

# RESILIENT WATERS: MANAGING FLOODS FOR ALL

This report brings forward the recommendations and visions for managing floods in the lower Fraser River watershed. Managing floods is vital for the protection of homes, farms and businesses as well as ecological values so integral to creating liveable communities and healthy habitats.

Final Report

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- Deborah Carlson, staff lawyer, West Coast Environmental Law
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- Craig Orr, conservation advisor, Watershed Watch Salmon Society
- Dave Zehnder, project lead, Farmland Advantage

## Executive Summary

In June 2019, Watershed Watch Salmon Society (WWSS), under the direction of a steering committee, convened *Resilient Waters: Managing Floods for All*; a two-day meeting in Abbotsford.

The objectives of the workshop were to:

- foster shared learning and collaboration;
- begin developing a shared vision for future fish-friendly flood control infrastructure (FCI);
- discuss the challenges in upgrading outdated flood control infrastructure along the lower Fraser;
- collaborate in a multi-sector/agency environment to develop a comprehensive list of issues and actions, priorities and success indicators for future consideration and follow-up; and
- identify key criteria for prioritizing flood control structures and adjacent habitats for restoration.

Eighty people participated in the two-day session, with attendees from: federal, provincial, municipal and First Nation governments; Indigenous groups; academia; the agriculture sector; environmental non-governmental organizations; and technology designers.

The first day-and-a-half featured presentations and panel discussions covering: the basics of flood control infrastructure; an array of perspectives and issues around flood management; the economic and legal imperatives; and the need for integrated approaches. Examples of solutions and innovations in technology, process and governance were presented. The last half of day two was an Action Planning Workshop where participants dug deeper into solutions.

### Summary of Presentations

(Detailed notes and discussion can be found in Sections 2 to 4.)

#### Ecological, Indigenous, Local Governments and Legal Considerations

1. Ecological Considerations: Dr. Jonathan Moore (Simon Fraser University) provided an overview of the ecological importance and current state of waterways impacted by flood control infrastructure (FCI). He identified the need for a culture change. For example: if we perceive a flood-controlled waterway as being valuable fish habitat, we would then look for solutions to improve that system's ecological values.
2. First Nations Lands Governance and Flood Protection: Stephen McGlenn (First Nations Land Management) focused on the nature of Indigenous governing authority, and the various jurisdictional and environmental challenges and opportunities that arise from boundary-crossing issues such as flooding and climate.
3. Legal Considerations: Deborah Carlson (West Coast Environmental Law) identified limited protection for fish in federal and provincial environmental regulations and none in provincial flood regulations, and no coordinated regional planning or management for land and water. She stressed the importance of a collaborative approach to identify barriers, address jurisdictional limitations and cumulative effects, support United Nations Declaration on the Rights of Indigenous People (UNDRIP) commitments, broaden "solutions" space and improve efficiency of permitting processes.
4. Municipal Government Considerations: Carrie Baron (City of Surrey) spoke about the need to change legislation, develop sound and strategic land use plans that set barriers and priorities while addressing cumulative affects and the need for an informed approach and intense collaboration.

## **Understanding the Economics of Flood Control Infrastructure**

1. Economic Benefits of Green Infrastructure: Andrea Curley (Intact Center for Climate Adaptation) highlighted the growing cost of insurance claims and the need to build flood infrastructure that will be robust to the effects of climate change. She also addressed the need to build better, smarter, adaptable, greener flood infrastructure and the new guidelines and standards for flood resilience that have been created.
2. Funding Focus panel:
  - a. Disaster Risk Reduction Funding: Jesal Shah (Emergency Management B.C.) presented the plan to connect communities at risk with funding to protect against floods. The Province's Flood Safety Section is developing a provincial flood risk strategy to help prioritize jurisdictions in need of financial support for flood mitigation.
  - b. Greg Moy (Insurance Bureau of Canada) addressed the overall increased cost of flood insurance claims and the impact to Canadians. Of note, the Bureau is collaborating with research centers to study the issue and identify solutions.
  - c. Jason Lum (City of Chilliwack) spoke about the rolling back of funds and support from higher levels of government. He also addressed the opportunities for collaboration and building trust with local First Nations who are working to protect their reserve lands from flooding.
3. Funding Focus- Agriculture and the Environmental Farm Plan: Dave Melnychuk (Environmental Farm Plan) presented on the benefits of this provincial program in supporting farms to restore, enhance and conserve parts of their farm for different values, from biodiversity to managing for floods.

## **Solutions and Innovations**

Case Study on Working Towards Resilient Waterways: Colony Farm. Dr. Craig Orr (Watershed Watch Salmon Society and Kwikwetlem Nation) presented on a successful habitat restoration project on the floodplain of the Coquitlam and Fraser Rivers. He emphasized the importance of finding multiple benefits and ensuring project monitoring was thoroughly planned and executed.

Fish Friendly Innovations: Gerard Manshanden (Fish Flow Innovations) presented an array of innovative fish-friendly flood control solutions and green/grey infrastructure designs that his firm has implemented in the Netherlands and elsewhere.

## **Integrated Management**

1. Floodplains by Design: Bob Carey (The Nature Conservancy) provided insights and solutions from this successful habitat restoration and flood control program in Washington State. Collaboration and managing for multiple benefits were key themes.
2. Lower Mainland Flood Management Strategy: Steve Litke (Fraser Basin Council) presented on the strategy's aims to reduce flood risk and improve flood resilience of communities in the lower Fraser. The process is integrating environmental values into the strategy through an advisory committee, collation and sharing of best available data, and research on flood mitigation options.
3. Pacific Salmon Explorer: Charlotte Whitney (Pacific Salmon Foundation) presented on a new and innovative web-based data tool for management and decision making which could help support cost effective strategies for restoration. One of the goals of the project is to democratize data to enable systematic and transparent decision-making.
4. Priority Threat Management for Species at Risk: Dr. Tara Martin (University of British Columbia) discussed this decision-making tool that identifies the threat management strategies that will

recover the most species for the least cost. Her work has found significant chances of survival for all 102 species studied if robust recovery strategies are implemented immediately.

5. **Balancing Farms, Fish and Floods – Using Hydrodynamic Modeling and Other Models:** Polly Hicks (National Oceanic and Atmospheric Administration) stressed the importance of trying to meet multiple interests, being transparent in process and building strong relationships. She co-led the development of the Skagit Hydrodynamic Model Project (HDM) which used an alternative analysis to prioritize a suite of projects that improve the identified values.
6. **Farmland Advantage:** Dave Zehnder discussed the benefits of a ‘payment for ecosystem services’ program to support farmers in managing their land in a sustainable way. This is an opportunity to move from grey towards green infrastructure solutions that support multiple benefits and stakeholders.

## **Action Planning Workshop – Top Recommendations by Issue Theme**

### **1. Governance and Regulations**

- a. Create a First Nations led governance body or process with decision makers/political leadership from all orders of government similar to Washington State’s [Floodplains by Design](#) or the Dutch Waterboards.
- b. Ensure Department of Fisheries and Oceans (DFO) participation.
- c. Identify relevant partners to be at the table to create multi-benefit approaches.
- d. Consider the issue through the lens of a climate change emergency.

### **2. Innovations**

- a. Blend existing technologies with new solutions. Incorporate fish-friendly technologies, living dikes, wetland treatments and unidirectional pumps into flood planning.
- b. Create an information sharing platform to support staff and decision makers in identifying best management practices, tools, and green infrastructure opportunities.
- c. Innovative assessment tool: priority threat management.
- d. Create more spaces like this meeting with diverse conservations and points of view and opportunities to address challenging issues.

### **3. Research and Monitoring**

- a. Pre- and post-project monitoring should become a requirement and the results must be made publicly available.
- b. Determine the carrying capacity of these habitats for specific species (e.g., Chinook).
- c. Create best management practices for newer, greener technologies.

### **4. Funding**

- a. Bring back stable, non-grant-based funding for infrastructure and restoration works.
- b. Explore green bonds to fund works.
- c. Create cooperative joint funding opportunities amongst local governments.
- d. Funds need to be managed by a convener who can plan and direct at the regional level.
- e. Build environmental considerations into funding criteria.

### **5. Planning and Prioritization**

- a. Identify the values and how to prioritize: fisheries, habitat carrying capacity, urgency, species at risk, UNDRIP, Free and Prior Informed Consent (FPIC), etc.
- b. Identify shared values (and multiple benefits) between: First Nations, farmers, local government and environmental needs.
- c. Consider creating a community-to-community forum.

### **6. Farmland Advantage**

- a. Farmland Advantage, as a payment for ecological services program, could support farmers who change their land use practices to better support the overall health of local waterways.

- b. There is strong programmatic support for Farmland Advantage for its many benefits including ability to prevent flooding and support communities during floods.
- c. Ideally the program would be provincially coordinated but regionally delivered in partnership with the Province and Investment Agriculture Foundation of B.C.
- d. Important to identify and confirm funding path to ensure program success.
- e. There is agreement on a 10-year initial program timeline.

### **Follow-up and Next Steps**

The purpose of this report is to jumpstart opportunities for collaboration and identify collective priorities and solutions. This report will help those involved in flood management and ecological restoration identify where they fit or have a role – be it leadership or supportive – to push various aspects of this issue forward. For our part, the next phase of the Connected Waters initiative will be guided by the recommendations of this meeting. The Action Planning Workshop consistently brought up specific long and short term goals which we will seek collaborative action towards.

On behalf of the Steering Committee, we thank all of the participants and look forward to working together to improve flood resilience and ecological connectivity in the lower mainland.

### **Steering Committee Members:**

- Shayla Walker and Trevor Loke, Tides Canada
- Aaron Hill, Lina Azeez and Meghan Rooney, Watershed Watch Salmon Society
- Jeanne Hughes, Lower Fraser Fisheries Alliance
- Gillian Fuss, First Nations Emergency Management Secretariat
- Dave Zehnder, Farmland Advantage
- Jonathan Moore and Laurie Wood, Simon Fraser University
- Laura Dupont, City Councillor Port Coquitlam
- Jason Lum, City Councillor Chilliwack
- Marcel Shepert, Facilitator



## 1.0 Overview of Agenda, Meeting Process, Global Café, and Reporting

The first day-and-a-half of the meeting included a mix of presentations and panel discussions with time for questions and answers. It began with an overview of what flood control infrastructure is, and moved to differing perspectives, challenges and issues with flood control structures, addressed the economic and legal imperatives, as well as the need for integrated approaches and finally discussed some examples of solutions. The last half of day two was structured to allow participants to dig deeper into what they had learned by using a global café style approach with the use of the ORID method (Objective, Reflective, Interpretive, and Decisional) to answer questions around key topic areas.

Staff and volunteers from Watershed Watch Salmon Society facilitated the small group discussions and took detailed notes to track participant ideas and concerns. Each small group discussion centered on key questions introduced by presenters. This report summarizes all the presentations, plenary discussions and highlights the main recommendations of the global café discussions to try to identify the most important next steps needs to move the needle on this issue.

See [Appendix A](#) for the meeting agenda.

### 1.1 Overview of Participants

Eighty people participated in the two-day session. Attendees represented federal, provincial, and municipal and First Nation governments, Indigenous groups, academia, agriculture, environmental non-governmental organizations, and high technology designers. This also included WWSS staff and volunteers present to support the meeting (presenters, small group facilitators, and note takers) and the 8-member Steering Committee.

See [Appendix B](#) for the list of organizations / groups represented at the meeting.

### 1.2 Participant Questions or Concerns to Presenters

Throughout the session, participants had the opportunity to ask questions and seek clarifications directly from the speakers, presenters and panelists. In order to assist participants, all relevant concerns and issues were tracked in real time in PowerPoint on a screen for all participants to see. The tracking of issues in real time allowed the facilitator to check in with participants to ensure the issues were framed correctly. Speakers answered questions in plenary, as time permitted. These responses are included within the relevant section of this report.

[Appendix C](#) includes the issue tracker shared in plenary.

[Appendix D](#) includes the full discussion including all other questions submitted from individuals throughout the day.

### 1.3 The Global Café Action Planning Workshop

The last half of day two was dedicated to an in-depth workshop session. The format was set up as a global café. The global café was structured along thematic lines. A total of six themes were chosen as follows: Governance and Regulation, Innovation, Research and Monitoring, Funding, Planning and Prioritization, Farmland Advantage. There were four 20-minute rounds conducted which allowed participants to explore four of the six themes. Many ideas/solutions were generated in these sessions.

[Appendix E](#) contains the full record of outputs from the global café.

## 2.0 Setting the Stage: Flood Control Infrastructure 101

### 2.1 Ecological, Indigenous, Local Governments, and Legal Considerations

The first half of day one was specifically designed to bring all participants to the same starting point and ensure there was a common understanding of what the current flood management regime is and what it is supposed to achieve, and what issues and concerns are presently at play. The first presentation was a snapshot of the current infrastructure in the lower Fraser River area, from Hope to the Salish Sea. This was followed by four different perspectives on the current flood control infrastructure: ecological, indigenous, legal, and local governments. Presenters were given 20 minutes to present followed by five to 10 minutes of questions and a panel discussion.

#### 2.1.1 Ecological Consideration

Dr. Jonathan Moore, professor, Resource and Environmental Management, Simon Fraser University, provided an overview of how the annual flood cycle supports the life cycles of native fish such as salmon and the current ecological state of flood control infrastructure in the lower mainland. He discussed the anatomy of floods and recent research showing impacts of flood infrastructure on fish passage and aquatic habitats.

The presentation identified the following issues and concerns:

1. There are a variety of gate types, sizes, and designs. Gates may differ in behaviour depending on tidal influence and ability to freely open. A study found most gates opened less than 10% of the day
2. Waterways with reduced connection had 2.5 times less salmon and three times more non-native fish
3. Continued hardening of the Fraser River riparian zone will continue to have negative ecological impacts
4. Consequences:
  - Hypoxia (lack of oxygen)
  - Invasive species
  - Reduction of native fish biodiversity
  - Reduced upstream salmon refuge
  - Blocked fish passage to access fish habitats

#### 2.1.2 First Nations Lands Governance and Flood Protection

Stephen McGlenn, specialist, Curriculum Delivery and Planning, First Nations Land Management Resource Centre, provided an overview of the Framework Agreement on First Nations Lands Management (“the Framework Agreement”), a sectoral self-government initiative that many of the Stó:lō communities are utilizing to resume authority over their lands and resources. His presentation focused on the nature of indigenous governing authority under the Framework Agreement, and the various jurisdictional and environmental challenges and opportunities that arise from boundary crossing issues such as flooding and climate. Examples were provided of First Nations leading the way on flood protection, climate resilience and collaborative governance initiatives. The key issues identified were as follows:

1. Indigenous people have a constitutionally recognized right to self-government, and their governing authority exists both within and outside the Canadian Constitution. This places indigenous communities in a unique position in that they operate at and exercise authority that parallels all levels of government, including Federal, Provincial and local/regional.

2. The Framework Agreement on First Nation Lands Management, and its corresponding enacting Federal legislation (the First Nation Lands Management Act) is a means by which Canada can recognize, but not delegate, indigenous governing authority over on-reserve lands and resources. It does not address issues of aboriginal rights and title off-reserve, which remain largely unaddressed in B.C. and where many flood protection projects take place that impact indigenous interests (e.g., fishing sites).
3. Many Stó:lō communities are developmental or operational under the Framework Agreement, while some remain under the Indian Act, and others are self-governing via modern day Treaties. Whatever lands governance regime a community falls under, it is vital that they are treated as legitimate governments and included in any decision-making that has the potential to affect their rights and interests, whether on or off reserve.
4. Under the Framework Agreement, First Nations have a recognized law-making authority. Many communities are working to create Environmental Assessment, Environmental Protection and Flood Protection laws to deal with flooding and other environmental issues. Under the Framework Agreement, First Nations are required to meet or beat Federal and Provincial environmental standards.
5. The UNDRIP is an international human rights instrument that represents the minimum standards for the survival, dignity and well-being of indigenous people.
6. Historically, the solutions to climate change and flooding have been just as damaging to indigenous rights as the problems they were meant to address. Meaningful protocols, agreements and planning processes with Indigenous communities must be developed in accordance with UNDRIP, and in recognition of Indigenous jurisdiction, so that communities are included in the conception, design and implementation of climate adaptation and flood mitigation projects. Such agreements, protocols, and processes should be collaborative in nature, based on a mutual recognition of authority, establish a clear vision and a relationships at both political and technical levels, set out priorities and intended outcomes, and contain conflict resolution mechanisms.

### 2.1.3 Legal Considerations

Deborah Carlson, staff lawyer, West Coast Environmental Law provided a legal geography and jurisdictional perspective including the opportunities to incorporate Indigenous law and a reminder about the limitations of existing Canadian (federal, provincial, local) law when it comes to flood control infrastructure, as well as challenges around funding and permitting. Key points included:

1. One way of approaching reconciliation is through the weaving together of legal systems.
2. UNDRIP and indigenous sovereignty are a key part of any legal discussion about land and water, including flood control.
3. We can use a legal geography lens for the lower Fraser; relationship between space, place, time, and law. How can we restore ecological function in this region and manage together for the future?
4. Fisheries Act is not site specific, and its general provisions provide only limited environmental protection in relation to flood control infrastructure. The law is reactive, and its focus is on not making things worse rather than on making things better.
5. Local land use planning and regulation context is important – development pressures in the floodplain are ongoing, and lead to further needs for flood control by local governments and communities.
6. Overall there is limited protection for fish in federal and provincial environmental regulations (Water Sustainability Act) and none in provincial flood regulations, and no coordinated regional planning/management for the environment—this is the opportunity.

7. A collaborative approach can identify barriers, address jurisdictional limitations and cumulative effects, support UNDRIP commitments, broaden “solutions” space and improve efficiency of permitting processes.
8. Discussed the challenge of fitting projects into funding criteria for funders and how to improve the design of funding programs from the perspective of encouraging innovation and needs of nature-based approaches to flood management.

