



Coquitlam River Watershed Roundtable

*Kwikwetlem, known as "Red fish up the river."
A living river that reveals its spirit.*

Planning for our Future: Watershed Health and Challenges

Coquitlam River Watershed Roundtable

Preliminary Pressures Identification Summary

Data from the June 6th Roundtable meeting compiled by Gillian Fielding and reviewed by the Watershed Plan Task Group

October 22nd, 2013

Background

The Coquitlam River Watershed Roundtable is developing a watershed management plan for the Lower Coquitlam River watershed following the [Open Standards for Practice of Conservation](#) framework, an adaptive management approach that seeks to integrate both ecological and human service (well-being) concepts into conservation planning. As defined by the Conservation Measures Partnership (2013), ecological components are specific species or ecological systems/habitats that are chosen to represent and encompass the full suite of biodiversity in the project area for place-based conservation or the focus of a thematic program. Human well-being components are used to show how conservation work also benefits humans. As defined by the Millennium Ecosystem Assessment, human wellbeing includes: 1) necessary material for a good life, 2) health, 3) good social relations, 4) security, and 5) freedom and choice. In the context of a conservation project, human wellbeing components focus on those components of human wellbeing affected by the status of conservation targets.

The first step in the multi-phased Open Standards for the Practice of Conservation process is to “Conceptualize”. The conceptual phase has involved a Watershed Plan Task Group, formed in fall 2012 by the Roundtable’s Core Committee, in order to develop a draft framework and health assessment for the watershed plan. Since the fall and spring 2013 months, the draft framework began to take shape, consisting of four Ecological and six Human Well-being components. The four Ecological components include: 1) Coquitlam River System; 2) Riparian Areas; 3) Salmon; and 4) Natural Areas. The six Human well-being components include: 1) Livable Communities; 2) Human Health and Safety; 3) Resource Industries; 4) Stewardship; 5) Cultural and Spiritual; and 6) Recreation. These components were presented for review and feedback at a public Roundtable meeting on June 6th, 2013.

Methods

The next step in the Open Standards for the Practice of Conservation process is to identify pressures to these components, in order to prioritize conservation actions. An initial phase to identify the pressures to the Lower Coquitlam River watershed occurred during the June 6th, 2013, public Roundtable meeting. Attendees of the Roundtable meeting were provided a “Pressures Feedback” form (Appendix A) and were asked to individually identify and rank, in order of severity, the top three pressures and associated stresses for three ecological components and three human well-being components of their choice. Of the 61 participants who attended the public Roundtable meeting on June 6th, 2013, 32 participants either fully or partially completed the pressures feedback form. For this exercise, the definition for “pressures” versus “stresses” was presented:

- **Pressures** are defined as human activities or natural processes that have caused, are causing, or may cause the destruction, degradation, and /or impairment of ecosystem and/or human well-being components.
- **Stresses** are defined as representing the ultimate ecological or human well-being effect or symptom of pressures.

Members of the Watershed Plan Task Group and consultants subsequently used the pressures feedback and an iterative and collaborative process (including a meeting on July 17, 2013) to categorize the pressures, stresses, and drivers identified into a manageable number that best reflected the feedback provided from the June 6th, 2013, public Roundtable meeting.

Results

Based on the feedback session and analysis, sixteen (16) pressures affecting ecological and human well-being components in the Lower Coquitlam River have been identified. The pressures identified in alphabetical order include:

- Culverts;
- Dams/Dikes;
- Development;
- Hatcheries;
- Hazardous spills;
- Invasive species;
- Mainstream cultural norms;
- Mining - Aggregate;
- Recreation;
- Roads, railways, and transit;
- Sewage and Wastewater Spills;
- Storm-water;
- Urban Wildlife;
- Vandalism; and
- Water extraction.

Feedback from participants was also used to generate some preliminary severity ratings for pressures. For each component, participants were asked to list three pressures in order of severity. In order to score pressures by severity, the pressure listed as most severe was given a value of three (3), second most severe a value of two (2) and least severe a value of one (1). The severity of pressures identified by participants at the public Roundtable meeting is summarized in Table 1 (numbers in the cells of Table 1 represent weighted values that integrate information on these rankings). It should be noted that these pressure ratings have been derived from feedback from 32 participants and may not reflect the actual severity of pressures in the watershed. The actual severity of pressures will be analyzed in greater detail by the Watershed Plan Task Group in the coming months.

