

WATERSHED PLANNING PROFILE

Stream Name	Page
Salmon River	20

Salmon River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Salmon River</i>		SISS Code:	08-5800
Physiographic Area(s):	Nechako Basin & Plateau/ Fraser Basin			
Drainage Area (ha):	443,700	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce - Subalpine Fir	
HMA:	Upper Fraser			

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	24.3	176.0	7.80	Jan	3.10	Sep
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	1,200 (1988)	443	1,200	396	Static	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		7
-percent logging		17 % on average	12
- ECA status	High	Extensive past logging; Watershed Assessment Procedure (WAP) completed for Prince George portion only.	1, 7
- riparian condition/ stream length impacted	Low		3

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	Localized on lower tributaries	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low	Review of water licences required	7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>	Residential	7
- population level	Low		7
- extent	Low	Localized on lower reaches	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	Not designated for placer mining	7
-water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	Localized gravel withdrawal from lower reach	7
- water quality	Low		7
-stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
Linear Development	High		7
- extent	High	Highway and BC Rail rights-of-way and stream crossings; pipeline; hydro, extensive logging roads	7, 4
- stream/riparian impacts	Low		7
Hydro Development	Low		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
Other Development	Low	Localized recreational concern	7
-extent	Low		7
-stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

Cumulative Development	Low		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
Soils	Low		1
- types		Coarse glacio-fluvial sediments	1, 12
Terrain	Low		1
- type		Low relief, gently rolling terrain	1, 12
Resistance to Change	Low	Relatively low gradient and basin lakes alleviate flood events	1
Hydrology	High	Underground flow noted in some years; summer low flow concern noted	1, 12

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>Low</i>		1
- type		Low gradient, moderately meandering channel	1
<i>Significant Environmental Variables</i>	<i>High</i>	Temperature concern in late summer	3

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Low flows in upper portion of basin concurrent with temperature concerns	7
<i>Sensitive Biological Features</i>	✓	Tributaries utilized by chinook rearing	7
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Chinook hatchery at Prince George used for outplanting back to Salmon River. Lower River fish counting fence	4
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	In Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
WAP review	Watershed Assessment Procedure (WAP) completed for Prince George portion	1,7

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(2)	✓(2)	✓(2)	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. 	<ul style="list-style-type: none"> • Apply FPC riparian guidelines to agricultural and range use of crown land. • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Apply the Land Development Guidelines to residential and industrial developments. • Develop a Water Management Plan (WMP) that includes a determination of water demand, fisheries/ minimum low flow of water storage opportunities and potential impacts of water extraction. • Develop a detailed riparian management plan (RMP) for the Salmon River watershed identifying agricultural areas requiring site specific prescriptions. • Develop a riparian management plan to protect and restore stream habitat in cooperation with agricultural and ranching communities. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment/inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

WILLOW RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
Willow River	27

Willow River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Willow River</i>		SISS Code:	00-5900
Physiographic Area(s):	Nechako Plain/Fraser Basin & Plateau/Quesnel Highlands			
Drainage Area (ha):	287,500	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce - Subalpine Fir	
HMA:	Upper Fraser			

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	36.5	257	7.37	Dec/Jan/ Feb	9.83	Aug
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	2,100 (NA)	1,107	2,100	370	Increasing	Medium

NB. Above numbers include escapement to Wansa Creek (a tributary).

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		7
-percent logging	High	approximately 45%	12
- ECA status	High	Extensive harvesting	7
- riparian condition/ stream length impacted	High	Tributaries impacted	7, 3

Willow River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	Concentrated below Highway 16	7
- riparian condition/ stream length impacted	High	Riparian removal in lower reaches	7
- water withdrawal	Low		7
- water quality	Low	Not assessed	7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	Willow River/Giscome/Wells	7
- riparian condition/ stream length impacted	High	Impacts in Barkerville/ Wells area and see agriculture	7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>High</i>	In upper basin	7
- extent	High	Extensive in upper reaches	7
- water quality	High	Extensive sedimentation	7
- riparian condition/ stream length impacted	High	Extensive, especially in upper basin tributaries	7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	Mosquito Creek mine, historic mining in Wells area.	7
- water quality	Low	Monitoring reclamation at Mosquito Creek	7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>	Forest roads, Highway 16 & 26 and CNR right-of-way	7
- extent	High	Extensive. Localized, e.g. Willow River	7
- stream/riparian impacts	Low	Bridge at Pitoney Creek confluence	7
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>High</i>	Forestry, agriculture, placer mining, linear development	7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>	Clay textured glaciolacustrine sediments	7
- types		north of Hwy 16, loamy glacial till and colluvium to the south	14
<i>Terrain</i>	<i>High</i>		7
- type		Rolling to steep & rugged (i.e. Cariboo Mtn)	7, 14
<i>Resistance to Change</i>	<i>Low</i>	Susceptible to sedimentation	7, 12
<i>Hydrology</i>	<i>High</i>	Extensive harvesting may affect hydrograph	7
<i>Channel Stability</i>	<i>High</i>	Laterally unstable especially below canyon	7
- type		at Hwy 16	7
<i>Significant Environmental Variables</i>	<i>Low</i>	Sedimentation concerns	7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>	✓	Tributary rearing	7
<i>Unique Features</i>	✓	Canyon below Hwy 16 hinders upstream migration at higher than average, and possibly extreme low, flows.	7, 12

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	passage improvement	7
<i>Restoration Activity</i>	✓	assessment required regarding bank/channel stability and migration	7
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
WAP review	Watershed Assessment Procedures review underway	7
WRP review	Watershed Restoration Program underway	7

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(4)	✓(4)	✓(2)	✓(6)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Improve inventories of aquatic resources. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Apply FPC riparian guidelines to agricultural and range use of crown land. • Apply riparian guidelines for new placer mines that are consistent with FPC standards. • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Apply the Land Development Guidelines to residential and industrial developments. • Conduct detailed stream channel stability assessment. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Willow River watershed identifying agricultural areas requiring site specific prescriptions . • Develop a riparian management plan to protect and restore stream habitat in cooperation with agriculture and ranching communities. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none"> • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Identify and request complete reclamation of past, present and new placer mining development sites. • Provide and maintain a water quality assessment and monitoring plan (WQP) for Willow River. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none">• Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

Wansa Creek

SISS 00-5900-070

Wansa Creek is a tributary of Willow River and has a drainage area of 293 km². In the last 30 years, 160.9 km² have been logged and in many cases logging has encroached on the riparian zone right down to the streamside. Another 21.3 km² is proposed for logging before 1998. Salmon presence is limited due to the low flows and beaver dams. Mean 7-day flow in the summer is 0.78 m³/s and in winter is 0.85 m³/s. Planning objectives and strategies pertinent to Willow River also relate to Wansa Creek.

McGREGOR RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
McGregor River	35

McGregor River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>McGregor River</i>	SISS Code:	00-6200
Physiographic Area(s):	McGregor Plateau/Nechako Plain/Hart & Park Ranges		
Drainage Area (ha):	276,900	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce- Subalpine Fir/ Alpine Tundra
HMA:	Upper Fraser		

NB. The **Drainage Area** figure does not include the Herrick, Captain, Otter and Seebach Creek drainage areas.

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	209	1127	35.7	Mar	95.0	NA
Comments:	Reference for above data is the stream mouth and hence includes input from Herrick, Captain, Otter and Seebach tributaries. See Ref. #12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	0	0	0	0	NA	NA

NB. The McGregor mainstem is a migration route and provides rearing habitat.

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		7
-percent logging		approximately 7 %	12
- ECA status	Low		12
- riparian condition/ stream length impacted	High	Extensive floodplain harvesting	3, 7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	Logging camps	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	Proposed quartz mine at Bastille Creek.	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None, some old, abandoned sawmills	7
- water quality	Low		7
- stream/riparian impacts	Low		7

McGregor River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		7
- extent	Low	Logging roads and bridges throughout	7
- stream/riparian impacts	Low	Localized	7
<i>Hydro Development</i>	<i>Low</i>	Hydro reserve. McGregor Diversion proposal	7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>High</i>	Forestry; extensive floodplain and low elevation harvesting	7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>	Unstable soils, high eroding stream banks	12
- types		Large deposits of lacustrine and fluvial soils throughout mid and lower elevations	7, 12
<i>Terrain</i>	<i>High</i>		7
- type		Originates in alpine area, mid reaches steep and wet	7, 12
<i>Resistance to Change</i>	<i>Low</i>	Large glacial, dynamic river	7
<i>Hydrology</i>	<i>Low</i>	Large river - low winter flows	7, 12

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>High</i>		7
- type		Extensive island/off channel habitat laterally unstable throughout	12
<i>Significant Environmental Variables</i>	<i>High</i>	Suspended sediments; glacial flour and till and eroding banks	7, 12

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Soils	7
<i>Sensitive Biological Features</i>	✓	Extensive off channel rearing in lower 57 km and tributaries; Canyon/waterfall 57 km upstream of mouth is impassable to salmon.	7, 12
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>		Was enhanced from Quesnel hatchery in previous years	7
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
	None	

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(2)	✓(4)	✓(2)	✓(4)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. 	<ul style="list-style-type: none"> • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Conduct detailed stream channel stability assessment. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the McGregor watershed identifying areas requiring site specific prescriptions (urban/agriculture). • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. 	<ul style="list-style-type: none"> • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

SEEBACH CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Seebach Creek.	42

Seebach Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Seebach Creek</i>	SISS Code:	00-6200-020
Physiographic Area(s):	Nechako Plain/McGregor Plateau		
Drainage Area (ha):	42,100	Biogeoclimatic Zone(s):	Sub-Boreal Spruce
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	6.46	60.6	1.22	NA	1.12	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Sockeye	230 (NA)	29	230	NA	Static	Medium
Chinook	2,500 (1986 & 1987)	973	2,500	625	Increasing	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		12
-percent logging	Low	Proposed logging would increase logged area to 11%, currently 2%	12
- ECA status	Low		7
- riparian condition/ stream length impacted	Low	Localized impacts in lower reaches	3, 7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		7
- extent	Low	Logging roads and bridge crossings	7
- stream/riparian impacts	Low	Sediment input and localized impacts at stream crossings	7
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		7
- types		Coarse, glaciofluvial deposits, some lacustrine	7, 12
<i>Terrain</i>	<i>Low</i>		7
- type		Low relief	7, 12
<i>Resistance to Change</i>	<i>High</i>	Small stream, low summer flows/high peak flows	7, 12
<i>Hydrology</i>	<i>High</i>	Peak flows average 10 times mean flow and 50+ times summer low flow (see Watershed Hydrology table).	12

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>Low</i>		7
- type		Upper reaches steep and confined, lower reaches in broad valley, alluvial fans, some areas laterally unstable and bank erosion in lower reaches	7
<i>Significant Environmental Variables</i>	<i>Low</i>		7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>	✓	Tributary chinook rearing	7
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>		Was enhanced in 1980's using Quesnel hatchery stock	7
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
	None	

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓		✓(2)	✓	✓(4)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Seebach Creek watershed identifying areas requiring site specific prescriptions. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement watershed restoration plan recommendations from assessment and inventory reports.

