

**DEVELOPMENT OF AN IMPLEMENTATION STRATEGY FOR LOWER
FRASER COHO HABITAT PROTECTION, ENHANCEMENT AND
REHABILITATION PROJECTS THROUGH INTEGRATED PLANNING
BY FIRST NATIONS**

Prepared for:

**Fraser Salmon and Watersheds Program
Vancouver BC**

March 2009

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1 INTRODUCTION

1.1 Project Background

Even though evidence of a decline in catch and harvest rates for Lower Fraser River coho populations began about 20 years ago, significant declines have been documented in the past 8-10 years. The 2006 report prepared by the Fraser Basin Council identified a substantial decline of >85% in abundance and harvests of Lower Fraser coho stocks between 1988 and 2004 (Fraser Basin Council 2006; Figure 1). Two important factors in these declines have been the trends toward lower marine survival since the early 1990's and the substantial reduction in suitable spawning and rearing habitat accessible along the lower Fraser River.

We proposed in this project to initiate the process to reverse these downward trends through meaningful discussions and collaboration among First Nations, conservation groups and fisheries agencies to identify an implementation strategy to protect, restore and improve rearing and spawning habitat for Lower Fraser coho.

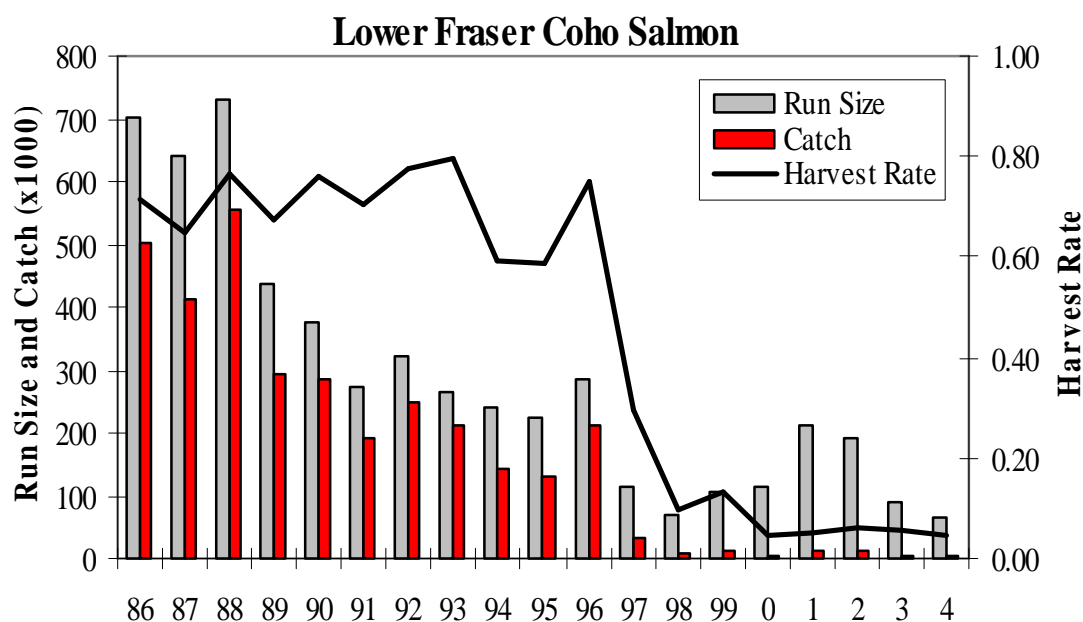


Figure 1. Summary of the substantial decline in abundance and harvests of Lower Fraser coho stocks, 1986-2004 (reproduced from Fraser Basin Council 2006).

1.2 Project Goals and Objectives

First Nations organizations within the lower Fraser River share a common interest – the current status of lower Fraser coho populations. The goal of this project was to identify the steps for First Nations organizations to be meaningfully involved in the restoration of lower Fraser River coho habitat.

The specific objectives of this project were:

1. To determine the framework and procedural mechanisms necessary for First Nations to collaborate together on the management, rehabilitation and enhancement of lower Fraser coho populations and habitats;
2. To determine the framework and procedural mechanisms for First Nations to engage other fisheries resource groups, volunteer organizations, conservation groups and fisheries agencies in discussions to develop an implementation strategy on solutions relating to fish habitat protection, enhancement and restoration projects; and
3. To identify specific habitat rehabilitation and enhancement activities that might be led by each First Nation organization.

It was recognized that the decision making process would also involve individuals that are connected with fisheries resource groups, volunteer organizations, conservation groups and fisheries agencies and that are concerned about lower Fraser coho (and other fish species). These organizations may include: Department of Fisheries and Oceans (DFO), BC Ministry of Environment (MOE), Pacific Streamkeepers Federation (PSkF), Fraser River Estuary Management Program (FREMP), Fraser River Sturgeon Conservation Society (FRSCS), and Pacific Salmon Foundation (PSF).

2 STUDY AREA

The extent of the lower Fraser area under consideration in this project includes the Fraser River mainstem and its tributaries west of Mission.

3 METHODS

The activities for this project proceeded in the following order:

1. A roundtable meeting schedule and agenda were developed and circulated to representatives from Musqueam, Kwantlen, Kwikwetlem, Katzie, and Tsawwassen First Nations. As a first step, roundtable meetings would bring together First Nations to discuss potential habitat protection, enhancement and restoration solutions to recover coho populations in the lower Fraser River. Two meetings were planned beginning in early April 2008;
2. The first roundtable meeting focused on reviewing the conceptual designs for the habitat enhancement and restoration projects described in the report titled 'Identification of Rehabilitation and Enhancement Opportunities for Lower Fraser Coho Salmon' prepared for Musqueam Indian Band by M. Gaboury of LGL Limited (2008);
3. The second roundtable meeting broadened First Nation involvement to include Tsleil-waututh FN and focused on the framework and procedural mechanisms that are necessary prior to establishing an implementation strategy for habitat restoration and enhancement projects.

4. Based on the recommendations made by participating First Nations and their representatives, a report was prepared that summarized group discussions, described actions necessary in the development of a habitat restoration and enhancement implementation strategy for lower Fraser River coho, and provided some specific enhancement and rehabilitation projects that could be implemented by FNs; and
5. The final report was distributed to member First Nations' representatives and FSWP.

4 FIRST NATIONS MEETINGS

4.1 Background to Discussions

This project was tied closely to a workshop organized by Pacific Salmon Foundation and Musqueam Fisheries Commission that occurred on 22 February 2008. The workshop, *"The Lower Fraser Coho Conservation & Enhancement Initiative – Pulling Together, Making a Difference"*, targeted the recovery of lower Fraser coho stocks and habitats. The goal of the workshop was *'To bring traditional and local knowledge, emerging science and commitment together to develop an innovative recovery strategy for lower Fraser coho salmon'* (http://www.thinksalmon.com/event/item/the_lower_fraser_coho_conservation_enhancement_initiative_workshop/).

Discussions at the workshop included information about the sacred connections between First Nations and coho, the Wild Salmon Policy, needs for mapping habitat, habitat restoration, marine survival of coho, community and partnerships active in the issues. The afternoon was devoted to identifying options and opportunities for committed action to address the many issues around habitat and water.

Workshop participants discussed the links between Musqueam First Nation and salmon. Integrating the complex scientific and social issues for coho in the lower Fraser into a plausible plan of action is a profound challenge. However, the workshop brought together the information and the people needed to act for lower Fraser coho recovery. One of the intended outcomes from this February Workshop was that attendees from First Nations, fisheries resource groups, government, volunteer organizations, conservation groups, fisheries agencies, etc. were invited to join a representative subcommittee and become involved in coho recovery.

4.2 First Roundtable Meeting

Date: 17 April 2008

Title: Lower Fraser First Nations Dialogue on Gateway and Other Collaborative Restoration Initiatives

Attendees:

Les Antone, Kwantlen Director of Lands and Resources

Mike Bonshor, Kwantlen First Nation, Lands and Resources Advisor

Nash Antone, Kwantlen First Nation

Lillian Thomas, Kwantlen First Nation

Gordon Thomas, Kwantlen First Nation

Marilyn Gabriel, Chief, Kwantlen First Nation

Thomas Munson, representing Kwikwetlem First Nation
Bob Guerin, Musqueam First Nation
Marc Gaboury, LGL Ltd. (Musqueam technical support)
Dave Moore (Kwantlen support)

Purpose(s) of the First Nations Meeting:

1. To discuss the level of First Nations engagement in the Gateway project, our collective understanding of the impacts, and the range of approaches taken to address the initiative;
2. To present individual priorities, plans and actions with respect to compensation, mitigation and reparation, and in particular to fisheries issues raised; and
3. To explore areas of common interest, collaborative projects (i.e., coho restoration initiative), and ways to work together.

Summary of Meeting:

- Musqueam would like to see the compensation funds under the Gateway Program used to lever a large-scale fish habitat restoration initiative in the lower reaches of the Fraser River;
- In addition, Musqueam would like to develop a program partnership with a broad-spectrum of interests, potentially to be administered through the Pacific Salmon Foundation – with a program governance role by area First Nations;
- Strong support from Musqueam, Kwantlen and Kwikwetlem First Nations for a Lower Fraser River restoration strategy that would be broader than one that may only address projects under the Gateway Program;
- The geographic and species scope needs to be clearly identified, and options for a proposed governance structure needs to be explored;
- Need to make presentations to each of the area First Nations and invite their participation; and
- Kwantlen agreed to draft cover letter to distribute with summary minutes of this session to area First Nations.

