

Sub Area: Southern Mainland Coast**Phillips River**

Watershed Code: 900447800

5th Order

Wild Stock Trend:	Declining (Based on Keogh)
Wild Stock Status:	Special Concern
Class:	Wild
Recent Steelhead Escapement:	Not assessed – believed to be small summer and winter runs
Angling Regulations:	Steelhead catch and release
Catch/Effort:	Light effort, heli-angling out of Campbell River and Powell River with some effort by local loggers and people from Stuart Island area. Fishable length: low to medium. Remote access by boat/float plane to camp at mouth, limited locations from existing roads.

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Not available

Existing Habitat: Un-gauged system, 27 km accessible length with lake approx 4 km from mouth, low natural productivity

Active logging and road construction in headwaters, main line logging road being extended out of flood plain on north west side, old roads deactivated. Subject to glacial runoff in summer months, lake 5 km above mouth, barriers on many tribs and on main stem at approx. 33km. Numerous side channels and excellent riparian habitats are found above lake. Clearwater confluence with Phillips has recently been “blown-out.”

HABITAT RESTORATION TO DATE

- Extensive road deactivation and riparian zone rehabilitation
- Fisheries and Oceans spawning channel below lake (very limited maintenance since new in 1984)

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Maintain good logging practices with particular emphasis on cut blocks on steep slopes in headwater reaches and in protection of high value spawning and rearing areas.

STEELHEAD OBJECTIVES AND STRATEGIES

- Develop cost-effective system of monitoring steelhead stock abundance and timing plus habitat condition on a regular basis.
- Upgrade existing biophysical inventory information to identify and prioritize steelhead recovery options – some work done to date but mainly on other species.
- Investigate the feasibility of making Phillips a steelhead index stream representing remote mainland systems.
- Have the existing Pacific Salmon Foundation initiative undertake a fish sustainability watershed plan as a community pilot for relatively inaccessible watersheds.
- Examine current fish utilization above an obstruction on Clearwater tributary of Phillips – substantial productive potential may be realized.

IDENTIFIED RECOVERY OPTIONS

- Enrichment potential confirmed with water sampling 2001 on both Phillips and Clearwater.
- Improve productive capability of warm water side channel stream at 22km on Phillips.
- Exploit side channel potential in old log flume channel downstream of existing Gillard Pass embayment.
- Beaver control in numerous natural side channels.
- Add rearing habitat complexity to DFO pink spawning channel.

NOTES: Excellent opportunity to partner with Gillard Pass community group who are active on site. Phillips could be developed as remote mainland index stream with help from PSEF. All species of salmon present, strong pink producer on even years, balance of species well below historic levels. FRBC reports available on habitat capability but have very limited info on steelhead. Last reported catch on SHQ was in 1996.

Draft 22/07/02

Quatam River (Ramsay Arm)

Watershed Code: 900368900

Wild Stock Trend: **Declining** (Based on Keogh and local observers)
 Wild Stock Status: **Special Concern**
 Class: **Wild**

Recent Steelhead Escapements: Not assessed – believed to be small summer and winter runs

Angling Regulations: Steelhead catch and release
 Catch/Effort: Very light effort, heli-angling out of Campbell River and Powell River. Last reported catch 1990, effort 1997. Fishable length: medium – remote access by boat/float plane to camp at mouth, unimproved airstrip, limited access to main stem.

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Not available

Existing Habitat: - 10 km accessible length, low productivity, no lake buffering

Has been heavily logged leading to channel instability, bank erosion, and sediment transport. Several active slides, intermittent logging operations. Two road-induced slides are contributing to sediment input and reduced channel complexity. Forest harvesting in 1950s, cutting second growth in valley bottom including alder (pending).

HABITAT RESTORATION TO DATE

- FRBC Riparian enhancement (March 2000), may be some road deactivation

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Requires much improved logging practices with particular emphasis on road-building standards and cut blocks on steep (and unstable) slopes.

STEELHEAD OBJECTIVES AND STRATEGIES

- Develop cost-effective system of monitoring steelhead stock abundance and timing plus habitat condition on a regular basis.
- Identify and prioritize recovery opportunities, initiate, complete, and evaluate results.
- Involve First Nation and PSF pilot in developing a steelhead monitoring system.
- Improve ongoing habitat protection to minimize future restoration requirements and costs.

IDENTIFIED RECOVERY OPTIONS

- Enrichment potential confirmed with water sampling in 2001
- Slide stabilization and old road deactivation
- Off-channel improvements. LWD installations, refuge alcoves

NOTES: First Nations (Cortes Island) interest on Quatam. They have undertaken contract escapement estimates and some biophysical survey work at Phillips and Quatam. Escapements of all salmon species very depressed or not reported. Heavy fishing effort and catch in 1970s may have contributed significantly to a sharp decline in catch and effort that has never recovered.

Draft 17/06/02

Orford River (Bute Inlet)

Watershed Map Code: 900391500

4th Order

Wild Stock Trend:	Declining (Based on Keogh and local observers)
Wild Stock Status:	Special Concern
Class:	Wild
Recent Steelhead Escapements:	Not assessed – believed to be small summer and possible winter runs
Angling Regulations:	Steelhead catch and release
Catch/Effort:	Very light reported effort – 95% of time from 1968 onwards has no reported activity. Fishable length is low to medium – remote access by boat/float plane to camp at mouth – potential for heli-angling out of Campbell River and Powell River

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Not available

Existing Habitat: Ungauged system, 5 km accessible length, low productivity, Channel instability, bank erosion, and sediment transport.

HABITAT RESTORATION TO DATE

- Some rehab and complexing has been done at a Fisheries and Oceans spawning channel
- May have been some riparian work and road deactivation

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Requires sensitive logging practices with particular emphasis on cut blocks on steep slopes in headwater reaches.

STEELHEAD OBJECTIVES AND STRATEGIES

- Develop cost-effective system of monitoring steelhead stock abundance and timing plus habitat condition on a regular basis.
- Identify and prioritize recovery opportunities, initiate, complete, and evaluate results.
- Involve Homalco First Nation in developing a steelhead monitoring system.
- Improve ongoing habitat protection to minimize future restoration requirements and costs.
- Check enrichment potential with water sampling

NOTES: Very remote system for angler access - except by helicopter, winter access is difficult because of weather conditions in Bute Inlet. No routine surveys. Homalco hatchery operation near mouth - strong hatchery run of coho in 2001. Restoration potential lessened by high access costs.

Draft 17/06/02

Brem River

Map Code: 900357900

3rd Order

Wild Stock Trend: **Declining** (Based on Keogh)
 Wild Stock Status: **Special Concern**
 Class: **Wild**

Recent Steelhead Escapements: Not assessed - believed to be <50 combined summer and winter runs

Angling Regulations: Steelhead catch and release
 Mean annual effort: Long term 1968-1996: 84/ Recent 1997-2001: 10 rod-days
 Best 5 years 1968,70,73,75,76 mean annual effort: 227 rod-days
 Mean Annual catch: Long term 1968-1996: 78/ Recent 1997-2001: 3
 (Catch and effort estimates at these low levels in the surveys are unreliable.)

Estimated Steelhead Capacity as Returning Adults (assuming 13% marine survival):

- Not available – system had reported catches historically in excess of 200 per annum.

Existing Habitat: 13.5 km accessible length, low productivity
 Active logging. Channel instability, bank erosion, and sediment transport.

HABITAT RESTORATION TO DATE

- Considerable up slope stabilization as a part of WRP

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Requires environmentally sensitive logging practices with particular emphasis on road standards and cut blocks on steep slopes in headwater reaches.
- Protect habitats to minimize future restoration requirements and costs.

STEELHEAD OBJECTIVES AND STRATEGIES:

- Develop cost-effective system of monitoring steelhead stock abundance and timing plus habitat condition on a regular basis.
- Identify and prioritize recovery opportunities, initiate, complete, and evaluate results.
- Involve logging contractor (if available) in implementing a steelhead monitoring system.
- Check enrichment potential with water sampling.

