Speaking for the Sockeye

A Truly Sustainable Natural Resource Worthy of Protection

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Fish of the Chilko River

- Bull Trout, Chinook Salmon, Coho Salmon, Dolly Varden, Longnose Dace, Mountain Whitefish, Pacific Lamprey, Rainbow Trout, **Sockeye Salmon,** Steelhead, Whitefish (General)

The Government of Canada

- Through Fisheries and Oceans Canada, the Canadian government has initiated the Cohen Commission to investigate the low returns of Fraser River sockeye in 2009.

The Pacific Fisheries Resource Conservation Council

Their 2009 Annual Report

The Fraser Basin Council

2009 State of the Fraser Basin Report: Sustainability Snapshot 4 The Many faces of Sustainability

Fraser Basin Council

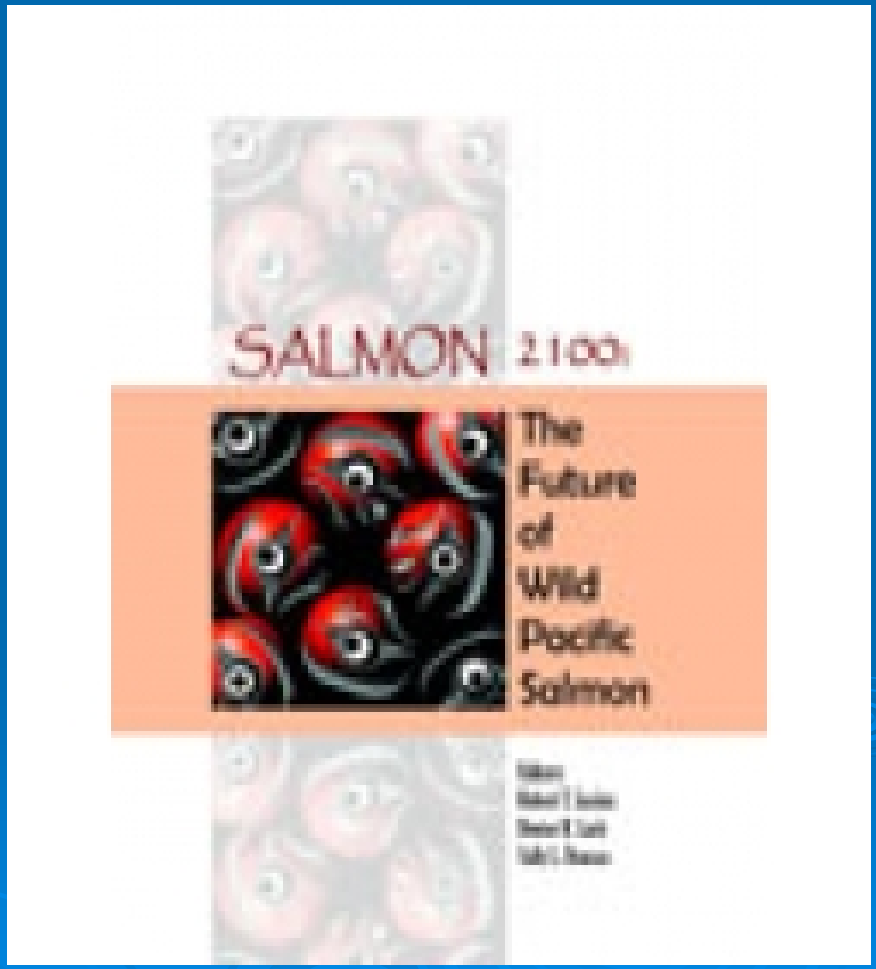
"inadequate information to support decision-making"

- **International Association for Impact Assessment Conference held recently in Geneva**
- **Green Economies**
- **Extracting and using less natural resources**

Salmon 2100

The views of 33 people on what the future holds for Pacific Salmon

Contributing author and co editor Dr. Robert Lackey



Sockeye Life Cycle

- Spawn in Chilko and Taseko Rivers
- Generally a 4 year life
- Rear in Chilko Lake
- Migrate to the ocean
- Rear in the Gulf of Alaska
- Return to natal stream to spawn

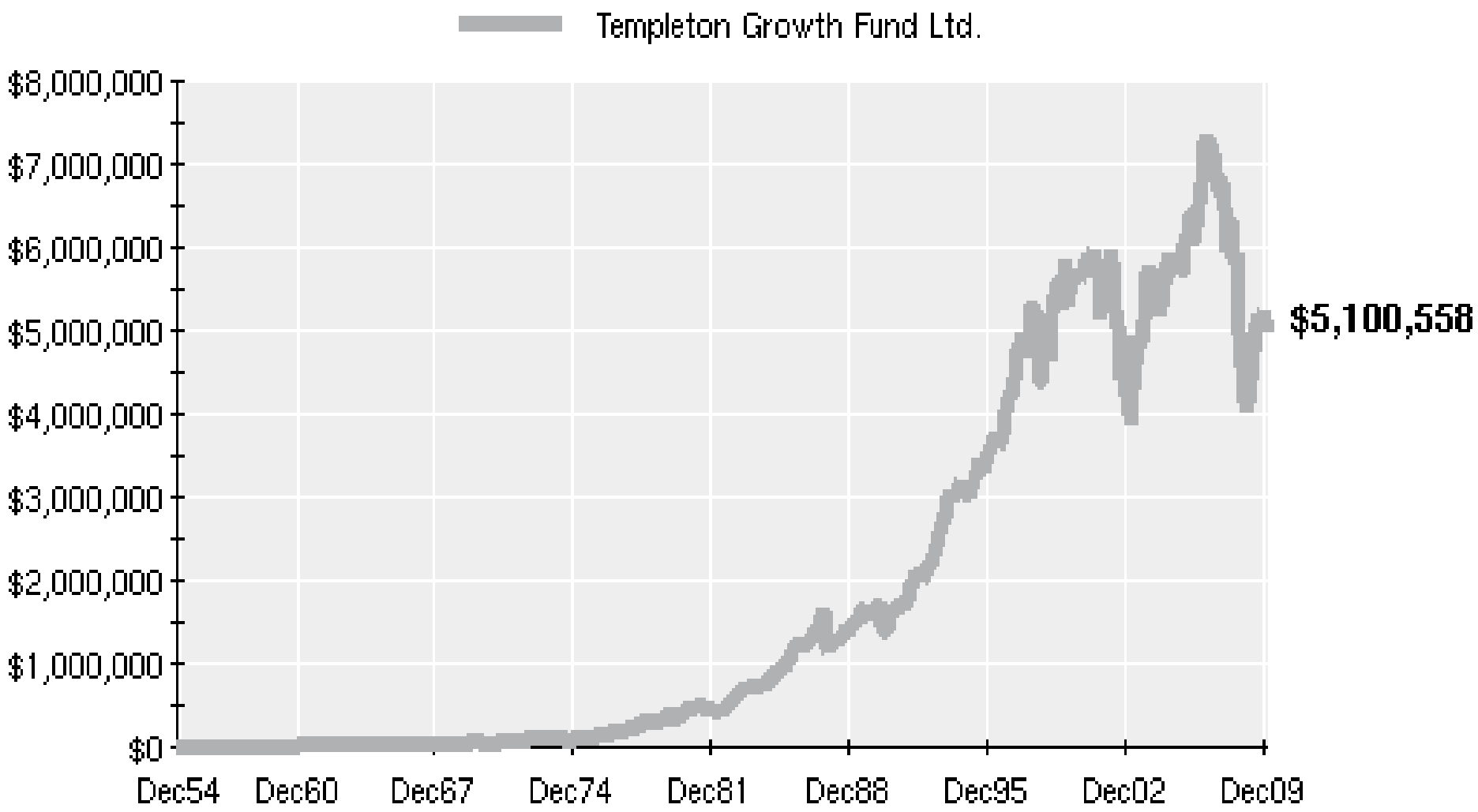
Chilko R Sockeye Run Size
1952 to 2008 Average