Action Items:

1. Kwantlen to circulate summary minutes and covering letter to area First Nations;
2. Musqueam to seek invitations and proceed with presentations on program vision to area First Nations on request - invited by Musqueam/LGL in concert with Fraser Basin programming to refine program work plan;
3. Kwantlen letter to invite First Nations, and to strike a Working Group to set the program in motion made up of area First Nations ~ target meeting date in June; and
4. Working Group should develop a protocol among First Nations to capture vision, scope, expectations, roles and resourcing plan.

4.3 Second Roundtable Meeting

Date: 26 November 2008

Title: Development of An Implementation Strategy for Lower Fraser Coho Through Integrated Planning by First Nations

Attendees:

Bob Guerin, Howard Grant, John Louis (Dickie), Wendy John, Debbie Point, Victor Guerin, Wayne Sparrow, Musqueam First Nation (FN)

Marc Gaboury, Fisheries Consultant, LGL Limited, support for Musqueam FN

Matt Foy, Salmon Enhancement Program, DFO

Brian Naito, Biologist, DFO

Mark Fetterly, PICFI Coordinator, DFO

Jay Forsythe, and Dave and Edward Thomas, Tsleil-waututh FN

Chief Mike Leon, Katzie FN

Ruth Kenny, Tsawwassen FN

Jennifer Neener, PICFI Manager, DFO

Dave Moore, support for Kwantlen FN

Invited but unable to attend:

Glen Joe, George Chaffee, Kwikwetlem FN

Summary of Meeting:

Opportunities were identified for First Nations to be involved in field surveys, planning, design, construction and long term effectiveness monitoring on fish habitat restoration projects in the Lower Fraser River and its tributaries. Musqueam, Kwantlen, Tsawwassen and Tsleil-waututh FNs expressed a desire to have their youth trained and employed in these types of projects. They indicated a willingness to proceed with the development of a Memorandum of Understanding (MOU) that would provide a framework for Lower Fraser First Nations to work collaboratively together to rebuild and restore coho and other Fraser fish stocks. The MOU would:

- Provide a strong, and clear political vision;
- Define the geographical area over which the MOU will function; and
- Provide a timeline for review and finalization by FNs

The group envisaged that under the MOU a Secretariat would be formed to oversee the management and implementation of enhancement, rehabilitation and compensation projects. The Secretariat would also be responsible for:

- Identifying opportunities and sites for potential fish habitat projects;
- Soliciting / negotiating potential projects with municipal, provincial or federal governments, and funding body(ies);
- Providing broad oversight and management for fish habitat projects implemented by FN members; and
- Engaging other FNs that desire involvement in these habitat restoration and enhancement projects.

It was anticipated that, initially, FNs would be involved in the implementation of fish habitat compensation projects under the Gateway Program. Over time, FNs could implement projects where funds are sourced from organizations such as Pacific Salmon Commission, Pacific Salmon Foundation, etc.

Action Items:

- Dave Moore to draft an executive summary of what needs to be done to establish the MOU; and
- Marc Gaboury to prepare a summary of the issues and concerns, relative to the MOU, that were discussed during the meeting.

5 DEVELOPMENT OF A MEMORANDUM OF UNDERSTANDING

5.1 Summary of Issues and Concerns

1. Identify Member First Nations

- To start with seek potential agreement between the following six First Nations - Musqueam, Kwikwetlem, Katzie, Kwantlen, Tsawwassen, Tsleil-waututh;
- Set up the MOU to allow for a broader inclusion of other First Nations based on success of collaborative efforts over time.

2. Purpose of MOU

That all six First Nations agree:

- To establish a Collaborative Management entity that will be founded on principles of sustainable ecological resource management and will be guided by integrated ecosystem/watershed management and planning processes,
- To collaboratively plan and implement a 'Lower Fraser First Nations Salmon Habitat Rehabilitation and Enhancement Program', and
- To develop 'Lower Fraser First Nations Commercial Fishing Aggregate(s)' comprised of two or more First Nations and submit applications to the Pacific Integrated Commercial Fisheries Initiative (PICFI) in order to develop an integrated commercial fisheries enterprise.

3. Identify Geographic Area

- Lower Fraser River including the mainstem, tributaries, wetlands, marshes and estuary, with boundaries extending to the limits of the six First Nations' territories.

5.2 Structural Components Under MOU

- Establishment of a Secretariat comprised of representative(s) from each of the six First Nations to provide policy direction and to act as a unified voice when announcing a policy decision or promoting a specific initiative. For example, the Secretariat would be very effective as a unified group of six First Nations when promoting the implementation of high priority rehabilitation projects to municipal, provincial and federal government agencies during the permitting / regulatory approval processes.
- Establishment of a Technical Advisory Committee made up of First Nation representatives and technical specialists to guide the planning, survey, design, construction and monitoring activities under the habitat rehabilitation and enhancement program.

5.3 Potential Benefits to First Nations Under MOU

- To establish a strong, clear political vision so the technical aspects relating to planning, design and construction of fish habitat rehabilitation and enhancement projects can proceed.
- Through the establishment of a collaborative management structure, the 'Lower Fraser First Nations' will be eligible to access funding for Capacity Building and Collaborative Management under DFO's Aboriginal Aquatic Resource and Oceans Management (AAROM) program (http://www.pac.dfo-mpo.gc.ca/tapd/aarom_e.htm).
- Through economies of scale, directed training can be delivered by recognized colleges (i.e., Malaspina College) to a large group of individuals with similar needs. The training could be tailored to First Nations community member needs to expand their capacity to deliver habitat rehabilitation and enhancement projects. Training could include disciplines such as heavy equipment operation, fisheries biologist and technician, professional engineer and engineering technician, forester and forestry technicians, arborist, land use planner, etc.
- Facilitate the formation of a sustainable Commercial Fishing enterprise under the auspices of PICFI by establishing a business aggregate comprised of two or more First Nations.

5.4 Benefits from Current Programs

Current infrastructure programs provide opportunities to fund training and involve First Nations in meaningful jobs where experience in the various disciplines described above can be obtained. The Gateway Program, for example, can potentially provide these opportunities. In order to meet the 'window of opportunity' offered by the Gateway Program, agreement between the First Nations to actively pursue training and jobs under the Program is seen as a critical first step. One of the most significant opportunities for long term meaningful jobs for First Nations communities is the long term effectiveness monitoring (10-15 yrs) that will likely be required for all fish habitat compensation works constructed under the Gateway Program. Job opportunities for long term monitoring go well beyond the Gateway Program as effectiveness monitoring (over 3-15 yrs) is typically always a condition of approval for projects where DFO determines that Harmful Alteration, Disruption or Destruction (HADD) of habitat is likely to occur.

5.5 Steps in MOU Development Process

1. Development of an executive summary of what needs to be done to establish an MOU (to be prepared by Dave Moore with support from Wendy John (Musqueam), with delivery of the summary by mid-December 2008).
2. In order to meet the window of opportunity for various infrastructure programs (e.g., Gateway), the Chief and Council from each of the First Nations will decide in the short term if they want to enter into a collaborative arrangement with the proposed six founding First Nations. If a preliminary Agreement in Principle is established and an (interim) Secretariat has been selected, work can begin on: 1) the development of training packages, 2) establishment of a technical advisory committee, 3) applications to Aboriginal Aquatic Resource and Oceans Management (AAROM), 4) EOI submissions to PICFI, 5) selection of key watersheds and sites for rehabilitation, etc.
3. Further development of the MOU by the First Nations with elaboration on specific terms of reference, goals and objectives, roles and responsibilities of Secretariat and Technical Advisory Committee, geographic area bounds, etc.
4. Preparation of Draft and Final MOU's to be reviewed and, if accepted, signed by Chief (and Council) of each of the First Nations bound by the agreement.

6 DEVELOPING A COHO HABITAT RESTORATION STRATEGY

Input for this section comes from Dave Moore, Fisheries Development Services, advisor to Kwantlen FN. The original version has been modified by the authors.

In 2007, First Nations from the lower reaches of the Fraser initiated consultations on the development of a collaborative fisheries restoration strategy¹. The emerging program vision focused in on restoring fisheries ecosystem function to the network of wetlands, sloughs and streams that are ubiquitous to both salmon and the fishing cultures of this region's *Halq'emeylem Peoples*. The Lower Fraser "Coho Restoration Strategy" framework is directed at mitigating the development pressures on the region's fishery that covers more than 1600 km² of floodplain, benchlands, and inter-tidal zones. The strategy adopts coho salmon as the keystone species, as a healthy ecosystem indicator.

Partnership discussions in 2008 have focused on habitat restoration, targeted unmet mitigation, and have included development interests as well as local, provincial and federal agencies with common fisheries stewardship interests. The founding First Nation members are now investigating the nature of the institutional capacity required to proceed with program implementation. The following brief was developed to outline outcomes for success (SWOT analysis), as well as some options and priorities for institutional development that will best support local First Nations capacity-building in fisheries.

¹ Led by Musqueam Fisheries Commission

The recommended steps to develop a lower Fraser coho habitat restoration strategy are:

1. **Develop a programming focal point** to organize strategic outcomes, generate funding, training and employment as basis for member First Nations programming capacity;
2. **Establish a distinct society** directed at finding and linking mitigation needs, generating funding, and assisting members to manage *local* First Nations programming;
3. **Organize a central capacity model** that supports *local* First Nations-run projects, and fisheries management capacity, builds a central mitigation fund, and helps restore a diverse network of coho habitats, with outcomes staged over a 10 year timeline;
4. **Prioritize and mobilize** pilot projects and community technical positions to work in projects and participate as representative members in core of strategy.

