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Financial Considerations
Associated with Potential SARA
Listing of Sakinaw & Cultus Lake
Sockeye

September 10, 2004

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Presented Nov. 9/2004
Stakeholders / Rosevic
Com Fish + Stena Club

Purpose

- Describe the technical analysis
- Highlight the potential financial impacts associated with the SARA listing of:
 - Sakinaw Lake Sockeye
 - Cultus Lake Sockeye
 - Both Sakinaw and Cultus

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- Alternative harvest levels are designed to address conservation concerns for Sakinaw and Cultus Lake sockeye populations.

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Salmon Landed Value Contribution to Total Fishing Industry

	Landed Value (\$ millions)				Total
	Salmon	Herring	Groundfish	Shellfish	
1982	183	36	28	9	256
1986	276	46	39	21	382
1990	273	82	90	42	487
1994	260	95	129	93	577
1998	54	37	127	94	312
2002	57	47	153	107	364

- in the early 1980's salmon was the dominant contributor to total landed value (71% of total landed value in 1982 ; 72% in 1986)
- salmon's dominance eroded during the 1990's and by 2002 salmon represented a mere 16% of total landed value

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Fraser River Sockeye Contribution to Salmon Coast-Wide Landed Value

Year	Salmon Landed Value (\$ 000's)	Fraser Sockeye Landed Value (\$ 000's)	Percentage Total Landed Value
2000	52,429	12,589	24%
2001	37,173	2,794	8%
2002	57,338	25,726	45%
2003	48,115	11,320	24%

- Fraser River Sockeye provide a significant contribution to coast-wide salmon landed value (range of 8%-45%).
- Fraser River Sockeye are only harvested in the Southern Coastal Areas of BC. The Allocation Policy for Pacific Salmon provides direction on harvest of all salmon.
- Potential changes in harvest of Fraser River sockeye will impact First Nations, commercial, processing and recreational sectors, and communities in the southern half of BC.

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Mary

I'll be attending the Prov briefing today, but may be a bit late. Sorry I have attend to an other matter.

Cory yesterday you were asking why 2001 catch of Fraser River sockeye was low. There are 2 main reasons. First, conservation concerns for both Late run sockeye and Early Summer placed limitations on access to Summers. There was a limit of 17% ER for Lates and this translated into an agreed maximum of 60% for Summers. Second, the actual run size was about 7M or about half of the 50p forecasted level of 12.9M.

Paul Ryall
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Sakinaw & Cultus Fishery Background Information

- Numerous sockeye stocks co-mingle on their return through Johnstone and Juan de Fuca straits
- They are caught by a variety of First Nations, commercial and recreational fishers
- Weak stocks may be harvested at exploitations rates suitable for the strong stocks
- Conservation measures applied to protect Sakinaw and Cultus will constrain fishing opportunities on (and catch of) abundant co-migrating sockeye stocks, thus reducing income and employment
- Sakinaw and Cultus stocks are affected by habitat and environmental changes

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• Important to note that Sakinaw and Cultus Lake sockeye populations are small populations which are insignificant to overall salmon harvest in southern BC. Since these two populations co-mingle with more abundant Fraser River Sockeye populations, conservations measures will protect not only Sakinaw and Cultus Lake sockeye, but also co-migrating Fraser River sockeye populations, thereby resulting in foregone income and employment opportunities.

Sakinaw & Cultus Biological and Geographic Background Information

- Sockeye have multi-year life histories that result in 4 year cycles (2006 being the dominant year).

Sakinaw Lake Sockeye

- Sakinaw Lake is located in the Sechelt Peninsula and is not part of the Fraser River system.
- Sakinaw sockeye migrate with early summer and summer Fraser River sockeye stocks.

Cultus Lake Sockeye

- Cultus Lake is located in the Fraser River system at the Fraser-Vedder junction.
- Cultus sockeye migrate with summer and late Fraser River Sockeye stocks.