- Cycle Year 0 = 1952 / 2008 — 1,847,541
- Cycle Year 1 = 1953 / 2005 — 929,186
- Cycle year 2 = 1954 / 2006 — 1,275,048
- Cycle year 3 = 1955 / 2007 — 1,583,211

Sockeye Values

- First Nation for Food Social and Ceremonial Needs
- Commercial
- Sport Fishery
- The carcass value in stream and on land

$10,000 Investment



Sockeye Harvest

- Since 1952 the Chilko River has contributed an annual average of 1,012,864 to the Commercial and First Nation harvest

The Sockeye Economy

- From a company called Salmon Village
- $45.00 a side or $90 for two
- Worth more than copper by the pound and amazingly comes back every year

The Math

- $90 per fish
- FN and Commercial Fishery average Chilko River catch from 1952 to 2008 = 1,012,864
- = $ 91,157,760 per year for sockeye alone from the Chilko River
- Divide $5 billion by the above
- = 55 years

What will it be?

20 years of this

Or 55 years of this

What will it be?

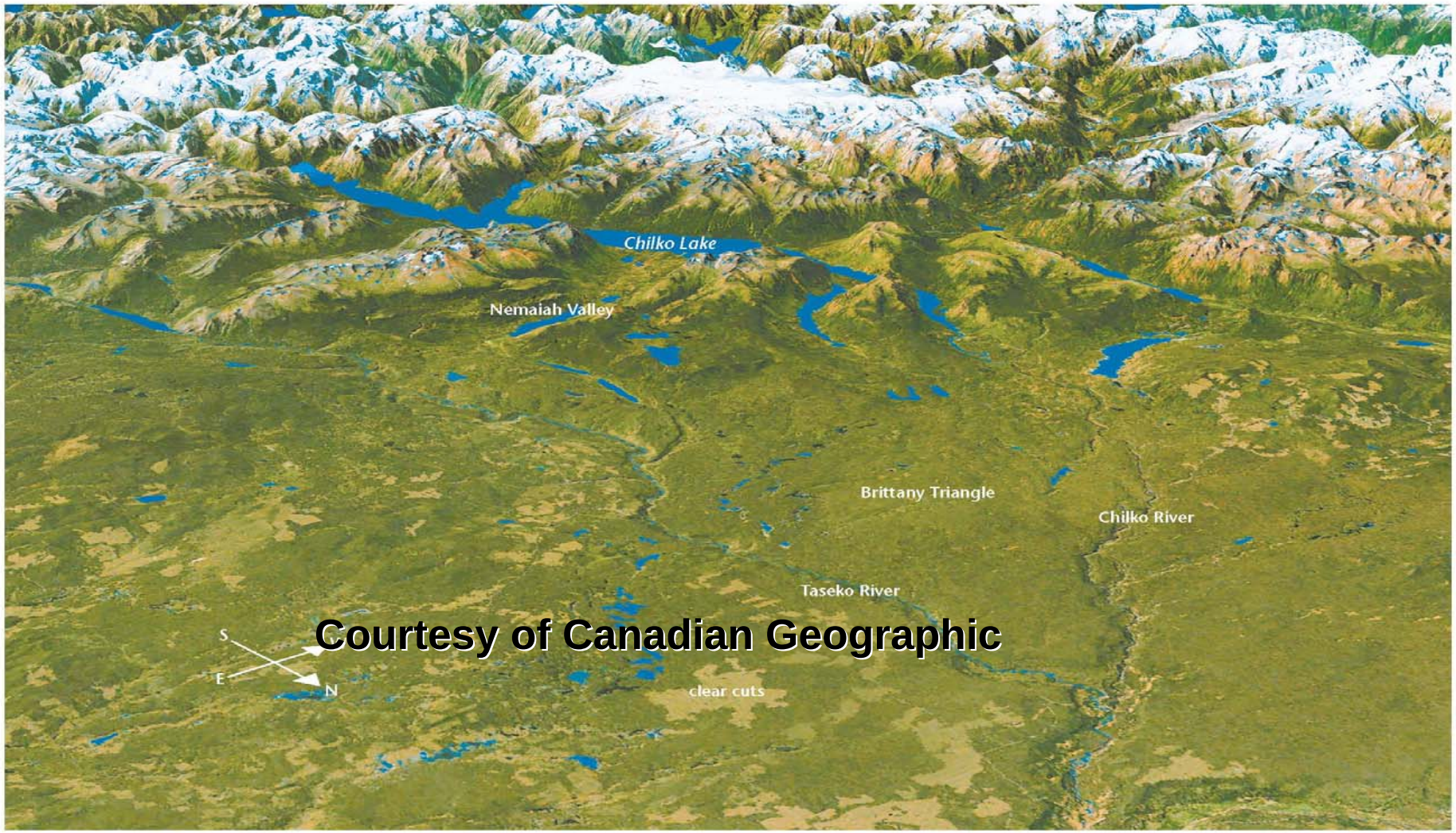
20 years to this

$ 5 billion dollars

Or 55 years to this

$ 5 billion dollars

The Real Gold is the Glaciers and Rivers of the Chilko River Watershed



Courtesy of Canadian Geographic

Sockeye
A Truly Sustainable and Valuable Natural Resource

Exhibit 78 – Speaking notes for Richard Holmes during his presentation

Slide 1
First of all I'd like to thank the Panel for providing the opportunity for all of us to speak and to share our thoughts on this proposal by Taseko Mines Ltd.

I 'd also like to thank the Anaham community for providing this venue in their traditional territory. I have worked in the fisheries sector as a fisheries technician, as an environmental consultant and a registered professional fisheries biologist in the Cariboo/Chilcotin for 30 years and I have always been made to feel welcomed by the Chilcotin people….and I thank you all for that. We share a lot of the same values.