6.1 SWOT Analysis

The strengths, weaknesses, opportunities and threats (SWOT) associated with the development of a First Nations coho habitat restoration strategy were identified and evaluated (

Table 1). From this analysis, it was concluded that there is a need to “kick-start” projects that will engage an active First Nations core membership in strategically-oriented projects. This will provide the basis for building local capacity to effectively engage in the collaborative mitigation programming envisioned in the Coho Strategy and the supporting bilateral relationships with both industry and government. Central professional capacity is required for this step, and may become redundant in time. The specific needs of the group are not compatible with an outside sponsored Society or loose network.

Table 1. Analysis of the strengths, weaknesses, opportunities and threats (SWOT) associated with the development of a First Nations coho habitat restoration strategy (Strategic institutional needs highlighted in yellow).

	Vision	Goal	Mission
S trengths	Healthy, sustainable and productive salmon ecosystems in the Lower Fraser	Restore and enhance coho and their habitats in the mainstem, estuary and tributaries of the Lower Fraser River to support coho fisheries	Collaborate among industry, government and NGO's to organize strategic outcomes, generate more funding, training and employment, and protect fishing rights
W eaknesses	Restoration is institutionally and jurisdictionally complex in the area	Need to create a focal point to connect jurisdictions, mitigation and project capacity	Enable and advocate rehabilitation work, speed-up strategic organization and project development
O pportunities	Numerous corporate partners with common interest and contribution potential	Identify meaningful opportunities and link them to potential partners and benefits (mitigation benefits, green image, and tax relief)	Build fisheries capacity with area First Nations by assisting with organization of projects, professional designs, and raising funding
T hreats	Lost coho fisheries, depleted coho habitats, and limited project capacity	Restore wild, self sustaining coho and First Nations coho fisheries	Involve First Nations and other governments in locally-run projects with partners to support bi-lateral objectives

6.2 First Nations Coho Strategy Institutional Needs

Various procedural mechanisms and institutional options are possible in the development of a framework for First Nations to collaborate on the management, rehabilitation and enhancement of lower Fraser coho populations and habitats (

Table 2). It is envisaged that Musqueam, Tsawwassen, Tsleil-Waultuth, Katzie, Kwikwetlem, and Kwantlen First Nations would be included initially in the proposed strategic organization. In the short term, the organization would likely function at a Tier 1 level, with member First Nations working independently or in informal partnerships on time-sensitive projects such as those proposed under the Gateway Program. Over time the membership would expand and the role and responsibilities of the First Nations organization would broaden to include establishing a Technical Committee with technical standards, coordinating funding and professional support to deliver habitat projects, and managing the implementation of all aspects of habitat and enhancement projects.

Table 2. Summary of range of structural options for proposed First Nations strategic organization. The recommended approach for the near term is highlighted in bold.

	Structural Options (Arising from SWOT Analysis)		
	Tier 1	Tier 2	Tier 3
Scope of Governing Body	Musqueam, Tsawwassen, Tsleil-Waultuth, Katzie, Kwikwetlem, Kwantlen – perhaps open to more distant First Nations beyond board of directors	DFO, Province, Regional District, City membership in joint technical sub-committee; Observer status for active industry and NGO partners	Engage lower Fraser First Nations forum with multiple tiers
Institutional Options	Partner with existing society	Set up dedicated First Nations Society for specific programming needs (may be hosted by Musqueam)	Open Lower Fraser network hosted by a lead Band (i.e. Musqueam)
Jurisdictions	Run projects	Coordinated funding, professional support, performance measures	Regional mitigation fund + share info and best practices
Capacity needs	Lean secretariat	Centralized professional support, information sharing	Operational field staff and central administration
Functions	Share information, organize meetings	Technical standards, projects clearing-house, professional support	Manage funding and projects
Business Plan	Dedicated to Gateway – related projects	Multi-industry mitigation and stewardship funding plan, including Gateway	Grants and contributions
Development Options (may combine elements)	Contract existing Society to provide professional services to organize projects in loose network	Appoint lead First Nation to develop secretariat and trust fund and contract professional services	Independent consultant to build secretariat and trust fund

Further to the activities that could occur in the short term, a recent meeting was held on 3 September 2008 with representatives from Musqueam, Katzie, Kwantlen, Kwikwetlem, Tsawwassen, and Tsleil-Waututh FNs and Gateway Program to discuss the vision, objectives/goals, structure/governance and operations for a proposed Gateway Program First Nations Fisheries Trust. The purpose of the meeting was:

- To initiate a possible series of meetings/discussions pertaining to the proposed fisheries trust;
- To provide clarification on the concept to date and identify a process to move ahead from the conceptual stage to implementation;

- To discuss, brainstorm and elicit input on topics such as vision, objectives/goals, structure/governance and operations for the proposed Gateway Program First Nations Fisheries Trust;
- To begin to present and address concerns and questions from possible participants; and
- To determine each First Nation's level of interest, commitment/willingness to participate and perceived role.

Participants offered their ideas and opinions on the focus and guiding principles for the Fisheries Trust that, in part, included:

- Focusing the Trust on Coho
- Focusing the Trust more generally on 'Saving Fish'
- Focusing on 'Ecosystem Restoration'
- Identifying a keystone fish species, such as coho
- Supporting initiatives and taking direct actions to protect and preserve salmon and to enhance their habitats in the lower Fraser River and its tributaries.
- Addressing water quality issues
- Addressing pollution
- Addressing the encroachment issue
- Recreating resources the creator gave us
- Identifying specific priorities for each First Nation
- Working together and communicating to a larger audience
- Obtaining economic opportunities to ensure longevity
- Ensuring meaningful participation by FNs in the management of aquatic resources in the territory

A subsequent meeting on the Gateway Program First Nations Fisheries Trust is currently planned for 27 April 2009 to discuss topics such as FN objectives, participation by FNs, government agencies, and non-government organizations, governance, funding, authority and accountability, and timing.

6.3 Timeline and Development Priorities

Tasks leading to the implementation of the coho habitat restoration strategy were outlined on a suggested schedule (Table 3). In summary, the scheduled tasks would include:

- Year 1-2:** Central capacity development and organize pilot projects and training through host, and engage project-based working group (at least 1 community technician per member);
- Year 2-3:** Society formalization - Vision, Goals, Objectives, and structure, set performance measures for strategy, negotiate mitigation program and establish trust fund;
- Years (5 -10):** (Trust fund comes on line?) Maintain sufficient projects to engage First Nations trainees, to engage in projects and regularly structured joint technical meetings. At least 1 annual meeting to track performance and maintain society business.

Table 3. Proposed schedule for implementation of coho habitat restoration strategy.

Development Year (<i>starting January 2009</i>)	1	2	3	4	5	6	7	8	9	10
Central capacity and project development										
Mobilize pilot projects and formal working group										
Formalize society and trust fund										
Regularized policy, technical and business committees										
Trust funding comes on-line										

6.4 Funding and Business Plan Elements

- Gateway funded local technicians and augmented with area project funding
- Centralized trust fund with 5-10 year building plan (i.e. DFO mitigation program partner)
- Baseline professional support from aggregate-oriented grants and contributions (i.e. AAROM application in for April 2009 funding)
- Project operations from mitigation, supplemented with grants and contributions (i.e. AAROM and Fraser Salmon and Watersheds Program - ongoing)

7 RECOMMENDED NEXT STEPS

The development of a comprehensive coho habitat restoration and enhancement implementation strategy for the lower Fraser River will follow from the establishment of a formal relationship among member First Nations that is articulated in a Memorandum of Understanding (MOU). The next steps in the development of this formal MOU and First Nations coalition should include:

1. A collaborative and formal relationship (i.e., coalition or society) should be sought between Musqueam, Tsawwassen, Tsleil-Waultuth, Katzie, Kwikwetlem, and Kwantlen First Nations with specific details on the roles and responsibilities described in a Memorandum of Understanding. MOU development should follow the steps outlined in Section 5.5.
2. The role and responsibilities of member First Nations that would be outlined in the MOU could include activities such as:
 - To collaborate among industry, government and NGO's to organize strategic outcomes, solicit and generate funding, identify and develop training and employment opportunities, and protect fishing rights;
 - To enable and advocate rehabilitation work, speed-up strategic organization and project development;
 - To build fisheries capacity with area First Nations by assisting with organization of projects, professional designs, and raising funds;
 - To involve First Nations and other governments in locally-run projects with partners to support bi-lateral objectives; and
 - To expand the coalition, over time, to include other First Nations within the lower Fraser River.
3. A Secretariat should be established comprised of representative(s) from each of the six founding First Nations to provide policy direction and to act as a unified voice when announcing a policy decision or promoting a specific initiative.
4. A Technical Advisory Committee should be established made up of First Nation representatives and technical specialists to guide the planning, survey, design, construction and monitoring activities under the habitat rehabilitation and enhancement program.
5. As projects require, invite and involve fisheries agencies such as DFO and BC Environment, as well as representatives from the province, regional districts, municipalities, cities, streamkeepers, non-government organizations, etc., as members on project-specific joint technical advisory committees.

Establishment of a formal MOU will facilitate First Nations organizations to come together with other concerned resource groups to identify and collaboratively discuss issues relating to coho populations and habitat in the lower Fraser River, and to develop a set of realistic and feasible recovery recommendations. To be feasible and effective in the long term, coho habitat restoration and enhancement activities will need to be innovative and creative by considering

traditional FN resource use and coho population status, as well as physical constraints within the lower Fraser associated with industrial development, channel maintenance for navigation, flood control, existing linear developments and other land uses in key river and riparian areas.