Additional pressures identified by the consulting team and members of the Watershed Plan Task Group on July 17th have been added (as 'x's) into Table 1. These pressures have not yet been ranked in terms of severity.

Table 1: Ranking of severity for identified pressures for individual components, by 32 participants at a June 6, 2013 Coquitlam River Watershed Roundtable public meeting, with additional input from the Watershed Plan Task Group.

Pressures	Components										Grand Total
	Coquitlam River System	Riparian Areas	Salmon	Natural Areas	Human Health, Well-being, and Safety	Liveable Communities	Resource Industries	Stewardship	Cultural and Spiritual Values	Recreation	
Culverts	1		5								6
Dams and Dikes	22	2	24	1					3		52
Development	40	57	24	31	9	13	4	1	3		182
Hatcheries			6							3	9
Hazardous Spills	3		2		1					1	7
Invasive Species		14		6						2	22
"Mainstream" cultural norms					6		X	11	12	X	29
Mining - Aggregate	13		13			1					27
Recreation	2	15	6	9			1			8	41
Roads, Railroads, Transit	1	5	1	4	2	2				X	15
Sewage and Wastewater Spills			5		1	4	4				14
Storm-water	11	2	13		X	5	3				34
Urban Wildlife					X	X					
Vandalism/Illegal activities	X										
Water Extraction	5				2		X		X	X	7
Grand Total	98	95	99	51	21	25	12	12	18	15	445

After all the pressures to the Lower Coquitlam River Watershed were identified, the Watershed Plan Task Group began a collaborative process in order to develop definitions for each pressure and to list all potential stresses and sources of stresses to the components. Pressures definitions are listed below (Table 2). See Appendix B for a list of potential stresses that are currently being investigated for each pressure.

Table 2: Lower Coquitlam River Watershed Pressures with Definitions as developed by the Watershed Plan Task Group members

Pressures	Definitions
Culverts	Pressures from actions that convert or degrade habitat or alter hydrology via installation of culverts to manage the flow and passage of water, sediment, and species.
Dams and Dikes	Pressures from actions that convert or degrade habitat or alter hydrology via establishment of dikes or the installation of dams in order to manage the hydrologic flow in a system, often to improve human welfare.
Development	Pressures associated with human settlements or other land uses with a substantial footprint, including residential, commercial, and industrial. This includes new and existing development. This also includes pressures from the deliberate and unintentional cutting of forests and trees (e.g. clearing for development, removal of hazardous trees, etc.). This does not include transportation and utility infrastructure, or storm-water associated with any developed areas (see related pressures).
Hatcheries	Pressures associated with non-commercial, small scale, community run fish hatchery-related practices.
Hazardous Spills	Pressures associated with the accidental, episodic, or potentially catastrophic spill of oil and other hazardous wastes in aquatic and terrestrial environments. This does not include chronic or other frequent, smaller pollution events related to normal operations of vehicles, and vessels etc. (see related pressures).
Invasive Species	Pressures associated with the introduction and distribution of non-native species or genes that are capable of aggressively establishing or causing environmental damage.
"Mainstream" Cultural Norms	Pressures associated with the disconnection from or lack of understanding of the value of local ecosystem services provided to people by local natural resources. Includes quality/access to environmental education, work-life imbalances, and pervasiveness of media/technology, globalization of culture and products, and materialism/consumerism.
Mining	Pressures associated with the commercial extraction of non-biological resources. This includes air and water pollution associated with mining and related activities.
Recreational Activities	Pressures from human activities that alter, destroy, and disturb habitats and species associated with non-consumptive and consumptive uses of biological resources. This includes illegal harvesting of wild and cultivated species (such as fishing and gathering of berries and fiddleheads). This also includes recreational vessels, off-road vehicles, associated air and water pollution, and disobeying bylaws for recreation such as dogs off leash, biking on walking trails, and creating fires where not permitted. This does not include transportation networks associated with recreational activities.
Roads, Railroads & Transportation	Pressures associated with the quantity and location of transportation and service networks, including boats, cars, trains and pipelines, transmission lines, and roads associated with