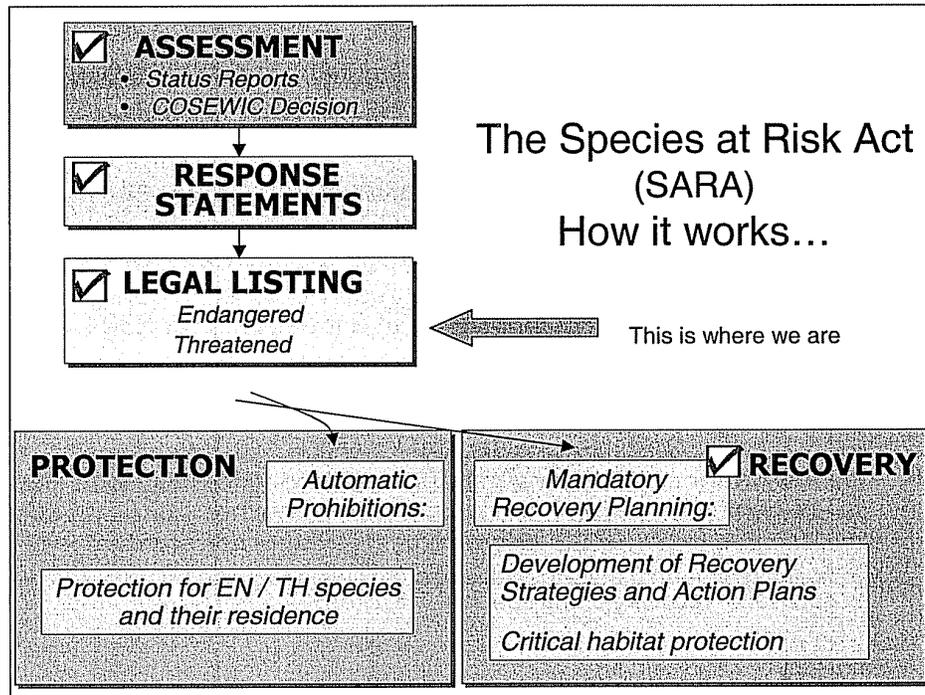
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- manages*
- DFO Fraser River sockeye stocks under four broad run timing groups:
 - Early – Late June to Mid July
 - Early Summer – Mid July to Late July
 - * • Summer – Late July to Mid August
 - Late – Mid August to Early October
 - Fraser River Summer runs historically make up the bulk of the commercial fishery.

Legislative Background Information

- In 2002, COSEWIC designated Sakinaw and Cultus as endangered.
- In 2003, COSEWIC requested emergency listing.
- Former Minister of Environment agreed not to emergency list in response to proposed protective measures for 2004. These included:
 - Enhancement,
 - Habitat work and predator control, and
 - 10-12% Exploitation Rate (ER)
- If listed, further restrictions may be required to comply with SARA, which provides full protection by allowing:
 - no direct harm (i.e. direct harvest)
 - no indirect harm (i.e. incidental by-catch) if it jeopardizes “the survival or recovery of the species” 73.(1)(c).

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This flow chart also outlines the main elements of the Act

A. ASSESSMENT - COSEWIC reviews status reports and determines a status designation.

- Following the COSEWIC designation, a RS must be prepared by the responsible Minister and posted on the public registry within 90 days. Includes ACT of designation and ID of lead jurisdiction and partners.

B. LEGAL LISTING – GIC reviews status designation and must make a decision whether to legally list within 9 months.

C. PROTECTION - Mandatory prohibitions on harming listed extirpated, endangered and threatened species and their residences.

D. RECOVERY - Mandatory preparation of recovery plan for extirpated, endangered and threatened species and preparation of a management plan for species of special concern. Protection for critical habitat.

Provisions taking effect immediately include COSEWIC species assessments and designations, the listing process and recovery planning.

Provisions taking effect in June 2004 are automatic prohibitions

Harvest Scenarios and Listing Options

- Three harvest scenarios were analyzed:
 1. Recent historical level: 20-25% ER
 2. 2004 target of 10-12% ER
 3. Less than 5% ER
- For each of the ~~above~~ harvest scenarios, 3 options were considered:
 1. List only Sakinaw
 2. List only Cultus
 3. List both Sakinaw and Cultus

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- The Exploitation Rates (ER) analyzed are for the Sakinaw and Cultus only, not the overall ER on Fraser River Sockeye.
- Recent historical ER is reflective of recent history – late 90's to 2003.
- 2004 Target ER is reflective of what was in place for the 2004 southern sockeye fishery.
- Less than 5% is reflective of what may be required if stocks continue to decline or if there is a legal listing.