The reason for my presentation today is based on the concerns presented in an earlier document prepared by Stratus Consulting Ltd. for the Tsilhqot'in National Government dated November 9, 2009. Titled "Comments on the Taseko Mines Ltd. Hydrometeorology Plan for the Proposed Prosperity Copper-Gold Project", the document provides the reader with potential environmental consequences should this project be granted approval. Taseko Mines has responded to these concerns by Stratus Consulting in a letter to the Panel and identified as Document No. 1821, and I thank Taseko Mines for further clarifying their position, however I understand a response is forthcoming from Stratus Consulting and that the issues between professionals on this topic remains in discussion and unresolved. Therein lies the problem. Many professionals do not agree with the Mine Plan, and I for one am doubtful that the water quality in the watershed will remain unscathed in perpetuity. Additionally I understand the fish compensation plan remains unresolved with Fisheries and Oceans Canada.

Of particular concern to myself and many others is the potential for acid mine drainage to negatively impact the salmon stocks of the Taseko and Chilko Rivers.

I don't wish to expand specifically on this hydrometeorlogical report, but I would like to present information on the historic and future value of the sockeye salmon that call this great watershed their home. I am here to spaek for the sockeye. Much has been stated recently about the economics of this mine, but I'm here to tell you that the real value of this watershed lies in the clean water it provides for our migrating salmon and for us. By the way in a recent National Geographic magazine titled Water, Our Thirsty World, it is stated that 97.5% of the world's water is salty, whereas 2.5% is freshwater, of which two thirds of that is frozen. Here with the Taseko and Chilko Rivers we have one of the greatest cold water contributors to the Fraser River, host of one of the greatest salmon rivers in the world.

The historic and future value of salmon……..this truly sustainable natural resource far exceeds the economic value associated with the Prosperity Project…..and I will get to this point after a brief presentation on what other people are saying about our west coast icon, salmon, and I'll provide you with some information on salmonids in the Chilko River watershed.

Additionally, I'll give you a brief overview of the life cycle of the Chilko River sockeye, their harvest and escapement numbers since 1952, and in closing, some simple math on the value of this truly sustainable resource.

Slide 2
This slide shows the fish species known to reside in the Chilko River and Rocky Quilt in the photo is being assisted by Chilcotin youngsters in landing a chinook salmon at Henry's Crossing. As you can see by the list, the Chilko River watershed is a great system for salmonids and deserves the utmost protection from further negative anthropogenic influences. I have been lucky enough to have worked as a professional fisheries biologist on more than a dozen fish and watershed projects within the Chilko River watershed since 2006…..all funded by initiatives submitted to funding agencies by the Xeni Gwet'in First Nation.

Perhaps Mr Bell Irving is aware of these reports, however he has never contacted me to discuss our findings, nor have I ever been contacted about the potential mitigation or compensation use of the University of Northern British Columbia's Quesnel River Research Centre which I manage in Likely, and is to this day a facility capable of producing 2 million fry.

The Xeni Gwet'in and the Chilcotin First Nations people get it…..what I mean by that is they understand how valuable the fishery resource is and how important it is to their culture and spirit.

Fish stocks around the world are in decline and we are the problem. The Xeni Gwet'in people are doing what they can to enhance, restore, and protect the fish in their watershed. We, collectively on the other hand seem very intent in making things as difficult as possible for most fish species to survive, let alone thrive.

Salmon are in trouble, specifically Fraser River salmon are in trouble, and I am not the only person who recognizes this. The Government of Canada and organizations such as the Pacific Fisheries Resource Conservation Council, the Fraser Basin Council, and world renown scientists such as Dr Robert Lackey all suggest that this west coast icon needs our help to survive.

Slide 3
The Cohen Commission. This Commission was recently initiated after the Fraser River sockeye run returned in 2009 in disastrously low numbers…..the lowest in 50 years. The expected return was greater than 10.5 million, however the most recent estimate that I could find was 1. 5 million returns to the Fraser River in its entirety. Of that total estimated Fraser escapement in 2009, 4.2 million were destined for the Chilko River. These figures are based on a 50% probability estimate. The final escapement estimate for the Chilko River was 271,000 based on field data collection.
The Cohen Commission website provides the following description of Phase II of their mandate:
"Phase two will investigate and make independent findings of fact regarding: the causes for the decline of Fraser River sockeye salmon including, but not limited to, the impact of environmental changes along the Fraser River, and so and so on……
The Chilko River watershed deserves our protection, and to me, it does not make economic sense to place this truly sustainable resource at any risk whatsoever through the development of the Mine Plan as currently presented by Taseko Mines Ltd. I believe the watershed and its fishery resource are being placed at risk through this proposed development. The recent Stratus report and the Panel's related correspondence with Taseko Mines presents information that brings into question the eternal safety of the local watersheds from a mine footprint that cannot predict with 100 % confidence that things will simply be ok. Eternal is a very long time…….I suppose it could be considered longer than the sockeye's presence on Earth….. which is by the way about 3 to 20 million years…….which is a number that will become important by the end of my presentation.

Slide 4
The Pacific Fisheries Resource Conservation Council (PFRCC) was established to provide independent advice to both the BC Ministry of Environment and Fisheries and Oceans Canada on Pacific salmon and their ocean and freshwater habitat. In their 2009 Annual Report the following may be of interest to those of you here:

The community meeting reports continued to reflect the widespread public dissatisfaction with the effort of
governments to maintain salmon habitat and fortify wild salmon populations. The perception observed by the
Council members is that British Columbians have considerably higher expectations of salmon protection than
government agencies are willing or able to deliver."

And another quote from their annual report states:

"The Council has taken a strong position that an ecosystem-based approach to wild salmon management could offer substantial advantages over the single-species and area management models that have been limited by their emphasis on immediate life history factors and have not adequately accounted for the impacts and interaction of environmental matters such as trophic levels, food and inter-species predation. This will require a shift in research towards emphasizing much broader biological monitoring and the modeling of ecosystems as crucial management initiatives, and a better sense of the conditions of natural variability affecting salmon and steelhead. Exploration and discovery resulting from these initiatives will lead to paradigm shifts that, more than just having more tools, will enable success with ecosystem-based management."

For reference it should be noted that a Chilko River Watershed Roundtable was formed a few years ago hosted by the Xeni Gwet'in First Nation and the members meet on a regular basis. The Roundtable is in the early stages of developing ecosystem based management for the Chilko River Watershed.

Slide 5
This document states *"While the Fraser River remains one of the most productive Pacific salmon rivers in the world, overall trends are not positive, and climate change is likely to make things worse. Many factors have contributed to the decline of salmon stocks, including mixed-stock fishing, poor ocean survival,* ***habitat deterioration (including water quality and quantity), and in some cases, inadequate information to support decision-making"***

Obviously from this statement from the Fraser Basin Council, mining is not the only culprit in the demise of sockeye salmon, however they do point out that water quality and quantity, along with ***inadequate information to support decision-making****"* are concerns that we must address while assessing the merits of this project.