	timber harvest. This includes air pollution from vehicles. This does not include storm-water, accidental spills associated with transportation networks, or pressures associated with recreational vehicles (see related pressures).
Sewage and Wastewater Spills	Pressures associated with accidental spills of water-borne sewage that includes nutrients, pathogens, toxic chemicals, and sediments. This also includes discharge from municipal combined sewer overflows (CSOs).
Storm-water	Pressures from the introduction of exotic or excess material into hydrologic systems due to surface water loading and runoff from the built environment. The "built environment" includes commercial, residential, and industrial lands and transportation facilities and corridors. This does not include discharge from municipal combined sewer overflows (CSOs), wastewater discharged from recreational and other vessels, or runoff from other activities (e.g. tree clearing) (see related pressures).
Urban Wildlife	Pressures associated with urban wildlife accessing areas in search of places to reside and to find food, both natural (e.g., berries, insects, salmon) and unnatural attractants (e.g., solid food waste), causing conflicts for residential safety and wildlife resulting in injury or death.
Vandalism/Illegal Activities	Pressures associated with the crime of destroying or damaging natural resources that can also affect human well-being. This includes dumping of garbage, littering, trespassing, vandalizing public and private property, and intentionally harming nature and species such as vegetation, birds, and fish.
Water Extraction	Pressures associated with modification, extraction, or diversion of water supplies. This includes changing water flow patterns, such as in-stream flows, from their natural range of variation either deliberately as a result of water supply or flood management operations.

Next Steps

Once pressures, stresses and sources of stresses are identified and clearly defined, pressures will be ranked by the Watershed Plan Task Group in order to identify the most critical pressures to the components so that attention can be directed at them. Pressures will be ranked based on scope, severity, and irreversibility of each pressure as per the Open Standards for the Practice of Conservation framework criteria.

Upon completion of ranking pressures within the Lower Coquitlam River watershed and in order to complete phase 1 of the watershed management plan, a situation analysis will be conducted. A situation analysis will contribute to a broader understanding of the Lower Coquitlam River watershed social-ecological system, as it allows moving beyond components and pressures, in order to include both the biological environment and the social, economic, political, and institutional systems that affect each component. In this way, situation analysis can ultimately assist in strategy development.

This step carries the process forward by linking concepts together visually through conceptual modeling. A conceptual model is a tool that visually portrays the relationships among the different factors in the

situation analysis. Developing conceptual models for each pressure will illustrate the main cause-and effect relationships that exist within the Lower Coquitlam River watershed. Conceptual modeling will be performed for each pressure by the Watershed Plan Task Group from 2013-2014.

Appendix A: Example Pressures Handout from June 6th, 2013, public Roundtable meeting.

Definitions

Pressure: Pressures are defined as human activities or natural processes that have caused, are causing, or may cause the destruction, degradation, and/or impairment of ecosystem components.

Stresses: Stresses represent the ultimate ecological effect or symptom of pressures.

Driver: Underlying conditions that support the persistence of pressures and are often outside the scope of local strategies. Common drivers include climate change, economy, population growth, and underlying geology or physical processes.

Contributing Factors: Contributing factors are the underlying, human-induced actions that allow pressures to persist (e.g. indirect threats, root causes and opportunities). They can commonly be classified as social, technical, funding, institutional, and legal factors.

Ex. Pressures	Example Associated Stresses
Development	Reduced habitat extent, reduced forest cover, degraded habitat connectivity, diversity, structure, altered hydrology, noise, light pollution, increased solid waste, more traffic
Roads, Railroads & Transportation	Reduced habitat extent, degraded habitat connectivity, species diversity, degraded air quality, degraded water quality, increased impervious surfaces, reduced human health (accidents, air/water quality)
Culverts	Species passage limitations, altered hydrological dynamics, loss of riparian habitat leave strips, altered sediment dynamics
Dikes	Altered hydrological processes, altered sediment dynamics, altered nutrient/organic dynamics, flood intensification, species passage limitations, reduced habitat connectivity
Dams	Species passage limitations, altered water availability, altered sediment dynamics, altered hydrological dynamics, altered dissolved oxygen levels for the river, loss of terrestrial/freshwater habitat upstream
Water Extraction	Reduced volume – groundwater or surface flow, degradation/loss of habitat
Stormwater	Toxics, degraded water quality (temperature, turbidity), altered hydrological dynamics, altered nutrient levels
Sewage	Toxics, degraded water quality