While the formal MOU is being negotiated and developed, there are a number of activities that member First Nations can undertake in the interim to capitalize on existing programs such as Gateway, Living Rivers Trust Fund, Pacific Salmon Commission, Fraser Salmon and Watersheds Program, etc. Member First Nations could act independently or in informal partnerships to implement activities relating to coho habitat restoration and enhancement projects. These recommended steps would follow the timetable outlined in Table 3 and would include individual First Nations and those within the informal partnership. The steps would involve:

1. Identifying FN needs and preferences concerning specific target project area(s), types of habitat restoration and enhancement projects, types of training and jobs, and level of involvement in planning, design, construction, and effectiveness monitoring;
2. Submitting proposals for coho habitat restoration and enhancement projects to existing programs that are mandated to fund or implement habitat projects; and
3. Organizing and implementing pilot habitat restoration and enhancement projects that include training, feasibility assessment, field surveys, planning and design, construction, and monitoring;

Overall, implementation of these recommendations will provide a strategy to facilitate collaboration amongst member First Nations and a framework for engaging other fisheries/resource sectors to discuss and resolve shared issues and concerns. These formal and informal working relationships will bring together First Nations, key conservation groups and fisheries agencies to develop meaningful solutions to the protection and recovery of lower Fraser River coho.

8 CONCEPTUAL DESIGNS FOR ENHANCEMENT AND REHABILITATION PROJECTS

As part of an earlier project, LGL Limited and Musqueam FN identified potential habitat enhancement and rehabilitation projects that could be implemented by one or more FNs and other partners in the lower Fraser River (Gaboury 2008). Conceptual enhancement or rehabilitation designs were prepared for those sites that would realize significant benefits to coho rearing and/or spawning habitats, and where implementation appeared feasible. The watercourses where rehabilitation / enhancement works were recommended included:

1. Bon Accord and East Bon Accord creeks,
2. Upper and Lower Brunette River, and
3. Ramsay Creek.

Potential tidal channel construction and enhancement sites that were recommended included:

1. Iona Island East,
2. McDonald Slough,
3. Manson Slough,
4. Surrey Bend, and
5. Wilson Farm.

A brief description of each project that includes a conceptual design, estimated channel length and habitat area improved, species and life stage benefiting, land ownership and potential partners in the project is presented below. These descriptions have been excerpted from Gaboury (2008). Where possible, modifications to the project descriptions and designs originally prepared in the report by Gaboury (2008) have been shown.

8.1 Bon Accord Creek

Opportunities for rehabilitation and enhancement in the Bon Accord watershed were described previously by Redden and Hickey (1994), Page and Millar (1997), and Coast River Environmental Services Ltd. (1997). More recently, rehabilitation and enhancement works in Bon Accord watershed have been proposed as compensation measures for South Fraser Perimeter Road construction (Coast River Environmental Services Ltd. 2006). The recommended high priority rehabilitation and enhancement projects are summarized in Figure 2 and included:

1. Remove the obstructions in Bon Accord and East Bon Accord creeks to increase access to productive fish habitat in the system. These projects entail:
 - a. Improving the flap gates at the mainstem mouth to ensure fish passage;
 - b. Removing the existing flume on the mainstem and constructing a meandering channel with pools, riffles and off-channel ponds;
 - c. Improving fish migration through the culvert on East Bon Accord at 116A Avenue;
 - d. Improving fish migration at the timber dam and culvert located at 1 km on the mainstem (Note: Before moving forward with this recommendation, discussions are required with Region two MOE staff who are concerned that removing the migration barrier may jeopardize the genetically isolated cutthroat trout stock inhabiting the upper reaches),
2. Design and implement instream complexing between 116A Avenue and Glenavon Drive in East Bon Accord Creek,
3. Create off-channel habitat for juvenile coho. The most suitable site is located in East Bon Accord Creek, immediately upstream of the sewer right-of-way. Other sites include areas proximal to 115A Avenue,
4. Implement bioengineering treatments along the channel to stabilize chronic erosion sites.

Removal of all fish impediments will allow access to a significant length of stream channel in the watershed currently suitable for salmon and trout spawning and rearing.

Channel re-construction of the 500 m flume section would create about 3350 m² of aquatic habitat area (Coast River Environmental Services Ltd. 2006). Spawning habitats in the re-constructed channel would be created by placing gravel on the upstream faces of constructed rock riffles. Logs and boulders will be placed in pool and glide habitats to enhance rearing habitat. These channel rehabilitation and enhancement measures would benefit primarily coho, cutthroat trout and rainbow trout rearing and spawning, and chum spawning.

It is expected that much of the proposed rehabilitation and enhancement works will be completed as habitat compensation projects under the auspices of the Gateway Program. Potential partners in the Bon Accord projects could include: Gateway Program, City of Surrey, Musqueam, Kwantlen and Kwikwetlem Indian Bands, Metro Vancouver, Canadian National Railway (CNR), MOE, Port Metro Vancouver, and DFO.

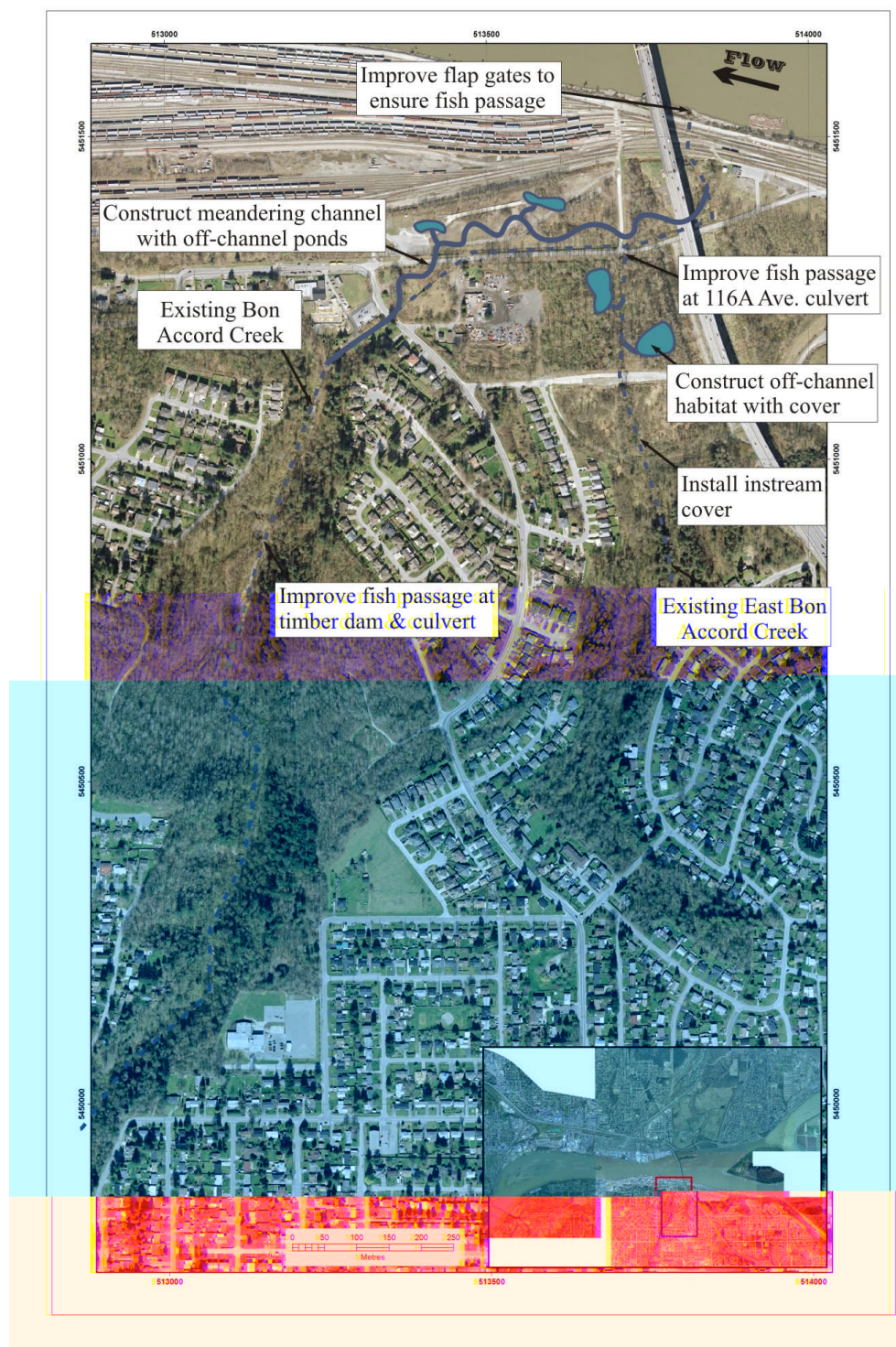


Figure 2. Conceptual habitat rehabilitation and enhancement designs for Bon Accord Creek watershed.

8.2 Brunette River

Conceptual enhancement designs were proposed by Gaboury (2008) for two locations in the Brunette River; between the river mouth and the Canfor Avenue crossing, and in the upper reaches between North Road and PTH 1. Proposed enhancement projects in the lower river included: 1) rebuilding the weir at the entrance to the floodway channel to ensure low to moderate discharges are confined to the historic channel; 2) improving instream rearing habitat in the historic channel by constructing log-boulder cover structures and creating defined pool-riffle habitats; and 3) constructing a tidal channel and pond near the mouth of the river (Figure 3).

