

## 4. References

### 4.1 Selected Major References and Sources of Information (in alphabetical order)

#### Alberta, Disaster Services

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Tel: 780 422-9000

*Alternatives to sandbags for temporary flood protection, October 1998.*

*Flood disaster and what to do before and after flooding*

Information on ways individuals can help themselves and their families.

#### American Red Cross, Disaster Services

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Internet: [www.redcross.org/disaster/](http://www.redcross.org/disaster/)

Information on many flood-related topics and publications including: Flood preparedness; Family disaster planning; Checklist for people with mobility problems; After the flood; Repairing your flooded home.

#### (US) Army Corps of Engineers

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Attn: CECW-PF, 20 Massachusetts Avenue, NW, Washington, DC, 20314

Publications on flood proofing

Internet: [www.usace.army.mil/inet/functions/cw/cecwp/fpreg](http://www.usace.army.mil/inet/functions/cw/cecwp/fpreg)

Information on sandbag construction, placement, estimation of numbers

Internet: [www.ncb.usace.army.mil/emb/sandbag.htm](http://www.ncb.usace.army.mil/emb/sandbag.htm)

#### Boston, Noel

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1997: *Human factors in emergency preparedness*. British Columbia Association of Professional Engineers and Geoscientists, Innovation, December 1997

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**BC Government**

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1996: *BC Dike Maintenance Act*

1996: *BC Drainage, Ditch and Dike Act*

1996: *BC Emergency Program Act*. See Sections 6(2), 6(3), 8(1), 12(1), and 13(1) and *Guide to the Emergency Program Act*. Also available on the Internet: [www.pep.bc.ca](http://www.pep.bc.ca)

1996: *BC Municipal Act*

1996: *BC Water Act*. See Section 9(2) and *A Users Guide to Working In and Around Water*.

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**BC Ministry of Attorney General (Provincial Emergency Program)**

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1996: *Local Authority Planning Guide*. 1996 Revision, updated in October 1998. Also available on the Internet: [www.pep.bc.ca](http://www.pep.bc.ca)

Headquarters, 455 Boleskine Road, Victoria, BC, V8Z 1E7, with six Regional Offices

Tel: 1-800-663-3456 Internet: [www.pep.bc.ca](http://www.pep.bc.ca)

All sorts of information and publications on flood and tsunami planning and preparedness including: *BC Emergency Program Act*; *Guide to the Emergency Program Act*; *Flood precautions for homeowners*; *Floodproofing your home, minimize damage*; *Self-help advice, floods*.

Links to Emergency Preparedness Information Exchange (EPIX) at Simon Fraser University, Emergency Preparedness Canada, Justice Institute of BC, and other provincial and state emergency measure organizations.

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**BC Ministry of Environment, Lands and Parks**

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Tel (Victoria): 250-387-1531 Internet: [www.env.gov.bc.ca/wa/flood/](http://www.env.gov.bc.ca/wa/flood/)  
Information on flood hazard management, Regional Offices and Headquarters.

1996: *Management of Flood Protection Systems in BC*, by P.J. Woods, Inspector of Dikes, in Proceedings of the Canadian Water Resources Association Watercourses Conference, Vancouver, BC, October

1998: *Dam Safety Guidelines*. Prepared by the Public Safety Section, Water Management Branch

1998: *Water Related Hazards, Emergency Response Plan and Procedures*. Internal government publication

1999: *Guidelines for Management of Flood Protection Works in BC*, prepared by Public Safety Section, Water Management Branch

### **BC Ministry of Transportation and Highways**

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#### *Emergency Response Plan - 1992*

BC Ministry of Transportation and Highways

Describes emergency services delivered by MOTD personnel.

#### *Round IV (1995-6) Maintenance Services Manual*

Standards for Road and Bridge Maintenance Services (Maintenance Standards)

August 31, 1995

BC Ministry of Transportation and Highways

Describes emergency services delivered by MOTD maintenance contractors.

1996: *Natural Hazards in British Columbia*, Section 3.4, Flooding. Prepared by the Geotechnical and Materials Branch

1998: *BC Flood Plan*. Prepared by BC Ministry of Transportation and Highways, BC Ministry of Attorney General (Provincial Emergency Program) and BC Ministry of Environment, Lands and Parks

Also available on the Internet: [www.pep.bc.ca](http://www.pep.bc.ca)

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**California Department of Food and Agriculture**

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Internet: [www.cdfa.ca.gov/newsinfo/news/](http://www.cdfa.ca.gov/newsinfo/news/)  
Information on topics including disaster guidelines for livestock and for pet owners.

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**California Department of Water Resources**

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*Flood Fighting Methods*  
Volume II - Revised 1997  
Division of Flood Management  
Flood Operations Branch

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**Canada, Government of**

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1985: *Emergencies Act* (Canada)

1985: *Emergency Preparedness Act* (Canada)

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**Canada Mortgage and Housing Corporation**

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700 Montreal Road, Ottawa ON K1A 0P7  
Tel: (613) 748-2367 or 1-800-668-2642/Fax: 1-800-245-9274  
E-mail: [chic@cmhc-schl.gc.ca](mailto:chic@cmhc-schl.gc.ca) Internet: [www.cmhc-schl.gc.ca](http://www.cmhc-schl.gc.ca)  
Information on cleaning, repairing and renovating homes after a flood.