Will water quality and quantity be protected, and do we and the Panel have enough information from the proponent to make an informed decision? Although not project specific, even the Fraser Basin Council suggests we have inadequate information to support decision making in order to protect salmon in the Fraser River.

Slide 6
And speaking of **"*inadequate information to support decision-making"*** , a related conference was held recently on April the 8th in Geneva.

"The 30th Annual Conference of the International Association for Impact Assessment (IAIA), hosted by the United Nations Environment Programme (UNEP), looked at the five sectors that have been identified as key green investment opportunities: agriculture, industry, tourism, cities and transportation.

The International Association for Impact Assessment (IAIA) is a global network for best practice in the use of impact assessment for informed decision making regarding policies, programs, plans and projects.

UNEP's Green Economy Initiative (United Nations Environment Program)
(http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=620&ArticleID=6523&l=en&t=long

Led by UNEP, the Green Economy Initiative (GEI) of the UN is designed to assist governments in "greening" their economies by reshaping and refocusing policies, investments and spending towards a range of sectors, such as clean technologies, renewable energies, water services, green transport, waste management and sustainable agriculture and forests.

As the governments around the world are devising responses to the challenges posed by financial, economic, food, fuel and climate crises, the GEI offers convincing macroeconomic evidence and technical advice for focusing policy and investment packages on key economic sectors as a means of stimulating economic development, creating jobs and addressing poverty, ***while reducing greenhouse gas emissions, extracting and using less natural resources and creating less waste.*** "

There is no denying that there is s global shift to a Green Economy, and we will all be better off as a result. Sockeye salmon are part of the Green Economy. At the request of Fisheries and Oceans Canada, the Xeni Gwet'in First Nation as well as the Tsilquot'in National Government are both submitting proposals in 2010 for demonstration fisheries to harvest, process, prepare as value added a variety of products, and market Chilko River sockeye. These people understand the Green economy because this what has been keeping them alive since time immemorial.

Nobody, and I mean nobody looks after a watershed better than the people who live in it and experience its needs on a daily basis. A clean healthy watershed has a symbiotic-like relationship with the people who reside within. Look after it and it will look after you.

Slide 7
I'd like to talk a bit about a book that I have been reading co-edited and co-authored by Dr. Robert Lackey, a world renown fisheries scientist who most recently retired from the US EPA and continues to teach at Oregon State University. ***The Salmon 2100 Project began in 2002 as a response to the apparent dichotomy between public and private understanding of the likely future of wild salmon in the region. The overarching goal of the Project was to assess the potential policy options needed to protect and restore wild salmon runs from southern British Columbia southward to California.*** In a chapter co-authored by Jack E. Williams and Edwin P. Pister titled "Lifestyles and Ethical Values to Sustain Salmon and Ourselves" the authors state ***"If wild salmon are to survive and prosper into the next century, humans must come to grips with the simple fact that our lifestyles directly affect land and water resources – and hence, we must learn to reduce our demands on the environment. Presently, the combination of a growing human population and an increasing per capita demand for resources is leaving less and less for salmon and all other species."*** I am forever an optimist, however I honestly don't believe that Pacific salmon, and the current Mine Plan can coexist in the Chilko River watershed. Society will make a decision on what is most important through this process hosted by the Panel, and through their advice to our elected Parliament. This will determine what we value the most……will it be a short term boost to the local economy through the development of this mine, or the protection of an everlasting legacy of returning salmon and the value it brings not only to us, but to the more than 137 species of fish and wildlife that depend on salmon for survival…..to say nothing of the plant life that is also reliant on this true gift of Nature.

Slide 8
Now a bit about Chilko River sockeye. Most of you in this room know the sockeye life cycle but I'll take a moment to provide a brief overview.

Slide 9
I am providing this data to show you that the Chilko River is one of the greatest sockeye salmon rivers in Canada and indeed the world. Its run size averages 1,416,445 per year and has been as high as 4.6 million in 1991 and as low as 140,000 in 1965, and a reminder that last year was 271,000 for the Chilko River and the lowest returns in the entire Fraser River in 50 years.

The data is based on a 4 year cycle as can be seen by this slide….so 2009 would be year 1 again and this year would be year 2 of the cycle.

Slide 10
Sockeye salmon have a variety of values, all of which can be researched and I suppose an actual dollar value placed on all of these. So as not to bore you to tears I'll only be presenting some brief overview information on the commercial and First Nation fishery and how it compares in value to the $ 5 billion dollars proposed spending by Taseko Mines.

But you have to be willing to think long term returns on this investment……..much like comparing the Templeton Growth Fund say……to gambling in Las Vegas….or indeed Vancouver as our own Provincial government provides this opportunity for risk takers. The Templeton Growth Fund for those who are not familiar with it was initiated in 1954 and had you invested $10,000 in 1954, it would have been worth $5.1 million dollars at the end of 2009.

So what I am suggesting to you, is that there is nothing wrong with a slow low risk investment such as the sustainable Chilko River sockeye run in comparison to the risk and gamble of the Taseko Mine Plan.

Slide 11
So I ask you again, what is wrong with a slow, steady investment. The investment here in this case is environmental protection, enhancement and monitoring of a natural resource that can pay us annual dividends…..into perpetuity. Perpetuity is a very long time…..much longer than a 20 to 33 year mine life.

And the mine plan does not provide us with a 100 % guarantee that things will be ok……into perpetuity. Whereas the salmon have been dependable and something the Chilcotin people have been able to rely on since time immemorial.

It is incomprehensible to me that we would put this truly sustainable and reliant resource in jeopardy, and yes I know the Taseko Mines folks here will say we have all the bases covered……well I don't buy that. One only has to type ***tailings pond failures*** into a search engine to get 44,800 hits…..and no I didn't read them all…only the first few that showed tailings pond failures as recently as 2009. These are facilities I am sure that had to go through a similar government approval process as this, and with qualified professionals providing the data much like this process…..***well you know what…… these facilities failed.***

Slide 12
Getting back to the sockeye, since 1952 the Chilko River has contributed an annual average of 1,012,864 to the Commercial and First Nation harvest.

Slide 13
Let's take a quick look at the sockeye economy. Here we have a side of smoked sockeye from Salmon Village and this side of sockeye can be had for $45.00 or two for $90.00. Maybe 3 pounds per side…so about $15.00 per pound. The fisherman would have received much less as always.

Slide 14
Admittedly this exercise has been selective by choosing sockeye and a fairly high value processed product. However, this can be offset for those of you who believe the estimates of value to be too high by acknowledging the following:
1.) No data is included for the value of the ocean sport fishery which can easily be measured in the $10s of millions of dollars where individual fish can have a market value of more than $1000 based on services provided by high end resorts
2.) No data included for chinook and coho for sport, commercial and First Nation harvest
3.) No $$$ value placed on nutrient delivery of the escapement

4.) No $$$ value placed on the Chilko sport fishery for non anadromous fish
5.) No $$$ value placed on roe for Japan and offal for feed plants

This simply is an exercise to help you recognize the value of the sockeye from the Chilko River system that includes the Taseko River.