Seebach Creek

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none"> • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate watershed restoration assessment & inventory for development of a Watershed Restoration Plan. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development & habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

East Seebach Creek

SISS 00-6200-020-030

East Seebach Creek is a tributary of Seebach Creek and has a drainage area of 160 km². It has had 3.1 km² of its area logged and that is recent forestry activity. Proposed cuts of 12 km² or 7% of the watershed area are planned to take place before 1998. Mean 7-day flow in the summer is 0.43 m³/s and in winter is 0.46 m³/s. Summer flows are low but no water licences have been implemented in the watershed. Planning objectives and strategies pertinent to Seebach Creek relate also to East Seebach Creek.

Horn Creek

SISS 00-6200-020-010

Horn Creek is a tributary of Seebach Creek and has a drainage area of 66 km². It has had 2.9 km² of its area logged recently and proposed cuts of 5 km² or 8% are planned which is a significant total. Mean 7-day flow in the summer is 0.18 m³/s and in winter is 0.19 m³/s. Summer flows are low but no water licences have been implemented in the watershed. Planning objectives and strategies pertinent to Seebach Creek relate also to Horn Creek.

WATERSHED PLANNING PROFILE

Stream Name	Page
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Otter Creek	49

Otter Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Otter Creek</i>	SISS Code:	00-6200-060
Physiographic Area(s):	McGregor Plateau		
Drainage Area (ha):	16,700	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce - Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	6.98	37.9	0.45	NA	1.58	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding Potential
Chinook	30 (1977)	0	0	NA	Decreasing	NA

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>	Proposed logging would increase logged area to 13%	12
-percent logging	Low	currently 4%	12
- ECA status	Low		7
- riparian condition/ stream length impacted	Low		3

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		7
- extent	Low	Logging roads and bridge crossings	7
- stream/riparian impacts	Low	Sediment input and localized impacts at stream crossings	7
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		7
- types		Coarse, glaciofluvial deposits, some lacustrine	7, 12
<i>Terrain</i>	<i>High</i>		7
- type		Steep slopes	7
<i>Resistance to Change</i>	<i>High</i>	Small stream, low summer and winter flows/high peak flows	7, 12
<i>Hydrology</i>	<i>High</i>	Mean flows average 15 times summer mean low flow.	12

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>Low</i>		7
- type		Upper reaches steep and confined, lower reaches in broad valley, alluvial fans, laterally unstable and bank erosion in lower reaches	7
<i>Significant Environmental Variables</i>	<i>Low</i>		7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			7
<i>Sensitive Biological Features</i>	✓	Chinook rearing in lower reaches	7
<i>Unique Features</i>			7

* See report section 6.0 References Cited

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Previously enhanced from Quesnel hatchery	7
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

* See report section 6.0 References Cited

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
	None	

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓		✓(3)	✓	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. 	<ul style="list-style-type: none"> • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Otter Creek watershed identifying areas requiring site specific prescriptions. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

HERRICK CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Herrick Creek	56

Herrick Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Herrick Creek</i>	SISS Code:	00-6200-070
Physiographic Area(s):	McGregor Plateau/Hart Ranges		
Drainage Area (ha):	205,800	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce- Subalpine Fir/Alpine Tundra
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m³/s)	86	466.8	5.93	NA	17.47	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	4,052 (NA)	1,625	4,052	453	Increasing	Medium

NB. Above data includes escapement to the tributaries James the Bad, Fontoniko, and Spakwaniko creeks.

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		7
-percent logging	Low	approximately 1%	12
- ECA status	Low	Rate of proposed development is high over next 10 years.	7
- riparian condition/ stream length impacted	Low		7, 12, 3

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low		7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>	one logging camp	7
- population level	Low		7
- extent	Low		7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

Herrick Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		7
- extent	Low	Forestry roads and bridge crossings planned throughout watershed, presently in lower valley	7
- stream/riparian impacts	Low	Some off channel rearing areas impacted	7
<i>Hydro Development</i>	<i>Low</i>	B.C. Hydro reserve for proposed McGregor River Diversion	5
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>	Unstable soils, high eroding stream banks	7
- types		Large deposits of lacustrine and fluvial soils at lower elevations	7, 12, 5
<i>Terrain</i>	<i>High</i>		7
- type		Rugged terrain, deeply incised stream. Originates in alpine area, mid reaches steep and wet.	7, 12
<i>Resistance to Change</i>	<i>Low</i>	Large, glaciated dynamic stream	7

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Hydrology</i>	<i>Low</i>	Flashy, low flows in summer and winter noted	7, 12
<i>Channel Stability</i>	<i>High</i>	Unstable valley walls, laterally unstable	7
- type			
<i>Significant Environmental Variables</i>	<i>High</i>	High background suspended sediments due to glaciers, lacustrine soil, bank instability, and flashy hydrograph	7, 12, 5

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Lacustrine deposits	7
<i>Sensitive Biological Features</i>	✓	Spawning below Herrick Falls, off channel rearing in lower valley	7, 12
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Enhanced from the Quesnel hatchery in the 1980's	7
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
LRUP completed	Consensus Report for the Herrick Creek Local Resource Use Plan. Completed January 1995, not yet (October 1995) implemented	5,7

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓		✓(4)	✓(2)	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES: (NB. Refer to completed LRUP)

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Improve inventories of aquatic resources. 	<ul style="list-style-type: none"> • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition. • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. 	<ul style="list-style-type: none"> • Conduct detailed stream channel stability assessment. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Herrick Creek watershed identifying areas requiring site specific prescriptions. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of forest harvesting is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Provide and maintain a water quality assessment and monitoring plan (WQP) for Herrick Creek.

Herrick Creek

Fontoniko Creek

SISS 00-6200-070-050

Fontoniko Creek is a tributary of Herrick Creek and has a drainage area of 321 km². Only 0.2 km² of the watershed's area has been logged and no new logging is proposed for the near future. Mean 7-day flow in the summer is 2.95 m³/s and in winter is 0.88 m³/s. There are no water licences on this stream. Planning objectives and strategies pertinent to Herrick Creek also relate to Fontoniko Creek.

James Creek

SISS 00-6200-070-030

James Creek is a tributary of Herrick Creek and has a drainage area of 116 km². Recent logging totals 3.7 km² and no new forestry activity is proposed for the near future in the watershed. Mean 7-day flow in the summer is 1.11 m³/s and in winter is 0.31 m³/s. There are no water licences on this stream. Planning objectives and strategies pertinent to Herrick Creek also relate to James Creek.

Spakwaniko Creek

SISS 00-6200-070-070

Spakwaniko Creek is a tributary of Herrick Creek and has a drainage area of 190 km². Only 0.8 km² of the watershed have been logged and no new forestry activity is proposed for the near future. Mean 7-day flow in the summer is 1.78 m³/s and in winter is 0.51 m³/s. There are no water licences on the stream. Planning objectives and strategies pertinent to Herrick Creek also relate to Spakwaniko Creek.

CAPTAIN CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Captain Creek	64

Captain Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Captain Creek</i>	SISS Code:	00-6200-070-020
Physiographic Area(s):	Nechako Plain/McGregor Plateau		
Drainage Area (ha):	13,500	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce - Subalpine Fir/ Alpine Tundra
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	5.64	30.6	0.36	NA	1.29	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding index
Chinook	60 (NA)	28	60	45	Decreasing	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>	Proposed logging would increase logged area to 8%	12
-percent logging	Low	currently 5%	12
- ECA status	Low		7
- riparian condition/ stream length impacted	Low	Localized impacts in lower reaches	3

Captain Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

Captain Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		7
- extent	Low	Logging roads and bridge crossings	7
- stream/riparian impacts	Low	Sediment input and localized impacts at stream crossings	7
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		7
- types		Coarse, glaciofluvial deposits, some lacustrine	7, 12
<i>Terrain</i>	<i>High</i>	Steep valley side slopes	7
- type			7
<i>Resistance to Change</i>	<i>High</i>	Small stream, low summer and winter flows/high peak flows	7, 12
<i>Hydrology</i>	<i>High</i>	Low summer flows/high peak flows	12

Captain Creek

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>Low</i>		7
- type		Upper reaches steep and confined, lower reaches in broad valley, alluvial fans, laterally unstable and bank erosion in lower reaches	7
<i>Significant Environmental Variables</i>	<i>Low</i>		7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Steep valley side slopes	7
<i>Sensitive Biological Features</i>	✓	Tributary chinook rearing	7
<i>Unique Features</i>			7

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Previously enhanced from Quesnel hatchery	7
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

* See report section 6.0 References Cited

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
	None	

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓		✓(3)	✓(2)	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Captain Creek watershed identifying areas requiring site specific prescriptions. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none"> • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

BOWRON RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
Bowron River	71

Bowron River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Bowron River</i>	SISS Code:	00-6300
Physiographic Area(s):	Nechako Plain/Fraser Basin & Plateau/Quesnel Highlands/ Cariboo Mountains		
Drainage Area (ha):	360,000	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Interior Cedar-Hemlock/ Engelmann Spruce -Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	63.4	351	15.6	Dec/Feb /Mar	21.70	Aug/Sep
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Sockeye	35,024 (1979)	5,937	12,804	9,741	Decreasing	High
Chinook	12,265 (1987)	6,224	12,265	1,392	Increasing	Medium

NB. The above data includes chinook escapement to the Hagggen, Indianpoint and Antler creek tributaries and sockeye escapement to Indianpoint Creek. (Sockeye escapement to the other tributaries has not been documented).