NOTES: Historically one of the better steelhead systems in the area however very high catches in 1970s could have led to the collapse in the 1980s. Restoration potential lessened by high access costs. Local logging contractors reported to be not operating in 2002. Has potential for guided heli-angling out of Campbell River and Powell River. Fishable length is quite high but access to upper waters for a visiting angler is difficult without a means of transportation.

Draft 22/07/02

Lang Creek (near Westview)

Watershed Map Code: 900278100

3rd Order

Wild Stock Trend: **Declining** (Based on Keogh)
 Wild Stock Status: **Special Concern**
 Class: **Wild** (Augmented 89-92)

Recent Steelhead Escapements: Not assessed

Angling Regulations: Steelhead catch and release
 Catch/Effort: Light effort by local loggers and nearby residents in Powell River area. Fishable length is low. SHQ shows steady decline in catch and effort.

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Not available

Existing Habitat:

Watershed area (km ²):	128	Comments
Mean Annual Discharge (m ³ /s)	4.23	Active logging. Channel instability, bank erosion, and sediment transport. Reasonable summer base flow that covers riffles for insect production to sustain juvenile salmonids. biomass 130g/unit
Summer Base Flow (%MAD)	9%	
Accessible length (km)	17.5	
Productivity	low	

HABITAT RESTORATION TO DATE

- N/A

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Logging and development practices need to put particular emphasis on riparian zones, road construction and maintenance and cut blocks on steep slopes in headwater reaches.

STEELHEAD OBJECTIVES AND STRATEGIES:

- Undertake a one-season comprehensive biophysical inventory and stock assessment to upgrade existing information on steelhead stock status, current capacity of the watershed to produce steelhead, recovery opportunities and watershed specific constraints to effective management
- Check enrichment potential with water sampling
- Evaluate restoration potential. Could be good because of low access costs, community interest, and local logging contractors on site

Draft 22/07/02

Jervis Inlet, Sunshine Coast and Howe Sound small systems

Wild Stock Trend: **Declining** (Based on Keogh)
 Wild Stock Status: **Special Concern**
 Class: **Wild** (Chapman had very limited stocking 88/89)

Recent Steelhead Escapements: Not assessed (Summer and Winter runs)
 Angling Regulations: Steelhead catch and release

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Not available

Vancouver River (Jervis Inlet) Watershed Map Code: 900210100 5th Order

Vancouver River: 11km accessible length, fishable length is low to medium, access to upper waters for a visiting angler is difficult without a means of transportation. Effort is light. Remote system, angler access by helicopter or boat from Egmont, winter access is difficult because of weather conditions. No routine surveys. No reported steelhead angling since 1995.

Tzoonie River (Sechelt Inlet) 3rd Order

Tzoonie River has 9.5 km accessible length, Very light spotty effort by local loggers and guided and unguided. Fishable length is medium. Remote system for angler access. No routine surveys.

Chapman Creek (near Sechelt)

Chapman Cr. has 22 km accessible length. Reported angler effort in 2001 comparable to Mamquam, but with half the catch per angler day - fishable length is quite high, easily accessible. Community water system and hatchery are located on system.

Rainy River (Port Mellon - Howe Sound)

Rainy River has 11km accessible length, Pulp mill adjacent. Light reported effort.

Existing Habitat: Active logging. Channel instability, bank erosion, and sediment transport.

HABITAT RESTORATION TO DATE

- N/A

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Logging practices need to put particular emphasis on road standards and cut blocks on steep slopes in headwater reaches.
- Protect habitats to minimize future restoration requirements and costs.

STEELHEAD OBJECTIVES AND STRATEGIES

- Develop cost-effective system of monitoring steelhead stock abundance and timing plus habitat conditions on a regular basis in these systems.
- Identify and prioritize recovery opportunities, initiate, complete, and evaluate results.
- Involve local residents in developing steelhead-monitoring systems.
- Check enrichment potential with water sampling.

NOTES: Restoration potential lessened by high access costs in remote systems except when local logging contractors are active on site. The Stawamus is a small creek near the mouth of the Squamish with steelhead reported that could possibly be used as an index stock for the Squamish system.

Draft 22/07/02

Wild Stock Trend:	In Decline
Wild Stock Status:	Extreme Conservation Concern
Class:	Wild
	(Hatchery headwater fry stock 60K/yr 1980-91, cancelled 92)
Recent Escapements:	200 – 500 winter run (Adult & juvenile counts in progress)
Angling Regulations:	Steelhead catch and release (bait ban on Squamish tribs)
Mean Annual Effort:	Long term 1968-1996: 3,064 Recent 1997-2001: 1,700 rod-days Best five years 70,73,74,77,79: 5,325 rod-days
Mean Annual Catch:	Long term 1968-1996: 711 / Recent 1997-2001: 200 Some angling guide activity - high fishable length – easy access from major population centres

Estimated Steelhead Habitat Capacity as Returning Adults (assuming 13% marine survival):

- 1000 – 2000 adults (based on extensive juvenile assessments by Clark et al.)
- Conservation Concern Level @ 30% of capacity is 300 - 600 adults

Existing Habitat:

Watershed area (km ²):	2330	Comments
Mean annual discharge (m ³ /s):	238	Watershed extensively logged, Cheakamus partially diverted into Squamish above normal confluence, hydro-influenced flow regime – very high summer base flows making main stem inhabitable for fry but does allow braids and side channels to be effective steelhead production sites. Most production from tributaries such as Shovelnose and side channels. Shovelnose and other tribs severely damaged by massive sediment input. Estuary significantly altered by port development and flood control measures. (Biomass 130g/unit in braids, side channels and short accessible tributaries.)
Summer Base Flow (%MAD)	114%	
Accessible length (km)	70	
Productivity – main stem Productivity – certain tributaries	Very low Fair to Good	

HABITAT RESTORATION TO DATE

- Several restoration projects including channels and ponds undertaken primarily involving smaller sub-basins including Ashlu side channel – mostly done for the benefit of other salmon species with some steelhead benefits expected. Some restoration of the estuary has been done.

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Curtail or eliminate forest harvesting sediment impacts from upslope S5 and S6 feeder streams to important steelhead habitat.
- Maintain intact riparian areas throughout the floodplain through elevated habitat protection.
- Proposed run-of-river hydro plant on the Ashlu tributary must not proceed without complete protection and/or mitigation of steelhead habitat values.

STEELHEAD OBJECTIVES AND STRATEGIES

- Rehabilitate wild stocks to routine management zone levels by taking full advantage of the potential productive capacity of this large system with 70 km of fishable water.
- Establish a co-operative monitoring system with Squamish First Nation for the entire watershed including Cheakamus and Mamquam.
- Conduct juvenile assessments in recently created side channels constructed to offset losses to natural production from major sediment events to check on (and improve where required) their effectiveness in producing steelhead.

IDENTIFIED RECOVERY OPTIONS

- Enrichment of streams and side-channels flowing through areas of granite rock geology
- Stream restoration on west side (requires detailed bio-engineering field assessment)
- Improved enforcement to deal with chronic poaching problems throughout watershed

NOTES: The main stem is unproductive with very low juvenile steelhead abundance detected in the mid-1980s. Production data from side channels and tribs (affected by major sediment events) is incomplete. Potential is limited by sediment events and lack of groundwater areas. See results of the Squamish River Sustainable Fisheries Conference of Nov. 1997. BC Hydro involved with Water Use Plan.

