated with harvest entries but harvesters don't necessarily enter new coordinates except every few entries
- prawn by trap – logbook longitude-latitude single points along trap lines which are approximately 1 km long
- shrimp trawl – single point representing a tow
- tuna hook & line – logbook entries represent start & end point of fishing days and not necessarily the area of active fishing

In some cases, where logbook data was missing or deficient, DFO allocated the catch uniformly within the recorded subarea.

The DFO Overlay Analysis. DFO conducted an overlay analysis of both the MPATT and MPT scenarios to allocate the average catch over the four year 2015 to 2018 period into four categories or broad regions:

- R – within a proposed site and having restrictions on the fishery of interest
- NR – within a proposed site but having no restrictions on the fishery of interest
- Inside – inside the NSB footprint but not within any proposed site having restrictions
- Outside – outside the NSB footprint

To protect confidentiality, DFO imposed a “rule of 5” on the broad regional analysis above i.e., at least 5 vessels had to have fished the region over the four year period for the catch to be included in the analysis.

The results of the DFO efforts are presented in Exhibit A.1 following.

A.2 Adjustments to DFO Results re Catch-at-Risk

The DFO results of Exhibit A.1 represent a minimum or floor as to the expected catch-at-risk for two main reasons:

- problems with the resolution of logbook data e.g., NSB sites generally are close to shore as are fishing locations of certain fisheries, such as salmon seine & gillnet, so the assumption of a uniform catch over a subarea is erroneous and results in underestimates of catch-at-risk
- logistical considerations re commercial fishing e.g., maintaining a safe distance away from any MPA boundary, the effect of non-access to fishing grounds located between nearly adjacent NSB sites

The data logbook problems vary by fishery e.g., very serious for salmon vs minimal for geoduck. And the logistical considerations also vary by fishery e.g., dive fisheries can operate very close to a MPA boundary whereas trawl fisheries can not.

Exhibit A.1: Catch-at-Risk Share of Total Coastal Catch Under NSB – DFO Analysis

		2018 Coastwide Catch*	Catch Share in NSB Restricted Zone**	
		tonnes	MPATT Proposal	MPT Proposal
Salmon	- Chinook	661	NA	NA
	- Chum	3,740	NA	NA
	- Coho	537	NA	NA
	- Pink	618	NA	NA
	- Sockeye	9,232	NA	NA
Herring	- Food & Bait	5,448	NA	NA
	- Roe	13,576	NA	NA
Groundfish	- Arrowtooth	9,458	.009	-
	- Dogfish	207	-	-
	- Hake	102,241	-	-
	- Halibut	3,330	.092	.031
	- Lingcod	1,111	.079	.017
	- Pacific Cod	280	.013	.001
	- Pollock	3,357	.051	.004
	- Rockfish	15,817	.076	.006
	- Sablefish	2,330	.071	.017
	- Skate	305	.053	.005
	- Sole	3,450	.103	-
Shellfish	- Crab	4,567	.054	.008
	- Geoduck	1,383	.265	.048
	- Prawn	1,701	.073	.011
	- Sea Cucumbers	1,689	.196	.043
	- Sea Urchin: Red	2,677	.268	.091
	- Sea Urchin: Green	232	NA	NA
	- Shrimp	381	NA	NA
Tuna (CDN Zone)		1,366	NA***	.001

* round (whole fish) weight

** based on 2015 - 2018 data from logbooks provided by industry to DFO

*** Not available (NA) but likely at most .15 based on DFO analysis for a larger region

Note: we do not present DFO data for species for which half or more of catch data was only available at the sub-area level.

Exhibit A.2 following gives our estimates of realistic catch-at-risk by fishery using the Exhibit A information from DFO as a base or reference. Exhibit A.2 is based on the industry knowledge of the contractor as well as the extensive consultations and discussions with the MPT and the individuals interviewed over the course of the study.

DFO provided the salmon harvests at the subarea level and the amount of shellfish harvest that was specified by sub-area, instead of coordinates, to assist in these adjustments.

The MPT proposal includes a shelf region closure that offsets the opening of closed inshore zones. The additional offshore closure is where hake often congregate and increases the risk of lost access to the hake fishery. This was deemed advisable to protect closer-to-shore opportunities and illustrates the trade-offs that had to be made in constructing the MPT proposal.

Some DFO Data Only Available at Subarea Level. As noted in Exhibit A.1, all salmon and herring catch are only available at the sub-area or broad region basis. In addition, 1-2% of the tuna catch is only available at the sub-area basis. The shellfish catch only available at the sub-area basis varies across species:

Share of 2015-2018 Shellfish Coastwide Catch Only Available at Sub-area Level			
Crab	9.8%	Sea Urchin - Red	11.5%
Geoduck	0.4%	Sea Urchin - Green	66.7%
Prawn	2.5%	Shrimp	1.4%
Sea Cucumbers	34.7%		

Groundfish catch data, in contrast, all is categorized on a point-line basis.

Special Investigations for Salmon & Herring. The MPT devoted a substantial portion of one of their January 2020 industry workshops to discussing the share of salmon catch, in some key subareas, that would be potentially lost due to closures under the MPATT and MPT scenarios (e.g., Celestial Reef for coho and Robson Bight for sockeye). This was used with other information to arrive at the catch-at-risk shares for salmon in Exhibit A.2.

The January workshop also addressed the shares of roe herring seine and gillnet catch and herring food catch, by location, that would potentially be lost. After the workshop we interviewed herring processors/buyers and a herring fisherman as to the exact location of herring operations. This together with input received at the workshop resulted in the catch-at-risk shares for herring in Exhibit A.2.

For example, industry input indicated that under the MPATT scenario all the seine roe fishery in Spiller Channel and Kitkatla was at risk but none of the gillnet roe fishery at Big Bay was at risk. The interview with the North Coast food herring fisherman indicated that he fished food herring at Kinahan Islands and Lucy Islands off Prince Rupert – neither grounds would be closed under the scenarios.

As a result we projected that the NSB initiative will have an impact on the seine herring fishery but no impact on the gillnet roe herring fishery or the herring food fishery (see Exhibit A.2).