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		7
-percent logging	High	approximately 39 % of the basin logged to date, some due to spruce bark beetle kill	7, 12
- ECA status	High	Watershed Assessment Procedure (WAP) under way	7
- riparian condition/ stream length impacted	High	Extensive harvesting to streamside, especially in mid to upper reaches	3, 2

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low	Some recreational dwellings and Provincial Park at Purden Lake	7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	Concentrated on Antler Creek	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	Exploration for coal and other minerals	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>	Logging roads and stream crossings, CNR and highway rights-of-way and crossings	7
- extent	High	Extensive throughout	7
- stream/riparian impacts	High	Extensive throughout	7
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>High</i>	Logging related	7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>		7
- types		Glaciofluvial and lacustrine sediments, till and colluvial soil	7, 12, 2
<i>Terrain</i>	<i>High</i>		7
- type		Primarily moderate slope with some areas steep and rugged	7, 12
<i>Resistance to Change</i>	<i>High</i>	Extensive sedimentation observed in the 1980's	7
<i>Hydrology</i>	<i>High</i>	Lake headed but glacial fed, snowmelt generated peak flow	7

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>High</i>	Tributaries on the eastern side of the upper basin (especially Haggan Creek) and mainstem below Hwy 16 are unstable.	7, 12, 2
- type			
<i>Significant Environmental Variables</i>	<i>High</i>	Water temperature and sedimentation concerns	7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Lacustrine deposits	7
<i>Sensitive Biological Features</i>	✓	Significant flood plain rearing habitat areas as well as tributary rearing	7
<i>Unique Features</i>	✓	Major spruce beetle salvage contributed to extent of logging. Largest chinook producer north of Quesnel River. Bowron Lake Provincial Park on headwaters.	7

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Past outplanting of chinook from Quesnel hatchery	7
<i>Restoration Activity</i>	✓	Watershed restoration program	7
<i>Native Fishery</i>	✓	Occurs in Fraser River	
<i>Recreational Fishery</i>	✓	Locally significant sport fishery, ocean sport fishery	7
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
WRP	Watershed Restoration Program underway	7
WAP	Watershed Assessment Procedure under way	7

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(3)	✓(6)	✓(3)	✓(6)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Ensure compatibility of lake foreshore developments with salmon utilization. • Improve inventories of aquatic resources. 	<ul style="list-style-type: none"> • Apply riparian guidelines for new placer mines that are consistent with FPC standards. • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Conduct detailed stream channel stability assessment. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Initiate restoration, revegetation and stabilization measures on linear developments.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. 	<ul style="list-style-type: none"> • Develop a detailed riparian management plan (RMP) for the Bowron River watershed identifying areas requiring site specific prescriptions. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Identify and request complete reclamation of past, present and new placer mining development sites. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

Bowron River

Haggen Creek

SISS 00-6300-210

Haggen Creek is a tributary of Bowron River and has a drainage area of 649 km². Most forestry activity has taken place here in recent years and total logging has occurred in 40% or 269 km² of the watershed. Another 10.1 km² is proposed for logging activity before 1998. Sedimentation is a concern due to the extensive logging. Roadway washouts occur often along logging roads and there are many weak slopes in the watershed. Mean 7-day flow in the summer is 5.77 m³/s and in winter is 3.51 m³/s. Planning objectives and strategies pertinent to Bowron River also relate to Haggen Creek.

INDIANPOINT CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Indianpoint River	79

Indianpoint River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Indianpoint Creek</i>	SISS Code:	00-6300-240
Physiographic Area(s):	Fraser Plateau/Cariboo Mountains		
Drainage Area (ha):	11,300	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/Interior Cedar-Hemlock/Englemann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	8.09	35.80	2.14	NA	3.52	NA
Comments:	Reference for above data is the stream mouth. See Ref. 43, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Sockeye	24	10	24	NA	Static	Medium
Chinook	940	615	940	NA	Static	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>	Some logging due to spruce bark beetle kill	35, 43
-percent logging	High	46.0% of the basin logged to 1992 (40.0% recent), 0% proposed (1993-1998)	35, 43
- ECA status			
- riparian condition/ stream length impacted	High	34.5% of streamside harvested	5

Indianpoint River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>	None	35
- extent			
- riparian condition/stream length impacted			
- water withdrawal			
- water quality			
<i>Urbanization</i>	<i>Low</i>		35
- population level			
- extent			
- riparian condition/stream length impacted			
- water withdrawal			
- water quality			
<i>Placer Mining</i>	<i>Low</i>		35
- extent			
- water quality			
- riparian condition/stream length impacted			
<i>Other Mining</i>	<i>Low</i>		35
- extent	Low	Exploration for coal and other minerals	35
- water quality	Low		35
<i>Industrial Development</i>	<i>Low</i>		35
- extent			
- water quality			
- stream/riparian impacts			

Indianpoint River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>	Logging roads	35
- extent	High	Extensive throughout	35
- stream/riparian impacts	High	Stream crossings	35
<i>Hydro Development</i>	<i>Low</i>	None	35
- extent			
- stream/riparian impacts			
<i>Other Development</i>	<i>Low</i>		
- extent	Low	Indianpoint Lake (at headwater) forms part of Bowron Lake Provincial Park	35
- stream/riparian impacts	Low		35

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>High</i>	Logging related	35
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>		35
- types		Glaciofluvial and lacustrine sediments, till and colluvial soil	43, 4
<i>Terrain</i>	<i>Low</i>		35
- type		Primarily moderate slope in wide valley, most logging in this area	43
<i>Resistance to Change</i>	<i>Low</i>		35
<i>Hydrology</i>	<i>High</i>	Lake (Indianpoint) headed. September low flow concern vis a vis water licence	43

Indianpoint River

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>Low</i>		35
- type			
<i>Significant Environmental Variables</i>		Low flow/high water temperature impacts not assessed	35

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Chinook outplanting from Quesnel hatchery 1982-1985, 1987-1988 brood years	16
<i>Restoration Activity/Opportunity</i>	✓	Watershed restoration	35
<i>Native Fishery</i>	✓	Occurs in Fraser River	35
<i>Recreational Fishery</i>	✓	Locally significant sport fishery, ocean sport fishery	35
<i>Commercial Fishery</i>	✓	Ocean fishery	

Indianpoint River

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
WRP	Watershed Restoration Program underway	35
WAP	Watershed Assessment Procedure underway	35

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(3)	✓(2)		✓(6)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Identify and protect salmon habitats. • ✓Restore and enhance habitat. • Maintain/enhance water quantity for instream uses. • Maintain/enhance water quality. • Maintain/enhance watershed and stream channel integrity and stability. • Maintain/enhance fish and habitat diversity. • Rebuild and enhance salmon stocks. 	<ul style="list-style-type: none"> • Ensure consistency of management objectives with existing provincial land use plans for the Bowron River. • Maintain logging moratorium in the upper Bowron River watershed until the assessment is complete and the plan developed. • Maintain designated "No Staking Areas" for placer mining. • Complete watershed assessment (Watershed Assessment Procedure) that has already been initiated in conjunction with the Prince George Forest District. • Initiate watershed assessment procedure in the Bowron River headwaters within the Cariboo-Chilcotin area (Quesnel Forest District). • Assess riparian conditions throughout the Indianpoint Creek watershed to determine if Forest Practices Code provisions for riparian areas are adequate. • Develop a Water Management Plan (WMP) that includes a determination of water demand, fisheries/ minimum low flow with attention to elevated temperature concerns, water storage opportunities and potential impacts of water extraction.

Indianpoint River

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none">• Participate in monitoring of implementation of CCLUP salmon fisheries targets which specify management for salmon stocks through riparian area protection and controls on the rate of cut in this watershed.• Identify opportunities for restoration of placer mining sites.

Kruger Creek

SISS 00-6300-240-050

Kruger Creek is a tributary of Indianpoint River and has a drainage area of 11,300 hectares. A total of 48.7 km², over 40% of the area, has been logged with most of the activity taking place in recent years. Roadway washouts occur often along logging roads and there are many weak slopes in the watershed. Mean 7-day flow in the summer is 1.00 m³/s and in winter is 0.61 m³/s. There are no water licences on the stream. Planning objectives and strategies pertinent to Indianpoint River also relate to Kruger Creek.