Draft 22/07/02

Cheakamus River

Watershed Map Code: 90009760012900,

5th Order

Wild Stock Trend: **Slowly Declining with Fluctuations**
 Wild Stock Status: **Conservation Concern/Routine Management**
 Class: **Wild** (Fry stocking 83 to 86)
 Recent Escapements: 200-500 Winter Run (Highly variable in recent years)
 Angling Regulations: Catch and Release of wild fish (bait ban) Introduced April 15 - June 30 closure in 2002 upstream of Sun Wolf Br. (Development of reopening plan is underway.)
 Mean Annual Effort: Long term 1968-1996: 3,147
 Recent 1997-2001: 1,304 rod-days
 Best five years: 1968-1972: 6,214 rod-days
 Mean Annual Catch: Long term 1968-1996: 711 / Recent 1997-2001: 484

Estimated Steelhead Habitat Capacity as Returning Adults (assuming 13% marine survival):

- 700 adults based on Beck/Clark assessments, including highly productive Brohm tributary.
- Conservation Concern Level @ 30% of capacity is 210 adults

Existing Habitat:

Watershed area (km ²):	1010	Comments
Natural MAD (m ³ /s)	68	High logging impacts, Significant BC Hydro Diversion to Squamish much higher in watershed than natural confluence, river over-widened with loss of riparian zone and habitat complexity, extensive dyking and flood plain loss due to development. Highly productive Brohm tributary may not be accessible by steelhead in some years.
Natural Summer Base (%MAD)	23%	
Regulated MAD (m ³ /s)	31.5	
Accessible length (km)	17.5	
Productivity -main stem	Medium	
Productivity - Brohm	High	

HABITAT RESTORATION TO DATE

- Several Fisheries and Oceans side channels.

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Monitor fisheries results following implementation of the BC Hydro Water Use Plan that is expected to result in improved base flow conditions below the diversion. (Completed but not yet authorized by the Water Comptroller.)
- Improve compliance with good forestry practices.
- Avoid further encroachments on the flood plain.
- The Cheakamus and its key Brohm tributary need special protection from potential habitat disturbance due to possible Whistler highway widening.

STEELHEAD OBJECTIVES AND STRATEGIES

- Restore and maintain stocks at or above 400 adults and provide minimal-impact angling opportunities for about 3,000 angler days per annum when and where possible.
- Provide optimal fisheries flows below the BC Hydro diversion.

IDENTIFIED RECOVERY OPTIONS

- Lowered pre-spawning mortality by reduced angling in holding / spawning areas (underway 2002)
- Increase enforcement of fishing and forestry regulations (numerous violations reported)
- Stream restoration: dyke complexing, side channel reactivation, main stem wood and pools
- Partial obstruction removal on Cheekeye at BCR Bridge that blocks Brohm spawners during low flow periods

NOTES: Brohm and Upper Cheakamus stocks hold together in Paradise valley area. Desirable to continue telemetry studies for at least one more year to firm up the relationship for predicting observer efficiency, which will enhance accuracy of less expensive routine steelhead monitoring programs. Some angling guide activity – heavy pressure in years of good steelhead returns. High fishable length – easy access from major population centers. Major Federal Tenderfoot Hatchery – no steelhead program.

Draft 22/07/02

Mamquam River

Watershed Map Code: 900-094300 – Squamish Tributary

Wild stock Trend: **Fluctuating (Highly variable)**
 Wild Stock Status: **Conservation Concern**
 Class: **Wild** (Hatchery headwater fry stocking 10K/yr 1986-91, discontinued 92)

Recent Wild Steelhead Escapement: 50-100 Winter Run – highly variable in recent years (Swim adult surveys, juvenile counts underway)

Angling Regulations: Steelhead catch and release, bait ban (Regulation change introduced in 2002 closing Mamquam upstream from Mashiter Creek April 15 - June 30)

Mean annual effort: Long term 1968-1996: 401/ Recent 1997-2001: 372 rod-days
 Best 5 years 1969,72,74,77,98: 881 rod-days

High Fishable length – outskirts of Squamish, close to Whistler and Lower Mainland. Heavy pressure depending on returns

Mean Annual catch: Long term 1968-1996: 79/ Recent 1997-2001: 78

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- 150 – 200 adults estimated by Hanson based on very low parr habitat capability, good but limited habitat in Mashiter Creek, Mean annual discharge correlations and low to moderate productivity of about 140 grams/100 sq. metre. Further review is required.
- Conservation Concern Level @ 30% of capacity is 50 - 60 adults

Existing Habitat:

Watershed area (km ²):	334	Comments
Mean annual discharge (m ³ /s):	25	High logging impacts, urbanization and flood control impacts - river over-widened with loss of riparian zone, minimum flows may be inadequate in some years. Hydroelectric facility just below anadromous barrier with a second facility proposed that may cause unrealized impacts relating to loss of gravel and woody debris and reduction in canyon productivity.
Summer Base Flow (%MAD)	60%MAD	
Accessible length (km)	5.5	
Productivity – main stem	Low	
Productivity – Mashiter Cr.	Good	

HABITAT RESTORATION TO DATE

- DFO side channel.

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Negotiate appropriate flow regime through a Water Use Plan with hydro producers
- Improve compliance with good forestry practices
- Minimize urban and flood control impacts

STEELHEAD OBJECTIVES AND STRATEGIES

- Recover and maintain wild stocks in Routine Management Zone capable of supporting a catch and release fishery with 400 rod-days
- Reduce pre-spawning mortality through angling regulation in holding and spawning areas
- Improve compliance with fishing regulations
- Investigate potential for further stream restoration
- See Squamish Plan for further overall watershed objectives

NOTES: A portion of the steelhead run in the Mamquam arrives after river visibility conditions have deteriorated making overall counts from swim surveys difficult. Nevertheless swim surveys should serve as a useful index of abundance for management. It would be desirable if they were verified through another independent means such as telemetry surveys.

Draft 22/07/02

Capilano River

Watershed Map Code: 90007100

5th Order

Wild Stock Trend: **In Decline or Fluctuating at a very low level**
 Wild Stock Status: **Extreme Conservation Concern**
 Class: **Augmented**
 (10K winter run smolts, 5K summer run smolts, ongoing)

Recent Steelhead Escapements: <50 Winter Run – 45% catch unmarked in 2001,
 <50 Summer Run – most if not all are hatchery fish

Angling Regulations: All steelhead catch & release, bait ban
 Mean annual effort: Long term 1968-1996: 2,576/ Recent 1997-2001: 1,500 rod-days
 Best 5 years 1972,89,90,94,96 mean annual effort: 3,946 rod-days
 Medium-high fishable length but canyon areas are dangerous, potential for high effort in major urban centre

Mean Annual catch: Long term 1968-1996: 518/ Recent 1997-2001: 157

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Approx. 300 fish, extremely low productivity but significant parr habitat available if adequate flows can be maintained, summer run habitat cut off by Cleveland Dam and reservoir.
- Conservation Concern Level @ 30% of capacity is approx. 90 adults

Existing Habitat:

Watershed area (km ²):	172	Comments
Mean Annual Discharge (m ³ /s)	20.2	Heavily Impacted by GVRD diversion and storage dam. Very low summer base flows. Lower reaches heavily urbanized and channelized. Dam east abutment project did not likely significantly impact the river below the dam during upgrade construction (over a year) but monitoring is continuing. Biomass 80g/unit
Summer Base Flow (% MAD)	2.8%	
Accessible length (km)	5.5	
Productivity	Low	

HABITAT RESTORATION TO DATE

- Side channel development underway.

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Special GVRD Initiative under development. *A request for proposals is currently being released to look at feasibilities of temperature augmentation (by blending water from different reservoir levels), providing a significantly higher summer base flow and improved ramping rates, upstream production and passage of smolts and adults around the dam.
- Prevent gravel removal from the lower river.

STEELHEAD OBJECTIVES AND STRATEGIES

- Reduce steelhead by catch in in-river coho fisheries through consultation with affected parties and DFO.
- Investigate potential of improved steelhead angling through a combination of hatchery production and potential headwater stocking* to support 2,600 rod-days per annum.

IDENTIFIED RECOVERY OPTIONS

- Enrich system below dam and hatchery – consider reintroducing carcasses from hatchery.
- Reduce fishing-related pre-spawning mortality of summer runs.
- Introduce gravel into the main stem.