Exhibit A.2: Catch-at-Risk Share of Total Coastal Catch Under NSB – Our Analysis

		MPATT Scenario					MPT Scenario				
		Salmon/Herring			Groundfish		Salmon/Herring			Groundfish	
		GN	SN	TR	H&L	Trawl	GN	SN	TR	H&L	Trawl
Salmon	- Chinook	-	-	.16			0	0	.02		
	- Chum	.08	.08	-			.01	.01	0		
	- Coho	-	-	.06			0	0	.01		
	- Pink	.02	.10	-			0	.02	-		
	- Sockeye	.04	.20	.18			.01	.02	.02		
Herring	- Food & Bait			-				0			
	- Roe		-	.11			0	.02			
Groundfish	- Arrowtooth					.01					0
	- Dogfish				-	-				0	0
	- Hake					.01					.02
	- Halibut				.10					.04	
	- Lingcod				.09	.09				.02	.02
	- Pacific Cod				.02	.02				0	0
	- Pollock					.05					.01
	- Rockfish				.12	.08				.02	.02
	- Sablefish				.08	.08				.02	.02
	- Skate				.06	.06				.01	.01
	- Sole					.11					0
Shellfish	- Crab					.10					.02
	- Geoduck					.27					.05
	- Prawn					.12					.03
	- Sea Cucumbers					.30					.07
	- Sea Urchin: Red					.30					.10
	- Sea Urchin: Green					.30					.10
	- Shrimp					.10					.02
Tuna (CDN Zone)						.10					0

Legend: GN – gillnet H&L – hook & line (halibut, sablefish, rockfish & lingcod fleets)
 SN – seine Trawl – hake (midwater) & bottom trawl fleets
 TR – troll

A.3 The Ability of the Fishing Fleet to Adjust to Closures

There is limited opportunity for the fishing industry in general to adapt to the closures embodied in Exhibit A.2.

Salmon Fleets. Salmon fleets have very limited ability to catch the fish elsewhere because: 1) much of the fish is caught in terminal areas, 2) the mixed stock nature of the fishery with attendant bycatch issues inhibit moving the timing & location of specific fisheries, and 3) the complexities of salmon management including meeting allocation targets and Pacific Salmon Treaty obligations inhibit flexibility in salmon management measures.

Herring Fleets. The roe herring fishery has close to zero opportunity to adapt to closures since the fish spawn in specific locations.

Groundfish Fleets. There is some opportunity for groundfish fleets to adapt to area closures.

However, the various groundfish fleets operate under an Integrated Fisheries Management Plan in which bycatch issues and international agreements or treaties with the US (for halibut and hake) need to be accommodated. For example, the majority of the groundfish trawl TAC for lingcod, a relatively high-value species, is not taken because of bycatch concerns.

Hook & line groundfish fishermen such as halibut indicate that they fish where they do now because they can fish “clean”. If they move to another area, they may not be able to harvest their halibut allocation if there is too much catch of choke species such as yelloweye rockfish.

Shellfish Fleets. For shellfish dive fisheries, there is zero opportunity to harvest the product elsewhere as the catch from lost grounds will translate into a lower TAC.

There will be severe congestion issues if displaced prawn and crab trap operators move to other areas as the fishermen are very territorial and there is very little unsubscribed fishing space. Moreover, the duration of prawn fishery openings by area is tied to spawner index readings and the number of vessels operating e.g., if too many vessels fish an area, DFO will close the fishery early.

Tuna Fleets. The tuna fishery is subject to an international treaty agreement with the US. The sector needs to be careful that it maintains fishing opportunities for US fishermen in Canadian waters in order to maintain reciprocal fishing privileges in US waters.

In conclusion, the potential for adaptive behavior of the various fleets to closures is very complicated. Such investigations would provide a promising avenue for future research.

Appendix B

Key Parameters

Exhibit B.1: BC Commercial Fishing Fleets in 2018

Fleet/Gear	Activity		
	No. Active Vessels	Crew per Vessel*	Weeks Fished per Vessel
Salmon			
Seine	91	5.0	8
Gillnet	626	2.0	9
Troll	215	3.5	9
Herring			
Roe Seine	35	5.0	3
Roe Gillnet	110	3.0	3
Food Seine	10	5.0	4
Groundfish			
Halibut Longline	147	3.8	3
Sablefish Longline/Trap	33	5.5	16
Rockfish Hook & Line	35	2.5	10
Lingcod Hook & Line	43	2.5	5
Hake Midwater Trawl	30	4.0	15
Groundfish Bottom/Other Trawl	37	4.0	25
Shellfish			
Crab Trap	214	3.0	20
Geoduck Dive	40	3.0	10
Prawn Trap	204	3.5	7
Sea Cucumber Dive	35	3.5	3
Sea Urchin – Red	38	3.0	10
Sea Urchin – Green	8	3.0	3
Shrimp Trawl	37	2.0	10
Tuna			
Tuna Hook & Line	120	3.0	6

* includes the skipper

Exhibit B.2: The BC Commercial Fishery in 2018 - Coastwide Catch

		Salmon/Herring Fleets			Groundfish Fleets						Other Fleets
		GN	SN	TR	HAL	SF	RF	LC	Hake	Trawl	
					• • • tonnes • • •						
Salmon	- Chinook	60	29	572							
	- Chum	2,056	1,661	24							
	- Coho	11	13	512							
	- Pink	96	451	71							
	- Sockeye	3,084	5,551	596							
Herring	- Food & Bait		5,447								
	- Roe Herring	10,465	3,110								
Groundfish	- Arrowtooth										9,458
	- Dogfish				40	5	2				207
	- Hake								102,241		
	- Halibut				3,113	109	86	22			
	- Lingcod				98	24	24	612			321
	- Pacific Cod										280
	- Pollock										3,357
	- Rockfish				310	361	247	13		14,677	
	- Sablefish				157	1,775	30				172
	- Skate				63	28	5				234
	- Sole										3,050
Shellfish	- Crab										4,657
	- Geoduck										1,383
	- Prawn										1,701
	- Sea Cucumbers										1,689
	- Sea Urchin: Red										2,677
	- Sea Urchin: Green										232
	- Shrimp										381
Tuna											2,715

Legend: GN – gillnet HAL – halibut longline
 SN – seine SF – sablefish longline/trap
 TR – troll RF – rockfish hook & line
 LC – lingcod hook & line
 Hake – hake midwater trawl
 Trawl – groundfish bottom trawl

Exhibit B.3: The BC Commercial Fishery in 2018 – Ex-Vessel Prices

		Salmon/Herring Fleets			Groundfish Fleets						Other Fleets
		GN	SN	TR	HAL	SF	RF	LC	Hake	Trawl	
		• • • \$ per kg RD • • •									
Salmon	- Chinook	11.20	6.60	17.00							
	- Chum	3.15	3.10	3.00							
	- Coho	2.75	2.20	7.80							
	- Pink	.65	.85	2.15							
	- Sockeye	7.20	6.40	8.70							
Herring	- Food & Bait		.35								
	- Roe Herring	1.20	.55								
Groundfish	- Arrowtooth										.95
	- Dogfish				.22	.22	.22	.22			.11
	- Hake								.27		.26
	- Halibut				13.25	13.25	13.25	13.25			
	- Lingcod				7.25	7.25	7.25	7.25			5.75
	- Pacific Cod							2.00			1.75
	- Pollock										.46
	- Rockfish				2.00	2.00	18.00				1.15
	- Sablefish				13.00	13.00	13.00	13.00			8.50
	- Skate				1.50	1.50	1.50	1.50			1.20
	- Sole										1.32
Shellfish	- Crab										14.30
	- Geoduck										37.40
	- Prawn										30.80
	- Sea Cucumbers										7.70
	- Sea Urchin: Red										2.65
	- Sea Urchin: Green										6.40
	- Shrimp										6.60
Tuna											5.20