#### 2.1.4 Municipal Government Considerations

Carrie Baron, drainage manager, City of Surrey presented on her experience working for the municipality of Surrey which has done extensive work around flood control. She spoke about the ongoing pressure to build on floodplains and to reduce the Agriculture Land Reserve in order to build more homes and businesses. Carrie spoke about the need to change legislation, develop sound and strategic land use plans that set barriers and priorities while addressing cumulative effects; the need for an informed approach and intense collaboration. Other aspects addressed included:

1. Plan for environmentally sensitive maintenance along waterways
2. Find opportunities to integrate environmental values into adaptation
3. Identify and address challenges in implementing flood protection measures
4. Have a plan to measure success
5. Find (create) a way to share success stories with other municipalities

#### 2.1.5 Expert Panel

After setting the stage, each of the previous presenters were asked to come back up to the front to sit on a panel to discuss further and answer questions from participants. The idea was to dig a little deeper into some of the issues identified earlier. The following are the questions and the responses from the panelists:

1. Where do we go from here?
  - Learn from the bright spots by identifying where and what people are already doing and build on them
  - Connect Nations to the experts and build the network and capacity
  - Amend the Local Government Associations to allow for First Nation involvement
  - Implement UNDRIP at all levels
  - Keep an open mind
  - Support pilot projects (e.g., Living Dikes)
  - Integrate research into policy
2. How to overcome legislation?
  - Be willing to take a chance
  - Be opportunistic in updating and changing legislation
  - Have regulation in place, that can be enforced on reserve
3. How do we bring those resisting change to the table?
  - Improve best practices and be cognizant of each other’s needs
4. Is there an opportunity for high level collaboration?
  - It has happened in the past and it can happen again e.g., Fraser River Estuary Management Plan
  - We need to return to models of working together from the start
  - Need resourcing for First Nations to participate
  - Identifying opportunities by connecting with people
5. How do we protect the wetlands?
  - Explore new and innovative ways to fortify and protect the wetlands

- Collaborate with Ducks Unlimited and work on identified projects with specially allocated funding

## 3.0 Understanding the Economics of Flood Control Infrastructure

### 3.1 Economics and Funding

This segment of the agenda focused on the economics and access, or lack thereof, of funding for green infrastructure projects. It also speaks to the absolute necessity for regional coordination and collaboration in order to set priorities and seek funding to coordinate and achieve common goals.

#### 3.1.1 Economic Benefits of Green Infrastructure

Andrea Curley, Manager, Intact Centre for Climate Adaptation talked about the growing cost of insurance claims and the need to build infrastructure that recognizes the changing climate and the need to build better, smarter, adaptable, greener infrastructure. Andrea identified that, for every \$1 of insurable loss, the homeowner receives \$3 - \$4, therefore the true depiction of economic loss is not reflected in insurable claims. She made the following points and gave a few examples of green infrastructure projects:

1. There are insurance companies that recognize the value in having flood resilient homes and communities. Insurance companies and banks have come forward and stated that if homeowners make proactive changes to their properties in order to decrease their possibility of a flooded basement (e.g., installing a backwater valve, grading their properties away from the home so that they do not accumulate water by the property, disconnecting downspouts and putting them above ground, away from the property), then they are willing to give financial incentives on their insurance.
2. Incentivise were possible. If homeowners are able to prevent flooding within their homes, by doing simple actions, there would be less threat of mortgage arrears as there would be no additional financial stress after a flooded basement, as a flooded basement costs an average of \$40,000.
3. Municipalities need to be combating Canada's rising flood costs. The costs to governments, businesses and individuals are three to four times more than that of private insurers.
4. There are benefits to consider between repairing grey infrastructure versus rebuilding with natural infrastructure.
5. New [guidelines and standards](#) for flood-resilience have been created
6. Key finding from study assessing the value of natural infrastructure: it can be a strong complement to grey (built) infrastructure for climate adaptation, but it is essential to quantify its total economic value for an informed investment analysis.
  - a. Natural ponds in Gibsons, B.C. provided \$3.5-4M of stormwater storage services
  - b. Engineered wetland in Manitoba values at \$3.7M for flood reduction, water quality improvement, etc.
  - c. Natural wetlands in Waterloo, ON reduced damage costs by \$51M

#### 3.1.2 Funding Focus: local governments (panel)

## Disaster Risk Reduction Funding

Jesal Shah, director, Disaster Mitigation Unit, Emergency Management B.C. (EMBC) discussed the critical funding issue, particularly for local governments. He spoke about the engagement EMBC participated in including communication through the Union of B.C. Municipalities (UBCM), regional workshops, and direct communications with communities facing significant flood risk. Jesal also spoke about the need for priorities and to prioritize. To address this need the Province's Flood Safety Section is developing a provincial flood risk strategy, which is expected to be completed in 2022. This strategy will help prioritize jurisdictions in need of financial support for flood mitigation. Other points made were as follows:

1. Purpose: to increase resiliency in B.C. and connect with funding
2. Flood Mitigation Funding Programs
  - Guidelines needed to support fish-friendly practices
  - First Nation Adapt Program, managed by Indigenous Services Canada (ISC) and many more
  - [Visit website for full list](#)
3. Acknowledged the value of incorporating fish-friendliness as criteria into funding guidelines

### **Insurance Bureau of Canada**

Greg Moy, manager, Government Relations, Insurance Bureau of Canada addressed the overall increased cost of flood insurance claims and the impact to Canadians in general. He brought an interesting perspective to this issue from a sector we generally do not hear from when it comes to considering green infrastructure and environmental values, however, the insurance sector is becoming increasingly concerned about the rising costs of climate change. He made the following points:

1. It is integral to build for flood resilience
2. In 2021, weather costs are estimated at \$900M with 75% of those costs coming from flooding
3. Collaborating with research centers to study the issue and identify solutions:
  - Raise consumer awareness; prioritize infrastructure investment, land use planning and natural infrastructure
  - Limit impact of extreme flooding through building natural infrastructure
  - Follow the 'build back better' concept

### **City of Chilliwack**

Jason Lum, councillor, City of Chilliwack spoke about the many years spent reaching out to address this important issue but since 1997 there has been a retraction of support and funding. Also, municipalities have only one source of revenue, that being municipal taxes and with so many demands flood control infrastructure tends to fall down the priority list. Other important points were as follows:

1. The property tax system is inadequate to raising funds for flood mitigation
2. Municipalities should protect infrastructure in collaboration with First Nation communities
3. Higher orders of government need to step up in terms of funding for infrastructure
4. Importance of working regionally
5. The more collaborators the better

#### **3.1.3 Funding Focus – Agriculture, Environmental Farm Plan**

David Melnychuk, advisor, Environmental Farm Plan, presented on this provincial program and its benefits. These are designed to enhance natural resources and reduce the possibility of harm to soil, water, and biodiversity values. It is a free, confidential, and voluntary process available to producers to identify both environmental strengths and potential risks, including flooding. The following points were discussed:

1. Environmental Farm Plan has certified over 5000 farms and ranches with over \$25M invested in on-farm projects such as:
  - Riparian fencing

- Improved stream crossing
  - Manure land application
  - Off stream watering
2. Bertrand Creek in Langley was identified as a great example of a waterway being improved by farmer participation

## 4.0 Solutions and Innovations

### 4.1 Moving Toward Practical and Real Solutions

The last two presentations from day one and the remaining agenda items on the morning of day two were dedicated to solutions. Many interesting solutions were shared and covered a wide array of aspects from financing to engineering innovations, outreach and partnerships, to democratizing data leading to better collaboration.

#### 4.1.1 Case Study on Working Towards Resilient Waterways: Colony Farm

Dr. Craig Orr, advisor to Watershed Watch Salmon Society, presented on the Colony Farm habitat restoration project in Coquitlam. It was a good example of an opportunistic project that addressed multiple benefits and made the following points:

1. Integral to find those synergies
2. Important to monitor projects to understand how they are working and if they are successful
3. Strong political support is key

#### 4.1.2 Fish Friendly Innovations

Gerard Manshanden, CEO, Fish Friendly Innovations, presented on the latest technology and innovations being designed by this Dutch company. The organizers were clear that they were not endorsing this company but wanted to highlight some of the excellent innovations in water pumps that do no harm to fish. This was relevant since many of the pumps in the lower Fraser area are not fish-friendly and are in need of replacement. The pumps presented were part of the grey-green infrastructure solutions to protecting and providing access to safe refuge for migrating salmon and other fish species in the lower Fraser river.

### 4.2 Integrated Management

#### 4.2.1 Floodplains by Design

Bob Carey, director, Strategic Partnerships, The Nature Conservancy (TNC) provided key insights and solutions from Washington State, U.S.A. Bob reminded us of just how important natural waterways are and how over time we have altered natural watercourses in the interest of urban expansion and agriculture not fish or people. Bob gave numerous examples of work currently being conducted and/or underway in Washington. Some of the examples and solutions were as follows:

1. Floodplains by Design
  - Focus on changing the floodplain management paradigm in Washington state
  - Multi-benefit projects across multiple sectors
  - Public-private partnership
  - The program provides funding, convening, advocate and communicate
  - The program also supports integrated planning and project development while enabling workshops, trainings and learning networks
2. The program provides a number of benefits:
  - More partnerships and collaborations

- More funding
  - More political support
  - Working at larger scale
  - Seeing fewer obstacles
  - Embrace values and goals of other partners
3. Sample projects included:
- Cedar River Corridor Project
  - Lower Dungeness Floodplain Recovery
  - Puyallup Calistoga Reach Project

#### 4.2.2 Lower Mainland Flood Management Strategy

Steve Litke, senior program manager, Fraser Basin Council (FBC) presented on the Lower Mainland Flood Management Strategy (LMFMS) that aims to reduce flood risk and improve the flood resilience of communities along the lower Fraser River and south coast — from Hope to Richmond and from Squamish to White Rock. Participants in the LMFMS include the Government of Canada, the Province of British Columbia, lower mainland local governments, First Nations and non-governmental and private sector entities in the region. He shared that the LMFMS is an opportunity for decision-makers to work collaboratively on flood management. Participants share information, fill knowledge gaps, enhance communications, build consensus, identify regional priorities and inter-dependencies, identify and advance projects of regional benefit and explore cost-sharing solutions. Steve acknowledged that collaboration is important since a regional consensus on a flood management strategy can identify shared solutions and a compelling case for action at all levels. Some highlights were as follows:

1. Phase 1 (2014 – 2016) studied flood hazards, vulnerabilities, policies, and practices. The regional assessment of flood vulnerabilities identified total economic losses.
2. Phase 2 (2016-2019) aims to develop a regional action plan and recommend management options and funding
3. Phase 3 will be implementation
4. The LMFMS process is integrating environmental values into the strategy through an advisory committee, collation and sharing of best available data, and research on flood mitigation options.

#### 4.2.3 Pacific Salmon Explorer (PSE) Program

Charlotte Whitney, project manager, Fraser Region, Salmon Watersheds Program, Pacific Salmon Foundation (PSF), gave a presentation about new and innovative web-based data tools for management and decision making. This tool provides the public with timely information on the current status of salmon by displaying conservation units and pressures on them. The Atlas has been created for the North and Central Coast of B.C. and PSF is currently working on developing the Atlas for the Fraser River. The Pacific Salmon Explorer is a living tool, and the information is updated on an ongoing basis as new data becomes available. Some of the key highlights were as follows.

1. One of the goals of the project is to democratize data to enable systematic and transparent decision-making
2. Common understanding of knowledge gaps
3. Ability to monitor and report on a yearly basis
4. It is a tool to explore cost effective strategies of restoration
5. The PSE is interested in visualizing fish passage/habitat connectivity data which would be a useful indicator for the work Watershed Watch is conducting



#### 4.2.4 Priority Threats Management for Species at Risk

Dr. Tara Martin, Forest and Conservation Science, University of B.C., presented on the Priority Threat Management (PTM) conservation and decision-making tool that identifies the threat management strategies that will recover the most species for the least cost. It brings together ecological data with decision science to determine what action to take and when and where to safeguard biodiversity and other resources. Her current area of focus is the Fraser River estuary and species at risk of extinction. Her work has found significant chances of survival for all 102 species studied if recovery strategies are implemented immediately. The goal is to identify the management actions needed to ensure the recovery and persistence of all species of conservation concern with the least cost to society. Some points she presented included:

1. In the Fraser estuary there is no management plan and no ecological governance
2. Priority threat management:
  - Is a collaborative process
  - Can clarify objectives
  - Conducts a threats assessment and identifies the most species to protect for the least cost
  - Develops actions for species recovery
  - It is similar to cost-benefit analysis except the benefit is expressed as a probability of persistence of a species as opposed to dollars
3. Her work found the probability of persistence:
  - For anadromous fish with no conservation action = approximately 45%
  - For anadromous fish with conservation action = just over 60%
  - For marine mammals with no conservation action = approximately 38%
  - For marine mammals with conservation action = just over 50%
4. Incorporating ecological governance into PTM improved outcomes for species at risk:
  - For anadromous fish with conservation action and eco-governance = approx. 65%
  - For marine mammals with conservation action and eco-governance = approx. 55%
5. The Blueprint for Restoring Ecological Governance:
  - Long-term commitment to sustainability over seven generations
  - Honour and implement UNDRIP
  - Enforcement mechanism must be implemented
  - Sustainable funding is needed
  - Respect for the view of others

#### 4.2.5 Balancing Farms, Fish and Floods: Using Hydrodynamic and Other Models

Polly Hicks, senior planning and evaluation coordinator, National Oceanic and Atmospheric Administration (NOAA), based in Washington State is NOAA's representative on the Skagit Farm, Fish and Flood Initiative (3FI). She presented on the need to create and advance mutually beneficial strategies that support the long-term viability of these three values. She stressed the importance of trying to meet multiple interests, being transparent in process and building strong relationships. Under 3FI, Polly co-led the development of the Skagit Hydrodynamic Model Project (HDM) which used an alternative analysis to prioritize a suite of projects that improve the identified values. For the HDM, each interest group developed their own objectives and identified specific metrics to measure how projects would contribute to those objectives. Other points included:

1. Consider using different forms of analysis to develop a suite of projects that provide chinook habitat and flood risk reduction in a way that protects and enhances farming and drainage.
2. Build trust and partnerships
3. Support interest groups in developing their own objectives

4. Work through existing agreements
5. Invest strategically, it is critical
6. Continued collaboration and transparency
7. Monitoring and adaptive management are integral to long-term success

#### 4.2.6 Farmland Advantage

Dave Zehnder, project lead, Farmland Advantage, works with farmers to enhance the natural values on their land. These natural values are often referred to as 'ecosystem services'; services of a natural environment that benefits humans. He identified water quality and loss of biodiversity as issues that need to be addressed. He also identified how B.C.'s Agricultural Land Reserve overlaps with those regions known for species richness and therefore the need for agriculture and conservation to work together naturally exists. The project helps farmers identify the natural values on their land that can be protected and enhanced, and develops recommendations and plans to preserve them. These plans can include actions such as water or stream setbacks, strategic fencing, reforestation, or rangeland enhancement. Farmers then carry out the recommendations, and Farmland Advantage helps by providing compensation based on successful implementation. Some of the key highlights were:

1. Payment for ecosystem services are supported by the communities where the program currently operates
2. It is an opportunity to move from grey to green infrastructure solutions that support multiple benefits and stakeholders

## 5.0 Global Café Action Planning Workshop & ORID Method

The global café combined with the ORID method were chosen by the Steering Committee as an effective method to distill conversations into specific recommendations and next steps. The global café is a good, simple process to bring diverse people together around ORID (objective, reflective, interpretive, decisional) questions. Six thematic areas were identified:

1. Governance and Regulations
2. Innovations
3. Research and Monitoring
4. Funding
5. Planning and Prioritization
6. Farmland Advantage (this was a standalone, concurrent session)

The following are some of the ORID questions used to stimulate conversations. For full detailed questions and answers refer to [Appendix E](#):

- *In the last two days, what forms of technical innovation caught your attention? What concerned you? Was anything missing?*
- *What are the main conclusions we can draw from the sessions that address innovative solutions? How has this experience changed your thinking on technological and ecological solutions to managing floods?*
- *What do we need to do next, do more of, or do differently? What messages will you take back to your organization or sector?*
- *Do the current options available to you have the potential to resolve your unique flood control infrastructure issues?*
- *What is the best way to communicate the available options? What are the opportunities for collaboration?*

- *What in the last two days caught your attention regarding capacity and funding needs for progressive flood management and habitat restoration behind dykes? What forms of capacity building are required for such projects to be successful?*
- *How has this experience changed your thinking on funding and other forms of capacity building for greener models of funding management?*
- *What resources do you think are needed to ensure you are successful in making the needed changes on this issue?*
- *What is the best way to manage resources and funding to ensure your role in managing watersheds and floods is streamlined and successful?*

### **Governance and Regulations: Take-aways and Recommendations**

1. Do not reinvent the wheel. Use existing resources and expertise at all orders of government and improve coordination with a regional, environmental focus. Study the Floodplains by Design approach and get clarity on details of the program and use the program to improve governance in the Lower Fraser.
2. Create a coordinated governance body or process, potentially led by First Nations. that includes a mandate environmental protection and restoration, and supports capacity building among First Nations. It needs to be streamlined, fill existing gaps and have a strong mandate. Consider Floodplains by Design in Washington, the Water Board in The Netherlands as examples, but make this an approach that fits the Lower Fraser.
3. Waterways, including fluvial processes, and wetlands must be protected and need to be considered as an essential service/critical infrastructure.
4. Fisheries Act is being built back, so DFO has increased capacity and can participate in forums like this meeting and the LMFMS by FBC. Ensure the DFO mandate letter incorporates integrated management, climate resilience, and flood management considerations.
5. Federal and provincial departments must work together to identify who needs to be at the table
6. Climate change emergency needs to direct action.
7. Improve emergency response plans to include environmental values.
8. Bring back non-grant-based funding for required infrastructure and restoration works
9. Regulations and permits need to be streamlined on a regional basis.

### **Innovations: Take-aways and Recommendations**

1. Need a multi-agency collaborative approach not only on the same projects in different communities, but collaboration on different projects that affect one another.
2. Increased information sharing is needed amongst jurisdictions. In the Netherlands there is an information gathering website called [Water Window](#). Perhaps we need to create a similar repository of information that can be hosted on CivicInfo or another stand alone site connected to a governance structure. Support open source data.
3. Start incorporating fish-friendly technologies, living dikes, wetland treatments, unidirectional pumps and other green-grey technologies into flood management. Blend existing technologies for new solutions e.g., dike setbacks with fish-friendly pump stations
4. Use modelling systems and Geographical Information System (GIS) mapping, lidar technologies to plan better.
5. Priority threat management is an innovative tool.
6. Cooperative sharing of funds – improve joint funding opportunities.
7. Washington’s Floodplains by Design is an innovative governance mechanism to be studied further.
8. Need more out of the box thinking
9. Need to manage for multiple species – how to best manage?