And for consideration as well for those of you who believe that this a best case scenario, sort of a rose coloured glasses point of view, well……those of you in business…..especially the mining sector will understand this approach I'm sure.

Nevertheless let's get back to the sockeye math…. Say we get $90 per smoked sockeye (and it does go much higher than this) and the FN and Commercial catch averages 1,012, 864 per year. This results in a potential $91,157,760 per year. If we round off a few numbers…..say the $90 to $100 and reduce the catch to 1,000,000, this gives us $100,000,000 per year, or 1 billion in 10 years and 5 billion in 50 years.
Slide 15
So I ask you, what is best for the local , the BC, and the Canadian economy over the long term. And here we are only presenting rough figures for 50 to 55 years and not hundreds or thousands or millions of years that the sockeye have been around historically, and we can only guess at what the future holds…..it's really about modeling and projections……much the same as the Mine Plan.

It's about making a decision on the future with the best information that you have. This did not work for Fisheries and Oceans Canada in 2009 when the best information they had suggested the Chilko River run should have had an escapement of 4.2 million sockeye and only 271,000 returned. This is the result on the most studied sockeye system in Canada, if not the world, where every fry is counted out of the system. Dozens of technicians, biologists and scientists work on this project on an annual basis and have an incredible amount of historical data at their fingertips. Even so, with volumes and volumes of information, much like this mine plan, things did not go as planned. Things can go wrong that are out of our control…..it's tough to admit this as professionals.

Nature is obviously unpredictable.

Slide 16
So I ask you once again what are we as a Society willing to risk? 20 years for $5 billion dollars through mining, or 55 years for $5 billion dollars through a sockeye fishery. I know which one I feel comfortable with.

Slide 17
Let's take a quick look at the area we are discussing today through an overview image provided a few years ago in a Canadian Geographic article on wild horses. Look at the glaciers, lakes and rivers that nourish the Chilcotin people. What an incredible wealth. Most countries in the world would simply love to have that water, to say nothing of the flora and fauna provided by the local landscape.

Slide 18
Here is the real sustainable natural resource that should be on everyone's mind. Why not a slow Green Economy based on sockeye and other species whose waste is actually beneficial to the rivers and local landscape?

Slide 19
In summary and with all due respect to Taseko Mines Ltd., I once again want to state that I do not have enough confidence that your mine footprint will not impact the Taseko and Chilko Rivers, and ultimately Fraser River sockeye and the other species of fish that reside in this great watershed.

The only reason we are indeed discussing this issue here today was due to the addition of Schedule 2 of the Metal Mining Effluent Regulation of the Fisheries Act in 2002. Much has been said about subsidies to the salmon fishery and indeed global fisheries in general, but I'm here to tell you that the Canadian mining industry received the biggest government subsidy they could ever have imagined when this was granted.

While related government policy has changed to address the economic needs of our society through the relaxation of environmental conditions that may enable similar projects to move forward, government policy has not kept abreast of our ever changing need to protect the environment. In fact current government policy has not protected the Fraser River sockeye well enough resulting in the establishment of the Cohen Commission. The cumulative effects of what we do as a Society, is the real problem facing sockeye salmon today, and I believe the Cohen Commission's work will provide such evidence.

Sockeye salmon do not need another threat or challenge placed in front of them. Sure they are resilient, they've been with us a long time as I have stated earlier. However we must think of future generations. Gold or copper are not some rare metal that is going to cure cancer or some other debilitating or deadly disease. Sure mining brings in taxes and good paying jobs that help pay for society's needs such as cancer clinics and hospitals, but so does a Green economy, and this project is simply too risky in my mind. We obviously need mines, and indeed I have worked for mining companies, but we do not need a mine here in the headwaters of this very important salmon producing watershed.

Slide 20
Sockeye salmon are truly a sustainable resource and with our care and protection can nurture us environmentally, socially, and indeed economically for thousands of years into the future. Or as stated earlier in this presentation 3 to 20 million years into the future In closing, I'd like to leave Taseko Mines with 2 questions……and 1 comment.

1.) If this project is granted approval against the wishes of the Chilcotin people, many of whom are with us here today, what sort of a relationship do you think you will have with them……..in view of your relationship with them now? ……..And secondly

2.) If you are successful in moving this project forward, what sort of a legacy to you plan to leave behind? Obviously the Fish Lake landscape will be very generous to you. Neither you nor I , nor anyone else on earth provided you with that wealth in the ground in that area, it was created by the earth. How will you be paying Her back……and this is over and above jobs, and taxes, a man made lake, etc. which is all the cost of you doing business. I am asking once again how will you choose to balance the books with Nature on what you will be receiving. What will your legacy be when you leave…….simply a man made lake, grass and trees planted, and a quick wave goodbye and a thank you very much, or will you be leaving a legacy behind that you can be proud of to offset the generosity that the landscape will be giving you valued in the billions of dollars? How will you repay Her?

Comment:
When you can show me or prove to me that you can create copper and gold, then I will believe you when you say that you can create a lake. Your arrogance towards Natural capital is astounding, and you will never replace Teztan Biny with something of equal or greater value.

I'd like to thank the Panel for providing me with this opportunity to speak. You have been tasked with a very difficult bit of work. I would urge you to think long term in your decision, far beyond the 20-33 years of this project's life and recognize that the Chilcotin people, "these people of the Chilcotin River" and the salmon they are so reliant on…….they do not need another obstacle in their path to the future.

Thank you for your time.

Additional Information requested by the Panel Chair during questioning of Mr. Holmes by the Panel.

Chilko Sockeye

Adults Only

Means

Year	Cyc	Marine Catch	Mrne ER	FRFN Catch	FRFN ER	Total Catch	Total ER	Spawn. Escape.	Enroute Loss	Total Run
	0	1,216,360	66%	125,748	7%	1,343,367	73%	479,058	17,947	1,847,541
	1	618,849	67%	45,543	5%	665,307	72%	250,514	13,365	929,186
	2	819,482	64%	98,285	8%	919,982	72%	313,195	41,860	1,275,048
	3	978,674	62%	118,533	7%	1,099,194	69%	471,402	12,615	1,583,211
	All	913,745	65%	97,531	7%	1,012,864	72%	380,306	121,897	1,416,445
1958	1969	752,855	70%	40,622	4%	793,477	74%	272,288	0	1,073,284
1970	1981	841,835	75%	58,240	5%	900,075	80%	219,901	0	1,121,433
1982	1993	1,720,923	74%	148,154	6%	1,869,078	80%	446,352	11,642	2,327,071
1994	Present	430,464	40%	128,156	12%	563,383	52%	462,517	56,803	1,082,703