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Catch Projection Methodology (1)

- Catch projections were estimated using the Fraser Panel Pre-Season Model.
- The model was created to help develop pre-season fishing plans for Fraser Sockeye and pink Salmon.
- Model is a 'box-car' type model that simulates the movement of Fraser River sockeye through all fishing areas, including US waters.
- Model was published in the Canadian Journal of Fisheries and Aquatic Sciences (Vol. 51).

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•Although Sakinaw Lake sockeye does not reside in the Fraser River system, it was incorporated into the model in order to address 2004 conservation concerns.

Catch Projection Methodology (2)

- The model calculated total catch for each harvest scenario and listing option based on:
 - Exploitation Rate (ER)
 - Forecast return (run size) by stock/~~stock~~,
 - Escapement goals,
 - Run timing and distribution, and
 - Diversion rate.

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Assumptions

- The methodology uses 6 key assumptions:
 1. Uncertainty of Run Size
 2. Diversion Rate
 3. Protection of Other Stocks
 4. ER for Non-listed Stocks
 5. Management Flexibility
 6. International Obligations

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Assumption # 1 Uncertainty of Run Size

- Estimates used in this analysis are averages based on Ricker Curve estimates:

- 5.0 million, 2004
- 11.6 million, 2005
- 14.8 million, 2006
- 6.0 million, 2007

Limitations:

- Run size estimates can have wide variations (i.e. 2006 ranges from 3.4 to 22.0 million)
- Run sizes vary dramatically and are driven by marine survival.

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•Examples of run size variations:

- 3.4 to 22.0 million in 2006
- 3.0 to 12.0 million in 2007

Cultus

Assumption #2 Diversion Rate

- Diversion Rate (DR) is the % of Fraser sockeye that migrate through Johnstone Strait (the remaining % migrate through Juan de Fuca Strait).
- Fraser Panel Model used a Fraser River sockeye DR of 60%.
- DR varies and increases with increasing water temperature.

Limitations:

- Variations in the DR can affect the outcome of the analysis.

For example:

- 60% or greater DR, increases the impacts associated with protecting Sakinaw,
- 60% DR provides adequate supply of sockeye for First Nations, FSC needs, and a
- 30% or less DR makes it very difficult to meet First nations, FSC needs.

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•For example, a 60% diversion rate means that 60% Fraser River sockeye migrate through Johnstone Strait and 40% migrate down the WCVI; is reflective of recent history (late 90's to 2003).

•Warmer the water the higher the diversion rate (i.e. the higher number of sockeye passing through Johnstone Strait).

*Sokinaw
thru Johnstone Strait*

Assumption #3

Protection of Other Stock

- Limited fishing opportunities to fish during other times or areas due to protective measures already in place to protect other stocks:
 - Early summer Fraser River sockeye
 - Late Fraser River sockeye
 - Thompson coho

Limitations

- If these stocks rebound, protective measures to protect Sakinaw and Cultus will limit fishing capabilities, thereby increasing the impacts associated with protection

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Assumption #4 ER for Non-listed Stocks

- In analyzing the impacts of listing only Sakinaw or only Cultus a judgment was required about the ER applied to the non-listed stock

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•It is assumed that the ER would not return to more recent historical levels of 20-25% from where it is today (2004 fishery: 10-12%). Therefore, for the purpose of this analysis, it assumed that:

- Under list 'Only Sakinaw' the ER for Cultus would remain fixed at 10-12%, and
- Under list 'Only Cultus' the ER for Sakinaw would remain fixed at 10-12%.

Assumption #5 Management Flexibility

- Management flexibility in designing fishing plans is advised by the Allocation Policy which:
 - Conservation as the primary objective,
 - Priority access to First Nations, FSC and Treaty rights,
 - Access for recreational and commercial harvest.

Limitations:

- If either species is listed, management flexibility in providing access to First Nations, recreational, and commercial users will be significantly constrained.

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•For example, providing commercial harvesters with 22 (TR), 38(GN) and 40 (SN) target gear share allocation under the current fishing regime is unlikely.