ANTLER CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Antler Creek.	86

Antler Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Antler Creek</i>	SISS Code:	00-6300-310
Physiographic Area(s):	Quesnel Highlands		
Drainage Area (ha):	35,900	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce- Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	7.34	32.45	1.94	NA	3.19	NA
Comments:	Reference for above data is the stream mouth. See Ref. 43, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	150	78	150	NA	Static	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>	Some logging due to spruce bark beetle kill. Intensive logging on tributaries	35, 43
-percent logging	Low	9.8% of basin logged to 1992 (recent 5.8%) 4.1% proposed (1993-1998)	35, 43
- ECA status	Low		35
- riparian condition/ stream length impacted	High	Logging on flood plain	35, 43

Antler Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>	None	35
- extent			
- riparian condition/ stream length impacted			
- water withdrawal			
- water quality			
<i>Urbanization</i>	<i>Low</i>		35
- population level			
- extent			
- riparian condition/ stream length impacted			
- water withdrawal			
- water quality			
<i>Placer Mining</i>	<i>High</i>		35
- extent	High	All tributaries mined at one time or another	43
- water quality	High	Sediment from placer mining	35
- riparian condition/ stream length impacted	High	Unstable areas in channels resulting from old hydraulic mining operations, encroachments have degraded riparian habitat	35, 43
<i>Other Mining</i>	<i>Low</i>		35
- extent			
- water quality			
<i>Industrial Development</i>	<i>Low</i>		35
- extent			
- water quality			
- stream/riparian impacts			

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
Linear Development	High	Logging roads	43
- extent			
- stream/riparian impacts	High	Road building on floodplain, impacts on stream, encroachments and fording of stream	43, 35
Hydro Development	Low		
- extent			
- stream/riparian impacts			
Other Development	Low	Bowron Lake Lodge/Airport located on either side of the south channel entrance of Antler Creek to the Bowron River	16
- extent			
- stream/riparian impacts			

CUMULATIVE DEVELOPMENT ACTIVITY:

Cumulative Development	High	Forestry and associated road building, placer mining	35
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
Soils	High		35
- types		Glaciofluvial and lacustrine sediments, till and colluvial soil	35
Terrain	High		35
- type		Flood plain in lower third, steep and rugged in upper two thirds	35
Resistance to Change	High		35
Hydrology	High	Low flow	35

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>High</i>	Some unstable reaches, some areas unstable due to placer (hydraulic) mining activities	35
- type			
<i>Significant Environmental Variables</i>	<i>Low</i>		35

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity/Opportunity</i>	✓	WRP	35
<i>Native Fishery</i>	✓	Occurs in Fraser River	35
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
WRP	Watershed Restoration Program under way	35
WAP	Watershed Assessment Procedure under way	35

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(4)	✓(5)		✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Identify and protect salmon habitats. • Restore and enhance habitat. • Maintain/enhance water quantity for instream uses. • Maintain/enhance water quality. • Maintain/enhance watershed and stream channel integrity and stability. • Maintain/enhance fish and habitat diversity. • Rebuild and enhance salmon stocks. 	<ul style="list-style-type: none"> • Ensure consistency of management objectives with existing provincial land use plans for the Bowron River. • Maintain logging moratorium in the upper Bowron River watershed until the assessment is complete and the plan developed. • Maintain designated "No Staking Areas" for placer mining. • Complete watershed assessment (Watershed Assessment Procedure) that has already been initiated in conjunction with the Prince George Forest District. • Initiate watershed assessment procedure in the Bowron River headwaters within the Cariboo-Chilcotin area (Quesnel Forest District). • Assess riparian conditions throughout the Antler Creek watershed to determine if Forest Practices Code provisions for riparian areas are adequate. • Require better regulation, monitoring and enforcement of placer mining by the MoEMPR. • Participate in monitoring of implementation of CCLUP salmon fisheries targets which specify management for salmon stocks through riparian area protection and controls on the rate of cut in this watershed. • Pursue restoration opportunities such as reclamation of placer mines.

WATERSHED PLANNING PROFILE

Stream Name	Page
Kenneth Creek	92

Kenneth Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Kenneth Creek</i>	SISS Code:	00-6425
Physiographic Area(s):	Nechako Plain/Fraser Basin & Plateau/Quesnel Highlands		
Drainage Area (ha):	21,600	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Interior Cedar-Hemlock/ Engelmann Spruce - Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	3.31	31.1	0.63	NA	0.58	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	100 (1986 & 1988)	52	100	NA	NA	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		7
-percent logging	High	Approximately 74 % of the basin logged to date, some due to beetle kill	12
- ECA status	High		7
- riparian condition/ stream length impacted	High	Extensive harvesting to streamside	3, 12

Kenneth Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>	Primarily logging roads and Highway 16 crossing as well as stream crossings	7
- extent	High	Extensive throughout	7
- stream/riparian impacts	High	Extensive throughout	7
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>High</i>	Logging, riparian harvesting and roads, stream crossings	7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>		7
- types		Glaciofluvial and lacustrine sediments, till and colluvial soil	7, 12
<i>Terrain</i>	<i>High</i>		7
- type		Moderate to steep and rugged	7, 12
<i>Resistance to Change</i>	<i>High</i>		7
<i>Hydrology</i>	<i>High</i>	Summer low flows may limit fish access and habitat, peak flows	12

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>High</i>	Extensive meandering and channel widening, particularly in lower reaches	7
- type			
<i>Significant Environmental Variables</i>	<i>Low</i>	Post harvesting streamside sedimentation	7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	summer low flow may limit fish access and habitat	12
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>	✓	Rehabilitation work including beaver dam removal was done as part of employment/corrections project	12
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
	None	

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(3)	✓(5)	✓	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. 	<ul style="list-style-type: none"> • Apply riparian guidelines for new placer mines that are consistent with FPC standards. • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Conduct detailed stream channel stability assessment. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Conduct minimum flow study. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Kenneth Creek watershed identifying areas requiring site specific prescriptions. • Document, map and assess watershed terrain and soils conditions and their hazard risk.

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment/inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Identify and request complete reclamation of past, present and new placer mining development sites. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

HUNGARY CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Hungary Creek	99

Hungary Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Hungary Creek</i>	SISS Code:	00-6500
Physiographic Area(s):	Rocky Mountain Trench/Cariboo Mountains		
Drainage Area (ha):	9,600	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Interior Cedar-Hemlock/ Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m³/s)	4.01	21.8	0.25	NA	0.93	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	NA (NA)	NA	NA	NA	NA	NA

NB. Chinook are known to be present however escapement numbers are not available.

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		7
-percent logging	High	37 % of total basin	12
- ECA status	High		7
- riparian condition/ stream length impacted	Low		7

Hungary Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low		7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

Hungary Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		7
- extent	Low	Highway 16 right-of-way, logging roads and stream crossings	7
- stream/riparian impacts	Low	Highway 16 culvert may be impassible	12
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>		7
- types		Localized lacustrine deposits, glacial till, alluvium	7
<i>Terrain</i>	<i>High</i>		7
- type		Upper portion of watershed in rugged Cariboo Mountains, lower basin in gentle terrain	7
<i>Resistance to Change</i>	<i>High</i>	High glacial sediment delivery exacerbated by flashy hydrograph	7
<i>Hydrology</i>	<i>High</i>	Flashy, summer and especially winter low flow	7, 12

Hungary Creek

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>High</i>	Evidence of flooding, braided, bank instability	7
- type			
<i>Significant Environmental Variables</i>	<i>High</i>	High sediment level, low summer and winter flow	7, 12

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Lacustrine deposits, high suspended sediment, extensive beaver activity	7
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>	✓	Hwy 16 culvert may prevent upstream migration to best spawning habitat. Re-engineer crossing.	12, 7
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

Hungary Creek

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
	None	

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓	✓(6)	✓	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. 	<ul style="list-style-type: none"> • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Conduct detailed stream channel stability assessment. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Hungary Creek watershed identifying areas requiring site specific prescriptions. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Improve inventories of aquatic resources. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development (i.e forestry) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

SLIM CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Slim Creek	106

Slim Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Slim Creek</i>	SISS Code:	00-6600
Physiographic Area(s):	Rocky Mountain Trench/Cariboo Mountains/Fraser Plateau		
Drainage Area (ha):	85,600	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce - Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	35.8	194.1	2.4	NA	7.54	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	5,500 (NA)	3,084	5,500	1,131	Increasing	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>	Extensive past harvesting along upper mainstem and tributaries particularly Everett Creek.	7
-percent logging	High	19% on average, 23% in Everett Creek	12
- ECA status	High		7
- riparian condition/ stream length impacted	High	Impacts on upper mainstem	7, 12

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low	None	7
- extent	Low		7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>		7
- extent	High	Logging roads, CNR and highway right of way and numerous stream crossings	7
- stream/riparian impacts	High	Localized, sedimentation from logging road cutbanks and loss of riparian vegetation	7, 12
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>		7
- types		Sandy, terraced glaciofluvial deposits	15
<i>Terrain</i>	<i>High</i>		7
- type		Upper valley in the rugged Cariboo Mountains; lower basin in gentle terrain	7, 12
<i>Resistance to Change</i>	<i>Low</i>	Lake headed stable mainstem	7

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Hydrology</i>	<i>Low</i>	Low summer and winter flows, lake headed	7, 12
<i>Channel Stability</i>	<i>Low</i>	Upper basin steep and confined, lower reaches stable below lake	7
- type			
<i>Significant Environmental Variables</i>	<i>High</i>	High mainstem summer water temperatures	12

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Channel upstream of spawning grounds filled with sediment from logging activities. Summer water temperature.	12
<i>Sensitive Biological Features</i>	✓	Chinook rearing in tributaries and small lakes during summer.	7
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
Research	One of the few upper Fraser River watersheds evaluated for Fisheries-Land Use interactions. 1972-1978, revisited in 1990's. DFO Science Branch. Continued monitoring of juvenile chinook habitat use.	7

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(2)	✓(3)	✓(2)	✓(4)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure adequate stream flows are present to maintain fisheries productive capacity. 	<ul style="list-style-type: none"> • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities. • Conduct detailed stream channel stability assessment. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Conduct foreshore inventory and classification of Slim and Tumuch Lakes for delineation of fisheries sensitive zones (FSZ) prior to development. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop a detailed riparian management plan (RMP) for the Slim Creek watershed identifying areas requiring site specific prescriptions.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Improve inventories of aquatic resources. • Ensure compatibility of lake foreshore developments with salmon utilization. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Develop Access Management Plans (AMP) for review and direction. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment/inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, development and restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

DOME CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Dome Creek	113

Dome Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Dome Creek</i>	SISS Code:	00-6660
Physiographic Area(s):	Rocky Mountain Trench/Cariboo Mountains		
Drainage Area (ha):	27,300	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Interior Cedar-Hemlock/ Engelmann Spruce-Subalpine Fir/ Alpine Tundra
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	11.4	61.9	0.74	NA	2.52	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	523 (1991)	269	523	NA	Static	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		7
-percent logging	Low	11% on average	12
- ECA status	Low		7
- riparian condition/ stream length impacted	Low	Extensive riparian harvest concentrated in upper reaches	7