As proposed by ECL Envirowest Consultants Limited (2003), the tidal channel could be constructed on soon-to-be decommissioned industrial lands. To ensure adequate water depth in the channel and pond for consistent fish rearing, the channel bed should be excavated about 0.3-0.5 m below low water level in the Fraser River. The shallow water depth in the channel will allow for most of the warmer water to be evacuated at low tide with cooler water (and juvenile fish such as Chinook) entering again at high tide (M. Foy DFO pers. comm.). Off-channel ponds should have pockets of deep water about 2 m below the river's low water level to provide primarily winter rearing habitat for coho. The length of the tidal channels would be 65 m with a channel area of 130 m² and a pond area of 1100 m². The tidal channel would create rearing and refuge habitat for a diversity of juvenile Fraser River fishes, including for example, Chinook, coho, chum, sockeye, steelhead, and cutthroat trout.

Preliminary enhancement and rehabilitation concepts were presented for the upper Brunette by Gaboury (2008). These concepts were subsequently refined by the Gateway Program into preliminary design drawings (Figure 4). The projects included: 1) in-filling two full-spanning concrete dams and constructing riffle structures with spawning platforms; 2) constructing three new weirs; 3) constructing a side channel and rearing ponds on the right and left banks; and 4) placing spawning gravel appropriate for coho and chum at the tail-outs of four constructed weirs. The constructed weirs will benefit Nooksack dace, and rearing salmonids. The side channels and ponds would primarily benefit coho, steelhead and cutthroat trout rearing.

Potential partners in the Brunette projects could include: Gateway Program, Sapperton Fish and Game Club, Metro Vancouver, Musqueam, Kwantlen, Kwikwetlem and Katzie Indian Bands, Port Metro Vancouver, and DFO.

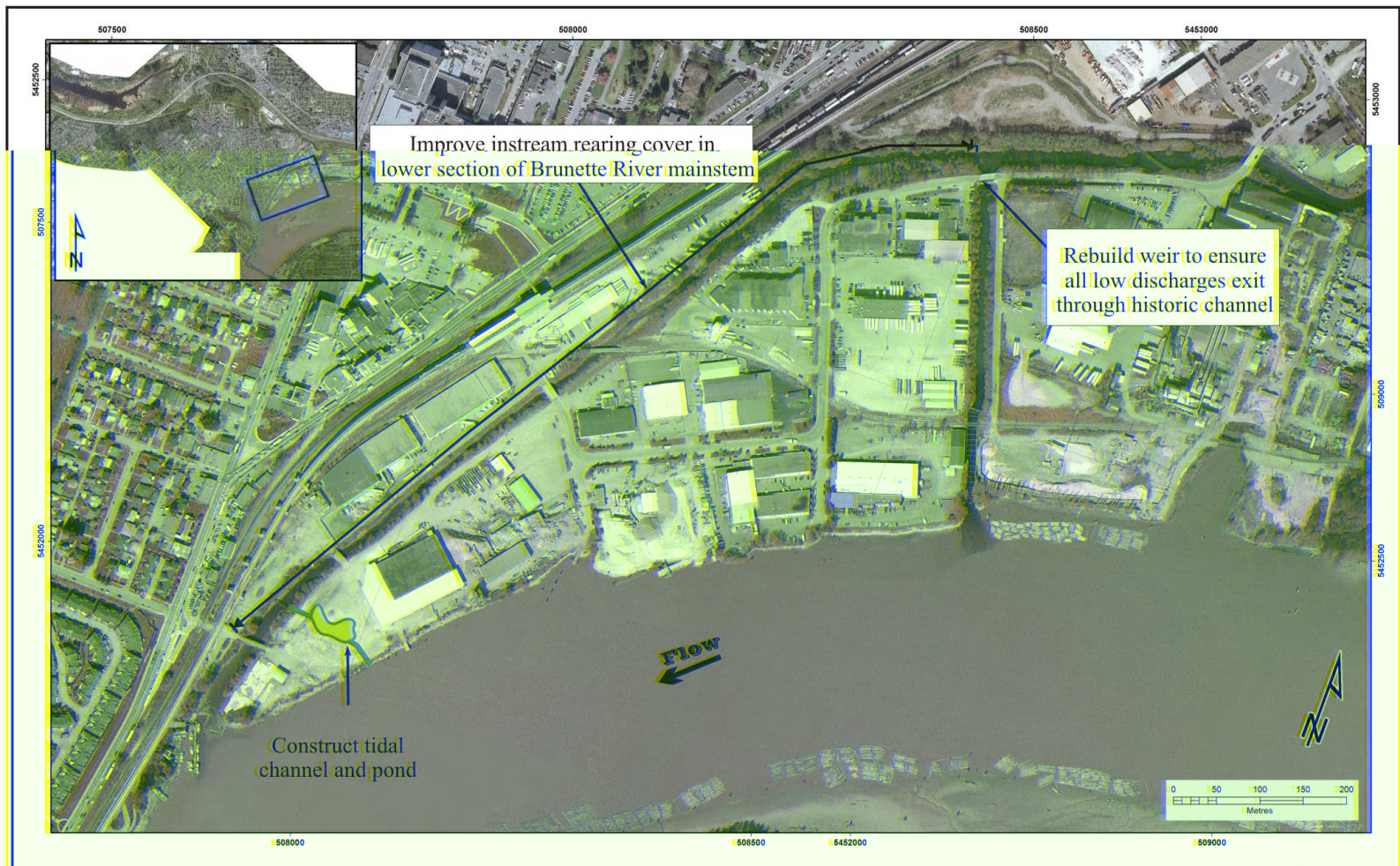


Figure 3. Conceptual habitat rehabilitation and enhancement designs for lower Brunette.

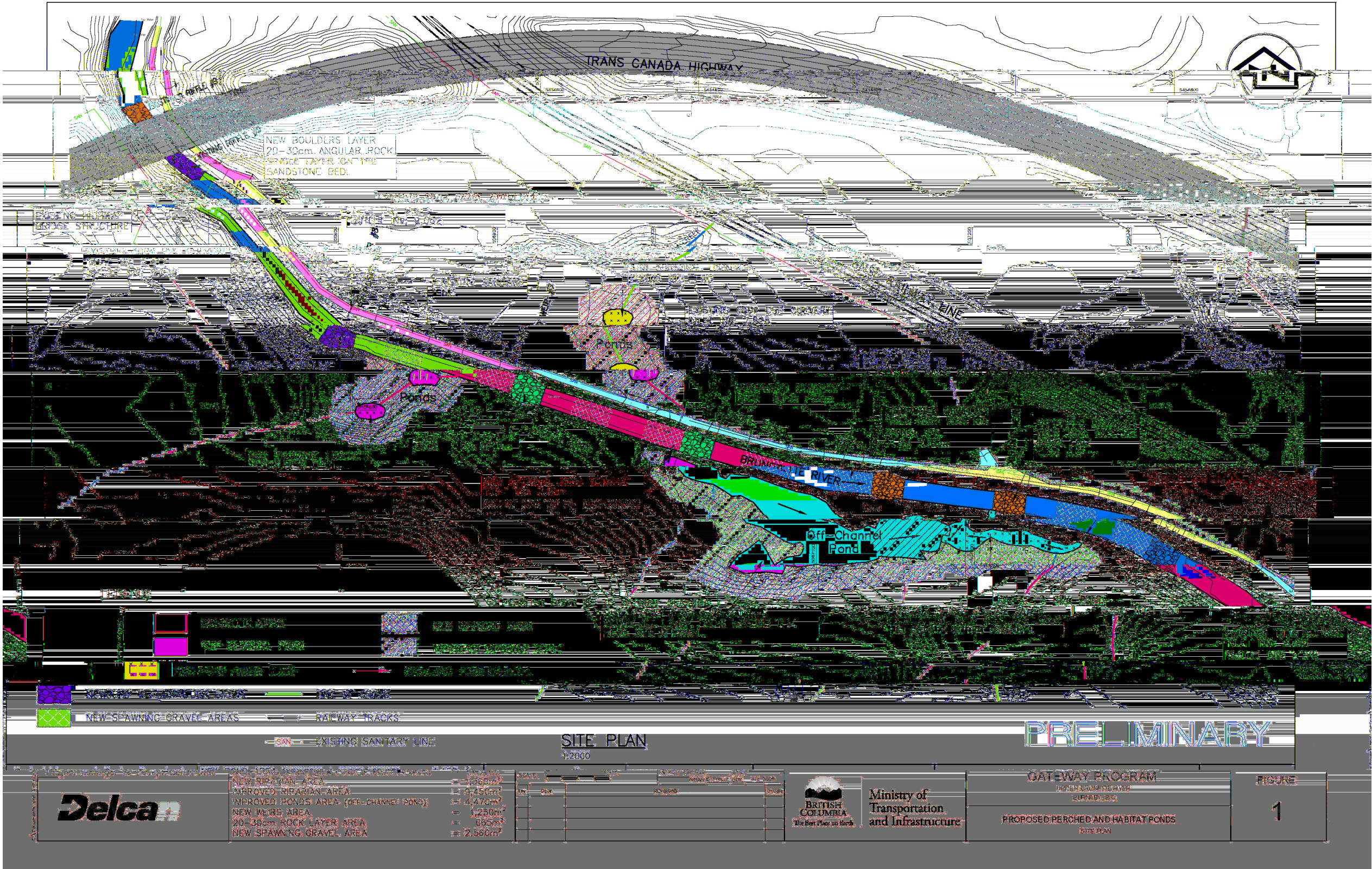


Figure 4. Conceptual habitat rehabilitation and enhancement designs for upper Brunette River.