Hazardous Spills	Species kill, habitat degradation or destruction, impaired species/habitat condition
Tree Clearing	Reduced genetic diversity, reduced species abundance, disease, erosion, altered hydrology, altered sediment dynamics
Aggregate Mining	Erosion/altered sediment dynamics, altered hydrology, increased slope instability, degraded air/water quality, habitat loss, habitat degradation
Recreational Activities	Erosion, degraded air quality, degraded water quality
Fishing/Hunting	Reduced genetic diversity, abundance, fecundity, productivity
Invasive Species	Competition, genetic disruption, predation, habitat degradation
Hatcheries	Reduced genetic diversity, reduced abundance, reduced fecundity, reduced productivity, reduced habitat quality (structural, shading), reduced water quality

Ecological Component Pressures Form

Please identify and rank, in order of severity, the top three pressures and associated stresses for three ecological components of your choice.

Name of Component:

<u>Pressures</u>	<u>Associated Stresses</u>
1.	1.
2.	2.
3.	3.

Name of Component:

Pressures

Associated Stresses

1.

1.

2.

2.

3.

3.

Name of Component:

Pressures

Associated Stresses

1.

1.

2.

2.

3.

3.

Additional comments:

Human Well-being Component Pressures Form

Please identify and rank, in order of severity, the top three pressures and associated stresses for three human well-being components of your choice.

Name of Component:

<u>Pressures</u>	<u>Associated Stresses</u>
1.	1.
2.	2.
3.	3.

Name of Component:

Pressures

Associated Stresses

1.

1.

2.

2.

3.

3.

Name of Component:

Pressures

Associated Stresses

1.

1.

2.

2.

3.

3.

Additional comments:

Appendix B: List of pressures to the Lower Coquitlam River Watershed with potential stresses that are currently being investigated.

Pressures	Definitions	Potential Stresses to be Further Investigated
Culverts	Pressures from actions that convert or degrade habitat or alter hydrology via installation of culverts to manage the flow and passage of water, sediment, and species.	Species passage limitations, altered hydrological dynamics, loss of riparian habitat, and altered sediment dynamics.
Dams and Dikes	Pressures from actions that convert or degrade habitat or alter hydrology via establishment of dikes or the installation of dams in order to manage the hydrologic flow in a system, often to improve human welfare.	Species passage limitations, altered hydrological processes, altered sediment dynamics, altered nutrient/organic dynamics, altered dissolved oxygen levels for rivers, flood intensification, changes in terrestrial/freshwater habitat upstream, and reduced habitat connectivity.
Development	Pressures associated with human settlements or other land uses with a substantial footprint, including residential, commercial, and industrial. This includes new and existing development. This also includes pressures from the deliberate and unintentional cutting of forests and trees (e.g. clearing for development, removal of hazardous trees, etc.). This does not include transportation and utility infrastructure, or storm-water associated with any developed areas (see related pressures).	Changes in habitat extent and quality, forest cover, habitat connectivity, diversity, structure, hydrology, noise, light pollution, solid waste, and traffic. Other stresses include reduced genetic diversity, reduced species abundance, disease, unsustainable growth, reduced natural aesthetics, lack of access to open/natural/gardening/recreational space, reduced cultural/spiritual connection, and decreased resilience to natural hazards.
Hatcheries	Pressures associated with non-commercial small scale community run fish hatchery-related practices.	Potential possibility of disease introduction and pollution. Possible impacts to genetic diversity, abundance, fecundity, and productivity.
Hazardous Spills	Pressures associated with the accidental, episodic, or potentially catastrophic spill of oil and other hazardous wastes in aquatic and terrestrial environments. This does not include chronic or other frequent, smaller pollution events related to normal operations of vehicles, and vessels etc. (see related pressures).	Species kills, habitat degradation or destruction, impaired species/habitat condition, reduced access to or quality of recreational activities in the river, and apathy towards improving/upgrading infrastructure for prevention.
Invasive Species	Pressures associated with the	Competition, genetic disruption, predation, and