NOTES: Smolt trapping for steelhead using RSTs has been successfully employed in the upper Capilano River above the lake if sufficient fry or adults were available it may be possible to reintroduce. Steelhead management is complicated by occurrence steelhead and coho in the river together. Regulation changes to protect summer steelhead would impact salmon angling opportunities even though coho are not easily caught in-river. Dialogue needed with Squamish Band fishers to reduce by catch. Results of current radio-tagging program need to be reviewed. Cold water temps impact fish culture for steelhead. Unnatural flow ramping is causing severe or harmful habitat alteration, disruption or destruction.

Draft 22/07/02

Lynn Creek (N. Vancouver)

Watershed Map Code: 900066900

4th Order

Wild Stock Trend: **Declined to very low level**
 Wild Stock Status: **Special Concern**
 Class: **Wild**
 Recent Escapements: Not Assessed (Believed to be very small)

Angling Regulations: Steelhead catch & release and bait ban
 Catch/Effort: Extremely low SH effort/catch after continuous decline from the 1970s. High fishable length easily accessible in major urban area

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Not available – see notes below.

Existing Habitat:

Watershed area (km ²):	36.3	Comments
Mean Annual Discharge (m ³ /s)	6.04	Lower reaches heavily urbanized, landfill site adjacent. Boulder cascade habitat, low nutrients, high runoff. Few large woody debris and very low summer base flows limit potential. Biomass 150g/unit.
Accessible length (km)	5	
Productivity	Low - moderate	

HABITAT RESTORATION TO DATE: NA

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Protect against urban encroachment

STEELHEAD OBJECTIVES AND STRATEGIES

- Determine wild stock levels and timings.
- Initiate steelhead recovery and develop a new management plan with public consultation.
- Determine feasibility of Low Flow Augmentation
- If stock levels are very low, could consider hatchery introduction and reclassification if a suitable donor stock is available to diversify angler effort away from Seymour

IDENTIFIED RECOVERY OPTIONS

- Enrichment potential confirmed with water sampling in 2001.

NOTES: Published report available from UBC Research – investigation by Hume and Parkinson early 1980s.

Draft 22/07/02

Seymour River

Watershed Map Code: 900066100

4th Order

Wild Stock Trend: **In Serious Decline** (based on SHQ results)
 Wild Stock Status: **Conservation Concern**
 Class: **Augmented**
 (10k winter run smolts, 20k summer run smolts, 1980 - ongoing)
 Current Steelhead Escapement: 100 – 200 (wild and enhanced, summer and winter combined)
 Angling Regulations: Marked steelhead retention fishery – wild catch and release, bait ban plus area angling closures and fly fishing regulations
 Mean annual effort: Long term 1968-1996: 3,467/ Recent 1997-2001: 1,672 rod-days
 Best 5 years 1976,87,88,90,91 mean annual effort: 5,142 rod-days
 High Fishable Length, large portion is within Seymour Conservation Area and is trail/foot access only – very sharp decline in SH effort/catch through the 1990s.
 Mean Annual catch: Long term 1968-1996: 797/ Recent 1997-2001: 280
 (35% reported wild in 2001 SHQ – lowest % in region)

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- approx. 3400 smolts / 450 adults (MAD model -low range)
- Conservation Concern Level @ 30% of capacity is approx. 135 adults

Existing Habitat:

Watershed area (km ²):	176	Comments
Mean Annual Discharge (m ³ /s)	16.1	GVRD Water Supply Dam, urbanization in lower reaches. System is gravel deficient because of lack of recruitment. Has reasonable base flows and juvenile habitats based on intense juvenile analysis in mid 1980s. Seal predation on smolts identified as a major concern. Serious lower river flood plain constriction. Estuary significantly altered by dredging, infilling on tidal flats and port development. Biomass 150g/unit.
Summer Base Flow (%MAD)	15%	
Accessible length (km)	18.5	
Productivity	Low	

HABITAT RESTORATION TO DATE

- Several multi-species, off-channel developments throughout the river below the dam.
- Fisheries and Oceans removal of an obstruction that MLAP felt had potentially negative impacts on summer steelhead.

STEELHEAD OBJECTIVES AND STRATEGIES

- Initiate a comprehensive recovery program to halt the apparent serious decline in steelhead abundance and rebuild wild stocks into the routine management zone so they can be sustained while angling is conducted targeting hatchery fish and other species.
- Conduct an immediate review of existing regulations to provide enhanced protection of declining steelhead populations.
- Survey reported predation and ensure that there are no structures or conditions in-river that facilitate unusually high predation.
- Upgrade habitat capability (including flow regime through a Water Use Plan)
- Review the existing two-year smolt augmentation program with a view to finding ways of improving hatchery smolt survivals and/or re-balancing the mix of hatchery and wild production.
- Improve public awareness of habitat protection requirements.
- Improve stock assessment to provide more reliable annual estimates of wild and hatchery escapements and smolt marine survivals.

IDENTIFIED RECOVERY OPTIONS.

- Conduct annual stream enrichment with slow release pellets as soon as available. (Enrichment potential confirmed with water sampling in 2001)
- Augment gravel recruitment to improve spawning conditions by modifying culverts associated with the dam access road and water pipeline or redistributing gravel removed from above culverts further downstream and/or by providing spawning platforms for steelhead.

NOTES: Community Hatchery and BCIT Training facility.

Draft 22/07/02

Indian River (Indian Arm)

Watershed Map Code:900056000

4th Order

Wild Stock Trend: **Declined to Low Level**
 Wild Stock Status: **Special Concern**
 Class: **Wild**
 Recent Wild Steelhead Escapement: Not Assessed but believed to be very small

Angling Regulations: Steelhead catch & release
 Catch/Effort: Less than 50 angler days/year reported from 1983 onward.
 High fishable length below obstruction is reasonably accessible by boat in sheltered waters close to Vancouver major urban area or by logging roads from Howe Sound.

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- 2400 smolts/300 adults (MAD model - low range)
- Conservation Concern Level @ 30% of capacity is approx. 90 adults

Existing Habitat:

Watershed area (km ²):	181	Comments
Mean Annual Discharge (m ³ /s)	11.7	Long history of logging in watershed, inaccessible falls well upstream from mouth. Estimated stream width based on MAD is 19.2 metres. Summer base flows are excellent for parr rearing. Biomass 80g/unit.
Summer Base Flow (%MAD)	29%	
Accessible length (km)	18.5	
Productivity	Low	

HABITAT RESTORATION TO DATE

- DFO work towards pink enhancement should help steelhead productivity

STEELHEAD OBJECTIVES AND STRATEGIES

- Undertake a one-time biophysical inventory and stock assessment to upgrade existing information on steelhead stock status, capacity of the watershed to produce steelhead, recovery/improvement opportunities and watershed specific constraints to effective management
- Establish a basic cost-effective regular monitoring system on stocks and habitat conditions for management.
- Check enrichment potential especially in off years for pink salmon escapements.

NOTES: Anecdotal reports indicate this system to have supported a small fishery on large steelhead several years ago.

Draft 22/07/02

Sub-Area: Lower Fraser Watershed

Lower Mainland Small Urban Streams

Wild Stock Trend: **Declined to Low levels**
 Wild Stock Status: **Special Concern**
 Class: **Augmented** (Small Community Level Programs)

Recent Wild Steelhead Escapement: Not Assessed

Brunette River (New Westminster)

Angling Regulations: Total steelhead catch & release

Existing Habitat:

Watershed area (km ²):	76.9	Comments
Mean Annual Discharge (m ³ /s)	3.18	Heavily urbanized and industrialized, subject to fish kills, strong community interest in rehabilitation
Summer Base Flows (%MAD)	9%	
Productivity	High	

Serpentine River (Surrey)

Angling Regulations: Steelhead catch & release, time and area closures
 Catch/Effort: Extremely low SHQ results

Existing Habitat:

Watershed area (km ²):	154.2	Comments
Mean Annual Discharge (m ³ /s)	6.23	Heavily urbanized in upper reaches, agricultural impacts in lower river, subject to fish kills, strong community interest in rehabilitation
Summer Base Flows (%MAD)	18%	
Productivity	high	

Nicomel River (Surrey)

Angling Regulations: Steelhead catch & release, time and area closures
 Catch/Effort: Extremely low SHQ results

Existing Habitat:

Watershed area (km ²):	99.5	Comments
Mean Annual Discharge (m ³ /s)	3.47	Agricultural and flood control concerns on lower reaches, urbanized - subject to fish kills, strong community interest in rehabilitation
Summer Base Flows (%MAD)	12%	
Productivity	high	

STEELHEAD OBJECTIVES AND STRATEGIES:

- Establish current populations of steelhead, develop conservation objectives and design appropriate recovery measures for each system involving local community groups as much as practicable.