Legend: GN – gillnet HAL – halibut longline
 SN – seine SF – sablefish longline/trap
 TR – troll RF – rockfish hook & line
 LC – lingcod hook & line
 Hake – hake midwater trawl
 Trawl – groundfish bottom trawl

Exhibit B.4: The BC Commercial Fishery in 2018 – Processed Prices

		Salmon/Herring Fleets			Groundfish Fleets						Other Fleets
		GN	SN	TR	HAL	SF	RF	LC	Hake	Trawl	
		• • • \$ per kg RD • • •									
Salmon	- Chinook	14.20	9.60	22.00							
	- Chum	6.10	6.10	6.10							
	- Coho	7.00	7.00	12.00							
	- Pink	2.00	2.00	3.50							
	- Sockeye	10.80	10.80	12.00							
Herring	- Food & Bait		.90								
	- Roe Herring	2.50	1.45								
Groundfish	- Arrowtooth										1.80
	- Dogfish				.70	.70	.70	.70			.70
	- Hake								1.05		1.05
	- Halibut				17.00	17.00	17.00	17.00			
	- Lingcod				10.25	10.25	10.25	10.25			8.75
	- Pacific Cod										3.25
	- Pollock										1.90
	- Rockfish				3.00	3.00	22.00	3.00			2.40
	- Sablefish				16.20	16.20	16.20	16.20			16.00
	- Skate				2.10	2.10	2.10	2.10			1.90
	- Sole										2.65
Shellfish	- Crab										18.70
	- Geoduck										46.60
	- Prawn										38.50
	- Sea Cucumbers										15.40
	- Sea Urchin: Red										6.35
	- Sea Urchin: Green										11.70
	- Shrimp										10.25
Tuna											8.50

Legend: GN – gillnet HAL – halibut longline
 SN – seine SF – sablefish longline/trap
 TR – troll RF – rockfish hook & line
 LC – lingcod hook & line
 Hake – hake midwater trawl
 Trawl – groundfish bottom trawl

Appendix C

NSB Impacts – Salmon Fleets

Exhibit C.1: NSB Impacts – All Salmon Fleets

Description: All Salmon Fleets	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	14,787	12,980	14,570	1,807	217
No. Vessels	932	901	932	31	-
Total Crew	2,460	2,375	2,460	85	-
Total Crew Weeks	21,681	20,720	21,681	961	-
Fishing \$000					
Ex-Vessel Revenues	89,852	78,160	88,458	11,692	1,394
Less: Management Fee	8,985	7,816	8,846	1,169	139
Fuel	8,431	8,043	8,431	388	-
Crew Wages	29,706	25,306	29,148	4,400	558
Other Variable	5,881	5,612	5,881	269	-
Share of Fixed	12,927	12,542	12,927	385	-
Net Return or EBITDA	23,922	18,841	23,225	5,081	697
Handling, Processing, Sales \$000					
Sales Revenue	144,599	125,699	142,366	18,900	2,233
Less: Ex-Vessel Payment	89,852	78,160	88,458	11,692	1,394
Payroll Burden*	2,525	2,151	2,478	374	47
Plant/Other Labour	16,087	14,142	15,854	1,945	233
Other	15,704	13,783	15,474	1,921	230
Net Return or EBITDA	20,431	17,463	20,104	2,968	327
Employment FTEs**					
Fishing Fleet - Management	120	104	118	16	2
- Crew	1,084	1,036	1,084	48	-
Handling, Processing, Sales	<u>322</u>	<u>283</u>	<u>317</u>	<u>39</u>	<u>5</u>
Subtotal	1,526	1,423	1,519	103	7

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit C.2: NSB Impacts – Salmon Seine Fleet

Description: Salmon Seine Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	7,705	6,417	7,568	1,288	137
No. Vessels	91	91	91	-	-
Crew per Vessel	5.0	5.0	5.0	-	-
Weeks per Vessel	8.0	7.4	8.0	0.6	-
Total Crew	455	455	455.0	-	-
Total Crew Weeks	3,640	3,370	3,640	270	-
Fishing \$000					
Ex-Vessel Revenues	41,279	33,723	40,509	7,556	770
Less: Management Fee	4,128	3,372	4,051	756	77
Fuel	1,602	1,483	1,602	119	-
Crew Wages	15,835	12,792	15,515	3,043	320
Other Variable					
Share of Fixed 50%	4,550	4,550	4,550	-	-
Net Return or EBITDA	13,890	10,347	13,517	3,543	373
Handling, Processing, Sales \$000					
Sales Revenue	71,354	58,463	70,036	12,891	1,318
Less: Ex-Vessel Payment	41,279	33,723	40,509	7,556	770
Payroll Burden*	1,346	1,087	1,319	259	27
Plant/Other Labour	8,475	7,058	8,325	1,417	150
Other	8,090	6,738	7,947	1,352	143
Net Return or EBITDA	12,164	9,857	11,936	2,307	228
Employment FTEs**					
Fishing Fleet - Management	55	45	54	10	1
- Crew	182	169	182	13	-
Handling, Processing, Sales	<u>170</u>	<u>141</u>	<u>167</u>	<u>29</u>	<u>3</u>
Subtotal	407	355	403	52	4

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit C.3: NSB Impacts – Salmon Gillnet Fleet

Description: Salmon Gillnet Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	5,307	5,017	5,256	290	51
No. Vessels	626	610	626	16	-
Crew per Vessel	2.0	2.0	2.0	-	-
Weeks per Vessel	9.0	8.75	9.0	.25	-
Total Crew	1,252	1,220	1,252	32	-
Total Crew Weeks	11,268	10,700	11,268	568	-
Fishing \$000					
Ex-Vessel Revenues	29,446	28,038	29,159	1,408	287
Less: Management Fee	2,945	2,804	2,916	141	29
Fuel	4,507	4,280	4,507	227	-
Crew Wages	8,630	8,226	8,514	404	116
Other Variable	2817	2675	2817	142	-
Share of Fixed 60%	4,507	4,392	4,507	115	-
Net Return or EBITDA	6,040	5,662	5,898	378	142
Handling, Processing, Sales \$000					
Sales Revenue	46,970	44,630	46,511	2,340	459
Less: Ex-Vessel Payment	29,446	28,038	29,159	1,408	287
Payroll Burden*	734	699	724	35	10
Plant/Other Labour	6,103	5,770	6,044	333	59
Other	5,572	5,268	5,518	304	54
Net Return or EBITDA	5,115	4,855	5,066	260	49
Employment FTEs**					
Fishing Fleet - Management	39	37	39	2	-
- Crew	563	535	563	28	-
Handling, Processing, Sales	<u>122</u>	<u>115</u>	<u>121</u>	<u>7</u>	<u>1</u>
Subtotal	724	687	723	37	1