	introduction and distribution of non-native species or genes that are capable of aggressively establishing or causing environmental damage.	habitat degradation and loss of recreational and cultural connections to native species.
“Mainstream” Cultural Norms	Pressures associated with the disconnection from or lack of understanding of the value of local ecosystem services provided to people by local natural resources. Includes quality/access to environmental education, work-life imbalances, and pervasiveness of media/technology, globalization of culture and products, and materialism/consumerism.	Changes in apathy, stewardship interest, environmental knowledge/awareness, sense of place or identification/connection with nature, of time/value for nature, of value for local culture and products, and feelings of wellness.
Mining	Pressures associated with the commercial extraction of non-biological resources. This includes air and water pollution associated with mining and related activities.	Potential erosion, altered sediment dynamics, and altered hydrology. Possible slope instability, air/water quality, habitat loss, and habitat degradation.
Recreational Activities	Pressures from human activities that alter, destroy, and disturb habitats and species associated with non-consumptive and consumptive uses of biological resources. This includes illegal harvesting of wild and cultivated species (such as fishing and gathering of berries and fiddleheads). This also includes recreational vessels, off-road vehicles, associated air and water pollution, and disobeying bylaws for recreation such as dogs off leash, biking on walking trails, and creating fires where not permitted. This does not include transportation networks associated with recreational activities.	Potential erosion. Impacts to air quality, water quality, and species conditions (including genetic diversity, abundance, fecundity, and productivity). Possible loss of recreational and cultural connections to iconic species, and impacts to quality of recreational experiences.
Roads, Railroads & Transportation	Pressures associated with the quantity and location of transportation and service networks, including boats, cars, trains and pipelines, transmission lines, and roads associated with timber harvest. This includes air pollution from vehicles. This does not include storm-water, accidental spills associated with	A change in habitat extent and quality, habitat connectivity, species diversity, air quality, water quality, impervious surfaces, human health (accidents, air/water quality), and pedestrian/cycling opportunities.

	transportation networks, or pressures associated with recreational vehicles (see related pressures).	
Sewage and Wastewater Spills	Pressures associated with accidental spills of water-borne sewage that includes nutrients, pathogens, toxic chemicals, and sediments. This also includes discharge from municipal combined sewer overflows (CSOs).	Introduction of toxins, and degraded water quality, reduced access to or quality of recreational activities in the river, apathy towards improving/upgrading infrastructure for prevention.
Storm-water	Pressures from the introduction of exotic or excess material into hydrologic systems due to surface water loading and runoff from the built environment. The "built environment" includes commercial, residential, and industrial lands and transportation facilities and corridors. This does not include discharge from municipal combined sewer overflows (CSOs), wastewater discharged from recreational and other vessels, or runoff from other activities (e.g. tree clearing) (see related pressures).	Introduction of toxins, degraded water quality (temperature, turbidity), altered hydrological dynamics, altered nutrient levels, reduced human health, and impaired species/habitat condition and reduced access to or quality of recreational activities in the river.
Urban Wildlife	Pressures associated with urban wildlife accessing areas in search of places to reside and to find food, both natural (e.g., berries, insects, salmon) and unnatural attractants (e.g., solid food waste), causing conflicts for residential safety and wildlife resulting in injury or death.	Changes in species abundance and composition (e.g., deer, bears, cougars versus smaller mammals, wildfowl residing and changes in suitable natural habitat spaces for local wildlife.
Vandalism/Illegal Activities	Pressures associated with the crime of destroying or damaging natural resources that can also affect human well-being. This includes dumping of garbage, littering, trespassing, vandalizing public and private property, and intentionally harming nature and species such as vegetation, birds, and fish.	Effects on water and habitat quality, and species abundance. May also result in stresses to cultural and spiritual connections to nature, changes in the quality of recreational activities, and apathy/ stewardship interest..
Water Extraction	Pressures associated with modification, extraction, or diversion of water	Changes in volume – groundwater or surface flow, altered flow regime (timing and magnitude of high

	supplies. This includes changing water flow patterns, such as in-stream flows, from their natural range of variation either deliberately as a result of water supply or flood management operations.	and low flows) and habitat.
--	--	-----------------------------