10. Incorporate a multi-benefit approach
11. Integrate alternatives into replacement works
12. Explore green bonds to fund works
13. We need more spaces like this meeting with more diverse conversations and stakeholders and an opportunity to address challenging issues

### **Research and Monitoring: Take-aways and Recommendations**

1. We need an umbrella organization for communications, sharing research, and strategic planning. First Nations Emergency Management Secretariat could possibly take a leadership role as a convener
2. Increased monitoring for projects is required as is access to monitoring results
3. Address Forest Land and Natural Resource Operation's (FLNRO) limited mandate
4. Many research gaps exist. For example, we need to study chinook habitat requirements (e.g., carrying capacity)
5. Ensure best management practices (BMPs) are being followed. BMPs only exist for guidance about the dike. There is nothing to guide the use of new technologies
6. Collate an inventory of green infrastructure that currently exists that is regional and easily accessible to all stakeholders.

### **Funding: Take-aways and Recommendations**

1. Funding cannot be partisan or work on a political timeline
2. Stable, multi-year funds are required
3. First Nations need to be better resourced to ensure participation
4. Funding needs to have a convener who can help plan at the regional level
5. A leadership authority like a Lower Fraser Flood Authority is needed
6. Create a centralized database for funds and grants
7. Build environmental considerations into funding criteria
8. Consider a regional approach to 'bulk buying' flood infrastructure
9. Fund long term planning, assessment, monitoring
10. Explore the potential to collaborate with farmers and incentivize to grow differently
11. Natural asset management should be considered 'on the books' to allow local governments to raise money

### **Planning and Prioritization: Take-aways and Recommendations**

1. Questions to consider: How do we prioritize the identified values? What values do we consider? Fisheries? What is the habitat's carrying capacity? Species at risk? Should we place a monetary value? Consider the urgency of the upgrades? What makes the greatest impact? How do we measure the logistical feasibility of potential infrastructure? Where can we make the greatest impact? Should we conduct a cost-benefit analysis? We should know when these infrastructure pieces come up for upgrading in order to work around opportunities.
2. Identify shared values between farmers, First Nations, environmentalists
3. Identify multiple benefits
4. UNDRIP and FPIC (especially Principles 6 and 10) must be incorporated into planning
5. Equally weighted shared decision-making at the leadership level
6. Consider creating a Community – to – Community Forum
7. Municipalities need to talk to each other – how can this happen?
8. Current practices need to be standardized across municipalities
9. Must acquire stable funding
10. Governance – need an umbrella organization

### **Farmland Advantage, Concurrent Session: Take-aways and Recommendations**

An in-depth discussion took place at this table on next steps for the Farmland Advantage program. Most participants did not participate in the other concurrent global café conversations.

1. The participants indicated strong programmatic support for Farmland Advantage for its many benefits, including ability to prevent flooding and support communities during flooding.
2. Farmers who were involved in the pilot study support the program but want to see community support from across the Province
3. A provincially coordinated but regionally delivered program was suggested to ensure long-term project success
4. Suggested Farmland Advantage to partner with Investment Agriculture Foundation of B.C.
5. Regions where Farmland Advantage program will be expanded will be prioritized – current locations include: Okanagan, Kootenays and Lower Mainland
6. A funding plan needs to be identified and finalized e.g., tax, bond, conservation fund. This is critical to the success of the program
7. Important to identify ways to encourage long-term participation of farmers and maintain Farmland Advantage Program overall, e.g., through certifications and have the market pay a premium. While this might work in the USA, not sure about success in Canada as shown by the SalmonSafe program due to limited uptake.
8. Metro Vancouver and Fraser Valley Regional Districts were identified as potential partners
9. DFO is interested in supporting the program but needs to see the program better defined
10. Concern identified: the monetary incentive might be insufficient – it was identified that the fees could go up based on buy-in, amount of work put in by farmers, etc.
11. Program time frame 10 years at the minimum
12. Opportunity to include flood inundation and compensation (fee for service)
13. Opportunity to include First Nation involvement in the program

## Appendices

### Appendix A: Meeting Agenda

#### Day 1: June 10, 2019

Welcome and Introduction	Welcome and Introduction	Robert Gladstone Aaron Hill	Chief- Shxwhay Village WWSS
Introduction	Introductions, survey results	Marcel Shepert	
1: Setting the Stage	FCI 101 Ecological First Nations	Jonathan Moore Stephen McGlenn	SFU FN LMRC
BREAK			
1: Setting the Stage	Legal Local Government	Deborah Carlson Carrie Baron	WCEL City of Surrey
LUNCH			
2: Economics	Economic benefits of green infrastructure	Andrea Curley	Intact Center
3: Funding: Local Govt	PANEL: What's out there, what are the limitations, how do we improve the process? 1:45 - 1:55 Jesal Shah 1:55 - 2:05 Greg Moy 2:15 - 2:25 Jason Lum	Jesal Shah Greg Moy Jason Lum	Emergency Management B.C. Insurance Bureau of Canada City of Chilliwack
BREAK			
3: Funding: Agriculture	Environmental Farm Plan	Dave Melnychuk	Enviro Farm Plan
4. Case Study on Working Towards Resilient Waterways	Colony Farm	Craig Orr	WWSS
5: Innovative Solutions	Fish Flow Innovations	Gerard Manshanden	Fish Flow Innovations
Wrap Up	Set the Stage for Day 2	Marcel Shepert	

## Day 2: June 11, 2019

Introduction for Day 2	Welcome, review issues tracked and review agenda for Day 2	Marcel Shepert	
Session 5: Integrated Management	Floodplains by Design	Bob Carey	The Nature Conservancy
Session 5: Integrated Management	Lower Mainland Flood Management Strategy	Steve Litke	FBC
Session 5: Integrated Management	Pacific Salmon Explorer	Charlotte Whitney	PSF
BREAK			
Session 5: Integrated Management	Priority Threat Management for Species at Risk	Tara Martin	UBC
Session 5: Integrated Management	Hydrodynamic Modelling	Polly Hicks	Skagit HDM
Session 6: Innovative Approaches	Farmland Advantage	Dave Zehnder	Farmland Advantage
LUNCH AND NETWORKING	Lunch	--	--
Global Café Action Planning Workshop	Breakout Sessions: Discuss key issues with your table. Have your key issues changed due to the last 2 days of information? Are there shared concerns between different sectors at your table?		
Wrap up			

## Appendix B: List of Organizations/Groups Represented at the Workshop

**Dennis Adamson**, Director,  
Electoral B, Fraser Valley  
Regional District

**Lina Azeez**, Campaign Manager,  
Connected Waters, Watershed  
Watch Salmon Society

**Wendy Bales**, Director, Electoral  
C, Fraser Valley Regional District

**Carrie Baron**, Drainage Manager,  
City of Surrey

**Sean Bennett**, Restoration  
Biologist, Fisheries and Oceans  
Canada

**Drew Brayshaw**, Principal, Statlu  
Environmental Consulting

**Cynthia Bunbury**, Constituency  
Manager for MP John Wilkinson

**Dionne Bunsha**, Aboriginal  
Knowledge/Climate Adaptation,  
Lower Fraser Fisheries Alliance

**Elise Carelse**, Student Intern,  
Watershed Watch Salmon  
Society

**Bob Carey**, Director of Strategic  
Partnerships, The Nature  
Conservancy

**Ellika Cairns**, Engagement  
Assistant, Watershed Watch  
Salmon Society

**Deborah Carlson**, Staff Lawyer,  
West Coast Environmental Law

**James Casey**, Fraser Estuary IBA  
Program Manager, Birds Studies  
Canada

**Stella Chiu**, Senior Drainage and  
Wastewater Engineer, City of  
Abbotsford

**Matt Connolly**, Environmental  
and Engineering Services  
Coordinator, District of Kent

**Ian Cowan**, Lands Planner, Katzie  
First Nation

**Michael Crowe**, Manager,  
Integrated Planning, Fisheries  
and Oceans Canada

**Andrea Curley**, Manager, Intact  
Centre on Climate Adaptation

**Ashley Doyle**, Manager of Lands  
and Stewardship,  
Seyem/Kwantlen First Nation

**Laura Dupont**, Councillor, City of  
Port Coquitlam

**Randy Evans**, Manager of Parks  
& Operations, City of Pitt  
Meadows

**Brenda Falk**, Councillor, City of  
Abbotsford

**Riley Finn**, M.Sc. Student, UBC

**Tara Friesen**, Manager of  
Environmental Services, City of  
Chilliwack

**Gillian Fuss**, Coordinator,  
Emergency Planning

**Robert Gladstone**, Chief,  
Shxwhá:y Nation

**Mike Goold**, Referrals Manager,  
Sto:lo Research & Resource  
Management Centre

**Ian Hamilton**, Biologist, Lower  
Fraser Fisheries Alliance

**Chloe Hartley**, Research  
Associate, Rain Garden Project,  
Faculty of Environment, SFU

**Polly Hicks**, Restoration  
Ecologist, NOAA, WA

**Aaron Hill**, Executive Director,  
Watershed Watch Salmon  
Society

**Jeanne Hughes**, Biologist, Lower  
Fraser Fisheries Alliance

**Alan Jonsson**, Habitat Engineer,  
Fisheries and Oceans Canada

**Elaine Kenny**, Consultant/Project  
Manager, Kwantlen First Nation

**Cher King-Scobie**, Manager,  
Flood Safety, BC Forest, Lands,  
Natural Res. Ops & Rural Dev.

**Michelle Koski**, Executive  
Director, Investment Agriculture  
Foundation of British Columbia

**Gerry Leering**, National Fish  
Passage Improvement  
Coordinator, Canadian Wildlife  
Federation

**James Leon**, Rights and Title  
Manager, Sqewlets

**Steve Litke**, Sr. Program  
Manager, Watersheds & Water  
Resources, Fraser Basin Council

**Trevor Loke**, Dev. Manager,  
Tides Canada

**Jason Lum**, Councillor, City of  
Chilliwack



**Gerard Manshanden**, CEO, Fish Flow Innovation

**Tara Martin**, Professor, Faculty of Forestry, UBC

**Matt Mayers**, Policy Analyst, British Columbia Real Estate Association

**Stephen McGlenn**, Land-use Planner, First Nations Land Management Resource Centre

**Tyrone McNeil**, Vice President, Sto:lo Tribal Council

**Bob Meachen**, Councillor, City of Pitt Meadows

**Dave Melnychuk**, Planning Advisor, Environmental Farm Plan Program

**Carrie Milsop**, Fisheries Habitat Stewardship Coordinator, Sumas First Nation

**Jonathan Moore**, Professor, Resource & Environmental Mgmt, Simon Fraser University

**Christopher Mottershead**, Student Intern, West Coast Environmental Law

**Greg Moy**, Manager, Government Relations, Pacific Insurance Bureau of Canada

**Craig Orr**, Conservation Advisor, Watershed Watch Salmon Society

**Carol Paulson**, Director, Secretary of the Board, Langley Sustainable Agriculture Foundation

**David Poon**, Manager, Resource Management Unit, BC Ministry of Agriculture

**Diane Ramage**, Director, Salmon Recovery Program, Pacific Salmon Foundation

**Diane Rodrigue**, Director, Electoral C, Fraser Valley Regional District

**Meghan Rooney**, Field Coordinator, Watershed Watch Salmon Society

**Bruce Runciman**, Coordinator, Client Liaison and Partnerships, Fisheries and Oceans Canada

**Kerstin Schwichtenberg**, Councillor, District of Kent

**Dave Scott**, Lower Fraser Salmon Pgm. Coordinator, Raincoast Conservation Foundation

**Rebecca Seifert**, Program Scientist, Environment and Climate Change Canada

**Jesal Shah**, Director, Flood Protection Emergency Management British Columbia

**Marcel Shepert**, Facilitator, Converging Voices

**Emily Sinclair**, Director, BC Ministry of Municipal Affairs and Housing

**Forrest Smith**, Director of Engineering and Public Works, City of Port Coquitlam

**Colette Squires**, Community Liaison for Darryl Plecas, Speaker and MLA

**Harvy Takhar**, Engineering Project Manager, City of Delta

**Andrea Tanaka**, Habitat Planner, Canadian Wildlife Service

**Christine Terpsma**, Communications Manager, BC Dairy Association

**Frank Van Nynatten**, Assistant Manager of Environmental, Services, City of Chilliwack

**Whitney Vicente**, Student Intern, West Coast Environmental Law

**Carrie Victor**, Manager, Ayelstexw Consulting

**Brad Vis**, Policy Director for MP Ed Fast

**Shayla Walker**, Senior Program Associate, Tides Canada

**Alex Wallace**, Manager of Community Development, City of Pitt Meadows

**Charlotte Whitney**, Project Manager – Fraser Region, Pacific Salmon Foundation

**Laurie Wood**, Manager, Community Engagement, Faculty of Environment, SFU

**Queenie Yip**, Flood Safety Engineer, BC Forests, Lands, Natural Resource Ops. & Rural Dev.

**Mark Zaborniak**, Manager, Design and Construction, City of Coquitlam

**Dave Zehnder**, Project Lead, Farmland Advantage

## Appendix C: Issue Tracker (Raw Notes)

### Jonathan Moore

1. Flood control structures are hit and miss
2. Hardening of the Fraser River
3. Monetary concerns regarding infrastructure projects i.e., New dikes
4. Consequences
  - Hypoxia (lack of oxygen)
  - Invasive species
  - Reduction of biodiversity
  - Reduces upstream salmon refuge
  - Block migration for adults
  - Variable performance

### Stephen McGlenn

1. High level governance structures
  - Framework agreements
  - Land codes
  - UNDRIP
  - Protocols
2. First Nation Land Management Act
3. Mixed jurisdictions
4. Delegated authority
5. Recognition and understanding of each others authority
6. Conflict resolution mechanisms

### Deborah Carlson

1. Reconciliation through the weaving together of the legal systems
2. Why is it taking so long to do what we need to do?
  - Use a legal geography lens; Relationship between space, place, law, time
1. Fisheries Act has little to do with actual fish, lands or animals
2. Law is reactive; About not making things worse instead of making things better
3. Limited protection for fish in Federal and Provincial environmental regulations and none in flood regulations
4. Broader land use planning and regulations
5. UNDRIP and Indigenous sovereignty is key
  - Collaboration is needed
6. Challenged of fitting projects into funding criteria and how we can do this better
7. Distinction between people working in and around stream

### Carrie Baron

1. Plan of maintenance
2. How can we adapt
3. Challenges in implementing flood protection measures
4. How do we measure success?
5. How do we share success?

## Panel

1. Where do we go from here?
  - Learning from the bright spots (where and what are people doing)
  - Connecting Nations to the experts (building the network)
  - Amending the Local Government Act (LGA) to allow for First Nation (FN) involvement
  - Implementing UNDRIP
  - Keep and open mind
  - Support for pilot projects (Living Dike)
  - Integrating research into policy
1. How to overcome legislation?
  - Be willing to try
  - Opportunistic
2. How do we bring the resistance to the table?
  - Best practices and being cognizant of each other
  - Have regulation in place, that can be enforced on reserve
3. Is there an opportunity for high level collaboration?
  - Happened in the past
  - Back to models of working together from the start
  - Need for resourcing on the First Nations side
  - Identifying opportunities by connecting with people
4. How do we protect the wetlands?
  - Ways to fortify and protect the wetlands

## Andrea Curley

1. Insurance issues, need to look at water and flooding
2. Mortgage issues associated with flooding
3. Combating Canada's rising flood costs
  - Benefits of repairing systems versus protecting/ restoring natural infrastructure
1. Willband Park, Abbotsford B.C.
2. Naturally occurring ponds in Gibsons, B.C.