Dome Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	Some on lower reaches	7
- riparian condition/ stream length impacted	Low	Localized impacts	7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	Community of Dome Creek on lower reaches	12
- riparian condition/ stream length impacted	Low	Some channelization associated with community	12
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
Linear Development	High		7
- extent	Low	Logging roads, CNR and Highway 16 rights-of-way and crossings	7
- stream/riparian impacts	Low	Concentrated at crossings	7
Hydro Development	Low		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
Other Development	Low		7
- extent	Low	Old log booming dam about 8 km upstream of mouth probable migration barrier at certain flows	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

Cumulative Development	Low		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
Soils	High		7
- types		Localized lacustrine deposits, glacial till, alluvium	7, 12
Terrain	High		7
- type		Upper reaches - Cariboo Mountains (rugged), frequent landslides Lower reaches - gentle terrain	7, 12
Resistance to Change	High	High glacial sediment delivery, flashy	7

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Hydrology</i>	<i>High</i>	Large watershed, low water yield (low winter and summer flow)	7, 12
<i>Channel Stability</i>	<i>High</i>	Evidence of flooding	7
- type		Bank instability and channelization	7
<i>Significant Environmental Variables</i>	<i>High</i>	High sediment levels	7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	High suspended sediment load	7
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Dome Creek counting fence, Penny hatchery, side channel rearing facility	7, 12
<i>Restoration Activity</i>	✓	Log weir upstream of Highway 16 should be removed.	7, 12
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
WRP	Some localized restoration projects underway	7

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓	✓(6)	✓	✓(6)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. 	<ul style="list-style-type: none"> • Apply FPC riparian guidelines to agricultural and range use of crown land. • Apply the Land Development Guidelines to residential and industrial developments. • Conduct detailed stream channel stability assessment. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Dome Creek watershed identifying areas requiring site specific prescriptions.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Develop a riparian management plan to protect and restore stream habitat in cooperation with agricultural and ranching communities. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment/inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none">• Review and document potential habitat improvement, habitat development and restoration opportunities.• Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified.

TORPY RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
Torpy River	121

Torpy River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Torpy River</i>	SISS Code:	00-6700
Physiographic Area(s):	Rocky Mountain Trench/McGregor Plateau/ Park Ranges		
Drainage Area (ha):	128,500	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Engelmann Spruce- Subalpine Fir/ Interior Cedar-Hemlock
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	53.7	291.4	3.65	NA	11.13	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	4,000 (NA)	2,136	4,000	672	Increasing	Medium

NB. The above numbers include escapement to the tributaries Walker and West Torpy creeks.

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>	Extensive harvesting proposed in upper valley, Hemlock looper infestation in lower valley	7
-percent logging	High	9% on average, more than 20% on mainstem, 30% in Upper Torpy River watershed	7, 12
- ECA status	High	Extensive harvesting in lower valley especially along floodplain below Pass Lake	7
- riparian condition/ stream length impacted	High	Extensive impacts from forestry	7, 12, 3

Torpy River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low	None	7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	None	7
- water quality	Low		7
- stream/riparian impacts	Low		7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>		7
- extent	High	Extensive logging roads and crossings	7
- stream/riparian impacts	High	Localized	7
<i>Hydro Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low	None	7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>High</i>	Substantial past harvest and more planned; Salvage planned to combat severe hemlock looper infestation.	7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>	Elevated suspended sediment load, siltation of spawning areas	7, 12
- types		Lacustrine sediments in benches along main valley	12
<i>Terrain</i>	<i>High</i>	Slope failure in upper basin, e.g. in 1994	7, 12
- type		Lower mainstem is in a broad floodplain and upper mainstem steep and confined in valley walls	12
<i>Resistance to Change</i>	<i>High</i>	Low flows/high sediment input, lacustrine valley bottom	7

Torpy River

BIOPHYSICAL CONDITIONS (continued)

Type	Level of Concern	Comments	Ref.*
<i>Hydrology</i>	<i>High</i>	Low flows in summer and winter	7
<i>Channel Stability</i>	<i>High</i>		7
- type		Wide floodplain, meanders in lower valley, unstable banks	7
<i>Significant Environmental Variables</i>	<i>High</i>	High suspended sediment levels	7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Lacustrine deposits	7
<i>Sensitive Biological Features</i>	✓	Chinook rearing in tributaries	7
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Removal of impassible falls above Pass Lake (approx. 63 km upstream of mouth) would provide access to excellent spawning areas in upper reaches	12
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
ROC	Rate of Cut review done	7
TRP	Total Resource Plan underway - Joint report (MoF/CFS) on extent of insect infestation	7
Research	Proposed for upper Fraser watershed synoptic-level joint (MoF, MoELP, DFO, University of Northern British Columbia [UNBC]) fishery/forestry interactions research program. A UNBC initiative.	7

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(3)	✓(6)	✓(2)	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Improve inventories of aquatic resources. 	<ul style="list-style-type: none"> • Apply the Watershed Assessment Procedures (WAP) to assess past and potential for future impacts of lands use activities(underway). • Conduct detailed stream channel stability assessment. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction.

Torpy River

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Develop a detailed riparian management plan (RMP) for the Torpy River watershed identifying areas requiring site specific prescriptions . • Develop a Water Management Plan (WMP) that includes a determination of water demand, fisheries/ minimum low flow of water storage opportunities and potential impacts of water extraction. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns.

Torpy River

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none">• Review and document potential habitat improvement, habitat development and habitat restoration opportunities.• Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

Walker Creek

SISS 00-6700-030

Walker Creek is a tributary of Torpy River and has a drainage area of 364 km². A total of 22.8 km² has been logged but none is proposed for the near future. Logging has occurred primarily in the lower valley but is now moving into the upper regions of the watershed. Timber has been beetle killed and the quality of the timber is poor. Mean 7-day flow in the summer is 3.32 m³/s and in winter is 1.00 m³/s. Planning objectives and strategies pertinent to Torpy River also relate to Walker Creek.

West Torpy River

SISS 00-6700-100

West Torpy River is a tributary of the Torpy River and has a drainage area of 168 km². Logging has taken place primarily in the lower valley but is now moving into the upper regions of the watershed. Recent logging totals 1.1 km² and 7.4 km², or 4%, is proposed up to 1997. Mean 7-day flow in the summer is 1.58 m³/s and in winter is 0.45 m³/s. Planning objectives and strategies pertinent to Torpy River also relate to West Torpy River.

WATERSHED PLANNING PROFILE

Stream Name	Page
Ptarmigan Creek.	129

Ptarmigan Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Ptarmigan Creek</i>	SISS Code:	00-6710
Physiographic Area(s):	Rocky Mountain Trench/Cariboo Mountains		
Drainage Area (ha):	18,300	Biogeoclimatic Zone(s):	Sub-Boreal Spruce/ Interior Cedar-Hemlock/ Engelmann Spruce-Sub-Alpine Fir/ Alpine Tundra
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	7.65	41.5	0.49	NA	1.72	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	130 (NA)	74	130	NA	Static	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		7
-percent logging	Low	14% on average	12
- ECA status	Low	No information available	7
- riparian condition/ stream length impacted	Low	No information available	7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		7
- extent	Low		7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Urbanization</i>	<i>Low</i>		7
- population level	Low		7
- extent	Low		7
- riparian condition/ stream length impacted	Low		7
- water withdrawal	Low		7
- water quality	Low		7
<i>Placer Mining</i>	<i>Low</i>		7
- extent	Low		7
- water quality	Low		7
- riparian condition/ stream length impacted	Low		7
<i>Other Mining</i>	<i>Low</i>		7
- extent	Low		7
- water quality	Low		7
<i>Industrial Development</i>	<i>Low</i>		7
- extent	Low	CN rail quarry	7
- water quality	Low		7
- stream/riparian impacts	Low	Creek diverted to prevent flooding of facilities	7

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		7
- extent	Low	Logging roads, CNR and Highway 16 rights-of-way and stream crossings	7
- stream/riparian impacts	Low		7
<i>Hydro Development</i>	<i>High</i>	Robson Valley Power Corporation (RVPC)	7
- extent	Low	Run-of-the-river small hydro plant at falls 4.5 km upstream of mouth.	12
- stream/riparian impacts	High	Channel diversion and re-engineering	7
<i>Other Development</i>	<i>Low</i>		7
- extent	Low		7
- stream/riparian impacts	Low		7

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		7
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>		7
- types		Localized lacustrine deposits, glacial till, alluvium	7, 12
<i>Terrain</i>	<i>High</i>		7
- type		Upper reaches - Cariboo Mountains (rugged) Lower reaches - gentle terrain	7, 12
<i>Resistance to Change</i>	<i>High</i>	High sediment delivery during fall and spring rainstorms, flashy	12
<i>Hydrology</i>	<i>High</i>	Low winter and summer flow, flashy	12

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>High</i>	Unstable in lower reaches	7
- type			
<i>Significant Environmental Variables</i>	<i>High</i>	High sediment levels in lower reaches	7

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	High suspended sediment load	7
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>	✓		
<i>Enhancement Activity/Opportunity</i>	✓	Rearing and spawning channels and tailrace gravel installed downstream of small hydro plant by owners	12
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	Occurs in Fraser River	7
<i>Recreational Fishery</i>	✓	Ocean sport fishery	
<i>Commercial Fishery</i>	✓	Ocean fishery	

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
	None	

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(1)	✓(6)	✓	✓(5)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Conduct detailed stream channel stability assessment. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Develop a detailed riparian management plan (RMP) for the Ptarmigan Creek watershed identifying areas requiring site specific prescriptions. • Develop a riparian management plan to protect and restore stream habitat in cooperation with agricultural and ranching communities. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development (forestry, urban, agriculture, etc.) is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Maintain designated "NO STAKING PLACER RESERVES" for placer mining where identified.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none"> • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