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit C.4: NSB Impacts – Salmon Troll Fleet

Description: Salmon Troll Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	1,775	1,545	1,747	230	28
No. Vessels	215	200	215	15	-
Crew per Vessel	3.5	3.5	3.5	-	-
Weeks per Vessel	9.0	9.5	9.0	(0.5)	-
Total Crew	753	700	753	53	-
Total Crew Weeks	6,773	6,650	6,773	123	-
Fishing \$000					
Ex-Vessel Revenues	19,127	16,399	18,789	2,728	338
Less: Management Fee	1,913	1,640	1,879	273	34
Fuel	2,322	2,280	2,322	42	-
Crew Wages	5,241	4,289	5,119	952	122
Other Variable	1,790	1,758	1,790	32	-
Share of Fixed 60%	3,870	3,600	3,870	270	-
Net Return or EBITDA	3,992	2,833	3,809	1,159	183
Handling, Processing, Sales \$000					
Sales Revenue	26,275	22,605	25,819	3,670	456
Less: Ex-Vessel Payment	19,127	16,399	18,789	2,728	338
Payroll Burden*	445	365	435	80	10
Plant/Other Labour	1,509	1,314	1,485	195	24
Other	2,041	1,777	2,008	264	33
Net Return or EBITDA	3,152	2,751	3,101	401	51
Employment FTEs**					
Fishing Fleet - Management	26	22	25	4	1
- Crew	339	333	339	6	-
Handling, Processing, Sales	<u>30</u>	<u>26</u>	<u>30</u>	<u>4</u>	<u>-</u>
Subtotal	395	381	394	14	1

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Appendix D

NSB Impacts – Herring Fleets

Exhibit D.1: NSB Impacts – All Herring Fleets

Description: All Herring Fleets	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	19,022	18,680	18,960	342	62
No. Vessels	155	153	155	2	-
Total Crew	555	545	555	10	-
Total Crew Weeks	1,715	1,685	1,715	30	-
Fishing \$000					
Ex-Vessel Revenues	16,175	15,987	16,141	188	34
Less: Management Fee	1,617	1,599	1,614	18	3
Fuel	2,154	2,147	2,154	7	-
Crew Wages	5,280	5,205	5,265	75	15
Other Variable	1,635	1,628	1,635	7	-
Share of Fixed	1,210	1,178	1,210	32	-
Net Return or EBITDA	4,278	4,230	4,262	48	16
Handling, Processing, Sales \$000					
Sales Revenue	35,574	35,078	35,484	496	90
Less: Ex-Vessel Payment	16,175	15,987	16,141	188	34
Payroll Burden*	449	442	448	7	1
Plant/Other Labour	6,555	6,469	6,539	86	16
Other	9,062	8,908	9,034	154	28
Net Return or EBITDA	3,334	3,272	3,323	62	11
Employment FTEs**					
Fishing Fleet - Management	22	21	22	1	-
- Crew	86	84	86	2	-
Handling, Processing, Sales	<u>131</u>	<u>129</u>	<u>131</u>	<u>2</u>	<u>-</u>
Subtotal	239	234	239	5	-

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit D.2: NSB Impacts – Roe Herring Seine Fleet

Description: Roe Herring Seine Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	3,110	2,768	3,048	342	62
No. Vessels	35	33	35	2	-
Crew per Vessel	5.0	5.0	5.0	-	-
Weeks per Vessel	3.0	3.0	3.0	-	-
Total Crew	175	165	175	10	-
Total Crew Weeks	525	495	525	30	-
Fishing \$000					
Ex-Vessel Revenues	1,711	1,522	1,676	189	35
Less: Management Fee	171	152	168	19	3
Fuel	126	119	126	7	-
Crew Wages	620	546	606	74	14
Other Variable	121	114	121	7	-
Share of Fixed 20%	560	528	560	32	-
Net Return or EBITDA	112	63	96	49	16
Handling, Processing, Sales \$000					
Sales Revenue	4,510	4,013	4,419	497	91
Less: Ex-Vessel Payment	1,711	1,522	1,676	189	35
Payroll Burden*	53	46	51	7	2
Plant/Other Labour	778	692	762	86	16
Other	1,400	1,246	1,372	154	28
Net Return or EBITDA	569	507	558	62	11
Employment FTEs**					
Fishing Fleet - Management	2	2	2	-	-
- Crew	26	25	26	1	-
Handling, Processing, Sales	<u>16</u>	<u>14</u>	<u>15</u>	<u>2</u>	<u>1</u>
Subtotal	44	41	43	3	1

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit D.3: NSB Impacts – Roe Herring Gillnet Fleet

Description: Roe Herring Gillnet Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	10,465	10,465	10,465	-	-
No. Vessels	110	110	110	-	-
Crew per Vessel	2.0	2.0	2.0	-	-
Weeks per Vessel	3.0	3.0	3.0	-	-
Total Crew	330	330	330	-	-
Total Crew Weeks	990	990	990	-	-
Fishing \$000					
Ex-Vessel Revenues	12,558	12,558	12,558	-	-
Less: Management Fee	1,256	1,256	1,256	-	-
Fuel	1,980	1,980	1,980	-	-
Crew Wages	3,848	3,848	3,848	-	-
Other Variable	1,469	1,469	1,469	-	-
Share of Fixed 100%	330	330	330	-	-
Net Return or EBITDA	3,675	3,675	3,675	-	-
Handling, Processing, Sales \$000					
Sales Revenue	26,163	26,163	26,163	-	-
Less: Ex-Vessel Payment	12,558	12,558	12,558	-	-
Payroll Burden*	327	327	327	-	-
Plant/Other Labour	5,233	5,233	5,233	-	-
Other	5,756	5,756	5,756	-	-
Net Return or EBITDA	2,289	2,289	2,289	-	-
Employment FTEs**					
Fishing Fleet - Management	17	17	17	-	-
- Crew	50	50	50	-	-
Handling, Processing, Sales	<u>105</u>	<u>105</u>	<u>105</u>	<u>-</u>	<u>-</u>
Subtotal	172	172	172	-	-