## Jesal Shah and Greg Moy

1. Flood Mitigation Funding Programs
  - Guidelines
  - Concerns with funding streams overlapping
  - FN concerns with being disjointed
  - First Nations Emergency Services Society
2. Building for Flood Resilience
  - Raise Consumer awareness; prioritize infrastructure investment; land use planning; natural infrastructure
  - Limiting impact of extreme flooding through building natural infrastructure
  - Build back better
  - Canadian Water Network Pilot Project

## Jason Lum

1. Property tax system is inadequate to raise funds for flood mitigation

2. Municipalities protecting infrastructure in tandem with the FN communities
3. Higher orders of government need to step up in terms of funding for infrastructure
4. Importance of working regionally
5. The more collaborators the better

### **Dave Melnychuck**

1. Environmental Farm Plan Program (EFP)
  - Protect air, soil, biodiversity
  - Marketplace demand
  - Risk mitigation and liability
2. BMP grants for farmers
  - Riparian fencing
  - Improved stream crossing
  - Manure land application
  - Off-stream watering
3. EFP= Peace of mind
4. Bertrand Creek

### **Craig Orr**

1. Synergy
2. Monitoring of projects
3. Colony Farm Regional Park, B.C.
4. Strong political support is key

### **Bob Carey**

1. Floodplains by design
  - Multi-beneficial
  - Locally driven
  - Large scale
1. Cedar River Corridor Project
2. Lower Dungeness Floodplain Recovery
3. Puyallup Calistoga Reach Project
  - Floodplains for the future
4. FbD
  - More partnership
  - More funding
  - More political support
  - Working at larger scale
  - Seeing fewer obstacles
5. Collaboration
  - Bring early and often
  - Deep level embracing value and goals of other partner

### **Steve Litke**

1. Consensus of Common vision
2. Regional Priorities
  - Consult communities
3. Mitigation Options

- Wide range of approaches
- 4. Funding
  - Cost Share
  - Proactive
  - Current funding & Advancing new programs
  - Sustainable mechanisms (integrated approach)

### **Charlotte Whitney**

1. Democratizing data
2. Common understanding of knowledge gaps
3. Monitor and report
4. Cost effective strategies

### **Tara Martin**

1. Prioritizing threat management
2. Priority threat management process
  - Collaborate
  - Clarify objectives
  - Save the most species for the least amount of money
  - Threats assessment
  - Developing actions
3. Cost effectiveness equation
4. Blueprint
  - Long-term commitment to sustainability
  - Honoring UNDRIP
  - Enforcement mechanism
  - Sustainable funding
  - Respect for the view of others

### **Polly Hicks**

1. Alternative analysis
2. Building trust and partnerships
3. Interest groups developing their own objectives
4. Working through existing agreements
5. Strategic investment
6. Continued collaboration
7. Monitoring and adaptive management

### **Dave Zehnder**

1. Payment for ecosystem services
2. Gray versus green infrastructure
3. Process
  - Contracting farmers
4. Farmers + First Nations + Land = Opportunity

## Appendix D: Plenary Notes (Raw)

### Jon Moore (Presenting on Masters' students, Rebecca Seifert and Dave Scotts' work)

- Floods are the foundation of productive waterways
- Flooding increases edges of refuge for juvenile fish, over time, fish can take advantage of this expansion- Flood pulse concept
- Rivers that can “pulse” are more productive than those that are not. The more flexibility to expand, the more fish in the system.
- Seifert: research on FCI- How often are floodgates open?
  - Some open often, five gates were open more than 50% of the day. Some were often closed. There was a huge range in performance.
  - Waterways with floodgates open less had less biodiversity
- Scott: Looked at sites with and without FCI. What fish are there?
  - Lots of Coho in sites without FCI
  - Dissolved oxygen study: Sites that had FCI 2-8 mg/L. Sites without: FCI 10 mg/L
  - At sites with FCI, dissolved oxygen would be in a 2-8 mg/L range and concentrations would reduce as you moved upstream, resulting in hypoxia

### Question and Answer

*Question: What are your recommendations?*

Diagnose the problem, think of solutions, what work is going on? What FCI could be better (benefit for cost)? How do we prioritize? Those that were open more had more biodiversity

*Question: Are there other jurisdictions doing this well?*

Stay tuned

*Question: Did the studies look at waterways with freshwater feed?*

Yes, freshwater upstream, also driven by tidal flow.

*Question: Can you expand on the importance of these habitats to salmon?*

When rearing habitat is degraded, salmon populations struggle. What happens in freshwater contributes to their success. [Salmon are] better prepared to deal with a changing climate, changing ocean conditions [if freshwater conditions are better].

### Stephen McGlenn- FLNMRC

- How jurisdiction works on reserve land
- Framework agreement FNLM- 13 Nations
- Framework agreement- then later an act. Allows opt out of sections of the Indian Act
- To reinvigorate management with traditional practices.
- Land code: Drafted by the community, sets out governance structure. Does not deal with certain issues but how the communities set laws. How governance works on FN reserves. Many FNs have multiple reserves.
- Establishes rules and procedures. Dispute resolution.
- The benefit is it allows FN communities to represent themselves.
- Land code requires that projects meet and beat Federal and Provincial environmental standards
- Section 88- provincial laws still apply on reserve land. Need to create parallel laws. What are the standards? Often FN communities choose to adopt Provincial legislation.

- ~22 FN communities with land codes. Strictly related to lands and resources.
- [Commenting on historical decisions made by colonists regarding FCI that negatively impacted local FN]
  - Draining of Sumas Lake
  - Natural erosion sites created scalloped banks along the Fraser River, near dikes. Created natural back eddies that are valuable fishing spots (they provide refuge for fish). These sites were infilled without consultation. Not good for relations between FN and municipalities. Future efforts were made to fortify the scallop shape, but they are unsure if it is still a good fishing location.
  - Money is going into projects in the upper portion of the lower Fraser. What are the downstream effects of this?
  - Gillian Fuss, new Emergency Planning Secretariat
  - Need for collaborative planning to create agreements

### Question and Answer

*Comment, Robert Gladstone: Speaks from the heart [referring to his introductory talk]. Collaboration is necessary. Strength of title by LMA. Tone is important. Old dumping [referring to dumping performed by municipalities] was in the past, efforts are being made to move forward collaboratively. Hatzic or Mission work in sturgeon habitat- new docks.*

*Carrie-lynn Victor is forming steering committee- Citizens of the Lake(?)*

### Deborah Carlson- Legal

- Focus is on legal solutions to protect the environment better and a bit of work regarding indigenous law- it is diverse
- Laws meant to protect the environment, lacking details on fish. They are very generalized and abstract. Reflects settler culture, where we have a poor relationship with land and water. Not present in a meaningful way. No history embedded in the law.
- Limited protection for fish. Fisheries Act, Riparian Area Regulations (RAR), Water Sustainability Act (WSA). **These are reactive laws.** Have embedded shifting baselines. "Let us not make it worse" not "Where do we want to be?"
- C68= 3rd reading in senate. Environmental flows not added. Will have stronger, all-encompassing habitat protection for fish habitat.
- DFO- limited capacity. WSA- delays in permitting, less efficient.
- Riparian Areas Protection Act (RAPA)- not Agricultural Land Reserve (ALR), implemented by local government
- FCI managed by municipalities. Significant tech and funding burden
- Dike Maintenance Act (DMA)- Provincial Act. Need approval for modification. No environmental provisions. Some vegetation policies in the act.
- Land use planning- ongoing pressure to develop in the floodplain. Don't build more in the floodplain. ALR.
- Legal Landscape- denial of FN jurisdiction, lack of acknowledgement of Indigenous Right
- Reserves are not always protected
- Bill C68 Indigenous partnerships and knowledge. Commitments to UNDRIP
- Three takeaways:
  1. Limited protection of fish in Federal and Provincial regulation that affects FCI.
  2. Broader land use planning and regulation context are important.

3. UNDRIP and Indigenous sovereignty are a key part of legal discussion about land and water.

### **Question and Answer**

*Comment, Craig Orr: UNDRIP- technical advise on renewal of salmon farms in Broughton. Agreement furthest on moving forward on UNDRIP.*

That agreement gives FN regulatory power over fish health. Decide if the fish are healthy enough to go into the pens. Musgamagw agreement.

*Question, Dave Zehnder: Regulatory agencies working in and about a stream. No distinction between restoration work and logging/ other organizations that are destroying habitat. Have to go through the same permitting process.*

Regulation or policy level, need a plan to have some confidence in the work being done

*Question, Aaron Hill: Collaborative planning process. In fisheries management can be effective or sometimes a quagmire. What legally can ensure that collaboration gets the job done?*

Agreement on what you are going to do, get staff involved, have objectives, good practices.

*Comment- Andrew Appleton: Wanted to point out that RAPA only applies with regard to farm work, not other work that may be taking place on ALR land.*

### **Carrie Baron- Drainage Management**

- Local government. Flood control is a huge issue in Surrey. (~30% in floodplain)
- Not all of the area is diked, but most of it is. ~ 100 dikes, 30 pumps, ~2 sea dams, 170 flood boxes, 10 spillways. Seadams are old, built by farmers 110 years ago.
- 2000- Surrey Lake, ALR compensation for dike building, Agricultural Land Commission (ALC) was there, needed compromise.
- 30 pumps, ~15 that are fish friendly. Some have fishways- these are not monitored
- Hydrostal and Bedford pumps are more adaptable to climate change. The land sinks over time, and the screw pumps can not go any lower. Hydrostal and Bedford pumps can go lower and still function. When non-fish friendly structures are up for replacement, they are replaced with fish friendly structures.
- Created more refuge area during high flows. For maintenance, clean from one side only and only clean when justified.
- Greenway Wetland-Purchased to be flood storage and built sediment basin to dry sediment. Much cheaper to haul away dry versus wet sediment.
- Working on coastal flood adaptation strategy. Coastal squeeze due to sea level rise.
- Nicomekel South frontage- make it so it can flood, bought the land. No more development in Nico-Serpentine floodplain.
- Living dike- natural building of dikes
- Seadam replacement- Something needs to be done, as they are very old. If they are removed, would lose farmland and homes. Surrey does not control water licenses. Can build better pump, floodgates etc., fishways. Complicated by other jurisdictions- Railways, ports.

### **Question and Answer**

*Question, Tara Martin: Feasibility is dependent on the time of renewal. How do we know when things are due for replacement? Pump 40 years, flood box 20 years*



When you have to invest again, it is easier to replace/ justify the expenditure. Allow gates or pumps to be upgraded what is going on in 100 years. Do we need to buy more land?

*Question, Dave Zehnder: Any way to account for environmental assets?*

Monitoring more, water quality, water column, not sediment, not fish, so much. How do we get over these obstacles? How well do they work? Need that baseline. Fish ladder/ slide, need to have a camera on it to see how well it works. Rivers are over-allocated, are quite stagnant, can we add dissolved oxygen with pumps.

*Question, Dave Zehnder: Replace seadam on Nicomekl. Any thought on relocating downstream?*

No, integrating with King George. Yes to Serpentine down to Highway 99. Change in habitat on both. How does that transform.

*Question, Dianne Ramage: Pre-survey question [Regarding how many people did not know where work is being done well] What is your process in sharing your story to encourage this work?*

Through forums like this, tours, through the Fraser Basin Council. But a lot of [municipalities/ municipal staff] are open to tours to learn about others' problems and solutions.

### **Panel Discussion (Jon, Deborah, Stephen and Carrie)**

*Question: What would it take to take this to the next level? Where do we go from here?*

Jon: Learning from the bright spots. Where and what are people doing?

Stephen: Support FN, understanding flood management, connect nations to experts, building the network. Legal: Amend local government act. Build collaboration into the system, create a legal space for shared land use planning. Implementing UNDRIP promoting from a legal perspective for land-use planning. Reserves represent less than 1% of FN land.

Carrie: With sea level rise, we are in new territory. We can not maintain the status quo. Have an open mind.

*Question: Living dikes?*

Against legislation. Not mowing [dikes] is against policy, How do you overcome legislation? Need to have people willing to try and backup plans. Living dikes, land tenure, provincial, but all need to be at the table.

Deborah- We need support for pilot projects-living dike. Need to do a better job of integrating research. Not available to decision-makers, policymakers, we have to incorporate research into policy.

We need to be opportunistic, parts that are represented. Land developers and agriculture, stakeholder groups, farming and fish do not go against each other.

Collaboration

*Question, Dave Zehnder: Higher level of a collaborative entity? FN, Federal, rather than at project, municipal level. Rather than pilot projects, do we value a new working group?*

Carrie: We had more collaboration in the past. Environmental review committees, work together but everyone [now] siloed.- "Why are we not back at the table?" Cutting back people.

Need to get working together from the start.

Stephen- Naysayers- on reserve, developers will target FN Reserve and the Nation will get taken advantage of. Regulations have teeth. Lots of pressure on staff to develop land reserve.

*Comment, Elaine Kenny: Comment from Kwantlen (was a consultant for 20 years) In 2018, bank erosion protection project at Macmillan Island. Loss of ½ hectare a year. FN perspective [of project]: money challenges, time restrictions, environmental requirements. Two times to FLNRO and DFO. Construction window for 2 years. Work was helped to completion by Brent Baron, PEng with ISC.*

*Comment, Harvy Takar (Delta): Delta has lots of similar problems as Surrey and will reach out.*

*Comment, Wendy Bales: Too many dikes, channelling created. Intensity issues, strategy to recreate the wetlands, still working on that, but how can we get legislation to protect the wetlands we have left? Ways to strengthen? How to change the value of the land? How to change so it is not cheap to build on environmentally sensitive land?*

*Don't appreciate infrastructure footprint, and how to incorporate the cost of protecting the land/ values of the land. The US- Transfer of development rights to places where it is more viable.*

### **Andrea Curley**

- Intact Applied Research Centre, Faculty of Environment. Flood risk mitigation and management.
- Graph of Insurance Bureau of Canada (IBC) insurance payouts. Has increased a lot in recent years, largely due to flooding. Bigger payouts, more severe. For every dollar of insured loss, there is 3-4 dollars of personal loss.
- Flooding locations are chronic problems. Same people get flooded over and over again.
- Survey of people who suffered from a flood- found that there are mental health implications
- Created adaptation guidelines and standards, some are becoming national guidelines
- Community design, flood resilient- do not build on the floodplain! Adequate sewer management, maintain current vegetation
- Urban centre wetland decreases damage by over \$50 million dollars. If we put in a stormwater tank for “x” dollars, or we could put in a wetland for “x” dollars. While the tank serves one purpose, the wetland serves many. How do we quantify the benefits of additional services, including habitat quality, carbon savings, water quality?

### **Question and Answer**

*Comment, Tara Martin: land resumption for flood mitigation, buying back land.*

*Question, Collette Squires: If you could describe the process for determining the benefit of installing stormwater system versus green infrastructure. What steps does the city need to take? Does the report have steps to proceed with this?*

[yes] Put in the cost/ benefit analysis of why you should pick green versus grey infrastructure

*Comment, Jon Moore: degree to which these findings are going into land management decisions. Scale of connections and benefits/detractions. Need to make sure that all the stakeholders are in the room, that stakeholders are willing to come into the room. Can see the \$, need to communicate the monetary value [of green vs grey]. Stakeholders need to be brought in from across the watershed. We do not need to develop these tools/ methods.*

*Question, Steve Litke: Guidelines on riverine flooding versus stormwater?*

[The Intact/ IBC report] breaks down framework into stormwater or riverine flooding

*Comment, Chloe Hartley: Municipal national assets- Assess the value of green infrastructure- Gibsons, B.C.. We do not put the value in dollars on natural infrastructure. [There are] millions in natural infrastructure.*

*Question, Cynthia Bunbury: Green up the valley, wetland reintroduced north of city centre, not only improved water quality but recreational value. From improving/ restoring wetland.*

It is not just storing water but also lots of other values- improved water quality, recreation.

Manitoba- Polly Lake- retain and then release water. During times of drought can release, during times of flooding, can retain (works well for the farmers).

### **Jesal Shah- Director of Disaster Mitigation Unit**

- Unit supports communities. How important is mitigation?
- B.C. is at significant risk of extreme events. Money into mitigation is millions/billions saved in response costs
- National Disaster Mitigation Program/ Community Emergency Preparedness Fund (CEPF)
- FN adapt program
- Adaptation and resilience and Disaster Mitigation Program- New fund- Strictly for shovel ready projects- through 2028- Managed by Public Safety Canada
- Progressive program over four funding streams. Strongly encourage feds to continue with this program.
- CEPF- now open to all FN communities, managed by UBCM, Funding by B.C. Government
  - 150,000K, next intake 2020
  - 750,000K intake closes in 2019
- B.C. Flood response plan- important for municipalities to know who is responsible for what
- Jesal advocating to have this include debris flow and other natural hazards

### **Question and Answer**

*Question: When awarding funds, are there points for including valve for fish passage? Or using this fund to mitigate the damage of emergency structures that were installed without taking ecological values into consideration?*

1. If it is mentioned that the infrastructure is fish friendly, it is noted that is an added value to the project. Need to beef up language on the application to support/ show that fish friendly infrastructure replacements are valued.
2. Application referring to orphaned structure rehabilitation- they would be considered, go to FLNRO to get their approval of the project. FLNRO doing orphan dike study on remediation/removal.

*Question, Aaron Hill: Greening flood infrastructure, do you see additional criteria or different ways of consulting? Can this be incorporated into decision-making?*

Actively trying to have FN involved. Guidelines updated annually. Sit with stakeholders, DFO, NGOs such as WWSS on how to improve guidelines to better outline the preference of green, fish friendly infrastructure. Presentations help to advocate for changes to the guidelines.

*Question, Elaine Kenny: Refresh comment on FN funding? CEMP? Does that include ERP?*

Includes 7 streams.

*How do we pull all of these funds together?*

The more pots of money, the more benefit, But needs to be more cohesion.

*Comment, Tyrone McNeil: Challenged with capacity. Some Nations are considered Nations but lack capacity [to perform routine tasks in addition to apply for these funds] Need to support communities, need broad regional approach as FN. We need to have more conversations. "Engage us." No vehicle as individual nations or tribal council to engage with local governments. We are not in competition. Municipalities have more capacity to plan for these things. It is a new era- representatives from government looking forward to discussion.*

### **Greg Moy- Insurance Bureau of Canada**

- Frequency of extreme events/ high payouts increased in recent years as climate changes. National insured costs average 1B a year. Most weather related costs are caused by floods.
- IBC- Raising consumer awareness, prioritize infrastructure investment. Improve land use planning, utilize natural infrastructure.
- Need to update mapping and risk assessments.
- Target priority infrastructure investments
- Doing in areas with greatest risk, can reduce human hardship and damage.
- Improve land use planning. Stop building on the floodplain, use natural infrastructure.
- Retain, restore, rebuild. We can limit the impact.
- Help decision-makers- community engagement, watershed climate risk, materiality assessments, economic benefits assessment, design construction and maintenance.
- Investments from insurance intro green infrastructure.

### **Jason Lum- Municipal Perspective**

- Costs increasing as the dike need to be raised. How do we raise funds? Municipalities do it via property tax. Infrastructure deficit for City of Chilliwack \$95 million and EMBC since 2017 has funded ~132 million total. \$45 million only does 6 km of dikes.
- FBC and Stó:lōevent- there are areas that are not adequately protected. Not competing with FN for funding. Few opportunities to fund via property tax. Difficulty with explaining the issue- good at scaring the public, but when public approaches the government about it, public doesn't care to hear it. Yes, we are building 6km of dike, but what if it breaches down or upstream? Not doing a good job of telling the public how we are working on solutions. "So important to work together regionally".

### **Question and Answer (Shared question period for Jason Lum and Greg Moy)**

*Question, Gerard Manshanden: Give the river room- 2 dikes. Need bigger pumps or more storage for water. Land use restrictions that prevent more dikes.*

Many dikes built in response to catastrophic flooding (not well planned out, essentially) What are the other solutions? No conversations have shifted to additional diking system due to land considerations. If you had local government tell people that they had to take land to give the river more space farmers [would not be pleased]

*Gerard: Land floods in the winter but in the summer it can be planted.*

Jason- Struggling to update, let allow a full reassessment. The approach [*in the Netherlands*] is a national approach? [*asking Gerard*]

*Gerard- Yes, spent millions to give the river room.*

*Question, Steve Litke: Implement UBCM resolution. Do you envision that funds need to be topped off or coupling environment funding with infrastructure funding?*

Jason: Coupling, need a combination, without taking away from other projects. An additional fund.