NOTES: According to the local Fisheries and Oceans Community Advisor, the latter two systems have seen some recent gains in steelhead abundance, possibly as a result of improved salmon returns.

Draft 22/07/02

Little Campbell River (S. Surrey)

Map Code: 900000500

4th Order

Wild Stock Trend: **Seriously declined from 1980s**
 Wild Stock Status: **Conservation Concern**
 Class: **Augmented**
 Recent Wild Steelhead Escapement: 50-100 (Fence counts by local hatchery of non-marked fish from 1994 to 2002: average 75 steelhead)

Angling Regulations: Marked steelhead retention – wild catch and release, time and area closures
 Catch/Effort: Catch 70% wild according to 2001 SHQ
 High fishable length easily accessible from major urban area

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- 1,900 smolts/250 adults (estimated from both adult and smolt counts).
- Conservation Concern Level @ 30% of capacity is approx. 75 adults

Existing Habitat:

Watershed area (km ²):	63.7	Comments
Mean Annual Discharge (m ³ /s)	0.938	Very high productivity, biomass 350g/unit – potential limited by size of watershed and lack of large woody debris and extent of boulder reaches for parr habitat, Summer flows are inadequate and well below 20% of mean annual discharge - natural summer 7-day mean low flow is 4% of MAD and domestic irrigation and industry water demand is 70% of MAD resulting in some sections going dry in the summer months. Highly urbanized (rural development) system. Intensive agricultural activities – reported fish kills, low dissolved oxygen levels. Significant habitat disruption of the riparian zone.
Summer Base Flow (%MAD)	10.8%	
Accessible length (km)	8	
Productivity	Very high	

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Improve summer low flows by establishing and enforcing a minimum flow and water quality provision as part of an integrated habitat and fisheries management plan that is locally developed and supported.
- Requires much more effective habitat protection of riparian zone.

STEELHEAD OBJECTIVES AND STRATEGIES

- Explore feasibility of making this a steelhead index stream by reviewing current downstream smolt counts for wild production and improving estimates of spawners and catch downstream of fence. (This will require much improved habitat conditions to support higher levels of wild stocks to be feasible.)

IDENTIFIED RECOVERY OPTIONS

- Improve smolt yields through improved habitat protection, better minimum summer flows and restoration of Large Woody Debris

NOTES: A watershed protection plan needs to be developed and supported at the local level with technical backup and enforcement from fisheries agencies. Community hatchery is very active on system – works with provincial Abbotsford facility on augmentation.

Draft 22/07/02

Coquitlam River

Map Code: 100024500

4th order

Wild Stock Trend:	Fluctuating
Wild Stock Status:	Conservation Concern
Class:	Wild (Proposed change from Augmented)
	Limited historic smolt augmentation, recent fry stocking
Current Steelhead Escapement:	200-300 Winter Run
Angling Regulations:	Wild steelhead catch and release, May 1 to June 30 closure for smolt protection
Mean annual effort:	Long term 1968-1996: 1,201 Recent 1997-2001: 950 rod-days Best 5 years 1970-73, 78: 2,264 rod-days
Mean Annual catch:	Long term 1968-1996: 251 / Recent 1997-2001: 268 Effort and catch down since 1998 but has not shown precipitous declines of other systems

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- 7000 smolts/ 800 adults (based on a review of existing information)
- Conservation Concern Level @ 30% of capacity is approx. 240 adults

Existing Habitat:

Watershed area (km ²):	237	Comments
Mean Annual Discharge (m ³ /s)	27	Existing productivity can be substantially improved with a combination of better base flows and sharply reduced sediment loadings from gravel operations as there is excellent habitat available. Flow regime alteration from GVRD/Hydro project. Urbanization along 18% of length resulting in serious flood plain constriction. Agricultural activity along 23% of length. August/September demand is 73% of natural summer 7-day mean flow. Additional water quality concerns including ammonia, non-filterable residues, and fecal coliforms. Biomass 140g/unit.
Summer Base Flow (% MAD)	4%	
Accessible length (km)	16	
Productivity	Fairly low	

HABITAT RESTORATION TO DATE

- Negotiated flow increases as part of the BC Hydro WUP to date
- LWD placements and side channel by WRP and DFO
- Clay bank stabilization on Orr Creek and mainstem

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Eliminate chronic sediment loads from gravel pits
- Develop an improved flow regime through a WUP
- Reduce water quality impacts from urban areas and agriculture
- Prevent gravel removal in the lower river.

STEELHEAD OBJECTIVES AND STRATEGIES

- Develop and implement a watershed recovery plan for steelhead and other salmon stocks and their habitats - possibly through the PSEF.
- Recover and manage wild steelhead stocks into the Routine Management Zone capable of supporting catch and release angling of about 1200 rod-days per annum.
- Undertake stock assessment surveys to produce annual escapement estimates.

IDENTIFIED RECOVERY OPTIONS

- Improved parr production through water quality improvements, many more well-anchored LWD and pools and increased summer base flows from 4% to 10 -20% of Mean Annual Discharge

NOTES: Need to review BC Hydro juvenile data. There is a small community hatchery in watershed that does not have the potential to raise steelhead smolts according to a Ministry staff assessment.

Draft 22/07/02

Stock Trend: **In Decline**
 Stock Status: **Conservation Concern**
 Class: **Wild**
 Recent Steelhead Escapements: 200-500 Winter Run (Local records by hatchery manager historical average 1000-1500; 1953- 1990: 500 fish average 1990-1997: 314 fish average)

Angling Regulations: Wild steelhead catch & release
 Catch/Effort: Largely jet boat based guided fishery

Estimated Steelhead Smolt Capacity as Returning Adults (assuming 13% marine survival):

- 1000 – 1500 (roughly estimated from past historical abundance)
- Conservation Concern Level @ 30% of capacity is approx. 300 - 450 adults

Existing Habitat:

Watershed area (km ²):	181	Comments
Mean Annual Discharge (m ³ /s)	54	High sediment loads from gravel operations, unstable flow regime – bed load movement in main stem and tribs above lake. 10% of watershed has been logged. Biomass <100g/unit
Summer Base Flow (% MAD)	118%	
Accessible length (km)	19.5	
Productivity	low	

HABITAT RESTORATION TO DATE

- Six DFO-WRP off-channel projects completed.

STEELHEAD OBJECTIVES AND STRATEGIES

- Significantly improve habitat conditions in order to recover wild stocks to consistently healthy levels.