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Year	Cyc	Marine Catch	Mrne ER	FRFN Catch	FRFN ER	Total Catch	Total ER	Spawn. Escape.	Enroute Loss	Total Run
1952	0	1,182,185	69%	51,058	3%	1,233,243	72%	485,585		1,718,828
1953	1	606,592	73%	18,850	2%	625,442	76%	200,691		826,133
1954	2	198,089	82%	8,901	4%	206,990	86%	34,296		241,286
1955	3	519,702	78%	25,620	4%	545,322	82%	121,167		666,489
1956	0	1,175,300	63%	36,601	2%	1,211,901	65%	646,906		1,858,807
1957	1	435,443	73%	19,082	3%	454,525	77%	138,464		592,989
1958	2	601,147	82%	11,981	2%	613,128	84%	120,104		733,391
1959	3	976,028	66%	32,962	2%	1,008,990	69%	463,060		1,472,050
1960	0	1,966,814	80%	60,248	2%	2,027,062	83%	426,546		2,453,608
1961	1	112,530	71%	7,567	5%	120,097	75%	39,101		159,198
1962	2	200,166	67%	21,168	7%	221,334	74%	77,713		299,047
1963	3	1,110,028	50%	116,432	5%	1,226,460	55%	998,231		2,224,691
1964	0	646,823	60%	95,835	9%	742,658	69%	238,272		1,070,990
1965	1	99,786	71%	5,533	4%	105,319	75%	35,335		140,654
1966	2	736,381	75%	30,684	3%	767,065	79%	209,619		976,684
1967	3	928,701	82%	23,723	2%	952,424	84%	174,715		1,127,139
1968	0	1,379,905	74%	76,223	4%	1,456,128	78%	413,862		1,869,990
1969	1	275,949	78%	5,112	1%	281,061	80%	70,902		351,963
1970	2	576,986	76%	48,915	6%	625,901	82%	135,388		761,289
1971	3	1,850,984	90%	41,948	2%	1,892,932	92%	157,193		2,050,125
1972	0	1,744,349	73%	77,840	3%	1,822,189	76%	562,650		2,384,839
1973	1	378,922	85%	12,863	3%	391,785	88%	55,675		447,460
1974	2	502,776	76%	46,357	7%	549,133	83%	110,026		659,159
1975	3	454,693	58%	83,141	11%	537,834	69%	244,631		782,465
1976	0	1,468,401	74%	135,255	7%	1,603,656	81%	384,390		1,988,046
1977	1	251,062	79%	16,307	5%	267,369	84%	51,330		318,699
1978	2	481,761	71%	47,110	7%	528,871	78%	146,842		675,713
1979	3	1,101,067	77%	71,962	5%	1,173,029	82%	258,391		1,431,420
1980	0	1,113,208	64%	103,687	6%	1,216,895	70%	497,759		1,732,131
1981	1	177,807	79%	13,497	6%	191,304	85%	34,540		225,844
1982	2	818,952	70%	105,831	9%	924,783	79%	249,578		1,174,361
1983	3	1,139,048	67%	181,124	11%	1,320,172	78%	382,833		1,703,005
1984	0	3,174,455	79%	254,587	6%	3,429,042	86%	580,179		4,009,221
1985	1	598,589	86%	24,035	3%	622,624	90%	71,975		694,599
1986	2	937,137	68%	150,736	11%	1,087,873	79%	293,804		1,381,677
1987	3	1,333,683	70%	151,876	8%	1,485,559	78%	421,015		1,906,574
1988	0	344,573	41%	141,457	17%	486,030	57%	363,389		849,419
1989	1	443,147	84%	20,690	4%	463,837	88%	63,381		527,218
1990	2	3,562,875	77%	233,570	5%	3,796,445	82%	825,837		4,622,282
1991	3	3,107,286	71%	222,488	5%	3,329,774	76%	1,037,737		4,367,511
1992	0	2,519,935	75%	186,766	6%	2,706,701	81%	511,267	139,701	3,357,669
1993	1	2,671,400	80%	104,692	3%	2,776,092	83%	555,226		3,331,318
1994	2	1,676,931	67%	267,496	11%	1,944,427	78%	450,745	107,851	2,503,023
1995	3	467,173	36%	313,969	24%	781,142	59%	534,559		1,315,701
1996	0	718,302	35%	331,677	16%	1,049,979	52%	974,349		2,024,328
1997	1	2,316,623	67%	166,911	5%	2,483,534	72%	985,827		3,469,361
1998	2	504,859	27%	148,338	8%	653,197	34%	879,017	364,318	1,896,532
1999	3	86,432	8%	67,666	6%	154,098	14%	891,922	76,549	1,122,569
2000	0	518,954	37%	114,232	8%	640,695	46%	758,941		1,399,636
2001	1	97,973	11%	81,500	10%	183,397	22%	668,783		852,180
2002	2	172,475	27%	83,784	13%	263,625	41%	382,814		646,439
2003	3	566,232	36%	256,091	16%	850,133	55%	608,321	100,058	1,558,512
2004	0	245,012	45%	91,285	17%	343,923	63%	91,909	110,545	546,377
2005	1	198,069	18%	140,963	13%	347,912	32%	535,967	187,115	1,070,994
2006	2	502,212	39%	171,121	13%	696,973	54%	468,947	113,866	1,279,786
2007	3	60,383	14%	70,466	16%	130,849	30%	305,853	0	436,702
2008	0	47,189	11%	129,470	29%	180,396	40%	249,863	18,963	449,222
2009										
2010										
2011										
2012										

Chilko Sockeye

Adults Only

2004 Cycle

Year	Cyc	Marine Catch	Mrne ER	FRFN Catch	FRFN ER	Total Catch	Total ER	Spawn. Escape.	Enroute Loss	Total Run
1952	0	1,182,185	69%	51,058	3%	1,233,243	72%	485,585	0	1,718,828
1956	0	1,175,300	63%	36,601	2%	1,211,901	65%	646,906	0	1,858,807
1960	0	1,966,814	80%	60,248	2%	2,027,062	83%	426,546	0	2,453,608
1964	0	646,823	60%	95,835	9%	742,658	69%	238,272	0	1,070,990
1968	0	1,379,905	74%	76,223	4%	1,456,128	78%	413,862	0	1,869,990
1972	0	1,744,349	73%	77,840	3%	1,822,189	76%	562,650	0	2,384,839
1976	0	1,468,401	74%	135,255	7%	1,603,656	81%	384,390	0	1,988,046
1980	0	1,113,208	64%	103,687	6%	1,216,895	70%	497,759	0	1,732,131
1984	0	3,174,455	79%	254,587	6%	3,429,042	86%	580,179	0	4,009,221
1988	0	344,573	41%	141,457	17%	486,030	57%	363,389	0	849,419
1992	0	2,519,935	75%	186,766	6%	2,706,701	81%	511,267	139,701	3,357,669
1996	0	718,302	35%	331,677	16%	1,049,979	52%	974,349	0	2,024,328
2000	0	518,954	37%	114,232	8%	640,695	46%	758,941	0	1,399,636
2004	0	245,012	45%	91,285	17%	343,923	63%	91,909	110,545	546,377
2008	0	47,189	11%	129,470	29%	180,396	40%	249,863	18,963	449,222
2012										