*Question, Tyrone McNeil: 1. Lose several acres of land due to erosion 2. UBCM some are engaged with FN community. Encouraged to work with Stó:lō community. 3. What about rise in gravel in river? Redundant to build up dikes if river is infilling with gravel. This gravel is detrimental tourgeon and fish in the river. If you dig down you find the historical riverbed. [The gravel] needs to be removed or dikes are redundant.*

*4. Look rivers where they meet the Fraser. Land destruction. More setbacks, keep streams clean and cool.*

Jason: Willingness of staff to work together, sea to sea forum. What are our shared values? Shift in how we look at regional flood program. Split into regional districts to manage.

*Question: Building on alluvial fans- upwater groundwater causes floods [behind dikes] not dike breach. Indigenous communities were not built on the edge of the river. They did not historically build there.*

Jesal: Do not encourage construction near dikes, best practices are 30 m setbacks. If a company wants to build a dike to develop- EMBC rejects the application. We do not want them developing there.

*Q- What about ground upwelling causing flooding? There are other ways to deal with flooding.*

Jesal: Leave the natural floodplain as it is. Purchasing homes in the floodplain. Diking is not the way to go.

Jason: Reality is to address issues with dikes (on property tax) but it does not stop us from looking at all the other options. Looking at natural assets. Farmers are losing a lot of land to the Fraser. At odds with other things we have been saying e.g., importance of protecting farmland.

### **Dave Melnychuk- Environmental Farm Plan**

- EFP identifies risks on farms and then develops action items to reduce these risks and incentives to implement. This is a voluntary program

### **Question and Answer**

*Question: How do farmers hear about EFP?*

ARDCorp responsible for communicating to producers. Info about EFP circulated in certain magazines and papers.

*Question, Tyrone McNeil: Are reserve farms eligible for EFP?*

Yes, FN lands follow same process.

Examples? Bertrand creek. EFP's on river that has flow issues. Encourage better management along riparian area, more working with smaller watersheds for planting, noxious weed control, all that has a benefit for peak flow issues.

EFP book deals with herbicide/ fertilizer use, esp in areas prone to winter flooding. Need good riparian areas for infiltration/ filtration.

### **Craig Orr- Colony Farm Restoration Project**

- Synergy- the word of the day- rather than collaboration
- Coquitlam River restoration. Bit of history- oldest hydroelectric dam- River was on endangered rivers list but collaborative efforts have improved this waterway. Created 1 km of channels and ponds for juvenile. Was concerns that this project would negatively impact bird habitat.
- Put in self-regulatory tidal gate- enhanced about 3 km- side mounted- engineers say it is more efficient- longer duration being open. Overshot gate

- Performed effectiveness monitoring after project- however this did not go on for long enough.
- Trained monitors from Kwikwetlem to perform ongoing monitoring- riparian monitoring, fish monitoring. Access could be improved, but functional, need more large woody debris. The gate is open 45-60% of the time and has been found to be used as a wintering site.

### **Question and Answer**

*Question, Randy Evans: Is the land in centre left natural? [the created waterways create an "island" that cuts it off from public access]*

Yes, it is an old field habitat. Performed riparian planting and hydroseeded.

*Question, Marcel Shepert: Concept to completion?*

Difficult to initiate. Took five or six community meetings, a couple years to design and construct. Over \$2 million project cost.

### **Gerard Manshanden - Fish Friendly Innovations**

- Pumpstations killed many fish- now in the Netherlands they are not allowed to not be fish friendly- same as in England now.
- Fish friendly screw pumps that are fully enclosed, more energy efficient, 100% fish safe
- Numerous designs- some floating, some with a vacuum to "suck up" fish- This is enclosed to protect from predators.
- Use deterrents to prevent fish from entering non-fish friendly pumps (light deterrents)
- Drum screen- fish safe- self cleaning,
- Also developing large, whale and fish friendly turbines and propellers that are silent.

### **Question and Answer**

*Question, Cynthia Bunbury- Challenges with noise pollution (Southern Resident Killer Whale)?*

*[Gerard restates his propeller design that indicates it is large enough for whales to swim through] need to be used in combination with diesel electric motors to minimize noise.*

## **Day 2**

### **Bob Carey - Floodplains by Design**

#### **Question and Answer**

*Question, Al Jonsson: [Washington State is] so advanced, has to be a fundamental shift in thinking. What led to this shift in Washington State? How did you get to where you are now?*

Do not wait for perfect to get stuff done. Had to test a few projects, brought people together, multi-benefit goals, overcome agricultural resistance to salmon restoration  
Build trust and show up together- multisector.

*Question, Deb Carlson: Puget Sound partnership- have relationship btw the partnerships' objects and FbD?*

Yes, effort emerged from initial set of project recovery indicators- based in restoration, Realized you can't go forward with these projects w/ a restoration goal [*mis-typed?*] These projects aren't just about fish and birds, but people

*Question, Elaine Kenny: How did the concept start? Who was involved?*

TNC spearheaded. Lots of people with shared experiences- River management, fish side, Experienced conflict but there was support for shared benefits- took 9 win-win projects to the legislature.

### **Steve Litke- Fraser Basin Council- LMFMS**

- Reduce flood risk- Freshet and storm surge
- FBC is the facilitator of LMFMS, an impartial convener
- If we are able to achieve consensus, deliver a strategy that will be a compelling case,
- Phased approach to the LMFMS, understand hazards, vulnerabilities, infrastructure, policies, practices
- Diking does not meet standards as standards keep getting updated -[*need to build dikes higher and higher to meet standards*]
- Phase two priorities- where can we reduce risk the most? What are the options for infrastructure? Recommend secure, sustainable funding.

### **Question and Answer**

*Question, Aaron Hill: What is the anticipated timeline [for LMFMS]?*

Phase 2 to be completed in mid 2020, Draft strategy this fall.

*Question, Aaron Hill: WWSS concerned that DFO is not at the table. WWSS is on the advisory committee- Wondering if a key piece is missing [from the strategy]*

[FBC] wants to strengthen those connections moving forward, wants to understand regulatory requirements.

*Question, Collette Squires: Likelihood of a major flood event- 2% chance in a given year. Homeowner insurance - need to get overland flood coverage or you are ineligible for government help. There are homes that are vulnerable and others that are not. What homes should have that coverage? [How do you let people know that they should have this]*

Part of the goal is awareness raising with the public. Difficult for government to solve Insurance coverage is new, and people do not understand the requirements [?] for government support. Requesting a communications strategy with public [*to educate*] Can do that in partnership with municipalities.

*Question, Bob Meachen: Lack of regional planning between municipalities. Costs coming for the tax base is scary- each municipality is doing their own thing. How are the new dikes in Chilliwack going to impact downstream communities like Pitt Meadows? What can FBC do better to help solve problems to bring back natural systems as a city/ as a region??*

More of what we are doing- approach it regionally and locally. Instill broader suite of sustainable management. Improving Floodgates and pumps.

### **Charlotte Whitney- PSF**

Regional approaches- currently making decisions without appropriate information.

### **Question and Answer**

*Question, Dave Scott: Why use the term "risk" for pressures that are already impacting habitat? This is confusing.*

Broad indicators may have impacted risk, most likely these pressures are impacting salmon, need to ground-truth to confirm.

*Question, Tyrone MacNeil: Do we have access to this data?*  
[Charlotte] can share, connect with people after presentation

*Question, Andrew: FLNRO- increasing assessment area, impervious area and flow information?*  
Sourced from Data BC

## **Tara Martin- UBC**

### **Question and Answer**

*Question, Tyrone McNeil: Canada Infrastructure Bank analysis, needs to consider infringement of FN rights. We need broader consultation on extirpation, every stream had runs and how it does not. Drafting 10 year plan. Need more consultation with FN on infringement, compensation with DFO.*  
FN perspective is very important

*Question, Ashley Doyle- [she] oversees consults with Kwantlen. Been a broken record for requesting this*  
1. *Who spearheads this work?*

Hope to establish the blueprint. Will leverage support of multiple agencies to drive this. Deeper dive into salmon with PSF, want to partner with DFO. Actions might be at a scale beyond the Fraser, if we have something like climate change.

2. *Is climate data integrated?*

*Question, Bob Meachen: Barriers [referring to Tara's use of the word in her presentation] Do you mean physical or government barriers?*

Referring to physical barriers to fish passage.

## **Polly Hicks- NOAA**

- Tidegate fish initiative- drainage district sat down with NOAA.
- Longtime with permits, how do we streamline?
- Linked drainage with salmon habitat, maintain infrastructure with salmon recovery.

### **Question and Answer**

*Question, Aaron Hill: Process spearheaded by U.S. government with NOAA. We do not have that leadership with provincial and federal government, Fisheries and Oceans Canada not at the table. Any words of encouragement for that collaboration? Could this work have been done without the support of Federal and State Government?*

Two agricultural groups, TNC and state initially involved, once the conversation was going smoothly, added others to the conversation.

Larger working group amassed by seeing that collaboration had already begun. Some groups had large role but many groups did not get additional funds to take on this work.

*Comment- Bob Carey- could argue that the private sector could lead to this type of project without state/fed involvement, but government involvement was helpful. Tidegate Fish Initiative greased skids to get agriculture at the table for HDM.*



## Dave Zehnder- Farmland Advantage

### Question and Answer

*Comment, Protective hedgerows. Also had a program backeast for better practices?*

There is a huge opportunity beyond that. Farmers could be willing to receive those waters [from floods] allowing the fields to flood, giving the river room.

*Question, Collette Squires: Listen to farmers but never made the connection to this topic. If you have farmland and restoration, farmers could help to produce more on fewer acres. But not if people do not know about the program. Doing work with zeolite- not as toxic if flooded. Water connects with land, how do we get an integrated approach?*

Pilot program moving towards that discussion of food production. Farmers driven to increase food production. Need a new way of thinking. Try and optimize food production with other values. We [Canada] will not be able to outcompete other countries production, especially the U.S. Instead we have an opportunity with ecology. Optimize for a combination of needs.

## Appendix E: Global Café Records (Raw Notes)

### Theme 1: Governance and Regulation

#### Round 1: Lina Azeez, Polly Hicks, Bob Carey, Michael Crowe, Emily Sinclair, Deborah Carlson, Whitney Vicente, Mike Goold, Colette Squires

D: She was only one to talk about law. Watershed Watch wants to deal with this.

#### Responses below are to Question 3.

*Question 3: With regards to governance, legal, and regulatory aspects of flood control management and ecosystem health, what was the most encouraging thing you heard, or what was the most concerning?*

**MG:** America very encouraging. They are where we want to go. Interested in how their governance system got to where it is without letting other things impact it?

**E:** Mutual benefits, clearly defined objectives, seeing what that might look like in the context of the Fraser. Interesting approach. Clarity of objectives and clarity of roles. Federally, Provincially...How do people fit in this system?

**M:** Encouraged to understand what happened in Gibsons. [Monetary] value to the wetlands. Wants to learn more about that. Wrap head around numbers and funding. Message from [Chief Robert] Gladstone regarding New Zealand and Columbia. Numerical value to ecosystem wetlands and linking to the perceived value. Canada Post [is an] essential service, flip that to thinking about wetlands as an essential service and give it the space

**D:** Critical infrastructure e.g., hospitals also like the River should be

**E:** Are there other funding models that are more sustainable?

No. D: Conservation funding pot

**P:** Investing conservation funds into funds that you can draw from. Understanding of long term management.

**B:** Bonds that tend to go for 10-20 years that you know you can draw from for a number of years

**MG:** Return on investment, money that can only be used for certain things

**C:** Riding the waves of political change. How do you encourage political will? They need to ask what's in it for me, what will get them votes. Persuasive arguments that [are] committed to evidence-based approach. Do it through the millennials, do it smart and so it [is] effective. Provincial and federal municipalities are so strapped. MLAs don't know what they don't know

**P:** In the States getting things that cross between political lines to get the funding

**D:** Match funding required

**E:** [This was] raised yesterday, how do you communicate having a single message that cuts across all parties?

**C:** Everyone's responsibility. People aren't hearing about this, it is not coming up. Use MLA strategically.

**B:** Multi-benefit approach: recognizing goals that may not be the same as yours but that you can say you are committed to.

**P:** Keeping in the language they understand and reflecting their interest towards them.

**MG:** [Projects will] only succeed when there is mutual benefit

**C:** Two important questions: 1. So what? 2. Who cares? You need to be able to answer that.

### **Responses below are to questions 1 and 2**

*Question 1: How could the current legal and governance framework better enable progress towards fish-friendly flood control and habitat restoration behind dikes?*

*Question 2: What are the main conclusions we can draw from this? What do we need to do next, do differently, or do more of?*

**MG:** On the cusp of the change to the Fisheries Act. They are building back the program (DFO). These are the types of forums that DFO wants to engage.

**C:** To what extent are they influenced by the mandate letters?

**MG + E:** Hugely.

**C:** Then we should try to influence mandate letters.

**E:** Integrate things so they are built into the way you work and do not need to be in the mandate letters.

**C:** About priorities and policies.

**E:** Make it that it is so important that it is good that you are doing that.

**B:** Key is getting the province and the feds of the same department to work together.

### **Round 2: Deborah Carlson, Whitney Vicente, Ashley Doyle, Wendy Bales, Mark Zaborniak , Tyrone McNeil, Frank Van Nynatten, Queenie Yip, Stella Chui**

#### **Responses below are to question 3.**

*Question 3: With regards to governance, legal, and regulatory aspects of flood control management and ecosystem health, what was the most encouraging thing you heard, or what was the most concerning?*

**F:** Four main things I was made aware of 1. Fisheries Act that does not do much for fish. Poor governance right there 2. The fact that it is split between jurisdictions and no one knows who is in charge. 3. Local government has all been doing their own thing and that does not make sense and that is bad. 4. Not enough about climate emergency and climate change.

**W:** Reminds me that has not changed do not have the governance to do things they promise. Checks and balances help. Not hopeful. Fisheries used to be more effective. Now they are impatient and tell

them to go elsewhere always passing on. Pass the buck exercise. No doing what you are meant to be doing.

**A:** Finds frustrating since so much is tied to development. E.g., TMX looking holistically at things, solutions that are tied to projects that are further degrading our environment. One step forward two steps back.

**T:** Do we talk government to government to displace DFO, FLNRO. Provincial ministries, Federal departments [are] not doing the right things. Create body that usurps these with common environmental protections. salmon we determined the. Not govern correctly from Ottawa or Victoria.

**M:** Washington State is a model that we should look to.

**T:** State and Feds value wild salmon

**D:** We do not have that. How did they get it?

**W:** Only care about fish with monetary value but you need to protect the other stuff to protect the [salmon].

**Q:** Salmon only under federal [responsibility]?

**D:** Province has responsibility too but under Fisheries Act.

**Q:** We are just passing balls.

**A:** First Nations need to be in the driver's seat. Issue with capacity. So strapped but need the resources.

**W:** That is the problem with most government agencies.

**D:** Cost of governance that is relatively small. Money is around but we need to be careful in how we invest it.

**V:** Everyone is trying to go after these grants. It is wrong to have to rely on these to get regular thing done.

**T:** In that we do not have a common plan we need to maintain... do not have authority.

### **Round 3: Deborah Carlson, Whitney Vicente, Charlene Menezes, Suzanne Thorpe, Harvy Takhar, Gillian Fuss, Aaron Hill, Elaine Kenny**

*Question 3: With regards to governance, legal and regulatory aspects of flood control management and ecosystem health, what was the most encouraging thing you heard, or what was the most concerning?*

**H:** Waterboard streamlined approval. Three different agencies to get approval but the budget creates pressure in comparison to Washington State. Hopeful that we get streamlined so that things get done smarter.

**E:** Limited funding from Indigenous Services Canada original to do 1.3k, go through the process Water Sustainability DFO learning curve from First Nations perspective they do not have the experience. The stress is greater if they do not spend it then it goes back at the end of the next fiscal year. Did not get the funding. Then the government changed there was more money and they had to start from scratch again.

**H:** Construction windows.

**S:** Emergency response plan.

**H:** Push and pull and quid pro quo.

**S:** Trying to get funding through emergencies and then there is sacrifices to First Nations consultation or environment.

**E:** Will not compromise a project to get it done. Why can they not collaborate on consultations?

**H:** Time perspective.

**S:** Streamlined is desperately in need. Need more capacity on provincial side of people who go through the applications.

**E:** Knowledge of those people who are going through the applications.

**D:** More capacity in Victoria that will not address concern here. Need a plan to have the capacity to match things here.

**E:** Needs to be an organization like Fraser Basin Council. Something that is an outside organization that pulls the umbrella of all the things we are talking about pulls them all together as a whole looking at where the gaps are and working with different organizations and getting people to fill the gaps.

**S:** Broader than project approvals?

**E:** Broader like taking what Washington is doing and effective collaboration. An umbrella that takes care of all of the needs, funding. Who can help research, all these things. First Nations have more challenges because they have no capacity.

**H:** This 'body' should be able to give permits. Sign off on behalf of-

**E:** Governance has to stay in government. Be able to have an organization that knows how, is in power and is able to work collaboratively.

**G:** More coordinated approach puts more pressure on the government in a good way. Knowing the priorities and pushing them through.

**S:** Pacific Salmon Foundation that could do some of that.

**H:** Water Board like Holland.

#### **Round 4: Deborah Carlson, Whitney Vicente, Laurie Wood , Matt Connolly, Alan Jonsson, Rebecca Seifert**

*Question 3: With regards to governance, legal and regulatory aspects of flood control management and ecosystem health, what was the most encouraging thing you heard, or what was the most concerning?*

**M:** We need a coordinating body to deal with this. No one knows what the other person is doing. All these things going on and we do not have a good picture about what is going on [with] the river today.

**L:** Everything is stretched out and all over the place.

**M:** Funding should be organized, funding pockets are not. Having the funding is important.

**L:** Before the days of grants, government would fund these things. Now it is piecemeal and inconsistent. Want to roll back the clock a little.