IDENTIFIED RECOVERY OPTIONS

- Requires major LWD or concrete substitutes in main stem and large tribs to create pools and complexity

NOTES: Productive capacity of watershed needs to be established through a full assessment program. Limited salmon trapping done by DFO. No juvenile surveys. Major recovery may need to wait until upland habitats are more stabilized. DFO (ex IPSFC sockeye salmon hatchery in watershed – not suitable for steelhead culture in sockeye facility)

Draft 22/07/02

Alouette River

Map Code: 10002670006000

5th Order

Wild (unmarked) Stock Trend: Wild Stock Status: Class: Current unmarked Steelhead Escapement:	Recovering from Conservation Concern Zone in late 1990s Routine Management Zone Augmented (Stocking 25K smolts 1980 – ongoing) 200-500 Winter Run
Angling Regulations: Mean annual effort:	Marked steelhead retention – wild catch and release, time and area closures Long term 1968-1996: 3,933 Recent 1997-2001: 1,697 rod-days Best 5 years 1985 -1989 mean annual effort: 8,553 rod-days
Mean Annual catch:	Long term 1968-1996: 979 / Recent 1997-2000: 483. Improved effort/catch in recent years – escapements increased likely as a result of improved flow conditions under the Alouette Water Use Plan. (67% wild catch reported in 2001 SHQ)

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival)

- 4,600 smolts/ 600 adults (based on review of existing information).
- Conservation Concern Level @ 30% of capacity is approx. 300 - 450 adults

Existing Habitat:

Watershed area (km ²):	234	Comments
Natural MAD (m ³ /s)	20	Diversion to Stave reservoir - improved flow releases implemented by BC Hydro now yield summer base flows of 20% of natural MAD - (Prior to 1995 were 5%MAD). August/September demand is 73% of natural summer 7-day mean flow. Urbanization along 22% of length with serious flood plain constriction. Agricultural activity along 47% of length. Wood waste impacts. Additional water quality concerns including ammonia, non-filterable residues, fecal coliforms, and high water temperatures. Biomass 220 g/unit.
Regulated MAD (m ³ /s)	6.2	
Summer Base Flow under WUP (m ³ /s)	4 (20% MAD)	
Accessible length (km)	22	
Productivity	Moderate	

HABITAT RESTORATION TO DATE

- BC Hydro WUP flow improvements and other in-stream work such as LWD placement
- Community stream restoration activities

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Agricultural and wood waste impacts need to be addressed.
- Urbanization impacts need to be minimized including flood protection impacts.
- Maintain adequate flow releases from BC Hydro diversion dam under Alouette River WUP.

STEELHEAD OBJECTIVES AND STRATEGIES

- Consider making the Alouette a steelhead index-stream.
- Maintain wild escapements in the Routine Management Zone plus existing augmentation levels capable of supporting 4,000 rod-days per year.
- Look for habitat recovery opportunities as a part of the developing plans and projects
- Implement community stream restoration activities and examine potential to recolonize areas upstream of the dam.
- Foster current efforts of the Alouette River Management Society (ARMS) towards an integrated and comprehensive watershed approach with all interested parties.

NOTES: ARMS is an effective local watershed and enhancement group using BC Corrections hatchery facility. Need to review smolt data from BC Hydro rotary screw traps. Parr rearing limited in the lower river by few large woody debris and boulder reach extent, good parr habitat above the hatchery. If fish were introduced into streams above Alouette Lake, screening the diversion into Stave would be required. (Roseneau pers. comm.)

Draft 22/07/02

Kanaka Creek

Watershed Map Code: 10037400

3rd Order

Wild Stock Trend: **Declined to a very low level**
 Wild Stock Status: **Extreme Conservation Concern**
 Class: **Augmented** (Stocking suspended on account of lack of brood stock)
 Recent Steelhead Escapements: <50 Winter Run

Angling Regulations: Wild steelhead catch and release, area and time closures
 Mean annual effort: Long term 1968-1996: 468 / Recent 1997-2001: 114
 Best 5 years 1989 -1993 mean annual effort: 982 rod-days per annum
 Mean Annual catch: Long term 1968-1996: 115 / Recent 1997-2001: 20
 Very limited steelhead fishing waters

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- 400 smolts/ 52 adults Ptolemy 2002 SHA analysis, only 2km is useful parr habitat

Existing Habitat:

Watershed area (km ²):	47.7	Comments
Mean Annual Discharge (m ³ /s)	2.8	GVRD park. Urbanization along 34% of length – 900 septic systems. August/September demand is 21% of natural summer 7-day mean flow. Sedimentation concerns from active and abandoned gravel pits. Additional water quality concerns including ammonia, heavy metals, low PH all exceed guidelines. Biomass 140g/unit
Summer Base Flow (% MAD)	8.5%	
Accessible length (km)	5.5	
Productivity	Moderate	

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Implement recommendations from the Kanaka Creek Recovery Plan (Sensitive Stream Designation)
- Urbanization and water quality impacts need to be addressed;
- Gravel pit impacts need to be addressed.

HABITAT RESTORATION TO DATE

- Off-channel work sponsored by DFO at Kanaka facility

STEELHEAD OBJECTIVES AND STRATEGIES

- Recover stocks sufficiently to allow for angling opportunities on other species and steelhead in stronger years.
- Consider angling regulation changes to better protect steelhead spawners.

IDENTIFIED RECOVERY OPTIONS

- Create additional habitat capability for natural production (very limited)

NOTES: Very large historical catches may have been passing stocks in the tidal influence zone. GVRD sponsored community hatchery on system.

Draft 20/09/02

Salmon River (Langley)

Watershed Map Code: 100038800

4th Order

Wild Stock Trend: **Declined to Low Level, Fluctuating**
 Wild Stock Status: **Special Concern**
 Class: **Wild**
 Recent Wild Steelhead Escapements: Not Assessed Winter Run

Angling Regulations: Wild steelhead catch and release and area closures

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- 1,900 smolts/ 250 adults based on actual smolt counts less an allowance for pump losses.
- Conservation Concern Level @ 30% of capacity is approx. 75 adults

Existing Habitat:

Watershed area (km ²):	47.7	Comments
Mean Annual Discharge (m ³ /s)	1.82	Summer base flows somewhat below 20% of mean annual discharge. Serious water quality concerns above established guidelines for nutrients, ammonia, fecal coliform, nitrate, nitrite, phosphorus, and water temperatures. High nutrient impacts coming from agricultural wastes - extremely high total alkalinity 42.8 mg/l, pumping station impacts smolts – estimated loss approx. 25%, extensive urbanization in watershed, golf course development. Potential limited by extent of boulder reaches for parr habitat. Biomass: 490 g/unit
Summer Base Flow (% MAD)	15%	
Accessible length (km)	15	
Productivity	Very High	

HABITAT RESTORATION TO DATE

- Planting in riparian zones

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Reduce nutrient inputs by working with farm community.
- Provide improved protection from urban sprawl and agricultural activities.
- Foster efforts to develop an improved protection plan for lower river that is subject to flooding and mitigate impacts on smolts from pump stations

STEELHEAD OBJECTIVES AND STRATEGIES

- Determine steelhead run size and updated productive potential of the system.
- Foster efforts to constitute a river conservation authority to develop a management plan, coordinate efforts to protect and rehabilitate habitats and set protection standards for other developments.

NOTES: Fence Counts from 1978-1980, 1987 - 1995. Good fishery in 2001, prior to that not much reported. This is one of the most seriously impacted groundwater areas in the Fraser Valley. A local watershed group has been in place for some time with support from DFO and the Fraser Basin Council. Long-term DFO index site for coho – some limited possibility of indexing steelhead if run strength is adequate. (Fence does not operate during adult steelhead migration.)

Draft 24/06/02

Stave River

Map Code: 100047100

5th Order

Wild Stock Status: **Hatchery Out plant**, no native stock (some unmarked catch reported)
 Class: **Hatchery** (Approx 10k smolts/yr ongoing from Abbotsford Hatchery)
 Recent Steelhead Escapements: Not Assessed

Angling Regulations: Marked steelhead retention – wild (non-native) catch and release

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Undefined – very limited over short length below dam

Existing Habitat:

Watershed area (km ²):	1140	Comments
Mean Annual Discharge (m ³ /s)	111	Stave power project cuts off most natural habitat.
Summer Base Flow (% MAD)	>100%	High summer flows, poor parr habitat (almost no cover) and unnatural ramping rates.
Accessible length (km)	3.2	16% of watershed has been logged creating impacts on natural hydrology
Productivity	Very Low	Biomass < 80 g/unit

HABITAT RESTORATION TO DATE

- BC Hydro WUP plan – off-channel habitat work for other salmon species

STEELHEAD OBJECTIVES AND STRATEGIES

- Provide an angling opportunity on hatchery fish to take pressure off other systems
- Manage downstream flows to allow for safe angling and some potential for natural production

Notes: Good fishery in 2000 – about half the effort in 2001. Several unmarked fish reported in catch. Hatchery female fish from Chilliwack crossed with wild males. Incubated at Abbotsford, reared to smolt at Inch Creek. High rate of hatchery release in 2000 fishery.