Assumption #6 International Obligations

- The US and Fraser River Panel access to Fraser River Sockeye, was assumed to be fixed at:
 - 16.5% Pacific Salmon Treaty, and
 - 1% Fraser River Panel, Test Fishery.

Limitations

- Domestic stakeholders bear all the impacts
- As the exploitation rate decreases, the impacts on domestic stakeholders are magnified.

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US is entitled to have →

•When applied to the current management regime of 15% on lates, this equates to 2.5% of the 15% ER for the US fisheries, in addition to the 1% for the Fraser River Panel for test fisheries. Therefore, once ER's are adjusted to reflect Canada-US and test fishing commitments, the Canadian ER is lower: for example:

- Recent history(20-25%): provides a 16.5-21.5% Canadian ER,
- 2004 (10-12%): provides a 6.5-8.5% Canadian ER,
- <5%: provides a max of 1.5% Canadian ER.

$$\begin{array}{r}
 10-12 \quad - 2.5\% \\
 \quad \quad - 1.0\% \\
 \hline
 \quad \quad 3.5\%
 \end{array}
 \left. \vphantom{\begin{array}{r} 10-12 \\ - 2.5\% \\ - 1.0\% \\ \hline 3.5\% \end{array}} \right\} = 6.5\% \text{ to } 8.5\%$$

Analysis

- Factors to consider:
 1. Analysis uses gross value and are for the entire industry:
 - First Nations, FSC
 - Commercial Harvest, Landed Value
 - Processing, Value-Added
 - Recreational Harvest, Expenditures
 2. Impacts are forecasted only for 4 years - recovery to a minimum population level will be much longer *at least 16 yrs (4 generations)* *Although*
 3. Mitigative options have not been explored
 4. Available harvest opportunities identified in areas where stocks of concern are not present may be constrained by other factors

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•If listed, impacts will occur for longer than 4 years, probably at least 16 years (4 generations).

•Example to Point #4: Commercial catches may not be accessible for two reasons:

•International Considerations: Not possible to put the entire fleet in the identified fishing areas because of US Obligations (i.e. Juan de Fuca Strait, although catch may be available, might be international issues with putting the entire fleet in area 20 7 days a week), and

•Domestic considerations: First Nation FSC obligations are given priority, therefore, only a few days per week may be provided to commercial fish in the Fraser River up to the Fraser-Vedder junction.

Impact Highlights (< 5% ER For Both)

- FSC requirements continue to receive priority access, but significant reductions occur in 3 of 4 years (2004, 2005, & 2007)
- No commercial harvesting of Fraser River sockeye in 3 of 4 years (2004, 2005, & 2007)
- No processing of Fraser River sockeye in 3 of 4 years (2004, 2005, & 2007)
- Recreational marine activity restricted to non-retention in southern marine areas, excluding Barkley Sound. In-river recreational sockeye fishing retention permitted upstream of Fraser-Vedder junction
- Several small communities with high dependency on fishing income, and least diversified economies will be disrupted.

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- Reduction in First Nations FSC is estimated to be 41% from 20-25% Exp. Rate or 10-12 as FN are not impacted under the 10-12% ER regime.

First Nations (< 5% ER For Both)

	Historic 20-25% ER	2004 10-12% ER	Less than 5% ER
First Nations Attributed Landed Value (\$ Millions)	32.3	32.3	22.2

First Nations – FSC Harvest

- Two FN have previously targeted their FSC fisheries on Sakinaw and Cultus sockeye (Sechelt and Soowahlie Bands)
- Many other FN have indirect target FSC fisheries on Sakinaw and Cultus as part of a mixed stock fishery in Johnstone Strait and Fraser River such as Kwakwiltl Territorial Fisheries Commission, Musqueam, Matsqui and other lower mainland bands
- FSC harvest will be reduced in 2004, 2005, and 2007. This reduction totals 1 million pieces over these three years and is estimated to have a foregone subsistence value of \$10.1 million.