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Note: costs include those associated with a “mothership” that provides living quarters and also packs the fish to port

Exhibit D.4: NSB Impacts – Food & Bait Herring Seine Fleet

Description: Food & Bait Herring Seine Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	5,447	5,447	5,447	-	-
No. Vessels	10	10	10	-	-
Crew per Vessel					
Weeks per Vessel					
Total Crew	50	50	50	-	-
Total Crew Weeks	200	200	200	-	-
Fishing \$000					
Ex-Vessel Revenues	1,906	1,906	1,906	-	-
Less: Management Fee	191	191	191	-	-
Fuel	48	48	48	-	-
Crew Wages	811	811	811	-	-
Other Variable	46	46	46	-	-
Share of Fixed 40%	320	320	320	-	-
Net Return or EBITDA	491	491	491	-	-
Handling, Processing, Sales \$000					
Sales Revenue	4,902	4,902	4,902	-	-
Less: Ex-Vessel Payment	1,906	1,906	1,906	-	-
Payroll Burden*	69	69	69	-	-
Plant/Other Labour	545	545	545	-	-
Other	1,906	1,906	1,906	-	-
Net Return or EBITDA	476	476	476	-	-
Employment FTEs**					
Fishing Fleet - Management	3	3	3	-	-
- Crew	10	10	10	-	-
Handling, Processing, Sales	<u>11</u>	<u>11</u>	<u>11</u>	<u>-</u>	<u>-</u>
Subtotal	24	24	24	-	-

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Appendix E

NSB Impacts – Groundfish Fleets

Exhibit E.1: NSB Impacts – All Groundfish Fleets

Description: All Groundfish Fleets	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	141,121	137,589	138,530	3,532	2,591
No. Vessels	325	309	322	16	3
Total Crew	1,203	1,145	1,190	58	13
Total Crew Weeks	11,492	11,492	11,492	0	0
Fishing \$000					
Ex-Vessel Revenues	144,233	134,033	140,756	10,200	3,477
Less: Management Fee	14,423	13,403	14,076	1,020	347
Fuel	10,462	10,462	10,462	0	0
Crew Wages	41,273	38,038	40,207	3,235	1,066
Other Variable	10,797	10,797	10,797	0	0
Share of Fixed	21,005	20,329	20,882	676	123
Net Return or EBITDA	46,272	41,004	44,332	5,268	1,940
Handling, Processing, Sales \$000					
Sales Revenue	285,008	269,407	278,769	15,601	6,239
Less: Ex-Vessel Payment	144,233	134,033	140,756	10,200	3,477
Payroll Burden*	3,508	3,233	3,418	275	90
Plant/Other Labour	56,975	55,254	55,966	1,721	1,009
Other	41,734	40,292	40,923	1,442	811
Net Return or EBITDA	38,557	36,595	37,707	1,962	850
Employment FTEs**					
Fishing Fleet - Management	192	179	188	13	4
- Crew	575	575	575	-	-
Handling, Processing, Sales	<u>1,140</u>	<u>1,105</u>	<u>1,120</u>	<u>35</u>	<u>20</u>
Subtotal	1,907	1,859	1,883	48	24

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit E.2: NSB Impacts – Halibut Longline Fleet

Description: Halibut Longline Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	3,781	3,407	3,645	374	136
No. Vessels	147	140	145	7	2
Crew per Vessel	3.8	3.8	3.8	-	-
Weeks per Vessel	3.0	3.15	3.05	(.15)	(.05)
Total Crew	559	532	551	27	8
Total Crew Weeks	1,676	1,676	1,676	-	-
Fishing \$000					
Ex-Vessel Revenues	44,722	40,290	43,004	4,432	1,718
Less: Management Fee	4,472	4,029	4,300	443	172
Fuel	1,103	1,103	1,103	-	-
Crew Wages	9,466	8,437	9,067	1,029	399
Other Variable	2,456	2,456	2,456	-	-
Share of Fixed 50%	4,410	4,200	4,350	210	60
Net Return or EBITDA	22,815	20,065	21,727	2,750	1,088
Handling, Processing, Sales \$000					
Sales Revenue	57,559	51,854	55,351	5,705	2,208
Less: Ex-Vessel Payment	44,722	40,290	43,004	4,432	1,718
Payroll Burden*	805	717	771	88	34
Plant/Other Labour	1,891	1,704	1,822	187	69
Other	3,781	3,407	3,645	374	136
Net Return or EBITDA	6,361	5,735	6,110	626	251
Employment FTEs**					
Fishing Fleet - Management	60	54	58	6	2
- Crew	84	84	84	-	-
Handling, Processing, Sales	<u>38</u>	<u>34</u>	<u>36</u>	<u>4</u>	<u>2</u>
Subtotal	182	172	178	10	4

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit E.3: NSB Impacts – Sablefish Trap/Longline Fleet

Description: Sablefish Trap/Longline Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	2,302	2,102	2,254	200	48
No. Vessels	33	31	32	2	1
Crew per Vessel	5.5	5.5	5.5	-	-
Weeks per Vessel	16.0	17.0	16.5	(1.0)	(0.5)
Total Crew	182	171	176	11	6
Total Crew Weeks	2,904	2,904	2,904	-	-
Fishing \$000					
Ex-Vessel Revenues	25,458	23,363	24,921	2,095	537
Less: Management Fee	2,546	2,336	2,492	210	54
Fuel	2,112	2,112	2,112	-	-
Crew Wages	5,159	4,593	5,014	566	145
Other Variable	3,604	3,604	3,604	-	-
Share of Fixed 70%	2,079	1,953	2,016	126	63
Net Return or EBITDA	9,959	8,765	9,683	1,194	276
Handling, Processing, Sales \$000					
Sales Revenue	31,999	29,358	31,323	2,641	676
Less: Ex-Vessel Payment	25,458	23,363	24,921	2,095	537
Payroll Burden*	439	390	426	49	13
Plant/Other Labour	1,151	1,051	1,127	100	24
Other	1,727	1,576	1,691	151	36
Net Return or EBITDA	3,225	2,977	3,158	248	67
Employment FTEs**					
Fishing Fleet - Management	34	31	33	3	1
- Crew	145	145	145	-	-
Handling, Processing, Sales	<u>23</u>	<u>21</u>	<u>23</u>	<u>2</u>	<u>-</u>
Subtotal	202	197	201	5	1

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit E.4: NSB Impacts – Rockfish Hook & Line Fleet

