

Innovations in Flood Protection, the Environment and Sustainability

March 26, 2009



Presentation by
Fraser Basin Council



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Outline

- A. Introduction
 - Fraser Basin Council
 - Flooding and Flood Hazards
- B. Integrated Flood Hazard Management
- C. Flood Management and the Environment
 - Issues, Challenges and Opportunities



Fraser Basin Council



Fraser River Basin Area
233,000 km²

- Board of Directors (36) includes four orders of Canadian government, private sector and civil society interests.
- Impartial role as convener of inclusive and constructive dialogue.
- Catalyst, educator, facilitator
- Role to assist in resolution of complex, inter-jurisdictional sustainability issues (e.g. flood hazard management).



Flooding - A Sustainability Challenge

- Flood events occur annually causing significant social, economic, and environmental impacts:
 - Damage to public and private property
 - Loss of agricultural crops and livestock
 - Damage and disruption to critical infrastructure
 - Disruption of businesses and community services



Flooding - A Sustainability Challenge

- Flood management practices can have significant environmental impacts (+ / -):
 - In-river / instream habitat (sediment management)
 - Riparian habitat (dikes and erosion protection)
 - Floodplain habitat (barriers to fish migration from the river into tributaries for spawning and rearing)
 - Loss of side channels and wetland habitat
 - Water quality (storage / protection of hazardous materials)



Flood Hazards in BC

- Large rivers basins
- Tributary rivers & streams
- Lakes & reservoirs



Flood Hazards in BC

- Ice jams
- Alluvial fans / debris flows
- Coastal storm surges
- Tsunamis
- Sea level rise



Integrated Flood Hazard Management

- Land use planning and floodproofing
- Flood protection works
- Emergency planning, response and recovery
- Data, information and analytical tools
- Social, economic and environmental considerations
- Inter-jurisdictional and multi-sectoral collaboration

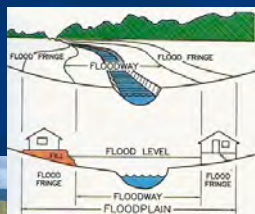


Land Use Planning & Floodproofing

- Most effective and affordable approaches available to communities to reduce vulnerability and potential flood damages
- Land use / zoning decisions to guide development away from flood hazard areas
 - **Horizontal setbacks from flood hazards**
- Implement floodproofing practices during development and redevelopment
 - Use fill or design to build habitable space above predicted flood levels **Flood Construction Level (FCL)**
 - Use flood resistant building materials



Land Use Planning & Floodproofing



Flood Protection Works

- Dikes don't guarantee protection from floods.
- Dikes require ongoing supervision and maintenance.
- Erosion, sediment and dredging? Possibly, if shown to reduce flood risk, using best practices with environmental assessment and monitoring



Flood Protection Works

- Annual dike maintenance includes control of vegetation and burrowing animals to protect the integrity of dike fills, and to ensure effective access and inspection.



Emergency Planning, Response and Recovery

- Local, Regional and Provincial Emergency Plans (storage and protection of hazardous materials)
- Capacity to Respond to Imminent Flood Events (including resources and training)
- Coordination of Resources During Response
- Canada - British Columbia Disaster Financial Assistance Arrangement (for recovery)



Flood Management and the Environment: Issues

- Land use planning and floodproofing can cause less environmental impacts than diking and dredging
- Flood protection works can be designed and maintained in ways to reduce environmental impacts.
- Emergency flood mitigation is more likely to result in adverse environmental impacts.



Flood Management and the Environment: Issues

- Flood protection works can be designed and maintained to reduce environmental impacts:
 - Setback dikes allow for reduced maintenance costs and increased environmental benefits
 - Not all pumps and flood gates are equal (fish passage versus fish barriers)
 - Vegetation management (dike inspection, dike integrity, riparian values, bird nesting)
 - Soft erosion protection (vegetation versus rock).
 - Sediment management practices (environmental assessment, timing, access, and methods).



Flood Management and the Environment: Issues



Flood Management and the Environment: Challenges

- Reconciling environmental and public safety needs
- Transition from historic decisions to new approaches
- Resources (financial and human)
- Changing flood risks (climate change, Pine Beetle, population growth)



Flood Management and the Environment: Opportunities

- Heightened public and political awareness
- New insights on flood risk
- Technology to improve and share knowledge
- Dialogue, collaboration and commitment for change
- BC Flood Protection Program



Flood Management and the Environment: Opportunities

- Incorporate best practices during maintenance activities (e.g. guidelines for vegetation management)
- Upgrade environmental design features during major capital improvements (dike upgrades and rehabilitation)
- Reduce flood vulnerability to property and infrastructure (and reliance on diking) during the (re)development cycle
- Consider land use change and setback dikes as opportunities arise (with "flood-friendly land uses" such as recreation, conservation, agriculture)



The Dutch "Space for the River" Policy



- | | |
|--------------------------------|---------------------------------|
| 1. Lowering the groyves | 6. Removing flood-proofed areas |
| 2. Deepening the channel | 7. Dike repositioning |
| 3. Removing summer embankments | 8. Retention areas |
| 4. Digging side channels | 9. Obstruction of lateral flow |
| 5. Lowering of floodplain | 10. Dike raising |



The Dutch "Space for the River" Policy

- Inland dike relocation near Arnhem
 - Can reduce high water levels by 70 mm
 - Improvement in the physical quality
 - Improvement of a larger nature conservation area outside the dikes.



Integration and Collaboration

Some Principles

- Long-term, comprehensive management
- Dedicated, long-term, cost-shared funding
- Regional coordination

Some Possible Next Steps

- Available Guides and Resources (\$?)
- Network of Practitioners
- Research on Good Practices
- Addressing Barriers, Identifying Opportunities and Setting Priorities
- Working with Authorities and Champions
- Follow-up Session?





Fraser Basin Council

Fraser Basin Council
1st Floor - 470 Granville Street
Vancouver, BC V6C 1V5

<http://www.fraserbasin.bc.ca>

Steve Litke, Senior Program Manager
Tel. (604) 488-5358
Fax. (604) 488-5351
Email: slitke@fraserbasin.bc.ca