Chilko Sockeye

Adults Only

2005 Cycle

Year	Cyc	Marine Catch	Mrne ER	FRFN Catch	FRFN ER	Total Catch	Total ER	Spawn. Escape.	Enroute Loss	Total Run
1953	1	606,592	73%	18,850	2%	625,442	76%	200,691	0	826,133
1957	1	435,443	73%	19,082	3%	454,525	77%	138,464	0	592,989
1961	1	112,530	71%	7,567	5%	120,097	75%	39,101	0	159,198
1965	1	99,786	71%	5,533	4%	105,319	75%	35,335	0	140,654
1969	1	275,949	78%	5,112	1%	281,061	80%	70,902	0	351,963
1973	1	378,922	85%	12,863	3%	391,785	88%	55,675	0	447,460
1977	1	251,062	79%	16,307	5%	267,369	84%	51,330	0	318,699
1981	1	177,807	79%	13,497	6%	191,304	85%	34,540	0	225,844
1985	1	598,589	86%	24,035	3%	622,624	90%	71,975	0	694,599
1989	1	443,147	84%	20,690	4%	463,837	88%	63,381	0	527,218
1993	1	2,671,400	80%	104,692	3%	2,776,092	83%	555,226	0	3,331,318
1997	1	2,316,623	67%	166,911	5%	2,483,534	72%	985,827	0	3,469,361
2001	1	97,973	11%	81,500	10%	183,397	22%	668,783	0	852,180
2005	1	198,069	18%	140,963	13%	347,912	32%	535,967	187,115	1,070,994
2009										
2013										

Chilko Sockeye

Adults Only

2006 Cycle

Year	Cyc	Marine Catch	Mrne ER	FRFN Catch	FRFN ER	Total Catch	Total ER	Spawn. Escape.	Enroute Loss	Total Run
1954	2	198,089	82%	8,901	4%	206,990	86%	34,296	0	241,286
1958	2	601,147	82%	11,981	2%	613,128	84%	120,104	0	733,391
1962	2	200,166	67%	21,168	7%	221,334	74%	77,713	0	299,047
1966	2	736,381	75%	30,684	3%	767,065	79%	209,619	0	976,684
1970	2	576,986	76%	48,915	6%	625,901	82%	135,388	0	761,289
1974	2	502,776	76%	46,357	7%	549,133	83%	110,026	0	659,159
1978	2	481,761	71%	47,110	7%	528,871	78%	146,842	0	675,713
1982	2	818,952	70%	105,831	9%	924,783	79%	249,578	0	1,174,361
1986	2	937,137	68%	150,736	11%	1,087,873	79%	293,804	0	1,381,677
1990	2	3,562,875	77%	233,570	5%	3,796,445	82%	825,837	0	4,622,282
1994	2	1,676,931	67%	267,496	11%	1,944,427	78%	450,745	107,851	2,503,023
1998	2	504,859	27%	148,338	8%	653,197	34%	879,017	364,318	1,896,532
2002	2	172,475	27%	83,784	13%	263,625	41%	382,814	0	646,439
2006	2	502,212	39%	171,121	13%	696,973	54%	468,947	113,866	1,279,786
2010										
2014										

Chilko Sockeye

Adults Only

2007 Cycle

Year	Cyc	Marine Catch	Mrne ER	FRFN Catch	FRFN ER	Total Catch	Total ER	Spawn. Escape.	Enroute Loss	Total Run
1955	3	519,702	78%	25,620	4%	545,322	82%	121,167	0	666,489
1959	3	976,028	66%	32,962	2%	1,008,990	69%	463,060	0	1,472,050
1963	3	1,110,028	50%	116,432	5%	1,226,460	55%	998,231	0	2,224,691
1967	3	928,701	82%	23,723	2%	952,424	84%	174,715	0	1,127,139
1971	3	1,850,984	90%	41,948	2%	1,892,932	92%	157,193	0	2,050,125
1975	3	454,693	58%	83,141	11%	537,834	69%	244,631	0	782,465
1979	3	1,101,067	77%	71,962	5%	1,173,029	82%	258,391	0	1,431,420
1983	3	1,139,048	67%	181,124	11%	1,320,172	78%	382,833	0	1,703,005
1987	3	1,333,683	70%	151,876	8%	1,485,559	78%	421,015	0	1,906,574
1991	3	3,107,286	71%	222,488	5%	3,329,774	76%	1,037,737	0	4,367,511
1995	3	467,173	36%	313,969	24%	781,142	59%	534,559	0	1,315,701
1999	3	86,432	8%	67,666	6%	154,098	14%	891,922	76,549	1,122,569
2003	3	566,232	36%	256,091	16%	850,133	55%	608,321	100,058	1,558,512
2007	3	60,383	14%	70,466	16%	130,849	30%	305,853	0	436,702
2011										
2015										

2009. Exceptions to this trend include late Shuswap, which is expected to be the largest component of the 2010 total return.

Based on the forecast approach that incorporates recent declining trends in stock productivity into the methods, there is a one in four chance (25% probability) that the return of Fraser River Sockeye Salmon will be at or below 7.0 million and a three in four chance (75% probability) that it will be at or below 18.3 million (Table 12). The mid-point forecast (50% probability) is 11.4 million. Given uncertainty regarding stock productivity through to 2010, two additional forecast approaches with different assumptions about productivity through to 2010 returns were also presented: productivity similar to the long term average and low productivity similar to the 2009 return year. Forecast methodology was reviewed on March 9, 2010 and the final research document, which includes the details of the forecasts associated with these alternate productivity scenarios, will be posted on the PSARC website at: www.pac.dfo-mpo.gc.ca/sci/psarc/.

Note that for the 2010 forecast, presentation of different probabilities that convey forecast uncertainty has changed. Historically, probabilities were described as "the probability of exceeding the specified forecast" with the lowest probability levels (e.g. 10p & 25p) associated with the highest forecasts. In the 2010 forecast, probabilities were described as "the probability of returning at or below the specified forecast". In this arrangement, the lowest probability levels (e.g. p10 & p25) are now associated with the lowest forecast. Hence the "old" 75p forecast is equivalent to the "new" p25 forecast (note the placement of the "p" to differentiate from previous years' notation). This new format is more appropriate from a conservation perspective.

Table 12. Pre-season sockeye return forecasts (at various probability levels) for 2010 by stock and timing group. Brood year escapements for recruits returning in 2010 and forecasted returns for 2010 are presented and colour coded relative to their 1980-2003 cycle average: red (< avg); yellow (avg); green (>avg).