8.3 Ramsay Creek

Conceptual enhancement designs were proposed for the lower section of Ramsay Creek. The proposed enhancement projects included: 1) re-constructing the existing channel with pools and riffles; and 2) constructing two off-channel ponds on the right bank of the creek.

Preliminary enhancement and rehabilitation concepts were presented for the upper Brunette by Gaboury (2008). These concepts were subsequently refined by the Gateway Program into preliminary design drawings (Figure 5). The reconstructed channel would be constructed with riffle-pool morphology and include spawning gravel placements on the upstream face of all riffles. Pools would have a residual water depth of 0.6-1 m. The existing channel is about 270 m long. The constructed channel would benefit coho and cutthroat trout rearing and spawning.

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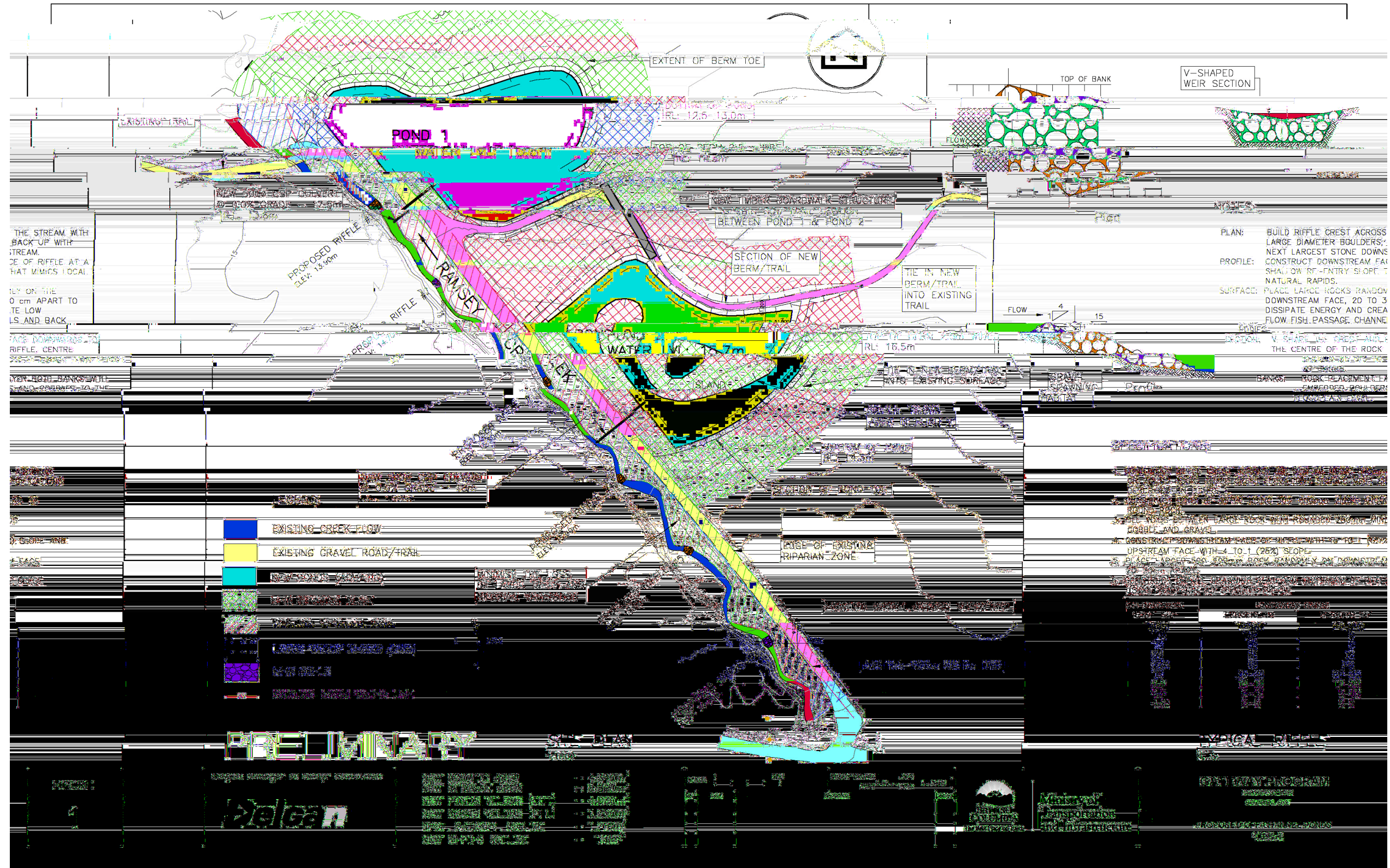


Figure 5. Preliminary drawing of habitat rehabilitation and enhancement designs for Ramsay Creek.

8.4 Iona Island East

A conceptual enhancement design was proposed that includes constructing a tidal channel and pond network at the east end of Iona Island (Figure 6). A tidal channel habitat improvement project was proposed for Iona Island East by ECL Envirowest Consultants Limited (2003). Their preliminary design proposed a bifurcated tidal channel that connected to McDonald Slough and was located east of a recently constructed DFO rearing channel. Most of the tidal channel project would be constructed within Iona Island Regional Park which is managed by Metro Vancouver Parks. The outlet of their proposed tidal channel and McDonald Slough itself lies within the head lease area of the North Fraser Port Authority.

A tidal channel was proposed by Gaboury (2008) in the same location as identified by ECL Envirowest Consultants Limited (2003). However, an in-channel pond connected to the tidal channel was also proposed by Gaboury (2008). The new channel could potentially be connected to the existing DFO channel. The channel bed should be about 0.3-0.5 m below low water level in McDonald Slough. The shallow water depth in the channel will allow for most of the warmer water to be evacuated at low tide with cooler water (and juvenile fish such as Chinook) entering again at high tide. Off-channel pond(s) should have pockets of deep water about 2 m below the river's low water level to provide primarily winter rearing habitat for coho. The length of the tidal channel would be 500 m with a channel area of about 1500 m² and a pond area of 900 m². The tidal channel would create rearing and refuge habitat for a diversity of juvenile Fraser River fishes, including for example, Chinook, coho, chum, sockeye, steelhead, and cutthroat trout.

Potential partners in the Iona Island East tidal channel project could include: Metro Vancouver Parks, Canfor, Transport Canada, Musqueam Indian Band, Port Metro Vancouver, and DFO.

8.5 McDonald Slough

A conceptual enhancement design was proposed for the causeway on the west side of McDonald Slough (Figure 6). Construction of the causeway in 1962 caused McDonald Slough to become blind-ended, denying direct access to Sturgeon Bank for downstream migrating juvenile salmon and reducing access to the North Arm of the Fraser River by upstream migrating adult salmon. The proposed project would breach the causeway with a bridge or large culvert(s) crossing to improve flows through the Slough and increase potential juvenile fish utilization and rearing habitat quality.

Hay and Company and Hatfield Consultants Limited (1995) conducted a feasibility study to determine, in part, if breaching the Iona Island causeway would improve hydrologic processes and biological function in McDonald Slough. They examined various design options and prepared cost estimates for each concept. Based on cost-effectiveness and construction flexibility, they recommended a conceptual design consisting of a 10 m wide box culvert to breach the causeway. They concluded that breaching would significantly rehabilitate historical hydrological processes to McDonald Slough which in turn would improve juvenile fish utilization and the quality of rearing habitats in the Slough. It was recognized that there would be greater utilization and migration by juvenile fish between Sturgeon Bank and the North Arm