Description: Rockfish Hook & Line Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	394	351	384	43	10
No. Vessels	350	350	350	-	-
Crew per Vessel	2.5	2.5	2.5	-	-
Weeks per Vessel	10.0	10.9	10.0	(0.9)	-
Total Crew	88	80	88	8	-
Total Crew Weeks	875	875	875	-	-
Fishing \$000					
Ex-Vessel Revenues	6,157	5,463	6,012	694	145
Less: Management Fee	616	546	601	70	15
Fuel	525	525	525	-	-
Crew Wages	1,831	1,569	1,776	262	55
Other Variable	656	656	656	-	-
Share of Fixed 40%	420	384	420	36	-
Net Return or EBITDA	2,109	1,782	2,033	327	76
Handling, Processing, Sales \$000					
Sales Revenue	7,640	6,780	7,458	860	182
Less: Ex-Vessel Payment	6,157	5,463	6,012	694	145
Payroll Burden*	163	141	158	22	5
Plant/Other Labour	156	133	151	23	5
Other	296	263	288	33	8
Net Return or EBITDA	539	482	526	57	13
Employment FTEs**					
Fishing Fleet - Management	8	7	8	1	-
- Crew	44	44	44	-	-
Handling, Processing, Sales	<u>3</u>	<u>3</u>	<u>3</u>	<u>-</u>	<u>-</u>
Subtotal	55	54	55	1	-

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit E.5: NSB Impacts – Lingcod Hook & Line Fleet

Description: Lingcod Hook & Line Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	647	588	634	59	13
No. Vessels	43	41	43	2	-
Crew per Vessel	2.5	2.5	2.5	-	-
Weeks per Vessel	5.0	5.25	5.0	(.25)	-
Total Crew	108	103	108	5	-
Total Crew Weeks	538	538	538	-	-
Fishing \$000					
Ex-Vessel Revenues	4,755	4,323	4,654	432	101
Less: Management Fee	475	432	465	43	10
Fuel	323	323	323	-	-
Crew Wages	1,492	1,329	1,454	163	38
Other Variable	403	403	403	-	-
Share of Fixed 40%	516	492	516	24	-
Net Return or EBITDA	1,545	1,344	1,492	201	53
Handling, Processing, Sales \$000					
Sales Revenue	6,686	6,079	6,545	607	141
Less: Ex-Vessel Payment	4,755	4,323	4,654	432	101
Payroll Burden*	127	113	124	14	3
Plant/Other Labour	388	353	380	35	8
Other	647	588	634	59	13
Net Return or EBITDA	769	702	754	67	15
Employment FTEs**					
Fishing Fleet - Management	6	6	6	-	-
- Crew	5	5	5	-	-
Handling, Processing, Sales	<u>8</u>	<u>7</u>	<u>8</u>	<u>1</u>	<u>-</u>
Subtotal	19	18	19	1	-

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit E.6: NSB Impacts – Hake Midwater Trawl Fleet

Description: Hake Midwater Trawl Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	102,241	101,219	100,196	1,022	2,045
No. Vessels	30	30	30	-	-
Crew per Vessel	4.0	4.0	4.0	-	-
Weeks per Vessel	15	15	15	-	-
Total Crew	120	120	120	-	-
Total Crew Weeks	1,800	1,800	1,800	-	-
Fishing \$000					
Ex-Vessel Revenues	27,605	27,329	27,053	276	552
Less: Management Fee	2,761	2,733	2,705	28	56
Fuel	2,700	2,700	2,700	-	-
Crew Wages	9,601	9,489	9,377	112	224
Other Variable	810	810	810	-	-
Share of Fixed 70%	8,400	8,400	8,400	-	-
Net Return or EBITDA	3,334	3,197	3,061	137	273
Handling, Processing, Sales \$000					
Sales Revenue	107,353	106,280	105,206	1,073	2,147
Less: Ex-Vessel Payment	27,605	27,329	27,053	276	552
Payroll Burden*	816	807	797	9	19
Plant/Other Labour	35,784	35,427	35,069	357	715
Other	25,560	25,305	25,049	255	511
Net Return or EBITDA	17,587	17,413	17,238	174	349
Employment FTEs**					
Fishing Fleet - Management	37	36	36	1	1
- Crew	90	90	90	-	-
Handling, Processing, Sales	<u>716</u>	<u>709</u>	<u>701</u>	<u>7</u>	<u>15</u>
Subtotal	843	835	827	8	16

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit E.7: NSB Impacts – Other Trawl Fleet

Description: Other Trawl Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	31,756	29,922	31,417	1,834	339
No. Vessels	37	35	37	2	-
Crew per Vessel	4.0	4.0	4.0	-	-
Weeks per Vessel	25	26.4	25	(1.4)	-
Total Crew	148	140	148	8	-
Total Crew Weeks	3,700	3,700	3,700	-	-
Fishing \$000					
Ex-Vessel Revenues	35,535	33,265	35,113	2,270	422
Less: Management Fee	3,554	3,327	3,511	227	43
Fuel	3,700	3,700	3,700	-	-
Crew Wages	13,724	12,620	13,519	1,104	205
Other Variable	2,868	2,868	2,868	-	-
Share of Fixed 70%	5,180	4,900	5,180	280	-
Net Return or EBITDA	6,511	5,851	6,336	660	175
Handling, Processing, Sales \$000					
Sales Revenue	73,770	69,056	72,886	4,714	884
Less: Ex-Vessel Payment	35,535	33,265	35,113	2,270	422
Payroll Burden*	1,167	1,073	1,149	94	18
Plant/Other Labour	17,466	16,457	17,279	1,009	187
Other	9,527	8,976	9,425	551	102
Net Return or EBITDA	10,076	9,285	9,920	791	156
Employment FTEs**					
Fishing Fleet - Management	47	44	47	3	0
- Crew	185	185	185	-	-
Handling, Processing, Sales	<u>349</u>	<u>329</u>	<u>346</u>	<u>20</u>	<u>3</u>
Subtotal	581	558	578	23	3

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Appendix F

NSB Impacts – Shellfish Fleets

Exhibit F.1: NSB Impacts – All Shellfish Fleets

Description: All Shellfish	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	12,720	10,259	12,090	2,461	630
No. Vessels	576	552	571	24	5
Total Crew	1,811	1,736	1,795	75	16
Total Crew Weeks	21,358	20,917	21,248	441	110
Fishing \$000					
Ex-Vessel Revenues	192,938	159,524	185,685	33,414	7,253
Less: Management Fee	19,294	15,952	18,569	3,342	725
Fuel	9,960	9,752	9,919	208	41
Crew Wages	59,869	49,832	57,622	10,037	2,247
Other Variable	13,637	12,863	13,459	774	178
Share of Fixed	15,862	15,329	15,767	533	95
Net Return or EBITDA	74,316	55,796	70,350	18,520	3,966
Handling, Processing, Sales \$000					
Sales Revenue	259,558	213,610	249,255	45,948	10,303
Less: Ex-Vessel Payment	192,938	159,524	185,685	33,414	7,253
Payroll Burden*	5,089	4,236	4,898	853	191
Plant/Other Labour	17,913	14,079	16,887	3,834	1,026
Other	13,435	10,831	12,771	2,604	664
Net Return or EBITDA	30,183	24,940	29,014	5,243	1,169
Employment FTEs**					
Fishing Fleet - Management	257	213	248	44	9
- Crew	1,068	1,050	1,068	18	-
Handling, Processing, Sales	<u>358</u>	<u>282</u>	<u>338</u>	<u>76</u>	<u>20</u>
Subtotal	1,683	1,545	1,654	138	29