Draft 17/06/2002

Chilliwack (Vedder) River

Map Code: 100065700

5th Order

Wild (Unmarked) Stock Trend: **Stable**
 Wild Stock Status: **Routine Management**
 Class: **Augmented** (125k smolts, 1973 to date, DFO hatchery)
 Recent Wild Steelhead Escapement: >2000 Winter Run

Angling Regulations: Marked steelhead retention (HY daily quota of one fish) – wild catch and release, area closures., restricted to fly fishing in lower river (below Vedder Crossing) late in season while river above is closed.
 Mean annual effort: Long term 1968-1996: 32,754 / Recent 1997-2001: 43,720
 Best 5 years 1987-89, 93,95 mean annual effort: 60,331 rod-days. Very high stable effort in the past five years, very crowded at times. Largest steelhead fishery in BC.
 Mean Annual catch: Long term 1968-1996: 10,087/ Recent 1997-2001: 13,554 (71% reported wild in 2001 SHQ)

Estimated Steelhead Capacity as Returning Adults (assuming 13% marine survival):

- 4000 adults (based on a review of several reports and models using updated conditions.)
- Conservation Concern Level @ 30% of capacity is approx. 1200 adults

Existing Habitat:

Watershed area (km ²):	1230	Comments
Mean Annual Discharge (m ³ /s)	67.3	Ideal summer base flows. Urbanization and flood control/riparian encroachment impacts in lower reaches below Vedder Crossing, gravel removal impacts, loss of SH habitat downstream of Slesse Creek (LWD removal and bank protection works for flood control), excessive channelization, turbidity and sediment input from naturally occurring clay slides, 29% of watershed has been logged. Biomass 318 g/unit
Summer Base Flow (% MAD)	20%	
Accessible length (km)	60	
Productivity	high	

HABITAT RESTORATION TO DATE

- A Very extensive suite of more than 16 off-channel projects have been completed in the last eight years through cooperative efforts with WRP, DFO etc. They are mainly salmon orientated but with steelhead rearing and spawning benefits; gravel placement at outlet of Chilliwack Lake; approx. 60 LWD placements.

STEELHEAD OBJECTIVES AND STRATEGIES

- Maintain wild stocks in Routine Management Zone and manage for a fishery based on augmentation at approximately 40,000 rod-days per annum.
- Establish a river conservation authority to develop a management plan that would rehabilitate damaged habitats and provide an improved protection plan (particularly below Vedder Crossing) by reducing dyking encroachments, opening up channels in the floodplain, stopping vehicle impacts on riparian areas, purchasing key parcels and more creative management of gravel removal operations.
- Implement a watching brief on wild stock levels through a comprehensive stock assessment program that would allow for regulatory adjustments if necessary.
- If necessary, consider reducing augmentation or redirecting some stocking to other systems to protect wild stocks and spread effort.

IDENTIFIED RECOVERY OPTIONS

- Lower river main stem pool creation with very well anchored large wood or heavy substitutes.
- Gravel placement and side-channel improvements in Foley Creek (spawning limited).
- New side channel potential on Tamahi Creek – approx 2.5 km \$500K.
- Selective annual stream enrichment (as required depending on pink and chum escapements).

NOTES: This is one of the most complex rivers in the province from a habitat protection standpoint – many jurisdictions and competing land and water uses. Major federal hatchery provides comprehensive enhancement of coho, pink, chum, chinook, and steelhead.
 Draft 22/07/02

Norrish (Suicide Creek)

Map Code: 100064000

4th Order

Wild Stock Trend: **Unknown – likely declined to a low level**
Wild Stock Status: **Special Concern**
Class: **Wild** (Augmented 90 – 92, discontinued)
Recent Steelhead Escapements: Not assessed wild Winter Run

Angling Regulations: Wild steelhead catch and release, time closures

Estimated Steelhead Smolt Capacity & Returning Adults:

- Undetermined

Existing Habitat: Flashy system, natural summer 7-day mean low flow is 14% of Mean Annual Discharge (MAD), 5 km accessible length, and relatively unproductive system.

Habitat protection has been extremely difficult. Gravel accumulation and bed stability problematic. Chronic problems with an inadequate opening at the CPR bridge crossing. Major water supply for Fraser valley - August water demand is 26% of MAD – low flows have caused fish kills in the past as portions of creek bed go dry. Slide and turbidity problems present, placer mining in area of creek.

HABITAT RESTORATION TO DATE

- Limited work done to mitigate flood control activities

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Negotiate with the CPR for a comprehensive gravel- and bridge-flow-through rehabilitation and management plan.

STEELHEAD OBJECTIVES AND STRATEGIES

- Examine regulatory options with respect to angling activity in the watershed and sloughs downstream to give increased protection to steelhead adults and parr.
- Investigate enrichment feasibility downstream of water intake.

NOTES: The railway bridge needs to be lengthened to provide for less constriction of the flood plain and to reduce the need for annual gravel removal. DFO has negotiated increased summer low flow releases from Dickson Lake reservoir. Still receives modest angling pressure.

Draft 22/07/02

Chehalis River Map Code: 110090200 5th Order

Wild (unmarked) Stock Trend:	Relatively Stable
Wild Stock Status:	Routine Management Zone
Class:	Augmented (High Level 40k winter run smolts, 1984/85-ongoing 25k summer run smolts, Coquihalla origin, 1993 – ongoing)
Recent Steelhead Escapements:	200 - 500 Wild Winter Run Not assessed introduced Summer Run (Coquihalla Hatchery Origin)
Angling Regulations:	Marked steelhead retention (HY daily quota) – wild catch and release, spring closure for smolt protection May 1 to May 31
Mean annual effort:	Long term 1968-1996: 3,558 / Recent 1997-2001: 6,937 rod-days Best 5 years 1991, 93-96 mean annual effort: 9,750 rod-days Major steelhead fishery – 2 nd most heavily fished in the region
Mean Annual catch:	Long term 1968-1996: 1,098 / Recent 1997-2000: 1,909 (50% reported wild in 2001 SHQ)

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Approx 6000 smolts/700 adults (based on a regional review of existing information).
- Conservation Concern Level @ 30% of capacity is approx. 210 adults

Existing Habitat:

Watershed area (km ²):	383	Comments
Mean Annual Discharge (m ³ /s)	40.5	Sediment problems, 32% of watershed has been logged, laterally and vertically unstable system resulting in channel changes on its fan, low summer flows – subsurface flows during low periods in aggregated areas, limited accessible area biomass 90 g/unit.; parr habitat limited by few large woody debris and boulder reach extent
Accessible length (km)	20	
Productivity	Low	

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Provide adequate habitat protection especially with respect to rate of cut in headwaters and logging in riparian zones and in land disturbance leading to sedimentation and flow regime changes in headwaters.
- Provide full protection to sensitive areas in the flood plain.

STEELHEAD OBJECTIVES AND STRATEGIES

- Maintain status quo with respect to fishery and winter run hatchery stocking as long as wild stocks are at healthy levels, consider limiting rod days through regulation changes and scaling back or re-deploying augmentation elsewhere to reduce impacts on wild fish.
- Maintain augmentation and resulting summer fishery based on introduced Coquihalla summer run fish (and Chinook) continuing to give priority to the needs of the Coquihalla system itself. (See Coquihalla Summary. Summer run could also be augmented by using hatchery and unmarked summer fish returning to the Chehalis.)
- Undertake habitat restoration to improve pool habitats in addition to pools in canyon area.
- Provide additional spawning gravel and off-channel rearing.
- Foster stewardship groups and local FN to assist in protection.