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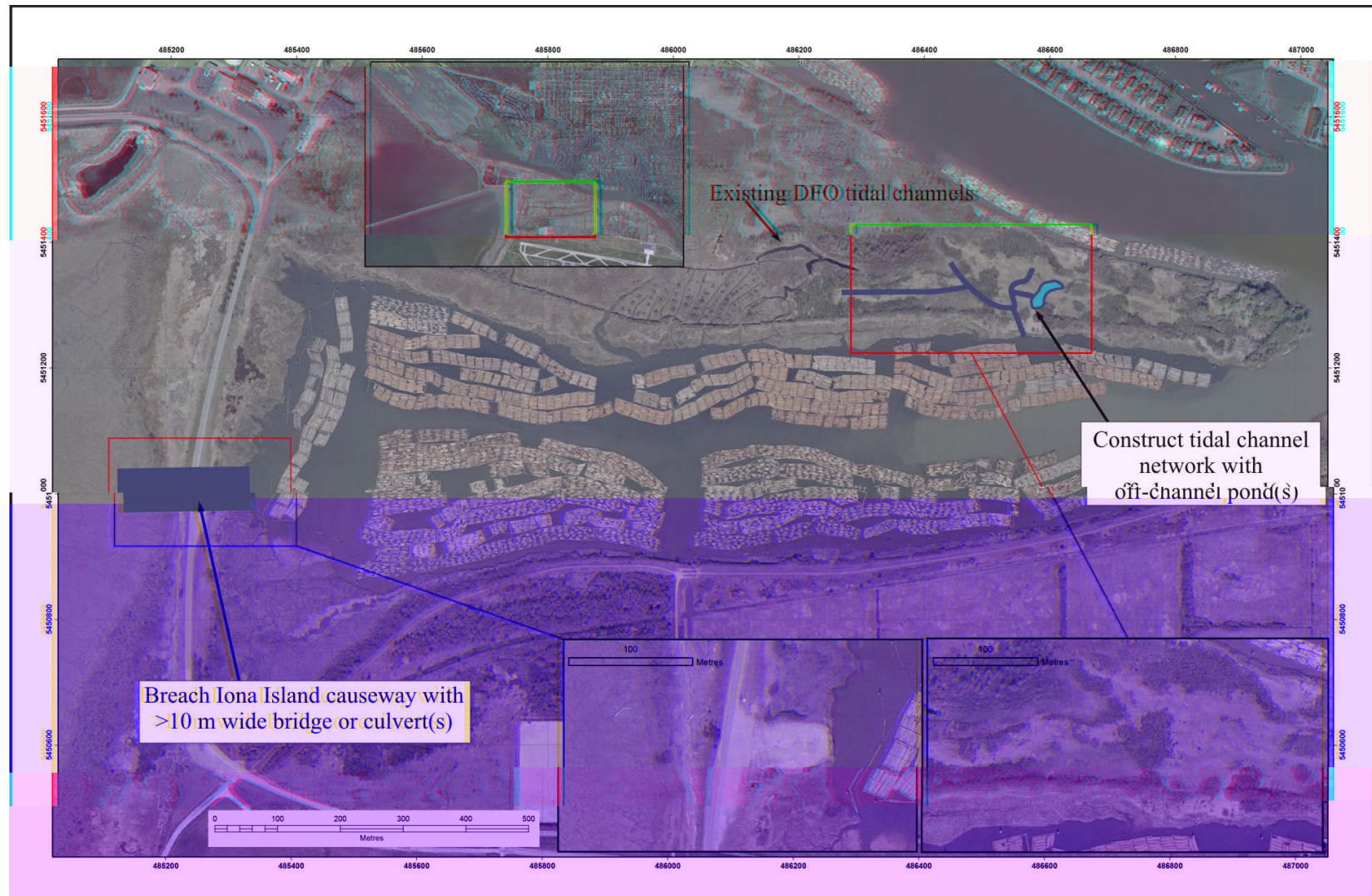


Figure 6. Conceptual habitat rehabilitation design for Iona Island East and McDonald Slough.

8.6 Manson Slough

Conceptual enhancement designs were proposed for the Manson Slough area by Gaboury (2008) (Figure 7) The enhancement project includes: 1) constructing a tidal channel and pond complex on the right bank of Manson Canal, and 2) widening and deepening the existing connection channel to the Fraser River on the upstream side of Manson Slough.

GL Williams and Associates and Northwest Hydraulic Consultants have recently refined the design for the tidal channel and pond complex for the Gateway Program. The proposed tidal channel and pond network is located in Tannery Park, which is managed by the City of Surrey Department of Parks, Recreation and Culture. The shallow water depth in the constructed channel would allow for most of the warmer water to be evacuated at low tide with cooler water (and juvenile fish such as Chinook) entering again at high tide.

The connection channel at the upstream end of the Slough is within the head lease area of the Port Metro Vancouver. The existing tidal channel should be dredged over a length of about 23 m to a minimum width of 20 m and about 0.8-1 m below low water level in the Fraser River. The wider connection channel would enhance flow exchange, sediment removal and transport through the Slough, reducing the accumulation of sands and silts in the Slough. Fish access to the Slough and Manson Canal from the Fraser River will also be enhanced.

The tidal channel projects would create rearing and refuge habitat for a diversity of juvenile Fraser River fishes, including for example, Chinook, coho, chum, sockeye, steelhead, and cutthroat trout. Potential partners in the Manson Slough projects could include: Gateway Program, City of Surrey, Musqueam Indian Band, Port Metro Vancouver, and DFO.

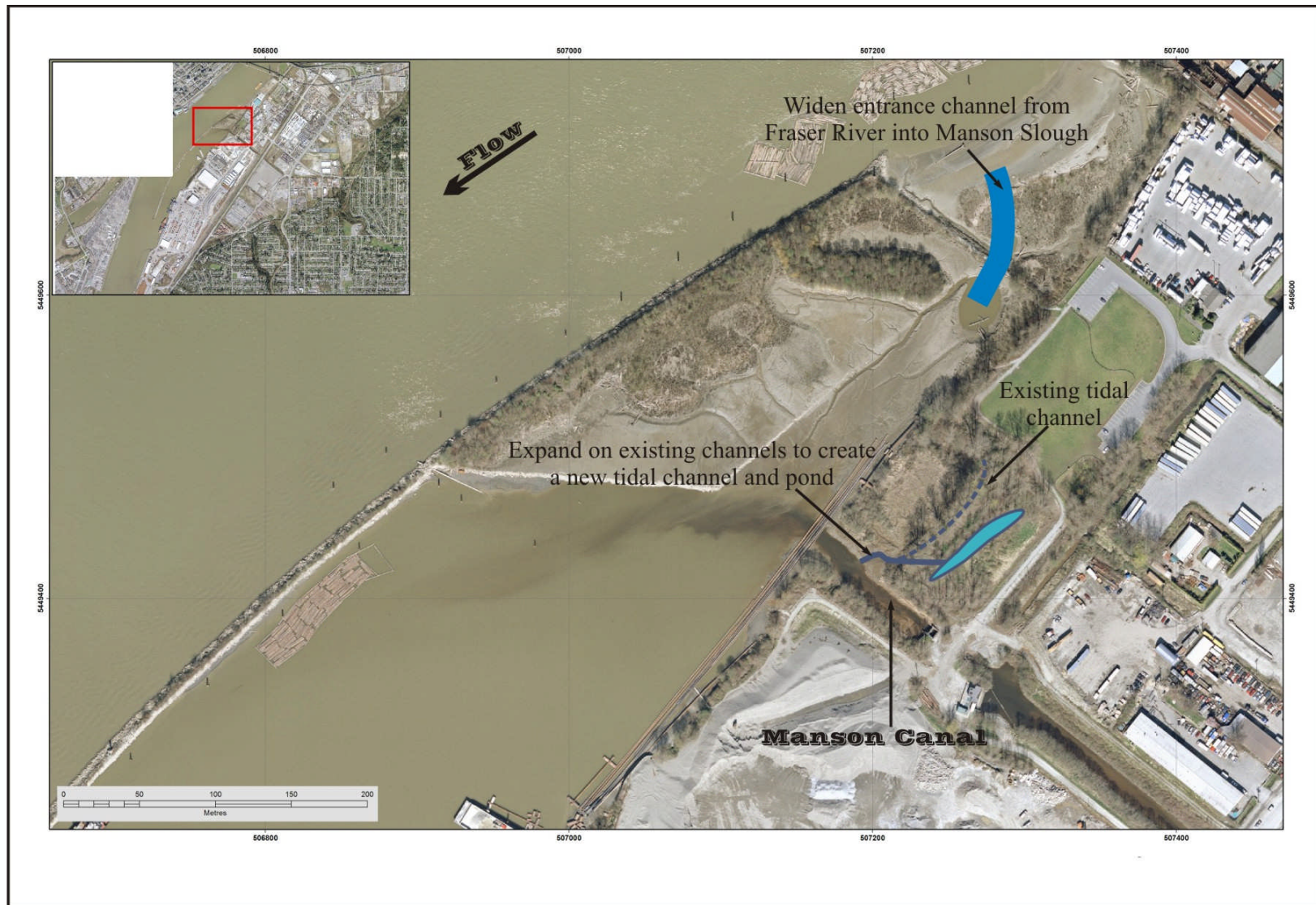


Figure 7. Revised conceptual habitat rehabilitation and enhancement designs for Manson Slough.

8.7 Surrey Bend

Conceptual enhancement designs were proposed for a man-made canal connected to Centre Creek within Surrey Bend (Figure 8). The lower tidal section of Centre Creek and the drainage canal to the east provide non-natal rearing habitat for chum, Chinook and sockeye fry and/or some smolts, and natal rearing habitat for coho (Levings et al. 1995). The proposed project enhances and expands on the existing tidally influenced habitat in the canal.

To ensure adequate water depth in the new channels and ponds for consistent fish rearing, the channel bed and ponds should be excavated about 0.3-0.5 m below low water level in the Fraser River. The shallow water depth in the channel will allow for most of the warmer water to be evacuated at low tide with cooler water (and juvenile fish such as Chinook) entering again at high tide. Off-channel ponds should have pockets of deep water about 2 m below the river's low water level to provide primarily winter rearing habitat for coho. The length of the new tidal channels would be about 1000 m with a channel area of 3000 m² and a pond area of about 6000 m². The tidal channels would enhance rearing and refuge habitat for a diversity of juvenile Fraser River fishes, including for example, Chinook, coho, chum, sockeye, steelhead, and cutthroat trout.

The proposed project is located within a Metro Vancouver Park. Potential partners in the Surrey Bend project could include: Metro Vancouver, Musqueam, Kwantlen, and Kwikwetlem Indian Bands, Port Metro Vancouver, and DFO.

8.8 Wilson Farm

A conceptual enhancement design was proposed for Wilson Farm, east of the lower Coquitlam River (Figure 9). Wilson Farm is owned and managed by Metro Vancouver. The proposed enhancement project included: 1) installing a self-regulating tidal gate at the mouth of the Wilson Farm drainage canals entering Coquitlam River to allow unimpeded fish migration and ensure flood protection; 2) constructing deep off-channel ponds near the downstream end of the existing perimeter drainage ditch; and 3) adding logs and rootwads to the ponds and channel to improve rearing cover.