Run timing group / Stocks	Forecast Model [b]	BY (06) (EFS)	BY (05) (EFS)	Prod. (-8yr)	Prod. (-4yr)	Ret 2010	Mean Run Size: all cycles [c]	Mean Run Size: 2010 cycle [d]	Probability that Return will be at/or Below Specified Run Size [a]: 10%	25%	50%	75%	90%
Early Stuart	RS4yr	15,900	51,000				304,000	113,000	**17,000**	**26,000**	**41,000**	**66,000**	**101,000**
Early Summer							--	--	**174,000**	**374,000**	**783,000**	**1,601,000**	**3,047,000**
(total exlcuding miscellaneous)							(504,000)	(797,000)	**(129,000)**	**(269,000)**	**(581,000)**	**(1,251,000)**	**(2,543,000)**
Bowron	RS4yr	600	900				21,000	20,000	400	700	1,300	2,500	4,600
Fennell	Power	8,000	3,000				29,000	26,000	9,000	16,000	31,000	56,000	90,000
Gates	KF	1,500	9,000				59,000	17,000	2,000	4,000	9,000	17,000	33,000
Nadina	Ricker-FrD-mean	4,500	12,000				79,000	22,000	9,000	16,000	30,000	60,000	107,000
Pitt	Ricker	20,000	33,000				60,000	55,000	7,000	12,000	26,000	53,000	96,000
Raft	Ricker-PDO	3,400	17,000				33,000	16,000	7,000	13,000	24,000	42,000	71,000
Scotch	KF	73,000	3,000				73,000	248,000	40,000	106,000	265,000	640,000	1,450,000
Seymour	RS4yr	57,000	2,000				150,000	393,000	55,000	101,000	195,000	380,000	691,000
Misc [e]	RS (Sc/Se)						--	--	13,000	58,000	134,000	242,000	302,000
Misc [f]	RS (Ra/Fe)						--	--	7,000	10,000	14,000	22,000	42,000
Misc [g]	RS (Ra/Fe)						--	--	24,000	35,000	48,000	76,000	144,000
Misc [h]	RS (Esum)						--	--	1,000	1,000	4,000	6,000	10,000
Misc [i]	RS (Esum)						--	--	0	1,000	2,000	4,000	6,000
Summer							**5,332,000**	**5,059,000**	**1,045,000**	**1,605,000**	**2,612,000**	**4,343,000**	**6,984,000**
Chilko [j]	RJ4yr (smolt)	71M	77M				1,740,000	1,900,000	864,000	1,273,000	1,958,000	3,011,000	4,435,000
Late Stuart	RS8yr	14,000	160,000				750,000	396,000	8,000	21,000	60,000	169,000	429,000
Quesnel	KF	90,000	800,000				2,350,000	2,200,000	111,000	215,000	438,000	909,000	1,727,000
Stellako	RS4yr	80,000	100,000				492,000	563,000	62,000	96,000	156,000	254,000	393,000
Late							**3,193,000**	**9,126,000**	**3,331,000**	**5,023,000**	**8,003,000**	**12,305,000**	**19,695,000**
(total exlcuding miscellaneous)							*(3,193,000)*	*(9,126,000)*	***(3,264,000)***	***(4,951,000)***	***(7,871,000)***	***(12,035,000)***	***(19,352,000)***
Cultus [j]	Smolt-Jack	400,000	100,000				17,000	18,000	5,000	6,000	9,000	14,000	19,000
Harrison [k]	Ricker-FrD-mean	91,000	57,000				58,000	NA	53,000	97,000	195,000	429,000	1,167,000
Late Shuswap	Ricker-cyc	1.2M	12,000				2,210,000	7,640,000	3,101,000	4,652,000	7,252,000	10,791,000	16,702,000
Portage	KF	11,000	8,000				55,000	90,000	8,000	18,000	42,000	99,000	221,000
Weaver	Ricker-FrD-peak	14,000	24,000				406,000	690,000	71,000	126,000	264,000	472,000	799,000
Birkenhead	KF	140,000	27,000				447,000	688,000	26,000	52,000	109,000	230,000	444,000
Misc. non-Shuswap [l]	RS (Weaver)								67,000	72,000	132,000	270,000	343,000
TOTAL							-	-	**4,567,000**	**7,028,000**	**11,439,000**	**18,315,000**	**29,827,000**
(TOTAL excluding miscellaneous)							*(9,333,000)*	*(15,095,000)*	***(4,455,000)***	***(6,851,000)***	***(11,105,000)***	***(17,695,000)***	***(28,980,000)***

a. probability that return will be at/or below specified projection.
b. see Methods & Appendix 1 & 2 for model descriptions.
c. sockeye: 1980-2006 (excluding miscellaneous stocks)
d. sockeye: 1980-2008 (excluding miscellaneous stocks)
g. North Thompson River
h. Nahatlach River & Lake
i. Chilliwack Lake and Dolly Varden Creek
j. Brood year smolts (not effective females)
k. Harrison are age-4 (2006 brood year) and age-3 (2007 brood year)
l. unforecasted miscellaneous Late Run stocks (Harrison L.)
e. unforecasted mis. Early Summer Stocks (Early Shuwap stocks: S.Thompson); return timing most similar to Scotch/Seymour
f. unforecasted misc. Early Summer stocks (N. Thomson tributaries; return timing most similar to Fennell/Bowron/Nadina).

Model definitions: Pi (Pine Island SST covariate); Ei (Entrance Island SST covariate); FrD (Fraser discharge); PDO (Pacific Decadal Oscillation (PDO) covariate); cyc (cycle line stock-recruit data only); KF (Ricker model using Kalman Filter for 'a' parameter estimation); RS4yr (product of R/S from last 4 brood years & EFS in brood year); RJ4yr (product of R/smolt from last 4 brood years & smolts in brood year);RS8yr (product of R/S from last 8 brood years and EFS in brood year); R/S (used for stocks with no recruit data: product of R/S for stocks as indicated and EFS).

Fraser Sockeye Escapement Plan

2010 Escapement Strategy and Harvest Rate Calculations: The Fraser River Sockeye Spawning Initiative (FRSSI) was undertaken to develop escapement strategies for Fraser River sockeye. Consultations are on-going with Regional and Sector advisory processes for feedback on 2010 Fraser Sockeye escapement objectives. Appendix 12 outlines the background for the escapement options for Fraser Sockeye in 2010 shown in Tables 13(a) and 13(b) and will also be available as a stand alone document on DFO's Consultation website.

FRSSI uses a simulation model to evaluate different management objectives and assumptions about stock dynamics in a consistent framework. The FRSSI model was developed to improve our understanding of the complex interaction between the population dynamics of individual stocks and escapement strategies that, due to practical constraints on in-season management, are applied to groups of stocks. The model currently includes 19 stocks (i.e. production units