**M:** Feds were paying and shut it down in 1997.

**R:** Shifting baselines regarding regulations.

**M:** Coordinated body should oversee all floodworks. Prioritize and do all the studies. FBC studies with no action.

**R:** Modelling on how the river should behave?

**L:** Important role for First Nations in that.

**R:** As participant or knowledge holders or both?

**M:** They are being both. The First Nations historical knowledge is different than science.

**A:** Period of change.. Changing the river and loss of wood and various other things. Not going to be able to deal with [by] just removing gravel.

#### Conclusions

**M:** Coordinated Body.

**A:** Use something that is already there. Take sections of all these groups and stick them together and come up with a coordinated response. The people are already there, give them a mandate.

**L:** A mandate.

**R:** Give them a mandate.

**M:** Like what they have done in Washington and we should look to that.

**D:** One of the things Bob [Carey] said is that they had a Request for Proposal before they had funding and asked what they wanted to build. A vision before they were able to fund it. If we could do this, what would it look like? Do not need to create a fundamentally new body.

**A:** Not have to be one official overarching thing. Mandate that is fundamental-

**M:** Harmonize legislation.

**L:** Prioritize. Partnering with First Nations

**M:** First Nations [are a] top priority.

### Notes from Post-its on Governance and Regulation

Question 1: How could the current legal and governance framework better enable progress towards fish-friendly flood control and habitat restoration behind dikes?

- DFO [must] come back to the table
- Get the issue in the budgets
- Neutral non-partisan leadership - do not rely on Federal or Provincial governments to lead - make external collaborations part of policy for government staffers,
- Include in the Ministers mandate letter.
- Get fisheries management and emergency management to talk.

Question 2: What are the main conclusions we can draw from this? What do we need to do next, do differently, or do more of?

- Prioritize the above actions.
- Need a champion, a coordinating body, a vision - too many silos.
- [Address] shifting baselines in regulations
- Need First Nations role - knowledge dissemination and partnership.
- [Attendees of the convening] found the Washington example encouraging. Fight the piecemeal approach, fragmented.
- Coordinated funding - go back to funding ongoing work.

Question 3: With regards to governance, legal and regulatory aspects of flood control management and ecosystem health, what was the most encouraging thing you heard, or what was the most concerning?

- Everything is tied to development. Increase the Salish Sea Initiative, only compensating for losses.
- Federal and Provincial government are passing the ball.
- Reliance on grant system for funding, instead need a common plan, leaders need to come together.
- Pacific Salmon Treaty trust funds.
- The U.S. presentation: bringing parties together: How do they manage politics?
- Water Sustainability Act delays - more capacity and local knowledge.
- We need to learn more about the Gibsons method of valuing ecosystems.
- Other jurisdictions are giving personhood to water, is this working?
- Need a simple message, clarify - farms, fish, flood - non-partisan.
- First Nations in the driver's seat - need to value this and provide resources.
- Challenge: Ca not 'amend' applications - have to start over.
- Clearly defined objectives and co-benefits - identify for the Fraser.
- Sustainable conservation funds for long term management.

- Emergency applications have negative impacts e.g.,: First Nations and environmental concerns.
- Who are the players/stakeholders, get the ear of decision makers.
- Leverage MLA support.
- Need a persuasive argument for politicians? Via millennials, as a constituency they can support innovation.
- Dutch Water Board is another example - streamlined - has connections to other government agencies
  - Here more than three agencies = delays
  - local government budgets - cannot carry over
- Legally mandate ecosystems as an essential service, critical infrastructure.
- Talk government to government about new governance.
- A new body that has regulatory authority with common values.
- Need our own body to govern here.
- One body to bring it all together - need funding and support First Nations
- Build stronger relationships with elected officials 'what is in it for them?'
- Greens support evidence-based approaches - encourage other parties to do so.
- Encourage Provincial - universal funding models, reduce silos.
- FLNRO and DFO - why not collaborate for FN consultation?
- Speak to people where they are. (So what and who cares?)
- Lack of clarity of responsibility: Federal, Provincial and Local. No management at regional scale.
- Multi-benefit approaches. Can get support from unconventional allies.
- Fisheries Act does not do enough for fish, not an effective agency.
- Not enough conversation about climate emergency.
- Further role for Pacific Salmon Foundation?
- Approvals process not effectively or timely.

## **Theme 2: Innovations**

### **Round 1 (Participants Unknown)**

***Question 1:** In the last two days, what forms of technical innovation caught your attention? What concerned you? Was anything missing?*

- Intrigued by the living dike project, an innovation that needs some work and research that could be brought into the regime (more coastal than river).
- Surprised by dike around the river so the river goes much faster and near the bottom there is problem, in Europe they let the water go more slowly rather than all at once. Somewhere to store the water. Dike[s composed] of sand – not very good. Narrower means more velocity in the river
- No one talked about herbicide and pesticide role in desiccation in fire hazards, soil, increase in runoff because of less forest and soil to retain water as it comes.
- Siphoning fish ladder is very interesting - Delta may have a cheaper solution such as flood belts.

***Question 2:** What are the main conclusions we can draw from the sessions that address innovative solutions? How has this experience changed your thinking on technological and ecological solutions to managing floods?*

- There is always a risk for flooding [no] matter how big your dikes and pumps are, you cannot become complacent just because you have dike.
- Killing two birds with one stone, reservoirs in the mountains – in drought years we use it, in rainy years we collect, this is being done in the Himalayas,
- More reservoirs in mountains affects the ecosystems out there - There are always give and takes.
- In gravel issues – gravel pits take them higher up to make reservoirs, still has an initial impact on the ecosystem. Should not be processing gravel in summer months and droughts – there are not cut offs for the gravel in for use of water, they do this for LNG, but not mining.
- [Participants] liked: The evaluation frame worked used in Washington for prioritization of projects
- What if we keep on degrading the soil, each year affects the others.
- In Holland is there a problem with smaller dike flooding and contamination with herbicide? Gerard Manshanden says no.

*Question 3: What do we need to do next, do more of, or do differently? What messages will you take back to your organization or sector?*

- Use fish-friendly technology.
- Promote getting onto the regulatory aspect of collaboration projects
- We are siloed, we need a multi-agency stakeholder approach and how things are interconnected with each other, one thing affects the other.
- Collaborating not only on same projects in different communities, but collaborating on different related projects that will affect one another.
- We have to share more information with each other – we might not have the political structure, municipalities do not have to talk to each other when we build a dike that will likely affect someone else.
- We are land locking places that should not be because of silt in the river.

*Question 4: Do the current options available to you have the potential to resolve your unique FCI issues?*

- There are not options for all situations.
- Everyone is lacking funding.
- FLNRO is supposed to be regulatory but do not have enough resources to help others.
- We all have different FCI and everyone does not know the others problems e.g., Coasts versus rivers versus irrigation.
- U.S. process is doing better - they get money out of feds and states.
- We give the power to the jurisdiction but usually not given enough money to do the work, the province should be at the table to provide solutions.
- We are all trying to get our own funding for our own projects - we should cooperate to get funding so everyone is involved.

*Question 5: What is the best way to communicate the available options? What are the opportunities for collaboration?*

- Joint funding opportunities between stakeholders.
- Collaboration at a regional scale, there is a gap between communities (communities have similar problems that they can work together)
- Municipalities need to know on the big picture, others are keeping their interests in mind.
- More collaboration especial on non-flood years, more proactive measures.

## **Round 2 (Participants Unknown)**

*Question 1: In the last two days, what forms of technical innovation caught your attention? What concerned you? Was anything missing?*

- Fish-friendly pumps, living dikes, wetland treatment.
- Innovation has not been a focal point, highlighted aspect of this.
- Washington is doing some good stuff.
- Not as much engineering innovation – more so innovation in ways to approach situations.
- How do we be innovative when people do not have clear goals, we need clear goals for innovation to really take off.
- Different things are happening but there is no collaboration.
- Innovation is just now starting to be talked about, more blending technologies. Together grey and green infrastructure. Next evolution is more ‘out of the box’ thinking.

*Question 2: What are the main conclusions we can draw from the sessions that address innovative solutions? How has this experience changed your thinking on technological and ecological solutions to managing floods?*

- DFO [representative] is shaking his head ‘no’.
- Tara [Martin] not managing for one species but multiple species, new frame work so how do we bring in into management?
- Importance of understanding what community goals are so they can drive innovation (just water then the solution is dike, for fish the solution is removing dikes).
- There needs to be more collaboration from the beginning of a project.

*Question 3: What do we need to do next, do more of, or do differently? What messages will you take back to your organization or sector?*

- Is there an appetite for other section of government to come to the table?
- More public understanding of the importance of government. and multi- approach
- We need oversight to help us with holistic mandate.
- We need to be aware of the problems and what our goals are.

*Question 4: Do the current options available to you have the potential to resolve your unique FCI issues?*

- We have a limited box in which dike innovation is allowed within funding guidelines (e.g., Cannot buy the land with funding received).
- We still do not have integration of ‘other eyes’, there are not a lot of people to call to give other perspectives/bring in their knowledge.

*Question 5: What is the best way to communicate the available options? What are the opportunities for collaboration?*

- Commutate the option in regard to qualities people care about e.g., birds, environment.
- Storytelling events that are local.
- Early communication in the super early stages of a projects.

## **Round 3 (Participants Unknown)**

*Question 1: In the last two days, what forms of technical innovation caught your attention? What concerned you? Was anything missing?*



- It was all new to city of Pitt Meadows representative, fish friendly pump design is hard to source locally, they do not have parts readily available for if there is a problem with the pump
- What Dave [Zehnder] said from Farmland Advantage. [It is] nice to hear what the farming community can do to become more environmentally friendly.
- Farmers do not seem to correlate [that] what they are doing causes damage that costs them more than 'fixing it would'.

*Question 2: What are the main conclusions we can draw from the sessions that address innovative solutions? How has this experience changed your thinking on technological and ecological solutions to managing floods?*

- Looking at what works for the whole system.
- Multi-benefit approach.
- Integrating alternatives, including how to make the replacement work.

*Question 3: What do we need to do next, do more of, or do differently? What messages will you take back to your organization or sector?*

- Public do not want taxes raised but get angry when they do not get something else that needs tax money.
- Idea of green bonds to support expensive [projects].

*Question 4: Do the current options available to you have the potential to resolve your unique FCI issues?*

- No, because it is all piecemeal (a little bit here and there), trying to plan ahead we need to be 'shovel ready'.
- What can we do for \$1 million versus how much do we need to do a certain action?
- Inspector of dikes does not have a budget.

*Question 5: What is the best way to communicate the available options? What are the opportunities for collaboration?*

- This workshop is good.
- Have something like this workshop more often for different groups to come together – or these events do not touch on environment agriculture or First Nations.
- How to get the environment brought into the strategy.
- In the Netherlands they have a website where you can go to that has different options for different kinds of infrastructure options there are – we should bring all different options into a website that has green. Natural. farmland all in one spot. Could be hosted at CivicInfo or standalone.
  - EG: <https://waterwindow.nl/>
- Are we achieving our goals (WWSS) – Yes, Lina Azeez thinks it is. Our goals were to bring a diverse group together, there was a diverse cross section, some are missing. They were invited but could not come.

#### **Round 4 (Participants Unknown)**

*Question 1: In the last two days, what forms of technical innovation caught your attention? What concerned you? Was anything missing?*

- Really liked the second American presentation (Skagit), how they gave everyone points for priorities. The whole model, realizing we will agree and disagree.

*Question 2: What are the main conclusions we can draw from the sessions that address innovative solutions? How has this experience changed your thinking on technological and ecological solutions to managing floods?*

- Fish-friendly, actually unidirectional pumps.
- Build on – we need to share and build on each other’s work, move to an open source database so all different people can use it.
- Not being afraid to try and test out different ideas, which can be hard when we are working on larger infrastructure projects. Is there a new way that technology can help mitigate the risk?
- Farmland was not answering about the chemicals around flood time and how to prevent run off, there are some gaps that we need to fill there.

*Question 3: What do we need to do next, do more of, or do differently? What messages will you take back to your organization or sector?*

- Come to the table (province) what is our role what tools do we have and what tools do we need?
- More of an ethical session [the convening] than leadership, we should have leadership get together that are updated on events like these once or twice a year.
- We can advise municipal council but cannot talk for them.
- Decision making is not separate from politics, how do we get them on board or get them to trust you to make the decisions?
- People are having trouble finding, have to pay for stuff ‘out of pocket’.

*Question 4: Do the current options available to you have the potential to resolve your unique FCI issues?*

- We need to speak to the whole watershed, to talk about water quality (e.g., People do stuff higher up the river that affect people lower down).
- Not enough discussion on the impact of soil loss ratio in association with freshet.
- Prioritizing projects rather than one off approach. Get very clear on how to start speaking with a unified voice on where investments should go.
- Very important to prioritize work and funds.
- What to see what was present in developing methods used in the US, it is so hard to make a system that is not just based on monetary damage.
- Marrying social and science.

*Question 5: What is the best way to communicate the available options? What are the opportunities for collaboration?*

- Talking to peers and colleagues, how can we make it resonate with a bigger audience, finding the value proposition to the different audiences.
- See more options in terms of models – Up river affects down – let us do some GIS mapping to be able to run simulations so we can see different scenarios.
- Run models to show people give and takes.
- Do not need to dike whole communities, we should not protect everything.
- Dikes do not always help because of upwelling of ground water, if you pump it too low we start to sink, so either leave or build up.
- Getting really clear on what it is and if you do not like it, then maybe you should leave.
- Surprising on how many people who are like, “Well, I have land so I should be able to do what I want.” – Entitled e.g., Subdivide in the floodplain.
- Increasing education opportunities, present it more intuitively.

- Move from being individuals to a new model that can manage everything about the floodplain.
- We need to make plans as communities that have similar goals.
- Where are we doing compensation, though it might not be in the same community.
- Taking people to the people who live on the river and hear from them, if you are not in the community it is not as easy to see, there is some dissociation.

### Post Its Notes for Innovation

Question 1: In the last two days, what forms of technical innovation caught your attention? What concerned you? Was anything missing?

- Living dike concept and how to bring it in.
- Dikes increase river velocity, keep water contained upstream longer, limit its flows and discharge.
- Herbicides and pesticides are causing problems in watershed e.g., killing soils and understory.
- Farm practices versus harm to receiving environment → need better links.
- Siphon fish ladders.
- Surface values and conflict and keep people engaged.
- [Attendees] liked the US Skagit presentation with giving points of priorities.
- Blending existing technologies for an approach e.g., marsh setbacks with pumpsations.
- Fish pumps
- Innovation was not really the focal point of the workshop.
- Need process to understand what we want to innovate, need goals.
- Need for collaboration.
- Enjoyed looking at watershed management in different ways e.g., Farmland Advantage.
- Hard to source some equipment locally.

Question 2: What are the main conclusions we can draw from the sessions that address innovative solutions? How has this experience changed your thinking on technological and ecological solutions to managing floods?

- Disappointed about Environmental Farm Plan and how it addresses deleterious chemicals and runoff.
- Not being afraid to try, learn, improve - do not just continue the old ways. New technologies can help mitigate risk.
- Unidirectional pumps - come back into the system.
- Technology of lidar. Use open source database.
- Integrate alternative thinking into flood protection designs - integrate environment into replacement.
- Multi-benefit approach.
- Importance of understands community and stakeholder goals.
- Multidisciplinary thinking : biology, engineering, geology from the ground up.
- Tara Martin's present - Species at Risk Act and multiple species management.
- Could create reservoirs to slow floods and provide drought relief.
- Give and take for all the projects.
- More timing of maintenance depending when climate conditions e.g., gravel and LNG.
- Washington - evaluation framework for affordability, benefits, and impacts.

Question 3: What do we need to do next, do more of or do differently? What messages will you take back to your organization or sector?

- New, fish-friendly technology exists.
- Collaboration needs regulatory cooperation to be able to advance.
- Siloed currently, need multi-agency approach.
- Connectivity - need to look at codependency of issues.
- Need to listen to each other.
- Need to bridge technology and leadership.
- Statutory decision-making has authority over many of the issues beyond what we come up with.
- Come to the table willing to discuss your role and available tools.
- More technical than leadership. Also bring together in leadership roles e.g., meet and discuss.
- Innovation options and discussions between organizations.
- Idea of green bonds to support expenses.
- Challenge organizational boundaries.
- Communication regarding public understanding importance of government and multi-agency approach.

Question 4: Do the current options available to you have the potential to resolve your unique FCI issues?

- How to value? e.g., social science, technical and costs.
- Not enough discussion on impact of SLR in association with freshet.
- Cannot manage floods and flood risk by only focusing on the lower Fraser - need to look at the whole watershed.
- Discussion regarding sub-regional aspects once know more on whole watershed.
- Prioritize subregion to focus on work and funding.
- No. Funding: limited innovation, limited spending, no money for designs.
- Need relationship building.
- Capacity and industry knowledge.
- No, all piecemeal
  - o Apply grants, need permissions, shovel ready, leaves no time to do good planning.
  - o What do we need to do for a good project versus a shovel ready project?
  - o Learned a lot technically
  - o Governance is key
  - o No. Need First Nations funding
    - Lack of understanding of the difference in watershed (coast versus river versus irrigation).
  - o Higher levels not putting resources into enforcement.

Question 5: What is the best way to communicate the available options? What are the opportunities for collaboration?

- Good participation from many agencies and organizations.
- Interactive website with potential options (e.g., Use CivicInfo) - technological options, Farmland Advantage, green infrastructure.
- Storytelling training.
- Good visualizations.
- Bring it home to community.
- More events like this workshop to share info between groups.
- Climate focus needs to integrate into environment.
- Communicate options in relation to the values they care about.

- Joint funding opportunities between stakeholders.
- Collaboration at sub-regional scale.
- More collaboration outside flood years - more proactive than reactive.

### **Theme 3: Research and Monitoring**

#### Key Messages:

- Need for Fraser River umbrella organisation for communication, sharing research and of course strategic planning and synergy.
- Lack of monitoring and then total lack of sharing/accessing results of monitoring (how do we learn effectiveness of restoration if we are not sharing with each other?)
- City councillors and staff need to be looped into this learning.
- FLNRO mandate is limited to dike regulation – flood control oversight is too limited.