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit F.2: NSB Impacts – Crab Fleet

Description: Crab Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	4,657	4,191	4,564	466	93
No. Vessels	214	214	214	-	-
Crew per Vessel	3.0	3.0	3.0	-	-
Weeks per Vessel	20.0	20.0	20.0	-	-
Total Crew	642	642	642	-	-
Total Crew Weeks	12,840	12,840	12,840	-	-
Fishing \$000					
Ex-Vessel Revenues	66,595	59,936	65,263	6,659	1,332
Less: Management Fee	6,660	5,994	6,526	666	134
Fuel	5,136	5,136	5,136	-	-
Crew Wages	26,635	23,489	26,006	3,146	629
Other Variable	4,066	4,066	4,066	-	-
Share of Fixed 80%	6,848	6,848	6,848	-	-
Net Return or EBITDA	17,250	14,404	16,681	2,846	569
Handling, Processing, Sales \$000					
Sales Revenue	87,086	78,377	85,344	8,709	1,742
Less: Ex-Vessel Payment	66,595	59,936	65,263	6,659	1,332
Payroll Burden*	2,264	1,997	2,210	267	54
Plant/Other Labour	3,958	3,563	3,879	395	79
Other	3,958	3,563	3,879	395	79
Net Return or EBITDA	10,310	9,320	10,112	990	198
Employment FTEs**					
Fishing Fleet - Management	89	80	87	9	2
- Crew	642	642	642	-	-
Handling, Processing, Sales	<u>79</u>	<u>71</u>	<u>78</u>	<u>8</u>	<u>1</u>
Subtotal	810	793	807	17	3

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit F.3: NSB Impacts – Geoduck Fleet

Description: Geoduck Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	1,383	1,010	1,314	373	69
No. Vessels	40	35	39	5	1
Crew per Vessel	3.0	3.0	3.0	-	-
Weeks per Vessel	10.0	10.0	10.0	-	-
Total Crew	120	105	117	15	3
Total Crew Weeks	1,200	1,050	1,170	150	30
Fishing \$000					
Ex-Vessel Revenues	51,724	37,759	49,138	13,965	2,586
Less: Management Fee	5,172	3,776	4,914	1,396	258
Fuel	800	700	780	100	20
Crew Wages	8,730	6,221	8,267	2,509	463
Other Variable	4,180	3,658	4,076	522	104
Share of Fixed 70%	1,400	1,225	1,365	175	35
Net Return or EBITDA	31,442	22,179	29,736	9,263	1,706
Handling, Processing, Sales \$000					
Sales Revenue	64,448	47,047	61,225	17,401	3,223
Less: Ex-Vessel Payment	51,724	37,759	49,138	13,965	2,586
Payroll Burden*	742	529	703	213	39
Plant/Other Labour	2,766	2,019	2,628	747	138
Other	1,660	1,212	1,577	448	83
Net Return or EBITDA	7,556	5,529	7,180	2,027	376
Employment FTEs**					
Fishing Fleet - Management	69	50	66	19	3
- Crew	60	53	59	7	1
Handling, Processing, Sales	<u>55</u>	<u>40</u>	<u>53</u>	<u>15</u>	<u>2</u>
Subtotal	184	143	178	41	6

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit F.4: NSB Impacts – Prawn Fleet

Description: Prawn Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	1,701	1,497	1,650	204	51
No. Vessels	204	200	204	4	-
Crew per Vessel	3.5	3.5	3.5	-	-
Weeks per Vessel	7.0	7.0	7.0	-	-
Total Crew	714	700	714	14	-
Total Crew Weeks	4,998	4,998	4,998	-	-
Fishing \$000					
Ex-Vessel Revenues	50,520	44,457	49,004	6,063	1,516
Less: Management Fee	5,052	4,446	4,900	606	152
Fuel	2,856	2,856	2,856	0	0
Crew Wages	18,723	16,104	18,068	2,619	655
Other Variable	3,606	3,606	3,606	-	-
Share of Fixed 70%	5,712	5,600	5,712	112	-
Net Return or EBITDA	14,571	11,846	13,862	2,725	709
Handling, Processing, Sales \$000					
Sales Revenue	65,489	57,630	63,524	7,859	1,965
Less: Ex-Vessel Payment	50,520	44,457	49,004	6,063	1,516
Payroll Burden*	1,591	1,369	1,536	222	55
Plant/Other Labour	3,402	2,994	3,300	408	102
Other	2,552	2,245	2,475	307	77
Net Return or EBITDA	7,424	6,565	7,209	859	215
Employment FTEs**					
Fishing Fleet - Management	67	59	65	8	2
- Crew	250	250	250	-	-
Handling, Processing, Sales	<u>68</u>	<u>60</u>	<u>66</u>	<u>8</u>	<u>2</u>
Subtotal	385	369	381	16	4

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit F.5: NSB Impacts – Sea Cucumber Fleet

Description: Sea Cucumber	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	1,689	1,182	1,571	507	118
No. Vessels	35	30	34	5	1
Crew per Vessel	3.5	3.5	3.5	-	-
Weeks per Vessel	3.0	3.0	3.0	-	-
Total Crew	123	105	119	18	4
Total Crew Weeks	368	315	357	53	11
Fishing \$000					
Ex-Vessel Revenues	13,005	9,104	12,095	3,901	910
Less: Management Fee	1,301	910	1,209	391	92
Fuel	105	90	102	15	3
Crew Wages	2,670	1,847	2,477	823	193
Other Variable	475	407	462	68	13
Share of Fixed 60%	840	720	816	120	24
Net Return or EBITDA	7,615	5,129	7,029	2,486	586
Handling, Processing, Sales \$000					
Sales Revenue	18,917	13,242	17,593	5,675	1,324
Less: Ex-Vessel Payment	13,005	9,104	12,095	3,901	910
Payroll Burden*	227	157	211	70	16
Plant/Other Labour	1,689	1,182	1,571	507	118
Other	1,689	1,182	1,571	507	118
Net Return or EBITDA	2,307	1,616	2,146	691	161
Employment FTEs**					
Fishing Fleet - Management	17	12	16	4	1
- Crew	18	16	18	3	-
Handling, Processing, Sales	<u>34</u>	<u>24</u>	<u>31</u>	<u>10</u>	<u>3</u>
Subtotal	69	52	65	17	4