To ensure adequate water depth and cool temperatures in the channel and ponds for consistent fish rearing, the channel bed should be about 0.3-0.5 m below low water level in the Coquitlam River. The shallow water depth in the channel will allow for most of the warmer water to be evacuated at low tide with cooler water (and juvenile fish such as Chinook) entering again at high tide. Off-channel ponds should have pockets of deep water about 2 m below the river's low water level to provide primarily winter rearing habitat for coho. The existing drainage ditches are about 4.8 km long with a channel area of about 9600 m². The length of new tidal channels would be about 600 m with a channel area of 1800 m² and a pond area of 5400 m². The tidal channel would create rearing and refuge habitat for a diversity of juvenile Coquitlam and Fraser River fishes, including for example, Chinook, coho, chum, sockeye, steelhead, and cutthroat trout. Potential partners in the Wilson Farm project could include: Gateway Program, Metro Vancouver, Kwikwetlem and Musqueam Indian Bands, North Fraser Salmon Assistance Project, Port Metro Vancouver, and DFO.

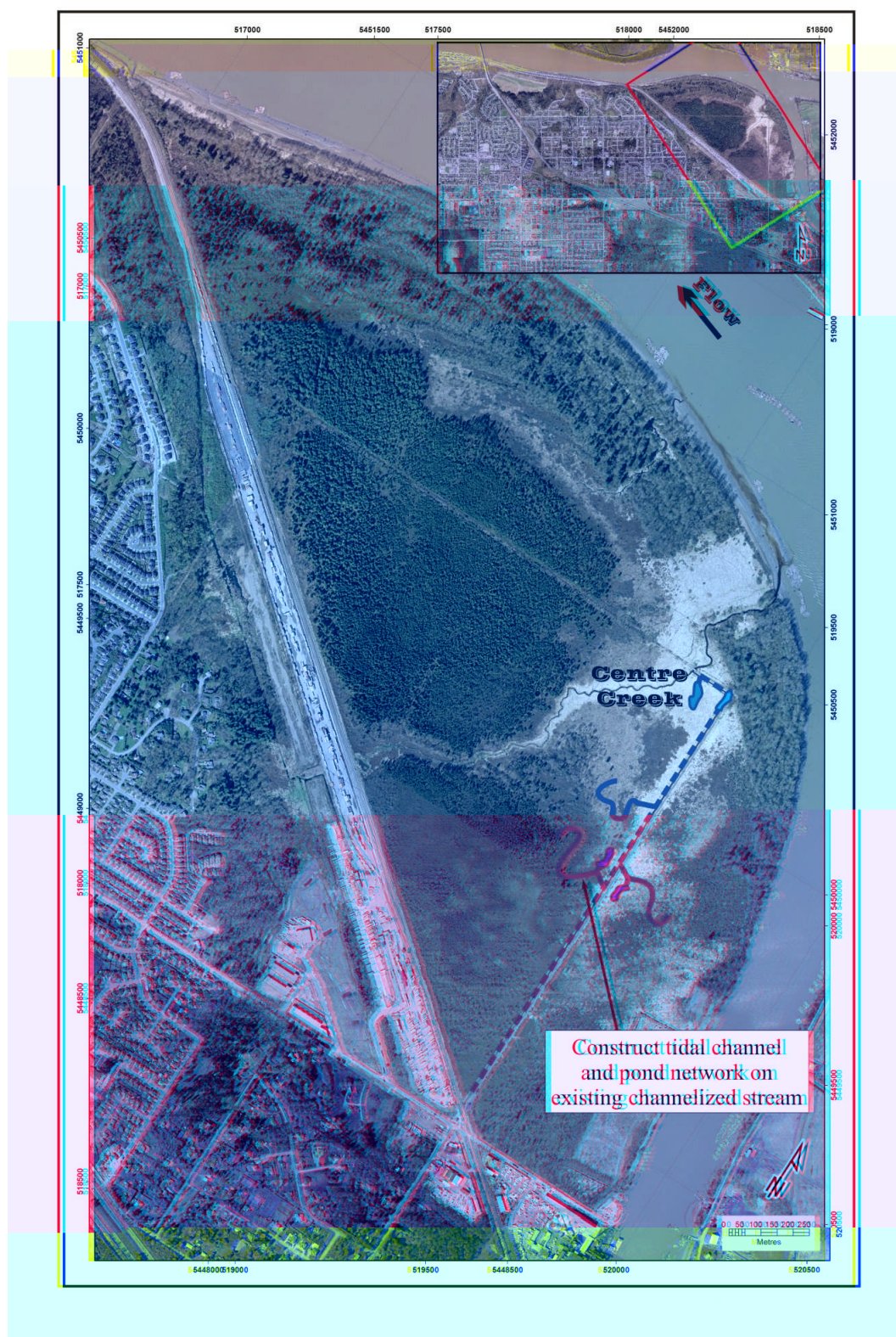


Figure 8. Conceptual habitat enhancement design for Surrey Bend.

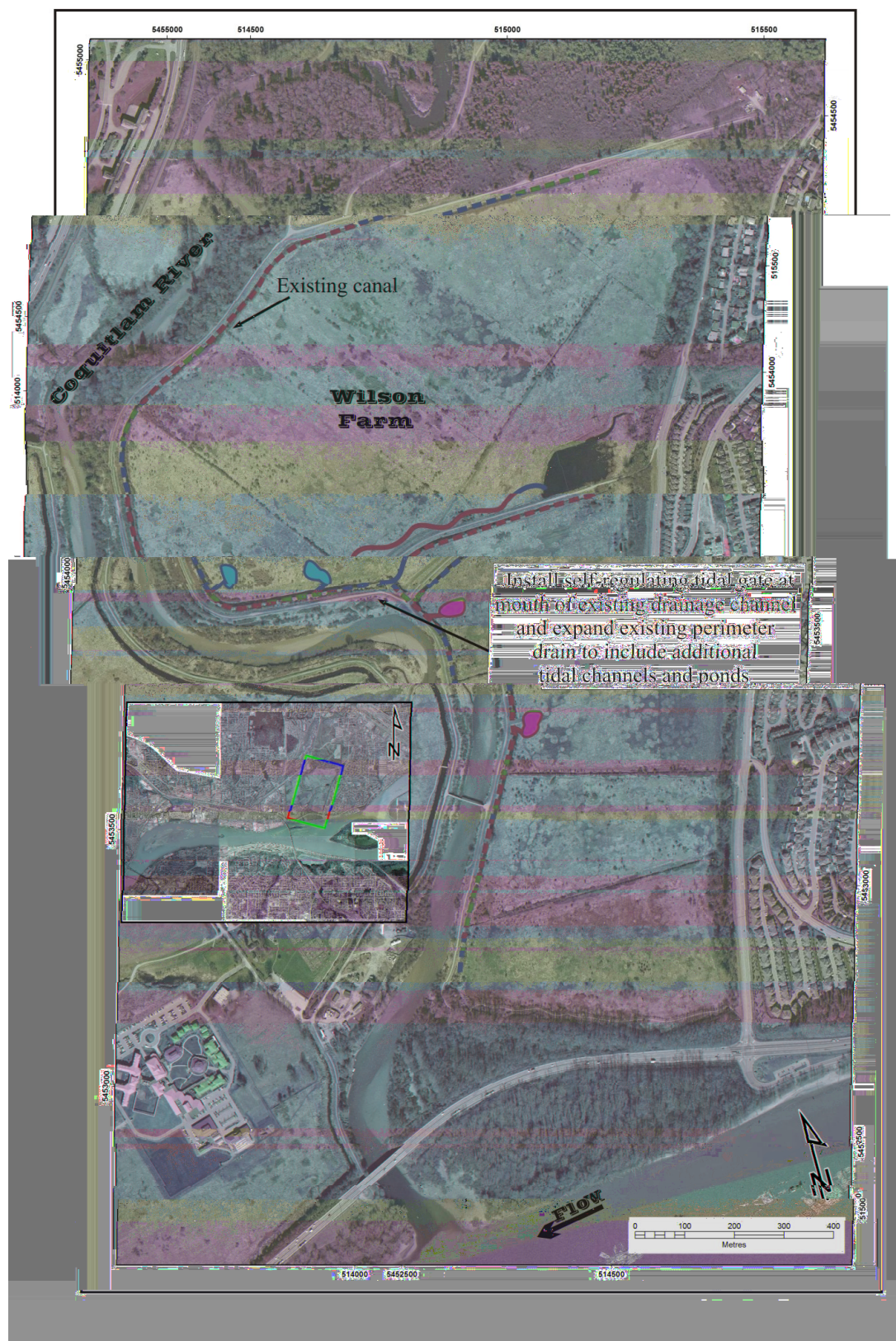


Figure 9. Conceptual habitat enhancement design for Wilson Farm.

9 ACKNOWLEDGMENTS

Several people participated in one way or another in the completion of this project. Firstly, we would like to thank all of the First Nations representatives that contributed their time and knowledge to develop the framework for an implementation strategy for coho habitat rehabilitation and enhancement. We would also like to thank Dave Moore (Fisheries Development Services; Kwantlen FN advisor) and Ruth Kenny (Tsawwassen FN) who prepared minutes for the roundtable meetings. Dave Moore also identified some clear options and priorities for development of a more formal FN coalition or society to administer the coho habitat rehabilitation and enhancement work. Jemma Scoble (Gateway Program) provided summary minutes on the proposed Gateway First Nations Fisheries Trust. Preliminary design drawings for upper Brunette River and Ramsay Creek were prepared by Stephen Fraser (Delcan). Kerry Stratton (LGL Limited) proofread and coordinated the production of this report. The support of all these individuals is greatly appreciated.

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