First Nation – Commercial Harvest

- FN own 23% of 1,012 southern commercial salmon licences significantly affected (either individually or communally)
- FN make up 25% of the estimated commercial harvest labour force (crew) and 30% of the estimated processing labour force (plants). On the south coast the largest concentration of FN employed in processing salmon occurs in Northern Vancouver Island (excluding Vancouver and Victoria areas).
- Reductions in commercial catch will result in reductions in aboriginal revenue, wages, net returns and employment

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Commercial Harvest Sector (<5% ER For Both)

	Historic 20-25% ER	2004 10-12% ER	Less than 5% ER
Commercial Harvest Landed Value (\$ Millions)	116.3	72.6	10.4

- There are 1,012 southern salmon licences significantly affected:
 - 167 in Area B Seine (average crew size 5.2 people/vessel) (866 fishers affected)
 - 692 in Area D & E Gillnet (average crew size 1.83 people/vessel) (1266 fishers affected)
 - 153 in Area H Troll (average crew size 2.1 people/vessel) (321 fishers affected)
- In 2003 about 44% of licence holders relied on Fraser river sockeye for more than 50% of their fishing income. For this group, 80% had fishing income less than \$30,000

Impacts

- No commercial harvest of Fraser River Sockeye at a <5% ER for 2004, 2005, 2007
- Limited commercial fishing in 2006 (high cycle year) of 1.0 million pieces (\$10.4 million)
- Fleet characterized by poor fleet economics due to large fleet with high fixed costs
- The fleet is in a precarious position and will not be economically viable under a 5% ER scenario.

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Processing Sector (<5% ER For Both)

	Historic 20-25% ER	2004 10-12% ER	Less than 5% ER
Processing Sector Value Added (\$ Millions)	83.3	52.0	7.5

- 103 processing plants process wild salmon, of which 28 exclusively process wild salmon
- The southern processing plants (77 of the 103 processing plants) provide an estimated total of about 1,100 person years of wild salmon processing employment . (Sum of monthly employment divided by 12). Wild Salmon processing employment consists of many seasonal and part-time jobs.

Impacts

- No processing of Fraser River Sockeye at <5% ER for 2004, 2005, 2007
- Limited processing in 2006 (high cycle year) of 1.0 million pieces (\$7.5 million)
- Salmon processing sector in BC is fragile economically
- Poor sockeye catches in 2004 resulted in the tenth consecutive year that salmon processors returns were negative or inadequate
- Reduction in processor value from \$52.0 million to \$7.5 million combined with the fact that the \$7.5 million only occurs in 2006 is likely to dramatically impact the ability of industry to survive and would result in changes to the existing processing infrastructure.

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Recreational Sector (< 5% ER For Both)

	Historic 20-25% ER	2004 10-12% ER	Less than 5% ER
Recreational Sector Expenditure Value¹(\$ Millions)	36.1	35.6	27.8

- There are currently about 125 fishing lodges, 500 charters and 330,000 licensed tidal anglers in BC
- In 2002 the recreational fishery generated 2.1 million angler days, 3,590 person years of employment and approximately \$550 million in sales expenditures

Impact

- Under a less than 5% ER there will be no retention of southern sockeye salmon, in marine waters with the exception of Barkley Sound.
- Opportunity for retention will be allowed within the Fraser River only upstream of the Vedder River
- It is expected that the expenditure value associated with this fishery will drop to \$27.8 million

¹ Estimated amount spent on lodges, charters, boats, accommodation, gear, etc.

Social & Community Impact

- Salmon is special to the people of BC. It is part of the intrinsic identity of the province, both to those living here and those who visit
- Salmon is a rich part of our cultural heritage and psyche
- Several communities depend heavily on Fraser sockeye and the economic benefits they generate
- Examples are Alert Bay, Sointula, Port Hardy and ~~Quadra Island~~ *Quadra Island* (North Vancouver Island)
- Actual dependence (economic and social not measurable)
- Significant reductions in harvest will have negative repercussions for a wide range of people and communities in southern BC

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Social & Community Impacts

Region	Active Licence Holders, 2003	Registered Fishers, 2002	Total Wild Salmon Processing Plants		
			# of Plants	Salmon Jobs (PYs)	Total Jobs (PYs)
QCI	2	115	3	12	32
North Coast	23	1,025	19	253	422
Central Coast	11	195	1	*	*
North VI	48	550	4	24	91
Mid VI	185	1680	4	*	*
South VI	90	930	6	*	*
WCVI	49	380	3	5	78
Victoria & Area	38	545	7	29	57
Sunshine Coast	27	545	1	*	*
Vancouver & Other	403	2,410	55	1,088	2,589
Other BC	10				
Outside BC/Unknown	20				
BC Total	906	8,375	103	1,549	3,629

- Small and remote communities are home to fishers, fishing ports, wild salmon processing plants, fish markets, etc.