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit F.6: NSB Impacts – Red Sea Urchin Fleet

Description: Red Sea Urchin	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	2,677	1,874	2,409	803	268
No. Vessels	38	32	36	6	2
Crew per Vessel	3.0	3.0	3.0	-	-
Weeks per Vessel	10.0	10.0	10.0	-	-
Total Crew	114	96	108	18	6
Total Crew Weeks	1,140	960	1,080	180	60
Fishing \$000					
Ex-Vessel Revenues	7,094	4,966	6,385	2,128	709
Less: Management Fee	709	497	638	212	71
Fuel	304	256	288	48	16
Crew Wages	2,163	1,440	1,922	723	241
Other Variable	931	784	882	147	49
Share of Fixed 50%	570	480	540	90	30
Net Return or EBITDA	2,417	1,509	2,114	908	303
Handling, Processing, Sales \$000					
Sales Revenue	16,999	11,899	15,299	5,100	1,700
Less: Ex-Vessel Payment	7,094	4,966	6,385	2,128	709
Payroll Burden*	184	122	163	62	21
Plant/Other Labour	5,622	3,935	5,060	1,687	562
Other	2,275	1,593	2,048	682	227
Net Return or EBITDA	1,824	1,283	1,644	541	180
Employment FTEs**					
Fishing Fleet - Management	10	7	9	3	1
- Crew	57	48	54	9	3
Handling, Processing, Sales	<u>112</u>	<u>78</u>	<u>101</u>	<u>34</u>	<u>11</u>
Subtotal	179	133	164	46	15

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit F.7: NSB Impacts – Green Sea Urchin Fleet

Description: Green Sea Urchin	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	232	162	209	70	23
No. Vessels	8	6	7	2	1
Crew per Vessel	3.0	3.0	3.0	-	-
Weeks per Vessel	3.0	3.0	3.0	-	-
Total Crew	24	18	21	6	3
Total Crew Weeks	72	54	63	18	9
Fishing \$000					
Ex-Vessel Revenues	1,485	1,039	1,336	446	149
Less: Management Fee	148	104	134	44	14
Fuel	19	14	17	5	2
Crew Wages	518	361	468	157	50
Other Variable	83	62	72	21	11
Share of Fixed 20%	48	36	42	12	6
Net Return or EBITDA	668	462	604	206	64
Handling, Processing, Sales \$000					
Sales Revenue	2,714	1,900	2,443	814	271
Less: Ex-Vessel Payment	1,485	1,039	1,336	446	149
Payroll Burden*	44	31	40	13	4
Plant/Other Labour	209	146	188	63	21
Other	673	471	606	202	67
Net Return or EBITDA	304	213	273	91	31
Employment FTEs**					
Fishing Fleet - Management	2	1	2	1	-
- Crew	4	3	3	1	1
Handling, Processing, Sales	<u>4</u>	<u>3</u>	<u>4</u>	<u>1</u>	<u>-</u>
Subtotal	10	7	9	3	1

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Exhibit F.8: NSB Impacts – Shrimp Fleet

Description: Shrimp Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	381	343	373	38	8
No. Vessels	37	35	37	2	-
Crew per Vessel	2.0	2.0	2.0	-	-
Weeks per Vessel	10.0	10.0	10.0	-	-
Total Crew	74	70	74	4	-
Total Crew Weeks	740	700	740	40	-
Fishing \$000					
Ex-Vessel Revenues	2,515	2,263	2,464	252	51
Less: Management Fee	251	226	246	25	5
Fuel	740	700	740	40	-
Crew Wages	429	370	414	59	15
Other Variable	296	280	296	16	-
Share of Fixed 60%	444	420	444	24	-
Net Return or EBITDA	354	267	324	87	30
Handling, Processing, Sales \$000					
Sales Revenue	3,905	3,515	3,827	390	78
Less: Ex-Vessel Payment	2,515	2,263	2,464	252	51
Payroll Burden*	37	31	35	6	2
Plant/Other Labour	267	240	261	27	6
Other	629	566	616	63	13
Net Return or EBITDA	459	414	450	45	9
Employment FTEs**					
Fishing Fleet - Management	3	3	3	-	-
- Crew	37	35	37	2	-
Handling, Processing, Sales	<u>5</u>	<u>5</u>	<u>5</u>	<u>1</u>	<u>-</u>
Subtotal	46	43	45	3	-

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE

Appendix G

NSB Impacts - Tuna

Exhibit G.1: NSB Impacts – Tuna Fleet

Description: Tuna Fleet	Scenario			Reduction Under	
	Base (1)	MPATT (2)	MPT (3)	MPATT (4)=(1)-(2)	MPT (5)=(1)-(3)
Activity					
Catch tonnes	2,715	2,444	2,715	271	-
No. Vessels	120	120	120	-	-
Crew per Vessel	3.0	3.0	3.0	-	-
Weeks per Vessel	6.0	6.0	6.0	-	-
Total Crew	360	360	360	-	-
Total Crew Weeks	2,160	2,160	2,160	-	-
Fishing \$000					
Ex-Vessel Revenues	14,118	12,706	14,118	1,412	-
Less: Management Fee	1,412	1,271	1,412	141	-
Fuel	1,800	1,800	1,800	-	-
Crew Wages	4,324	3,790	4,324	534	-
Other Variable	612	612	612	-	-
Share of Fixed 40%	2,880	2,880	2,880	-	-
Net Return or EBITDA	3,091	2,354	3,091	737	-
Handling, Processing, Sales \$000					
Sales Revenue	23,078	20,770	23,078	2,308	-
Less: Ex-Vessel Payment	14,118	12,706	14,118	1,412	-
Payroll Burden*	368	322	368	46	-
Plant/Other Labour	1,901	1,710	1,901	191	-
Other	4,073	3,665	4,073	408	-
Net Return or EBITDA	2,619	2,366	2,619	253	-
Employment FTEs**					
Fishing Fleet - Management	19	17	19	2	-
- Crew	108	108	108	-	-
Handling, Processing, Sales	<u>38</u>	<u>34</u>	<u>38</u>	<u>4</u>	<u>-</u>
Subtotal	165	159	165	6	-

* EI & WCB assessments on vessel crew wages

** Management FTEs – \$75,000 fee per FTE, Crew FTEs – 20 weeks fished per FTE, & Handling, Processing, Sales FTEs – \$50,000 wages per FTE