### **Round 1: Ashley Doyle, Suzanne Thorpe, Gillian Fuss, Chloe Hartley, Stephen McGlenn, Craig Orr, Matt Connolly**

*Question 1: In the last two days, what caught your attention when it comes to knowledge gaps and monitoring practices? What was the most positive thing you heard? What was the most concerning?*

**All:** Jonathan's presentation.

**M:** Effects of flood gates on diversity and oxygen, conveying this knowledge.

**A:** Main concern: Effects of upstream infrastructure on downstream.

*Question 2: What are the main research needs for informing decision-making and planning and who must address them? What are the opportunities for collaboration?*

**S:** Flood plains- determined how much habitat needed for chinook (2700 square metres needed for chinook. Determining fish needs – following the Washington Puget Sound idea). Super useful and interesting idea for setting goals.

**C:** Still need to have standardized data collection and way to bring this research together.

People like habitat indicators of Pacific Salmon Foundation (Charlotte Whitney).

*Question 3: Are current best management practices being followed? If so, are they sufficient for pre- and post- project monitoring? Where are the gaps? What are the challenges? Who should oversee the work?*

**ST:** – Who is monitoring?

**A:** Where is Fraser River Estuary Management Program (FREMP), Burrard Inlet Estuary Management Plan (BIEMP).

**C:** Return to regional planning

**ST:** Federal government is point of communication but not working. You throw your proposal into black box and needing to explain work to new government agent each time.

**G:** Habitat mapping overlay by jurisdiction and legislation (navigable water, contaminated sites) research what might work for the region.

**SM:** Indigenous Guardians program, training needs

**ST:** Need for enforcement too and First Nations can take on more of this role. Water Sustainability Act can take over where DFO falters. But First Nations as enforcement would be good.

**A:** Applying for Indigenous Guardians.

**CO:** Money is getting there for monitoring (sea lice budget).

**M:** Too many small groups need bigger umbrella organisation to get things done. Each person inventing the wheel.

**G:** Secretariat might be able to play the role of bringing people together.

**ST:** Many groups together – when they got together they saw lots of small tiny projects that no one knows about, so many projects people did not even know about.

**CO:** There is a registry of Fraser River Restoration project registry.

**G:** Are the project's success being tracked? Lack of monitoring and bringing together.

**A:** Who should oversee this? Ministry of Information. Need a regional approach, prioritize actions to cost-benefit.

## **Round 2: Elaine Kenny, Lina Azeez, Craig Orr, Chloe Hartley**

*Question 1: In the last two days, what caught your attention when it comes to knowledge gaps and monitoring practices? What was the most positive thing you heard? What was the most concerning?*

**E:** There seems to be a lot of research but monitoring....

**L:** Pacific Salmon Foundation – like but based on spawning not on overwintering and not on rearing, resting and outgoing juvenile salmon. Mike Pearson- Need for longer term monitoring but bigger intervals in between surveys (to be economical).

**E:** Restoration projects – DFO requires five years of monitoring – what happens after that? How to ensure maintenance and monitoring going forward.

**L:** Piecemeal approach again, need bigger picture.

**E:** How effective is data? Do other organisations learn from this data?

**E:** Succession planning? For monitoring, where does this data go?

**CO:** More mentoring.

**L/E:** Need a bigger body! A coalition group to receive funding, at arm's length, centralized, key information coming in, tracking and monitoring.

Fish, Flood and Farm initiatives / Floodplains by Design – state, federal, private, public funding (green bonds)

*Question 2: What are the main research needs for informing decision-making and planning and who must address them? What are the opportunities for collaboration?*

**E:** Lack of collaboration, finding gaps.

## **Round 3: Laura Dupont, Steve Litke, Polly Hicks, Gerard Manshanden, Alan Jonsson, Wendy Bales, Craig Orr, Chloe Hartley**

*Question 1: In the last two days, what caught your attention when it comes to knowledge gaps and monitoring practices? What was the most positive thing you heard? What was the most concerning?*

**S:** Lack of monitoring

**G:** Lack of cooperation, make a coalition to cover the whole watershed.

**P:** Watershed approach, unified vision – if you have set goals you do not need all 60 at each meeting.

**A:** [Lack of] trust.

**L:** Lots of good solutions out there.

**S:** – Living dike concept very positive, need more research but great proof of concept.

**W:** Government is ineffective, cannot make decisions, impotent, downloading to municipalities.

*Question 2: What are the main research needs for informing decision-making and planning and who must address them? What are the opportunities for collaboration?*

**W:** Impacts of herbicide, herbicide in forest. Impacts of debris flow runoff coming down the Fraser.

**S:** Impacts of land cover change.

**A:** We already know quite a bit, we should go ahead.

**P:** Set your goals to inform decision-making.

**W:** Separate profit from regulators.

***Question 3:** Are current best management practices being followed? If so, are they sufficient for pre- and post- project monitoring? Where are the gaps? What are the challenges? Who should oversee the work?*

**All:** No, in fact, what is the list?

Research gap: Lack of knowledge of Best Management Practices

**L:** Municipalities could be doing this but no resources. Feel very removed from the Feds and the Province. People with local knowledge are the ones who should have power.

**P:** Democratization of the data for monitoring.

**L:** Even across municipalities we are all doing silo research using consultants, work together.

#### **Round 4: Stella Chui, Queenie Yip, Bob Meachen, Mark Zarborniak, Craig Orr, Chloe Hartley**

***Question 1:** In the last two days, what caught your attention when it comes to knowledge gaps and monitoring practices? What was the most positive thing you heard? What was the most concerning?*

**B:** Bringing farmers in, economic benefits.

**M:** We could do a lot more with monitoring.

- Monitoring of effectiveness of projects, results.

**CO:** Duration of monitoring.

**S:** Learning a lot as an engineer. Good for engineers to understand fish but also for environmentalists to understand engineers – need to protect public safety, first goal. Share information back and forth between engineering needs and environment needs.

***Question 2:** What are the main research needs for informing decision-making and planning and who must address them? What are the opportunities for collaboration?*

Municipalities need this information.

**M:** Lack of inventory of green infrastructure there too.

**M:** Missing governance. Use Washington model.

**B:** We are addressing, bringing up issues but what are we getting done, who becomes the catalyst for change?

***Question 3:** Are current best management practices being followed? If so, are they sufficient for pre- and post- project monitoring? Where are the gaps? What are the challenges? Who should oversee the work?*

**M:** Build back better.

**S:** Infiltration goal. Usually go out to consultants who have the knowledge. Benefit to integrated stormwater.

**Q:**

- BMP is just about the dike – not for new technologies – BMP need to be updated.
- Understaffed, cannot monitor dike maintenance standards.
- Water Sustainability Act outside of their department.
- Dikes are not the only thing that can solve these problems but the only thing that is under FLNRO purview
- Funding on research and structure, but engagement not funded.

- Funding needs to cover more.
- Mandate of FNLRO is too narrow because only covers dikes but the issue is much broader.

## **Theme 4: Funding**

*Question 1: What in the last two days your attention regarding capacity and funding needs for progressive flood management and habitat restoration behind dykes? What forms of capacity building are required for such projects to be successful?*

- Funding from First Nations perspective is a challenge. Need more capacity as there are a number of gaps.
- For progressive ideas, may need more time and more capacity. Creativity needs time and process.
- Funding cannot wait for politics. Not working on 3- or 4-year election cycles.
- Need to be non-partisan.
- Need to have a better understanding of timeline and broad funding timelines. Need to know it will be there for more than four year.
- May need a regional approach.
- Mass purchases. Economies of scale.
- Having a convener.
- Should be on 10-year timeframe. Know what you are getting and for how long far earlier.
- List of grants.
- Government wants shovel ready and to make it look good. Not realistic.
- Have government funding passed to a not for profit to redistribute. Non-partisan then and the total amount would be given every year regardless, then it is distributed by the organization.

*Question 2: How has this experience changed your thinking on funding and other forms of capacity building for greener models of funding management?*

- Demonstrated that we may have the tools, but the resources are not being used.
- No.
- No.
- Yes. Indigenous perspective positively challenged with respect to view of farmers. Seems they may now be interested in working with them. Great opportunity.

*Question 3: What resources do you think are needed to ensure you are successful in making the needed change on this issue?*

- Need more time. Things are always too short term.
- Money.
- Need to take advantage of local or traditional knowledge.
- Communication.
- Stronger leadership.
- Having a champion.
- Leadership authority – Like a Lower Fraser Flooding Authority.

*Question 4: What is the best way to manage resources and funding to ensure your role in managing watersheds floods is streamlined and successful?*



- Organization with a clear mandate that can do more and group more capacity. Bigger and better and more than Fraser Basin is.
- Incentives to grow new crops.
- Limited communication is a real issue, find a way to break that down.
- Can you make it politically untenable to not fund?
- Can you leverage alternative stakeholders or bodies (say military [not actually, but saying as a currently unengaged organization]).
- Joint capacity – sharing building space. Think campus. Share resources and space and time and staff.
- More group meetings and time together. Be a coalition.
- Create an Indigenous role or organization resourced and trained to be the contractors to do this work for them that they are not resourced to do.
- Develop a long-term working group.
- Bring in other jurisdictions or more research into alternatives.
- More interest in funding and capacity issues. Not that it is an issue or being worried about it, but people on the issue of solving it. There are a lot of people in science and leadership, very few on policy and funding.
- Need to identify scale for what you are talking about first. Funding for what level? For what kind of capacity? Building structures and infrastructures or for staff, and organizational and time.
- Database for shared info and data.
  - Funding opportunities, grants, etc.
    - Federal, Provincial, Private, Indigenous,
    - For different kinds
      - Health, environment, Indigenous
  - Research, ideas, models used, funding applications, projects, parties, stakeholders, etc.
- Really need to think bigger. How do you really affect change? Think way outside the box.
- Questions too long and complex to answer in manner asked.
- Private funding (YVR potato example).
- More meet and greet.
- What are your issues/what can I do for your time.
- Break up the day more. More on problem solving in groups. A few less lectures. Break the lectures up a bit.

## Notes from Post-Its

*Question 1: What in the last two days your attention regarding capacity and funding needs for progressive flood management and habitat restoration behind dykes? What forms of capacity building are required for such projects to be successful?*

- Central database with all available grants and due dates for proposals
- Lack of funding and regulatory support for innovation
- Including environmental considerations in building funding programs
- Non-partisan , predictable, consistent
- Regional approach to 'bulk buying' flood infrastructure
- Money for pilots for fish-friendly innovations
- Fund beyond narrow politically motivated time windows
- Incorporate longer term planning, assessment, monitoring...not just shovel-ready
- Need for a convener to link objectives

- From a First Nations perspective, need better support regarding capacity building for project management. Consultants not doing a good job for First Nations. Suggestion to have a qualified project management assist First Nations with understanding work through DFO and Provincial regulation e.g., WSA
- First Nations have unique challenges in addressing flood management and capacity
- Sharing ideas/funding with FBC
- Find solutions that meet multiple objectives
- Similar to Room for the River
- Separate human capacity from human capital
- Funding for studies is not there because governments want to fund shovel-ready projects. But we need studies and engagement support together projects shovel ready

***Question 2:** How has this Experience Changed your Thinking on Funding and other Forms of Capacity Building for Greener Models of Funding Management?*

- No
- Pay farms for following potential crop change
- Politically neutral 3rd party entity (e.g., FBC) to hold funds from Feds/Prov to relocate to region
- Entity decides/helps determine projects that should be done in a meaningful priority
- USA has more supportive legislation

***Question 3:** What resources do you think are needed to ensure you are successful in making the needed change on this issue?*

- Money
- Local knowledge
- Leadership
- Time
- Flood authority
- Empowered to innovate and try new things
- Champion
- Political will
- Build capacity to develop flood authority, separate from existing regulatory bodies and comprised of local leadership

***Question 4:** What is the best way to manage resources and funding to ensure your role in managing watersheds floods is streamlined and successful?*

- Set long term goals
- Bring projects in house
- USA - the Skagit example
- Budgeting and planning
- Non-political
- Strategic planning, not tied to changes, political will
- Allow natural asset management 'on the books' to allow local govts to raise money
- Value and include full inclusion of leadership included

***Question 5:** What do we need to do next, do more of, or do differently? What messages will you take back to your organization or sector?*

- Value ecosystem services
- Better communication of what the USA is doing and how all that ties together

- Must be multiple benefits
- Think about a regional approach
- Incentive to grow different crops

## **Theme 5: Planning and Prioritization**

### **Round 1: Riley Finn, Ellika Cairns, Bob Meachen, Aaron Hill**

*Question 1: In the last two days what caught your attention when it comes to identifying waterways for restoration and flood management?*

**B:** Pitt Meadows with 80 km of dikes and mostly farmland. Farmers are already concerned about the water in the ditches being very poor quality and cannot put it on their fields anymore. Need to pay lots of money to use potable water, concerns over water restrictions with drought.

No inventory of all dikes. Pitt Meadows first needs to build this inventory (in the works). Does spending money on this actually make sense? Situation with weeds is so bad that there is almost no hope.

Invasives are growing so quickly.

**A:** From this, sounds like prioritization: invasive species, farm practice, water quality for farmers

**B:** Farmers do not want to do this. Has heard that they think there is too much cost - giving up the acres of their land. Getting mixed messaging from them because they do not want to spend money on environmental work but also want clean water. Issue - no flow, lots on invasives. Taking out about a truck full of weeds each day, and keeps coming. Taking back to the City of Pitt Meadows. Need to bring people like Lina Azeez in to talk to them.

#### **All**

- Shared values with farmers and environmentalists
- Multi benefits - need to identify these and be able to measure them
- Land values - Farmers do not want to give this up. If they are compensated fairly for the land, they would be more receptive. Need to educate with this - let them know what is in it for them.

*Question 3: What should we be measuring or monitoring in order to assess waterways/structures against important values?*

#### **All**

- Resources to contact the people at this gathering
- Prioritization tour of the sites
- Allowing leaders to rank the values - identify values, identify project scopes, and evaluate the priorities of those projects

#### **Riley**

- Working on prioritizing the sites based on the habitat
- Further work would be looking towards the cost analysis
- Potential issues - there are lots of constraints,
- Difficult to quantify certain issues. Upstream habitat can be quantified, and data collected.
- Reserved lands as being an afterthought.
- Value - the UN declaration and the 10 principles. Free prior and informed consent. Distinction based approach.
- Recognizing rights to the land
- Not having indigenous people and rights as just an afterthought. Needs to be incorporated in preliminary discussions
- This work needs to improve salmon habitat - a positive impact
- Whose dikes are being blown if there is a flood? Diking alone not the solution - broader

- Managing a small area
- Poor forest practices are also a big issue, bringing gravel into the river. Management upstream is having large impacts downstream here.
- Should be shared decision making - not as part of the public but part of the leadership.
- Weighting stakeholders with the same value. Understanding that priorities will be different but are all important to consider.
- Making sure all standards are maintained across city boundaries - need communication together (management of the same waterways)
- Need a separate process from the Fraser River Basin Council
- Community to Community Forum

## Round 2 (Participants Unknown)

*Question 1: In the last two days what caught your attention when it comes to identifying waterways for restoration and flood management?*

- Issues in the lower basin - need to start with the whole river and then go more local
- Need good communication between municipalities and need for an overall “master plan”. Not just the lower mainland.
- Need a model that will encompass the entire watershed. Big model.
- Habitat restoration
- Amount of habitat needed to restore the species to a certain level. Example from past project -
- How do you prioritize the value? Is it the fishery value?
- What is the potential carrying capacity?
- Prioritizing species at risk. Which species at risk are we prioritizing
- Can we place a monetary value on these things? Might be the only way to sell to politicians / public
- Killer whales / other species to consider - value of the species as an ecosystem resource
- What if each municipality prioritizes different species? Might be a consideration - but is this a regional perspective or municipal?
- 

*Question 2: What do we need to do next, do more of or do differently? What message will you take back to your sector/org?*

- Urgency of the upgrades
- Where we can make the greatest impact?
- Make sure that we are weighing the potential outcomes properly, based on values

*Question 3: What should we be measuring or monitoring in order to assess waterways/structures against important values?*

- Values - logistical feasibility of potential infrastructure. How do we measure this?
- Cost-benefit analysis

*Question 4: What are the important values to consider in assessing and prioritizing flood control structures for upgrades and associated waterways for habitat restoration?*

- When do these infrastructure pieces come up for upgrade anyways?
- Costs - liability with not doing the infrastructure. Many lawsuits as a result of improper management. Looking at retrofits so that they are less liable for failures.

- Criteria - opportunity. When there is a renewal, it is an opportunity for another technique of management. Testing out the options

### Round 3

*Question 1: In the last two days what caught your attention when it comes to identifying waterways for restoration and flood management?*

- Opportunity to open flood gates during freshet, risk of flood
- Technological ways to improve fish habitat
- Through upgrades to increase flow in a safe way
- Considering all the potential stakeholders - farmers.
- Multi-criteria tools - helpful to decide what the levels of criteria are
- Need a co-ordinating body that can link discussions all the way from Hope to the mouth of the Fraser. Not working together right now.
- Standard practices in some communities are different from others
- FREMP
- Funding to encourage collaboration regionally
- Flood management, farmers, communities, etc.

*Question 2: What do we need to do next, do more of or do differently? What message will you take back to your sector/org?*

- Public safety, infrastructure safety
- Farming, environment
- Value of other peoples' perspectives
- Property values that will decrease with lost last
- Balancing values - wanting food production to remain local
- Agricultural land on river-side of dikes. Can integrate
- Thinking ahead - 100 years out. Surrey as an example
- Capacity potentially an issue - for collaboration especially
- Need another organization like FREMP - somebody that organizes the collaboration across the entire Fraser River, holistic view. Possibly a regulator body. Keeping all values and groups in mind.

*Question 3: What should we be measuring or monitoring in order to assess waterways/structures against important values?*

- We need leadership / collaboration between groups
- Kent not wanting to be part of Fraser Basin Council - too much studying and not enough action. At what point is there enough data to act?
- Funding is an issue - how do we scale projects and balance the risk

### Round 4

*Question 1: In the last two days what caught your attention when it comes to identifying waterways for restoration and flood management?*

- Variety of different perspectives - not sure because there was so much.
- Fragmented waterways - awareness.