IDENTIFIED RECOVERY OPTIONS

- Large wood and pools in lower river below bridge
- Annual stream enrichment program using slow release fertilizer and carcasses from the hatchery (Enrichment potential confirmed with water sampling in 2001.)
- One-km long side channel at Bentley Creek

NOTES: Major Federal Chehalis Hatchery and Weaver Creek spawning channel in watershed. Many years ago, the Nature Trust acquired a significant parcel of land in the lower river for habitat protection.

Draft 22/07/02

Big Silver Creek (Harrison Lake)

Map Code: 110599000

4th Order

Wild Stock Trend: **Unknown, likely declining** (on account of low productivity)
Wild Stock Status: **Special Concern**
Class: **Augmented** (5 to 10K fry)
Recent Steelhead Escapements: < 50 Winter Run

Angling Regulations: Wild steelhead catch and release
Catch/Effort: Very few fish ever reported in catch, none reported in 2001.

Estimated Steelhead Smolt Capacity & Returning Adults (assuming 13% marine survival):

- Unavailable

Existing Habitat: 9 km accessible length, Very low productivity – biomass 80-g/unit limits potential
Sediment problems, 24% pf watershed has been logged, low summer flows

HABITAT RESTORATION TO DATE

- Some work done under WRP and by DFO.

STEELHEAD OBJECTIVES AND STRATEGIES

- Monitor any fishing activity and wild stock levels
- Pursue opportunities for habitat restoration.

IDENTIFIED RECOVERY OPTIONS

- Undertake gravel placement.
- Install well-anchored LWD complexing and refuge alcoves;
- Initiate an annual stream enrichment program.

NOTES: This is a much bigger system than “Creek” would indicate and supports an improving sockeye escapement. However SHQ shows very little reported steelhead angling.

Draft 22/07/02

Silverhope Creek

Watershed Map Code 100112900

5th Order

Wild Stock Trend	Relatively Stable
Wild Stock Status: (Winter Run)	Special Concern
Wild Stock Status: (Summer Run)	Conservation Concern/Routine Management
Class:	Wild (Previously stocked with Steelhead fry to supplement natural production but was discontinued many years ago.)
Recent Wild Steelhead Escapements:	100 – 300 Summer Run Winter Run not assessed – believed to be very small
Angling Regulations:	Wild steelhead catch and release, bait ban, fly fishing upstream of Silver lake (Aug./Sept.), area closures
Mean annual effort:	Long term 1968-1996: 486 / Recent 1997-2001: 241 Best 5 years 1968-1972: 1209 rod-days
Mean Annual catch:	Long term 1968- 1996: 146 / Recent 1997-2000: 191

Estimated Steelhead Capacity as Returning Adults (assuming 13% marine survival):

- 3100 smolts /400 adults (based on a review of existing information).
- Conservation Concern Level @ 30% of capacity is approx. 120 adults

Existing Habitat:

Watershed area (km ²):	350	Comments
Mean Annual Discharge (m ³ /s)	14.4	Lake, high productivity below – biomass 300 g/unit, parr habitat limited by few large woody debris and boulder reach extent. Logging damage in upper watershed, road in riparian area has resulted in bank armoring for flood protection with resulting impacts on stream morphology and steelhead habitat. Major damage from flooding in 1989/1990 in upper watershed above lake – streambed is very mobile.
Summer Base Flow (%MAD)	31%	
Accessible length (km)	19	
Productivity (below Silver Lake)	high	

HABITAT RESTORATION TO DATE

- WRP – off-channel work in stream above lake

STEELHEAD OBJECTIVES AND STRATEGIES

- Return / maintain wild summer run stocks in Routine Management Zone capable of supporting 500 rod-days of effort.
- Upgrade existing summer steelhead stock assessment and obtain basic stock information on winter steelhead. (Consider using the stable Silver lake outlet as a smolt and adult enumeration location.
- Examine feasibility of developing a summer steelhead index stream on Silverhope (or Coquihalla).
- Ensure Fraser River net fisheries are conducted as selectively as possible to reduce SH by catch.
- Develop a management plan and coordinate efforts to protect and rehabilitate habitats and set and enforce protection standards in consideration of very heavy general recreational use within the floodplain of upper Silverhope.

IDENTIFIED RECOVERY OPTIONS

- Well-anchored LWD complexing and refuge areas to provide pool habitat in channelized sections
- Road removal/relocation in riparian and channel areas of floodplain

NOTES: System is performing reasonably well at present. Lacks salmon spawning carcasses in upper watershed to provide marine nutrients - enrichment potential there confirmed with water sampling. Any future enrichment and restoration activities should be integrated with general watershed recovery work required by forestry companies. By catch has been equal to returns in some past years according to coded wire tag data.

Draft 17/06/02

Coquihalla River

Watershed Map Code: 100115400

5th Order

Wild Stock Trend: **Fluctuating with Some Recovery** (2000,2001)
 Wild Stock Status: (Winter Run) **Special Concern**
 Wild Stock Status: (Summer Run) **Conservation Concern/ Routine Management** (Last 2 years)
 Class: **Augmented** (Stocked from 1978 to date with 24K Coquihalla summer run smolts raised at Abbotsford and Chehalis)
 Recent Wild Steelhead Escapements: 200 – 500 Summer Run,
 Winter Run not assessed, believed to be <50
 Angling Regulations: With the exception of a 6-week opening in 1996, river has been closed to summer steelhead angling since 1993; catch and release of wild fish from Nov 1 to April 31 for winter steelhead angling below lower railway tunnel, closed year-round further upstream in summer run spawning area
 Mean annual effort: Long term 1968-1996: 783 / Recent 1997-2001: 168
 Best 5 years 1968-70, 87, 90 : 1368 rod-days
 Annual catch: Long term 1968- 1996: 236 / Recent 1997-2001: 156
 (100% reported wild in 2001 SHQ –angling on winter run)

Estimated Steelhead Capacity as Returning Adults (assuming 13% marine survival):

- 700-summer run and 300 winter run adults (based on a review of existing information and current conditions).
- Conservation Concern Level @ 30% of capacity is approx. 210 summer run and 90 winter run adults

Existing Habitat:

Watershed area (km ²):	741	Comments
Mean Annual Discharge (m ³ /s)	33	Upper 22km summer run habitat; moderate productivity – biomass 220 g/unit. Major highway and pipeline corridor, urbanization in lower reaches below Coquihalla Canyon Park, lacks large wood and pools. Periodic sediment events beginning in 1985. Extensive floodplain development near the confluence with the Fraser River has destroyed habitat.
Accessible length (km)	33.5	
Productivity	moderate	

SPECIAL HABITAT PROTECTION REQUIREMENTS

- Minimize impacts from transportation corridor construction activities.
- Ensure sensitive logging practices are followed consistent with current standards and codes.
- Evaluate past mitigation works designed to alleviate highway and pipeline corridor impacts – rebuild or modify as necessary and develop and implement an improved habitat protection and restoration plan for the watershed.
- Reduce flood plain incursions and minimize damage from flood control activities.

HABITAT RESTORATION TO DATE

- Mitigation works built to offset highway impacts – these have not been durable.
- LWD placements and restructured off-channel habitat on Karen Creek.

STEELHEAD OBJECTIVES AND STRATEGIES

- Rebuild/maintain steelhead returns in the Routine Management Zone.
- Upgrade existing stock assessment to cover both summer and winter runs effectively.
- Consider introducing angling directed at summer run fish subject to an appropriate regulatory framework and a pre-season estimate of abundance.
- Review whether augmentation is still required.
- Conduct Fraser River net fisheries as selectively as possible to reduce steelhead by catch

IDENTIFIED RECOVERY OPTIONS

- Well-anchored large wood to create pool habitats
- Off-channel stable habitats with spawning gravels
- Annual stream enrichment program. (Potential confirmed with water sampling in 2001)
- Guardian program to reduce poaching.

COQUIHALLA NOTES: River commercial net fisheries have been significantly curtailed in recent years but First Nation net fisheries directed on early summer Chinook overlap Coquihalla Summer Steelhead run timing in Fraser River.
 Draft 20/09/02