SNOWSHOE CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Snowshoe Creek.	137

Snowshoe Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Snowshoe Creek</i>	SISS Code:	00-6782
Physiographic Area(s):	Cariboo Mountains, Southern Rocky Mountain Trench		
Drainage Area (ha):	10,000	Biogeoclimatic Zone(s):	Engelmann Spruce Sub-Alpine Fir, Interior Cedar Hemlock, Alpine Tundra
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	4.18	22.7	0.26	NA	0.96	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, Table 7 and Appendix B					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-90 Ave.	1981-90 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	50	50 (1995)				Unknown

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		16
-percent logging	Low	4.3% logged, 6.8% proposed	12
- ECA status	Low		16
- riparian condition/ stream length impacted	Low		16

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		18
- extent	Low	In lower reaches	16
- riparian condition/stream length impacted	Low		
- water withdrawal	Low		
- water quality	Low		
<i>Urbanization</i>	<i>Low</i>	None	18
- population level	Low		
- extent	Low		
- riparian condition/stream length impacted	Low		
- water withdrawal	Low		
- water quality	Low		
<i>Placer Mining</i>	<i>Low</i>	None	18
- extent	Low		
- water quality	Low		
- riparian condition/stream length impacted	Low		
<i>Other Mining</i>	<i>Low</i>	None	18
- extent	Low		
- water quality	Low		
<i>Industrial Development</i>	<i>Low</i>	None	18
- extent	Low		
- water quality	Low		
- stream/riparian impacts	Low		

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		18
- extent	Low	CNR Line & Hwy 16 crossing	18
- stream/riparian impacts	Low		
<i>Hydro Development</i>	<i>Low</i>	Potential for small hydro development	18
- extent	Low		
- stream/riparian impacts	Low		
<i>Other Development</i>	<i>Low</i>		
- extent	Low		
- stream/riparian impacts	Low		

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	Low		
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>		
- types	High	Old roads and landings in upper/middle Snowshoe require attention, plugged culverts, inadequate ditching, surface erosion problems are evident.	16
<i>Terrain</i>	<i>Low</i>	Steep in upper reaches, flat in mid to lower	18
- type	Low	reaches	
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>		
<i>Channel Stability</i>	<i>Low</i>		18
- type	Low		
<i>Significant Environmental Variables</i>	<i>Low</i>	Infestation of Hemlock Looper at mid-elevation will lead to logging activity and in turn may affect channel stability	18

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

* See report section 6.0 References Cited

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓		✓(1)		

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Assess the biophysical condition of the watershed. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Ensure that rate of development is balanced against hydrologic recovery to maintain cumulative ECA at or below 25% (total watershed drainage area). • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate watershed restoration assessment & inventory for development of a Watershed Restoration Plan. • Initiate restoration, revegetation and stabilization measures on linear developments. • Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns. • Review and document potential habitat improvement, development and restoration opportunities. • Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

MORKILL RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
Morkill River	143

Morkill River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Morkill River</i>	SISS Code:	00-6800
Physiographic Area(s):	Continental Ranges, Southern Rocky Mountain Trench		
Drainage Area (ha):	1,333,300	Biogeoclimatic Zone(s):	Engelmann Spruce Sub-Alpine Fir, Interior Cedar Hemlock, Alpine Tundra
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	55.7	302.3	3.79	NA	11.53	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, p. 12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	2,000 (1987)	863	2,000 (1987)	250	Increasing	Medium

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	High	Due primarily to lower river riparian encroachment and forest road development	18
-percent logging	Low	1.3% logged, 4% proposed. Majority of logging in Cushing Creek where total % logged to 1997 will be 11.1%	16
- ECA status	Low		
- riparian condition/ stream length impacted	High	Road encroachments and slope failures. Riparian buffers in lower river have been blown down or burned	16

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	Low		18
- extent	Low		
- riparian condition/ stream length impacted	Low		
- water withdrawal	Low		
- water quality	Low		
<i>Urbanization</i>	Low		18
- population level	Low		
- extent	Low		
- riparian condition/ stream length impacted	Low		
- water withdrawal	Low		
- water quality	Low		
<i>Placer Mining</i>	Low		18
- extent	Low		
- water quality	Low		
- riparian condition/ stream length impacted	Low		
<i>Other Mining</i>	Low		18
- extent	Low		
- water quality	Low		
<i>Industrial Development</i>	Low		18
- extent	Low		
- water quality	Low		
- stream/riparian impacts	Low		

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
Linear Development	High	From forest road development	18
- extent	High	Walker-Morkill forest road in lower valley	16
- stream/riparian impacts	High	Forest road stream crossings	18
Hydro Development	Low		
- extent	Low		
- stream/riparian impacts	Low		
Other Development	Low		18
- extent	Low		
- stream/riparian impacts	Low		

CUMULATIVE DEVELOPMENT ACTIVITY:

Cumulative Development	Low		18
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
Soils	High		
- types	Low	Highly erodible lacustrine soils	16
Terrain	High	Steep valley sides, wet and unstable	16
- type	Low	Landslide potential	18
Resistance to Change	Low		18
Hydrology	Low	Low water in April	16
Channel Stability	High	Encroachment on lower river, extensive riparian removal	16
- type	Low		
Significant Environmental Variables	High	High sediment loads during freshet and rainstorm floods	16

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Very steep, highly incised terrain, fine-textured soils	18
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>	✓	Heavy sandy-loam deposits along lower to mid-elevation bands	18

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>	✓	FRBC-WRP Forest Road Remediation	18
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>	✓		18

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*
IWAP/Level 1	Initiated by MoELP to address forest road development concerns	18
Interagency Interdisciplinary Task Group	To propose future developments and provide recommendations to the Ministry of Forests. It uses Watershed Assessment Level 1 information and focusses on engineering	18

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(2)	✓(4)	✓(2)	✓(2)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. 	<ul style="list-style-type: none"> • Initiate a watershed assessment and terrain hazards analysis and mapping. • Initiate watershed assessment to evaluate the cumulative impacts associated with forest harvesting and provide recommendations for future resource development. • Assess and restore degraded riparian habitat in the lower Morkill River through revegetation, bank stabilization and other improvement practices. • Biophysical conditions should be further investigated to determine site specific information regarding the potential impacts of forest harvesting on the fisheries resource in the Morkill drainage. • Conduct detailed gully assessments for specified sensitive channels identified in development plans. • Design high elevation forest cutblocks to optimize snow accumulation and retention similar to unharvested or undisturbed areas. • Develop Access Management Plans (AMP) for review and direction. • Distribute timber harvesting opportunities throughout the available range in elevation to maintain natural hydrologic conditions. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update.

SPECIFIC OBJECTIVES AND STRATEGIES (continued):

Specific Objectives	Specific Strategies
	<ul style="list-style-type: none">• Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls).• Retain riparian reserves along specified S4-S6 (FPC riparian class) stream channel reaches in high sensitivity areas or channels identified as having stream temperature concerns.• Review and document potential habitat improvement, habitat development and habitat restoration opportunities.• Review resource development plans for compatibility with sensitive habitats in terms of hydrology, water quality, channel stability and riparian condition.

GOAT RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
Goat River.	150

Goat River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Goat River</i>	SISS Code:	00-6900
Physiographic Area(s):	Cariboo Mountains, Southern Rocky Mountain Trench		
Drainage Area (ha):	66,100	Biogeoclimatic Zone(s):	Interior Cedar-Hemlock, Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m³/s)	27.6	149.9	1.84	NA	5.89	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	160	87			Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		16
-percent logging		5.1% logged, 0.6% proposed, concentrated in valley. Killian Creek sub-basin 40% logged	16
- ECA status	Low		16
- riparian condition/ stream length impacted	High	Most impact on Milk River, tributary to Goat.	16

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>	Development present	16,17
- extent	Low		17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low		17
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low		17
- extent	Low	None	17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low		17
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- stream/riparian impacts	Low		17

Goat River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>		17
- extent	High	Hwy 16, roads adjacent to stream, CN Rail	16
- stream/riparian impacts	High	Includes Milk River tributary which has been encroached on throughout its length	17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>High</i>	High silt content	16
- types			
<i>Terrain</i>	<i>High</i>	Instability problems	
- type	Low		
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>		
<i>Channel Stability</i>	<i>Low</i>	Bank erosion and channel movement in	
- type	Low	lower reaches below Hwy 16	
<i>Significant Environmental Variables</i>	<i>Low</i>	History of high silt content in Milk R. which could potentially affect lower Goat spawning	16

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓ (2)	✓ (2)		

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan for Killian Creek, Lower Goat and Milk River. • Initiate procedure for terrain hazard mapping, watershed restoration and watershed assessment analysis. • Assess cutover areas and road networks in Goat River and Milk River and address existing erosion and hydrological problems by restoring natural drainage patterns through road maintenance or road deactivation. • Develop a riparian management plan to protect and restore mainstem stream habitat in cooperation with agricultural and ranching communities. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Provide Streamside Management Plans (SMP) for harvesting areas identified in the annual forest development plan update. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

Goat River

NOTES:

The upper Goat River above the Milk River confluence is untouched at present. The Ministry of Forests has just allocated this area to Zeidler Forest Industries who have quickly developed a plan to access the valley and commence timber harvesting. The access route favoured by the Ministry of Forests will place a road along the valley bottom near the Goat River and encroaching on the riparian reserve in various locations. Over the next few years there will be considerable roading and timber extraction in the drainage and upper tributaries. Slope stability, water quality and flow changes will be an issue as this development progresses.

Milk River

SISS 00-6900-060

Milk River is a tributary of Goat River and has a drainage area of 191 km². It has had 8.7 km², or 5%, of its area logged recently and another 4.1 km², or 2%, is proposed to 1998. Mean 7-day flow in the summer is 1.79 m³/s and in winter is 0.51 m³/s. It has been encroached on by linear development throughout its length. There is a history of high silt content in Milk River which could potentially affect lower Goat River spawning activity. Surface run-off has been observed and there is the potential for debris slump as evidenced on the east side of the river. There are no water licences on the stream. Planning objectives and strategies pertinent to Goat River also relate to Milk River.