*Question 2: What do we need to do next, do more of or do differently? What message will you take back to your sector/org?*

- Need for a project that considers prioritization - but more than just the work Riley is doing with habitat (municipalities responsible, funding availability, agricultural land).
- Considering that there are people living next to these waterways - education on how to keep the waterways healthy. Value = the presence of people who are there and willing to contribute. Engaged community members
- Hydrodynamic modelling - look at multi-benefits (fish, flood, farm as three big values).
- Probability of the action to have intended effect and of it actually being implemented. E.g., thinking about competing uses of the land.
- Farmers or anyone with water in their land need to know that there is a “backup” / “safety net” option. Need to make the public comfortable.
- Technological innovation presentation - do not need to sacrifice safety.
- Capacity is an issue. Small nations = small capacity. Monitoring and maintenance does not always follow.

*Question 3: What should we be measuring or monitoring in order to assess waterways/structures against important values?*

- Looking at the age of infrastructure
- How do we quantify certain things?
- Scale matters - small waterways versus larger rivers.
- Need to determine values before we prioritize. What are we prioritizing for?
- Maybe a different set of values based on what your background / lense is
- Fisheries values, liability,
- Having each group set the values and put their own prioritization criteria. Can't have everybody match up with the same values.

*Question 4: What are the important values to consider in assessing and prioritizing flood control structures for upgrades and associated waterways for habitat restoration?*

- Theme of governance - need an umbrella organization to bring all the pieces together, identify gaps, lead communication, help with research collaboration
- Communication is essential.
- Floodplains by design model - created a working group, initiated by native conservancy, which is bringing feds and local governments to the table
- Possible to use an existing organization as this leadership? Fraser River Basin Council as a suggestion.

## **Notes from Post-Its on Planning and Prioritization**

*Question 1: In the last two days what caught your attention when it comes to identifying waterways for restoration and flood management?*

- Everything
- Using water for fish and farming and water quality
- Technological upgrades

*Question 2: What do we need to do next, do more of or do differently? What message will you take back to your sector/org?*

- Education and ecosystem health
- Need for leadership

- Business planning approach could be used
- Need an overall plan for the Fraser
- Master plan for floods
- Accommodate range of values
- Expert communication
- Prioritization tool needed to rank by values (vigorous and transparent)
- Identify where multiple benefits and values lie

*Question 3: What should we be measuring or monitoring in order to assess waterways/structures against important values?*

- Other perspectives
- Local food production
- Public safety
- Pollution protection
- Species at Risk
- Presence of at risk species
- Quantifiables eg: amount of habitat
- Costs and benefits to farmers (beyond the money)
- Amount of habitat needed to restore salmon populations
- Which SAR are using the habitats or would use if accessible
- Where can we have the greatest benefit
- Opportunity: age of structure: is it due for upgrade, what is the extra cost of making it f-friendly

*Question 4: What are the important values to consider in assessing and prioritizing flood control structures for upgrades and associated waterways for habitat restoration?*

- Liability, cost of not upgrading
- Land ownership
- When to take action
- Risk of failure
- Costs
- Leadership and capacity
- Weigh stakeholder input properly eg: give everyone equal weight
- UNDRIP, especially FPIC #6 and Principle #10
- Invasive species management
- Potential value to fisheries

## **Theme 6: Farmland Advantage, Concurrent Session**

**Participants: David Zehnder, David Poon, Carol Paulson, Michelle Koski, Mikayla Roberts, Kerstin Switchenberg, Dave Melnychuk, Christine Terpsma, Meghan Rooney, Bree Seabrook (on call but background noise made it difficult to listen to/ participate in discussion.)**

### **Conversation on moving Farmland Advantage into a long-term program**

**DZ:** Any questions on the approach or what we are doing?

**Consensus:** No

**DZ:** For Township of Langley (TOL) scenario- TOL has been supportive of Farmland Advantage (FA). Looking forward, TOL wants to implement FA in collaboration.

**DM:** We have to go back and tell our story and find suggestions on how to move forward. We have a lot of positive feedback and asking people what they thought of the program, do they support it in the long term? There is a limit in what they want to pay, but they want to move forward and duplicate what was done in the Kootenays.

**CP:** Farmers support this but they think the community needs to support this, that this is an initiative that is supported provincially.

**DZ:** Provincially coordinated but regionally delivered.

Michelle- Investment agriculture has a long history of supporting programs.

**DZ:** Investment Agriculture Foundation of B.C. (IAF) would be supporting this at the provincial level.

Where we are at and where we want to go, looking at the TOL scenario.

How will this look at the programmatic scale. Provincially coordinating body with Investment Agriculture. Looking at the initial 10 years of a long-term program. Ecological services take a long time to restore.

TOL has unique issues to restore, especially with Bertrand Creek. Pollution issues, international challenges as the United States asking the province to do something with the creek [as the creek flows into the United States].

These are the problems we are looking to resolve.

FA prioritized locations for restoration

Focusing on five streams in the TOL. Farmers will be contracted to put in Best Management Practices (BMPs) working with Environmental Farm Plan (EFP) to work on and fund those initial BMP efforts (cattle fencing, riparian plants). Ongoing maintenance is key for project success. Projects work together to build connectivity

**DP:** How do you pick sites?

**DZ:** Spoke with Langley Environmental Partners Society biologists, and others, including local biologist Mike Pearson. Narrowed down to regions (Okanagan, Kootenays, Lower Mainland) and then to sub-regions.

**MR:** In any pilot projects was that work taken on by farmers or do NGOs do it, or putting land into land trust in order to maintain land?

**DZ:** Contracting the farmers to do the maintenance work or could subcontract with a group such as NGO to do the work. Hopefully it is the farmer doing the work, we are going to reward the person who is actively doing the work. They get the money.

**MR:** There are lots of small parcels in TOL.

**DZ:** Anticipated this, looked at bigger pieces of land and apply a bigger approach, smaller approaches for smaller sites. Those smaller areas are not really a farm. Do not want to put too many resources towards those small sites. *[Assume this is due to limited ecological benefit for the cost]*

There is the small scale and large scale- large falling into this BMP approach

Initially set up the funding and the program through the IAF. Then establishing the stewardship contract with farmers and how much they get paid per year, if there is any training needed for farmers, and they will implement the project. this will include baseline monitoring and then reassess after the work has been done, then follow-up with the farmers, reassess program and rework it where necessary.

Assumptions are that we have funding secured at start-up, IAF is involved, there will be local coordinator (lower mainland coordinator, for example)

Envision a mosaic of programs to get the regional scale.

**DM:** Metro Vancouver and Fraser Valley Regional District can play a role in this due to their interest in invasive weeds, species at risk.

**DZ:** There are interests at various levels of government and other orgs and put that money into a funding pot and then the farmer deals with that one pot. Minimizes paperwork and bureaucracy. Farmers like it, maintain it, buy in- based on pilot project



The program is not selecting for farmers, but for prioritized sites. But almost all farmers have committed.

**KS:** Is this true in my area? [*Referring to buy-in / interest of farmers in joining FA in District of Kent*] Everyone has more cows, producing more manure, Dwayne Post [*Name could be incorrect*] says that the money that is being offered [*by FA for PES*] is not worth it in the grand scheme of things.

Reconcile what dairy is doing with the money you can get from this program

In Langley are we talking dairy farms where \$2000 is not worth the trouble [*Farms are too big, so the monetary incentive of doing the work to restore ecosystem services would not be worth the time*] or are we talking 10 cows [*Very small farms, would (likely) not be suitable for the program*].

**DZ:** The money offered in the pilot was arbitrary, was not based on the potential of their project but their willingness to support it.

**CP:** Compensation needs to relate to the amount of work required by the farmer

Doing a cost-benefit analysis, we need to come up with a number that is rational

**KS:** If we keep distributing more quota, people are using more land to distribute nutrients, what do we have to pay the dairy farmer as we have to reduce the size of the farm.

**DZ:** Farmers can't deplete the land anymore. Farmers options are limited. We are going to where we have the most potential, Agassiz is an outlier [*I believe this was in regard to a lower interest in participating in FA*].

Need to focus on the funding, the common funding pot. There is an interest in TOL to establish a local fund. \$10 a parcel – [*will create*] \$400 000 alone from that. Provincial funding with own requirements, we will give money, but for it, we want certain goals obtained.

FA will prioritize project funding to reach those goals

New initiative from UBC, food purchase offsets, when consumers go to buy food, they will offset the impact of the production of that food. It is an example of another funding source that can go into that pot. By combining funds into pot, more secure, farmers are dealing with only one entity

**MK:** What is the funding mechanism? Tax?

**DZ:** one form, a new tax initiative, bonds.

**MK:** SRI in Okanagan.

**CP:** TOL asked on survey: would you support an itemized line on your municipal taxes for this purpose (local conservation fund), most said yes. Asked how much money they would support putting towards this- 76% said they would pay up to a certain amount.

**DZ:** In Kootenays they pay \$20. Held focus group and to capture willingness to pay. When they know it is funding initiatives in their region, when there is trust with those running the program, the community is more willing to put more money towards the initiative. People can see the effects locally [*and are more willing to pay into it*].

**DP:** So \$400K from property tax in TOL. How much more above \$400K are you looking for, for the cost of the project? What the ask for the provincial government

**DZ:** We want to have a conversation on this with the parties involved before we put a \$ amount forward

**DM:** The province should be receptive to a 50% share. Used to be broken down by 1/3's: feds, prov, locally. There should be an equal contribution.

**MR:** The township is supportive of this work and support for the proposed tax and supportive of an equal partnership.

**DZ:** When the province comes to the table, there is more support, and vice-versa

There are prov entities, EMBC had funding that could support this initiative.

Want the moral support from the Ministry of Agriculture.

Cattlemen, farm groups are interested (and minister?) Said the province should develop PES program

**KS:** How supportive was the council in TOL?

**CP:** 100% support.

**DZ:** Head planner at TOL- there is strong support from the beginning and understanding of the direction of the program

**MR:** Very strong support.

**CP:** Supported over multi-elections

**DP:** I hear the interest of the ask, appetite for the program, wise to take another look at this: if there is more low hanging fruit to tackle, there is monitoring required here. **Cap funding** (DP- bolster the business case for this work)

**DP:** Need to work on this for fecal issues, bacterial source tracking,

**MK:** Has the ministry made an ask for money

**DZ:** [*The ask was*] combined with other line items but when it hit treasury it was turned down, but ministry is still interested

**DP:** Can take a look at what has been done, where we can go. Look for low hanging fruit, can support not directly through IAF, Ministry can pay for monitoring of some BMP to build support.

**DZ:** IAF could coordinate that

**DP:** There are things that can be done easily that don't require an ask. Water quality monitoring, nutrient management, looking for synergies.

**DM:** To deal with WQ issues, we need a source of funding that are beyond the EFP program

**DP:** That has been a limitation

**DZ:** Not eligible under the BMP, that would have a big impact in the community

**DP:** That is what is special in the township, hard to put cap dollars to that. We have to go beyond cap

**DZ:** Also [*need to address*] the potential for this [*FA*] to affect flood mitigation

**KS:** Asked if FA has approached Kent

**DZ:** Haven't approached district of Kent due to low of support

*Bob Carey (The Nature Conservancy, Washington) joins conversation*

**DZ:** New to payment for ecological services, has U.S. had this component to it?

**BC:** In Skagit, created a farming-for-wildlife program, testing ability to incentivize building wetlands. Was successful, had farmers competing over who had more birds in their fields.

Started as a demo project to encourage Feds to incorp into farm build. Similar to barley for birds.

Focused on building wetlands between crops. Tried to see if potato farmers could rotate and have one year where they have wetlands, to restore nutrients to fields before replanting with potatoes. Bermed and flooded fields to create wetlands

**MR:** [*Was there*] compensation for that?

**BC:** Not sure, the pilot showed it could work out.

**DZ:** US agri branch has a department that deals with PES. We have a method that we can look to, to implement

**DZ:** We envision a funding pot that is delivered through a single entity. Bree- can you talk to CBT? Is there a possibility of the CBT to contribute to this, hypothetically, what are the possibilities?

**BS:** There are groups that are interested in this. Aligns with objectives under enviro but there are some restrictions. If there is increased interest, CBT would be interested

**DZ:** Run the program for 5-10 years- nobody wants to fund a bottomless pit; how do we manage that without scaring off funders? Want to do this with a timeframe and then do some reanalysis, either continue to run it, modify it or terminate it [*after the predetermined time frame*]. Do you think this approach is wise? Should it be a 5 – 10-year program?

**DM:** Should be 10, it takes time to make connections with farmers, to determine ecological benefits over time. Should be a minimum of 5 years.

**KS:** Did you ask TOL about time frame?

**CP:** No, no limit.

**MR:** Minimum 5 years, ideally 10

**CT:** Grassland set aside program, encourage farmers to plant grasslands for a period of 5 years, to see improvements resulting from fallow grassland. Monitor to show success.

**DZ:** BC from your experience do you know the length of time for the program?

**BC:** Depends on the type of goals you are aiming for. In the US, a ton of habitat was created under programs that was then lost. What about a certification program [*i.e.*, *FA Certified Farm*], so you don't have to pay for it [*in the long term*]? Want to avoid having to fund it forever. Is there a way to incentivize the start and have the market pay a premium to continue?

**DZ:** PSF supports this program, brought in Salmon Safe. But the problem is that they have limited success as there is only so much uptake in consumer market for that. We are not afraid of ongoing payment. This is to encourage farms to do the work, and provides recognition that farmers are doing more beyond food production towards ecosystem services. Want funding over the long term, but want funder buy-in for the short term to see the benefits/ success and hopefully there will be support for long term support

**KS:** Like 10 years [*for the pilot*], after 5 years it's hard to see the outcomes

**CT:** Takes a long time to get hedgerows to develop

**CP:** DUC has a lifetime attachment to property [*That they work on*]. Conservation easements?

**CT:** Yes, then that land is rented back to the farm families with restrictions

**DZ:** Not allowed to put easements on ALR land, can dictate what is produced through the covenant [*Missed some conversation here due to noise*]

*New members: Chris Zabek, Ashley Doyle, Susanne Thorpe, Wendy Bales*

**DZ:** Working on model and scenario working on the program moving forward from the pilot

**CP:** (4<sup>th</sup> year of pilot in TOL) consider these, not working with FN yet: 1. Does the land have to be in the ALR? For example, park land w/ stream that could benefit by FA?

**ST:** Would a governing entity that would it qualify for this [*PES through FA*]? Do we want it to be?

**WB:** We need more small farmers

**DZ:** Does it make sense to apply to non-ALR lands? We have worked with FN in Salmon Arm, that is First Nations land, might be ALR but regulations are not enforced there.

used ALR layer to identify farmland [*Was used in prioritization exercise to select farms for pilot*]. Would be something to look at [*a way for expanding the program*]

**CP:** Could target streams. 2. Can't imagine that landowners are taxed, that money be sent away and then it is sent back. Everything needs to be managed with visibility.

**WB:** If there are line items in property taxes, there is pushback. Maybe it needs to come out of something bigger, *i.e.*, gas tax

**DZ:** Went to Prov. Think a logical thing [*would be*] to tax within the carbon tax. Min of agri suggested we go directly through min of agri.

**WB:** Makes sense as farms produce carbon

**CP:** Also sequester a lot of carbon

**CP:** Program doesn't limit to riparian, water, rivers, but also air pollution, soil remediation, going forward, need to move forward on other initiatives

**DZ:** Want that expansion

**WB:** Have not heard about herbicide or pesticide use, stopping or managing that

**DZ:** This tool has the potential to do that, has in other places, Riparian areas are an easy place to start, a constrained part of the farm, with the intention to extend the program from there. And to flood

mitigation. Model could allow for inundation of farmland with flood water and allow compensation. The farm would be partially inundated, but you will be compensated.

**WB:** Big floods in prairies, they chose to flood farmland instead of houses, did they get compensation?

**KS:** Yes, they did

**DZ:** This is to be proactive; this is a fee for service arrangement, your farm set up in a way [*to minimize risk if there is flooding*] i.e. no herbicides, fertilizers as we know there will be flooding, may need to modify practices, but this is a calculated move [*to allow farmland to flood, rather than homes*], the benefits will outweigh the costs [*to the region as a whole*] without the farmer becoming impoverished

**WB:** Reintroduced wetlands after flooding in Winnipeg, had to buy land to do that. If try to do all diking and channeling, large impact downstream [*hardening infrastructure upstream, will create issues for landowners downstream*], if you allow for water escapement upstream it reduces the [*downstream*] damages for this

**KS:** How does the monitoring work?

**DZ:** Riparian health assessment, assess a number of indicators that gives back a score. Can do annual assessment to show annual improvements.

**KS:** Monitor DO, conductivity. SFU offered support.

**AD:** FN interested in providing monitoring. Doing work on Salmon River. Having issue with restoration land but it is small public land, restoration work is being done at Trinity Western, if work could be done on private land that would be a huge benefit. Kwantlen could do that monitoring and restoration work.

**DZ:** Have not incorporate FN involvement into program in TOL yet. Want to check in and have things to report back.

*Question: Is there general support to move towards the programmatic phase?*

**General Consensus:** Yes, table consensus on support for program in general. Support for 10-year phase, to set things up and monitor it. Want to take a first look that is comfortable with everyone.

W/in need to look into small parcels. IAF interest in provincially coordinating the program

**ST:** DFO interested- would need to be better defined before support. Restoration needs to meet the terms of their mandate. Want to hear more about it. lots of questions around governance, have funding for restorative efforts but will have to wait and see, issues with land ownership are big, and unsure what the terms are. Might be able to get attention on Fisheries issues but less on air and soil. Need to define program and maybe there are multiple branches.

DFO are reconfiguring

**DZ:** Program has to work for farmers and funders.

In context of flooding. Is there support of the concept, is this a mechanism that could support flood management

**CP:** Also has the potential to prevent flooding. If the streambanks are being greened and with a healthy riparian area, river can crest and recede without ripping the field apart.

**DZ:** With pilot- 5yr trajectory, then a few years in wanted to talk about the potential to see to move forward, who will be coordinating, what are the funding logistics and setting up the initial ten years

**DZ:** Contact at DFO?

**ST:** Mike Probe [*Sp?*]