Northern Vancouver Island

Communities such as Port Hardy, Port McNeil and Alert Bay have:

- High concentration of fishing industry employment to total population
- High dependence on fishery related revenue for household income (4-15%)
- Some of the least diversified economies coupled with significant challenges, such as
 - Downtum in forestry industry
 - Little ability for employment transferability

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Social & Community Impacts cont.

- Ageing skippers and crew – unlikely to retain.
- Less continuity in crew workforce and high turnover rates due to decreased earnings and increased use of casual labour.

- **OTHER AREAS – Mid VI, South VI, West Coast VI, and Sunshine Coast**

- Impacted to a lesser extent
- Have more diversified economies
- Have income dependencies on the fishing industry of less than 4%.

- **Vancouver & Victoria**

- Most diversified economies
- Large concentrations of licence holders, registered fishers and salmon and other processing jobs.

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Conclusion

- Overall, introducing more stringent measures will magnify what is already a difficult situation for the industry.
- If Sakinaw and Cultus are listed, ER would be guided by the Recovery Plan Objectives and the allowable harm assessment which may lead to a <5% ER. Under a <5% ER Scenario:
 - First Nations would realize reductions in FSC,
 - Southern fishing industry will not survive on only one year of fishing every four years,
 - Coastal communities will be significantly disrupted.
- If listed, impacts will extend over a much longer time frame

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**Gross Value of Fraser River Sockeye (2004-2007)
Under Three ER Scenarios**

	Recent History (20-25% ER) Gross Value ¹ (\$ Millions)	2004 Target (10-12% ER) Gross Value (\$ Millions)	More Restrictive (Less than 5% ER) Gross Value (\$ Millions)
Restrictions to Protect Sakinaw	N/A	N/A	\$139.10
Restrictions to Protect Cultus	N/A	N/A	\$69.40
Restrictions to Protect both Sakinaw & Cultus	\$268.00	\$192.50	\$67.80

- The analysis covers a four year period 2004-2007.
- Accurate forecast is not possible because events have not happened and we are dealing with natural systems that have large cyclical variation that are subject to natural factors over which we have no control. We do believe that these results represent a fair approximation.
- Gross value of catch of Fraser River sockeye based on recent ER is estimated to be \$268 million over 4 years (2004-2007)
- Conservation measures were introduced in 2004 to protect both Sakinaw and Cultus (target 10-12% ER). This measure is expected to reduce the gross value to \$192.5 million over 4 years (2004-2007).
- It may be necessary to further reduce the ER to <5% under a legal listing scenario. Additional measures will reduce fishing opportunities on (and catch of) co-migrating stocks. This is expected to further reduce gross value, to \$67.8 million over 4 years (2004-2007).

¹ Gross Value is inclusive of the entire fishing industry including First Nations FSC, commercial landed value, recreational expenditure value and processing value added.

• Important to note that gross value includes all values: First Nations (FSC), Commercial Harvest, Recreational Harvest, and Processing Value-Added.

• There is no differentiation between Sakinaw and Cultus for two reasons:

- It was assumed that the species would remain at 10-12% ER, therefore.
- Protective measures already in place to protect early summers, overlap with measures necessary to protect Sakinaw.

• Therefore, Sakinaw impacts would increase if, Cultus could be harvested at a higher ER or if early summers rebound and protective measures are no longer necessary.

Under 10-12%

Much more complex and difficult to estimate impacts associated with fishing only Cultus or only Sakinaw.

Given the assumptions used in this analysis concerning run size, run timing, survival rates, diversion rates etc. -

The impacts assoc. with fishing Cultus only drive analysis + account for most impacts of staffing. Based on the assumption the analysis shows once protective measures in place for Cultus adding Sakinaw protection - further reduces gross value by 10-20%

However if assumption were changed, impacts assoc with Sakinaw even could be estimated quite well - then distribution would be quite different