EAST TWIN CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
East Twin Creek.	157

East Twin Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>East Twin Creek</i>	SISS Code:	00-6950
Physiographic Area(s):	Cariboo Mountains, Southern Rocky Mountain Trench		
Drainage Area (ha):	12,800	Biogeoclimatic Zone(s):	Interior Cedar-Hemlock, Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	5.35	29	.34	NA	1.22	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	25	10			NA	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		16
-percent logging		5.6% logged, 1.7% proposed	16
- ECA status	Low		
- riparian condition/ stream length impacted	Low		

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>High</i>		16
- extent			
- riparian condition/stream length impacted	High	Impacted by agriculture in lowermost portion of Creek adjacent to spawning areas	16
- water withdrawal	Low		17
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low		17
- extent	Low		17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low		17
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		17
- extent	Low		17
- water quality	Low		17
- stream/riparian impacts	Low		17

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		17
- extent	Low	History of road failures along Mountainview logging road	16
- stream/riparian impacts	Low	Encroachment by logging road up valley	17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	Small hydroelectric project at falls	16
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		17
- extent	Low		17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>			
- types		Gravel and sand, steep, erodible banks. Limited spawning grounds	16
<i>Terrain</i>			
- type			
<i>Resistance to Change</i>			
<i>Hydrology</i>		Frequent streamflow changes	16
Channel Stability		Frequent channel changes	16
- type			
<i>Significant Environmental Variables</i>			

East Twin Creek

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	spawning habitat located below hydro facility	16
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(1)		✓(1)	

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Assess road networks in the upper East Twin drainage and address existing erosion and hydrological problems by restoring natural drainage patterns through road maintenance or road deactivation. • Apply the Land Development Guidelines to residential and industrial developments. • Develop a riparian management plan to protect and restore mainstem stream habitat in cooperation with agricultural and ranching communities. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

WEST TWIN CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
West Twin Creek	163

West Twin Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>West Twin Creek</i>	SISS Code:	00-6955
Physiographic Area(s):	Continental Ranges, Southern Rocky Mountain Trench		
Drainage Area (ha):	17,400	Biogeoclimatic Zone(s):	Interior Cedar-Hemlock, Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	7.27	39.5	0.47	NA	1.64	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	105	42			Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>	No current activity but past logging has left huge clearcuts with failing roads	17
-percent logging		7.5% logged, none proposed	16
- ECA status	Low		16
- riparian condition/ stream length impacted			

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		17
- extent	Low		17
- riparian condition/stream length impacted	Low	Encroachment on riparian by land development	17
- water withdrawal	Low		17
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low		17
- extent	Low		17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low	500 gal/day domestic use	12
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- stream/riparian impacts	Low		17

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		17
- extent	Low	Hwy 16, CN Rail, agriculture	16
- stream/riparian impacts	Low		17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		
- extent	Low	None	17
- stream/riparian impacts	Low		

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		
- types	Low	Limited gravels	16
<i>Terrain</i>	<i>Low</i>	Evidence of slope instability, steep gradient	16
- type	Low		
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>		
<i>Channel Stability</i>	<i>Low</i>		
- type	Low		
<i>Significant Environmental Variables</i>	<i>Low</i>		

West Twin Creek

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>	WRP	Zeidler Forest Industries are working on this	17
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓ (1)			✓ (1)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Implement watershed restoration plan recommendations from assessment and inventory reports. • Assess the degree of forestry development and biophysical condition of this watershed. • Apply the Land Development Guidelines to residential and industrial developments. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Initiate restoration, revegetation and stabilization measures on linear developments. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

MCKALE RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
McKale River	169

McKale River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>McKale River</i>	SISS Code:	00-7000
Physiographic Area(s):	Continental Ranges, Southern Rocky Mountain Trench		
Drainage Area (ha):	28,000	Biogeoclimatic Zone(s):	Interior Cedar-Hemlock, Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	8.38	58.1	1.05	NA	2.70	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	75	28			Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>		16
-percent logging	Low	4.3% logged, 1.5% proposed	16
- ECA status	Low		16
- riparian condition/ stream length impacted	High	Encroachment in upper and lower river	16, 17

McKale River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		17
- extent	Low	Some cattle grazing	14
- riparian condition/stream length impacted	Low	Unknown	17
- water withdrawal	Low		17
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low		17
- extent	Low	None	17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low		17
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		17
- extent	Low		17
- water quality	Low		17
- stream/riparian impacts	Low		17

McKale River

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		17
- extent	High	Logging road adjacent to river, to headwaters, crossings	17
- stream/riparian impacts	High	Road encroachment on riparian in lower and upper watershed	17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		
- types	Low	Streambed mostly gravel and sand	16
<i>Terrain</i>	<i>Low</i>		
- type	Low		
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>	Streamflow changes	12, 16

* See report section 6.0 References Cited

McKale River

BIOPHYSICAL CONDITIONS (continued):

Type	Level of Concern	Comments	Ref.*
<i>Channel Stability</i>	<i>High</i>	Encroachments, frequent channel changes,	
- type	Low	debris accumulation	
<i>Significant Environmental Variables</i>	Low		

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓ (2)	✓ (1)		

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Apply FPC riparian guidelines to agricultural and range use of crown land. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Develop a riparian management plan to protect and restore mainstem stream habitat in cooperation with agricultural and ranching communities. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

HOLMES RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
Holmes River	175

Holmes River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Holmes River</i>	SISS Code:	00-7200
Physiographic Area(s):	Continental Range, Southern Rocky Mountain Trench		
Drainage Area (ha):	78,500	Biogeoclimatic Zone(s):	Mountain Hemlock, Interior Cedar-Hemlock, Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	32.8	178	2.20	NA	6.94	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	3000	1885			Increasing	
Sockeye		100			Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>High</i>	Logging in valley flats, extensively logged by 1981	16
-percent logging		7% logged, 0.1% proposed	16
- ECA status	Low		16
- riparian condition/ stream length impacted	High	Impacts from logging, fires and windthrow problems	16

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>High</i>		16
- extent	Low	Significant ranching and farming in valley south of Hwy 16	16
- riparian condition/stream length impacted	High	Livestock grazing throughout watershed, damage to riparian in low lying grass flats	16
- water withdrawal	Low		17
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low		17
- extent	Low	None	17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low		17
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	Unknown	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low		17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- stream/riparian impacts	Low		17

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>High</i>	Logging road up entire watershed, several	17
- extent	High	crossings	17
- stream/riparian impacts	High	Encroachment on riparian areas by roads and crossings	17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low		17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		17
- extent	Low		17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		
- types	Low		
<i>Terrain</i>	<i>Low</i>	Some instability in valley walls, evidence of material slides/slumps	17
- type	Low		
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>	Low flows in April	16
<i>Channel Stability</i>	<i>Low</i>	Removal of riparian vegetation	12
- type	Low		
<i>Significant Environmental Variables</i>	<i>Low</i>		

Holmes River

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>	✓	Significant flood plain earthen areas	17
<i>Unique Features</i>	✓	Extensive logging in the Holmes and a major fire in the Holmes and Chalco watersheds (mid 1900s?) removed a considerable amount of the watershed forest	17

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>	✓	WRP	17
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(3)		✓(2)	✓(1)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Assess the biophysical condition of the watershed • Develop Access Management Plans (AMP) for review and direction. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Initiate restoration, revegetation and stabilization measures on linear developments. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

NEVIN CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Nevin Creek	181

Nevin Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Nevin Creek</i>	SISS Code:	00-7500
Physiographic Area(s):	Continental Range, Southern Rocky Mountain Trench		
Drainage Area (ha):	13,700	Biogeoclimatic Zone(s):	Mountain Hemlock, Engelmann Spruce Sub-Alpine Fir, Interior Cedar Hemlock
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m³/s)	5.73	31.1	0.36	NA	1.30	NA
Comments:	Reference for above data is the stream mouth. See Reference # 12, Table 7 and Appendix B					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-90 Ave.	1981-90 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	140	71			Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		16
-percent logging	Low	0.3% logged, none proposed	
- ECA status	Low		16
- riparian condition/ stream length impacted	Low		

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		17
- extent	Low		17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low		17
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low		17
- extent	Low	None	17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low	2,500 gal/day domestic use	12
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		
- extent	Low		
- water quality	Low		
- stream/riparian impacts	Low		

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		17
- extent	Low	Hwy 16 bridge crossing	17
- stream/riparian impacts	Low		17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		17
- extent	Low		17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>	Lower 1 km unstable, bank sloughing and erosion have impacted on spawning habitat	17
- types	Low		
<i>Terrain</i>	<i>Low</i>		
- type	Low		
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>		
<i>Channel Stability</i>	<i>Low</i>		
- type	Low		
<i>Significant Environmental Variables</i>	<i>Low</i>		

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

* See report section 6.0 References Cited

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓				

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Assess the degree of forest development and biophysical condition of the drainage. • Apply the Land Development Guidelines to residential and industrial developments. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Document, map and assess watershed terrain and soils conditions and their hazard risk. • Initiate watershed restoration assessment & inventory for development of a Watershed Restoration Plan. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

HORSEY CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Horsey Creek	187

Horsey Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Horsey Creek</i>	SISS Code:	00-7700
Physiographic Area(s):	Continental Range, Southern Rocky Mountain Trench		
Drainage Area (ha):	20,100	Biogeoclimatic Zone(s):	Mountain Hemlock, Interior Cedar-Hemlock, Engelmann Spruce - Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m³/s)	8.40	45.6	0.54	NA	1.88	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	325	147			Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		16
-percent logging	Low	1.5% logged, none proposed	16
- ECA status	Low		16
- riparian condition/ stream length impacted	Low		16

Horsey Creek

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		17
- extent	Low	Some ranching and grazing.	16
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low	Irrigation licences total 75 ac-ft	12
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low		17
- extent	Low	None	17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low		17
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	Unknown	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
- stream/riparian impacts	Low		17

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		17
- extent	Low	Hwy 16, CN Rail	16
- stream/riparian impacts	Low		17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		17
- extent	Low		17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		
- types	Low		
<i>Terrain</i>	<i>Low</i>		
- type	Low		
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>		
<i>Channel Stability</i>	<i>Low</i>	Some potential for stream bank erosion due to logging, grazing and road encroachments.	16
- type	Low		
<i>Significant Environmental Variables</i>	<i>Low</i>		

Horsey Creek

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>			
<i>Sensitive Biological Features</i>			
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Assess the biophysical condition of the watershed. • Apply the Land Development Guidelines to residential and industrial developments. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Develop a riparian management plan to protect and restore mainstem stream habitat in cooperation with agricultural and ranching communities. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Initiate restoration, revegetation and stabilization measures on linear developments. • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.

MCLENNAN RIVER

WATERSHED PLANNING PROFILE

Stream Name	Page
McLennan River	193

McLennan River

GENERAL WATERSHED INFORMATION:

Watershed:	<i>McLennan River</i>	SISS Code:	00-8200
Physiographic Area(s):	Cariboo Mountains, Continental Ranges, Southern Rocky Mountain Trench		
Drainage Area (ha):	69,300	Biogeoclimatic Zone(s):	Mountain Hemlock, Interior Cedar-Hemlock, Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m ³ /s)	14.5	59.0	4.64	NA	6.50	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook					Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		16
-percent logging	Low	3.6% logged, 0.2% proposed	16
- ECA status	Low		16
- riparian condition/ stream length impacted	Low	Private land surrounding waterways, riparian areas intact but unstable	16

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		17
- extent	Low	Some land clearing encroachment on riparian	17
- riparian condition/stream length impacted	Low		16
- water withdrawal	Low	Irrigation licences total 524 ac-ft	12
- water quality	Low		17
<i>Urbanization</i>	<i>Low</i>		17
- population level	Low	Some recreational dwellings and acreages	17
- extent	Low		17
- riparian condition/stream length impacted	Low		17
- water withdrawal	Low	Domestic water use equals 3,500 gal/day Waterworks uses 370,000 gal/day	16
- water quality	Low		17
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low		17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low		17
- water quality	Low		17
<i>Industrial Development</i>	<i>Low</i>		17
- extent	Low		17
- water quality	Low		17
- stream/riparian impacts	Low		17

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>		17
- extent	Low	Logging roads and stream crossings	17
- stream/riparian impacts	Low		17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>	<i>Low</i>		17
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		
- types			
<i>Terrain</i>	<i>Low</i>		
- type			
<i>Resistance to Change</i>	<i>Low</i>		
<i>Hydrology</i>	<i>Low</i>		
<i>Channel Stability</i>	<i>High</i>	Erosion evident, sedimentation, potential to impact Tete Jaune spawning grounds.	12, 16
- type	Low		
<i>Significant Environmental Variables</i>	<i>Low</i>		

McLennan River

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	River channel downstream of Swift River composed of highly erodible materials	17
<i>Sensitive Biological Features</i>	✓	Rearing habitat	17
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>			
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
?		✓(1)	✓(2)	

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Assess and map channel stability problems. • Initiate riparian rehabilitation projects with private land owners in appropriate areas. • Apply the Land Development Guidelines to residential and industrial developments. • Conduct and maintain fisheries, habitat (critical) and enhancement inventories. • Develop a riparian management plan to protect and restore mainstem stream habitat in cooperation with agricultural and ranching communities. • Implement a water drainage management plan for sensitive soils, stream crossings or other areas specified in development plans. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls).

SWIFT CREEK

WATERSHED PLANNING PROFILE

Stream Name	Page
Swift Creek	199

Swift Creek

GENERAL WATERSHED INFORMATION:

Watershed:	<i>Swift Creek</i>	SISS Code:	00-8200-050
Physiographic Area(s):	Continental Ranges, Southern Rocky Mountain Trench		
Drainage Area (ha):	13,500	Biogeoclimatic Zone(s):	Mountain Hemlock, Engelmann Spruce-Subalpine Fir
HMA:	Upper Fraser		

WATERSHED HYDROLOGY:

Stream Flows:	Mean Annual	Mean Flood	Mean 7-day low flow			
			Winter		Summer	
(m³/s)	14.5	59.0	4.64	NA	6.50	NA
Comments:	Reference for above data is the stream mouth. See Reference #12, Table 7 and Appendix B.					

SALMON ESCAPEMENT:

Species	Historical Max. (yr)	1981-92 Ave.	1981-92 Max.	1969-80 Ave.	Population trend	Rebuilding potential
Chinook	1500	942			Increasing	

DEVELOPMENT ACTIVITY:

Type	Level of Concern	Comments	Ref.*
<i>Forestry</i>	<i>Low</i>		
-percent logging	Low	2.4% logged, none proposed	16
- ECA status	Low		16
- riparian condition/ stream length impacted	Low	Private land surrounding waterways, riparian areas intact but unstable.	16

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Agriculture</i>	<i>Low</i>		17
- extent	Low	None	17
- riparian condition/stream length impacted	Low		16
- water withdrawal	Low	Total conservation storage totals are 790 ac-ft. Irrigation licences total 221 ac-ft	12
- water quality	Low	Susceptible to agricultural development.	16
<i>Urbanization</i>	<i>Low</i>	Village of Valemount water supply	17
- population level	Low	1250	17
- extent	Low	Restricted to lower 3 km of river	17
- riparian condition/stream length impacted	Mod	Land development along lower spawning reach has reduced riparian and destabilized banks	17
- water withdrawal	Low		16
- water quality	Low	Susceptible to urban development.	16
<i>Placer Mining</i>	<i>Low</i>		17
- extent	Low	Unknown	17
- water quality	Low		17
- riparian condition/stream length impacted	Low		17
<i>Other Mining</i>	<i>Low</i>		17
- extent	Low	None	17
- water quality	Low		17
<i>Industrial Development</i>			
- extent			
- water quality			
- stream/riparian impacts			

DEVELOPMENT ACTIVITY (continued):

Type	Level of Concern	Comments	Ref.*
<i>Linear Development</i>	<i>Low</i>	Hwy 5, urban development near Valemount	16
- extent	Low	Hwy 5 crossing has reduced riparian and	17
- stream/riparian impacts	Low	possibly caused downstream bank erosion	17
<i>Hydro Development</i>	<i>Low</i>		17
- extent	Low	None	17
- stream/riparian impacts	Low		17
<i>Other Development</i>	<i>Low</i>	Water diversion dam 3 km from mouth.	16
- extent	Low	Structure updated in 1995 fish passage provided	17
- stream/riparian impacts	Low		17

CUMULATIVE DEVELOPMENT ACTIVITY:

<i>Cumulative Development</i>			
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BIOPHYSICAL CONDITIONS:

Type	Level of Concern	Comments	Ref.*
<i>Soils</i>	<i>Low</i>		17
- types	Low		17
<i>Terrain</i>	<i>Low</i>		17
- type	Low		17
<i>Resistance to Change</i>	<i>Low</i>		17
<i>Hydrology</i>	<i>Low</i>		17
<i>Channel Stability</i>	<i>High</i>	Erosion evident, gravel removal, potential to impact Tete Jaune spawning grounds.	16
- type	Low		17
<i>Significant Environmental Variables</i>	<i>Low</i>		17

Swift Creek

SENSITIVE WATERSHED FEATURES:

Type	Present	Comments	Ref.*
<i>Sensitive Physical Features</i>	✓	Water demand	12
<i>Sensitive Biological Features</i>	✓	Spawning beds susceptible to erosion and bedload movement during peak flows	17
<i>Unique Features</i>			

SPECIAL CONSIDERATIONS:

Type	Present	Comments	Ref.*
<i>Stock Management</i>			
<i>Enhancement Activity/Opportunity</i>			
<i>Restoration Activity</i>			
<i>Native Fishery</i>	✓	North Thompson band harvest chinook	17
<i>Recreational Fishery</i>			
<i>Commercial Fishery</i>			

RECENT WATERSHED PLANNING/PROJECT INITIATIVES:

Type	Comments	Ref.*

* See report section 6.0 References Cited

SUMMARY OF HABITAT CONCERNS (no. of high ratings):

Salmon Present	Development Concerns	Biophysical Concerns	Sensitive Watershed Features	Special Considerations
✓	✓(1)	✓(1)	✓(2)	✓(1)

SPECIFIC OBJECTIVES AND STRATEGIES:

Specific Objectives	Specific Strategies
<ul style="list-style-type: none"> • Maintain natural watershed hydrologic characteristics and stream flow regime. • Maintain the natural stream temperature regime. • Maintain the structural and functional integrity of riparian areas. • Maintain slope stability. • Maintain or improve water quality. • Protect stream channels and floodplains from influences of development activities. • Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality. • Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance. • Ensure that the intensity of development activities does not negatively impact the natural watershed ecological processes through site specific or cumulative development. • Ensure the inventory, assessment and implementation of stream restoration and enhancement programs. • Ensure adequate stream flows are present to maintain fisheries productive capacity. • Improve inventories of aquatic resources. • Support existing fisheries enhancement programs and activities. • Improve fish passage in the watershed. 	<ul style="list-style-type: none"> • Assess and map channel stability problems. • Initiate riparian rehabilitation projects with private land owners in appropriate areas. • Apply the Land Development Guidelines to residential and industrial developments. • Conduct a stream channel assessment to identify potential barriers to fish migration and remove or facilitate access where appropriate. • Develop a Water Management Plan (WMP) that includes a determination of water demand, fisheries/ minimum low flow of water storage opportunities and potential impacts of water extraction. • Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan. • Implement watershed restoration plan recommendations from assessment and inventory reports. • Restrict or control development within or along tributary confluences, alluvial fans, floodplains or areas of slope instability (e.g. valley walls). • Review and document potential habitat improvement, habitat development and habitat restoration opportunities.