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**Canadian Conservation Institute**

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1030 Innes Road, Ottawa ON K1A 0M5  
Tel: (613) 998-3721/Fax: (613) 998-4721  
Internet: [www.pch.gc.ca/ci-icc](http://www.pch.gc.ca/ci-icc)  
Information on cleaning, repairing and renovating homes after a flood.

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**Duncan, J.M., Mitchell J.K., Lovern C., and Coffey J.**

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1997: *Innovative alternatives to conventional levees for flood protection.*  
Department of Civil Engineering, Virginia Tech, Blacksburg, Virginia,  
Report 24061-0105

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**Emergency Preparedness Canada and Canadian Mortgage and Housing Corporation**

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1998: Self-Help Advice, Floods, What to do before and after. Also available on the Internet: [www.pep.bc.ca](http://www.pep.bc.ca) or [hoshi.cic.sfu.ca/epc](http://hoshi.cic.sfu.ca/epc)

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**Emergency Plan Development**

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Internet: [www.emergency-planning.com/sample/Basic](http://www.emergency-planning.com/sample/Basic)

A method for preparing an “all-hazard” emergency operations plan. Lots of good ideas.

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**Emergency Planning for the Home**

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Internet: [www.achilles.net/~alwillms/emergency/index.html](http://www.achilles.net/~alwillms/emergency/index.html)

Emergency planning for the home in one HTML document.

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**Emergency Preparedness Canada**

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122 Bank Street, 2nd Floor, Ottawa ON KIA 0W6

Tel: (613) 991-7035/Fax: (613) 998-9589

E-mail: [communications@epc-pcc.x400.gc.ca](mailto:communications@epc-pcc.x400.gc.ca) Internet: [hoshi.cic.sfu.ca/epc](http://hoshi.cic.sfu.ca/epc)

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**Environment Canada**

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Internet: [www.weatheroffice.com](http://www.weatheroffice.com)

The source for weather in Canada

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**(US) Federal Emergency Management Agency (FEMA)**

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Tel: 1-800-480-2520

Internet: [www.fema.gov](http://www.fema.gov)

Among other things, publications including: *Mitigation*; *Family disaster planning*; and *Flood emergency and residential repair*.



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**(US) The Floodplain Management Web Site**

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Internet: [www.floodplain.org](http://www.floodplain.org)  
Information on floodplains and their management.

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**Fraser Basin Management Board**

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1994: *Review of the Fraser River Flood Control Program*

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**Illinois Department of Transportation (Division of Water Resources) and Illinois Emergency Services and Disaster Agency**

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1985: *Flood fighting*

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**Illinois Department of Natural Resources, Office of Water Resources**

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524 South Second Street, Springfield, Illinois, 62701-1787, USA  
Publications include: *Flood fighting; Protect your home from flood damage; Floodplain management; Flood hazard mitigation; Floodplain compliance; Flood hazard mitigation plan, Village of Thebes, Illinois; Flash flood handbook; Flooded basements, a homeowner's guide; Elevating flood-prone buildings, a contractor's guide.*

A number of these publications are out of print and are presently being updated to be reprinted.

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**Illinois Emergency Management Agency**

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110 East Adams Street, Springfield, Illinois, 62706, USA  
Internet: [www.state.il.us/iema/flood.htm](http://www.state.il.us/iema/flood.htm)  
Publications include: *Flood emergency and residential repair handbook; Guide for flood preparedness planning.*

### **Justice Institute of BC**

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715 McBride Boulevard, New Westminster, BC, V3L 5T4

Tel: 604-528-5790 Fax 604-528-5798 email emd@jibc.bc.ca

The Emergency Management Division offers a wide range of courses on emergency management. Its library (library@jibc.bc.ca) contains publications on mitigation, preparedness, recovery, and response, and videos (see BC Ministry of Attorney General (Provincial Emergency Program) Internet site for a link to the Justice Institute)

1997: Emergency Operations Centre (EOC). Course notes

### **Manitoba**

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Internet: [www.net-mark.mb/html/profile/flood](http://www.net-mark.mb/html/profile/flood)

Information on the 1997 Red River flood including: information on building a dike; how to keep the public informed; returning home after the flood; health related issues after the flood, including food, hygiene, basement clean up and sandbag removal.

Internet: [www.gov.mb.ca/flood/after](http://www.gov.mb.ca/flood/after)

Information on procedures for returning home including determine if your home is safe, restore the utilities, clean up, health and hygiene, and rebuilding and flood proofing.

### **Michigan Department of Natural Resources, Land and Water Management Division**

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1988: *Flood Hazard Mitigation Handbook*

### **New Brunswick, Environment**

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1989: *New Brunswick River Ice Manual*

Prepared by The New Brunswick Subcommittee on River Ice  
Environment Canada New Brunswick

Inland Waters Directorate, Department of the Environment

August 1989

Internet: [www.gov.nb.ca/environm/](http://www.gov.nb.ca/environm/)

Provides information on ice jam development and also ice control and removal techniques.

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**(US) National Technical Information Service, US Department of Commerce**

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Springfield, Virginia, 22151, USA

Publications include: *Community handbook on flood warning and preparedness programs* (prepared for the US Army Corps of Engineers); *Flood warning system, does your community need one?*; *Information for local officials on flood warning systems*

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**Safe Guard Secretariat**

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455 Saint-Antoine Street West, Suite 311, Montreal QC H2Z 1J1

Tel: (514) 868-1562 or 1-800-830-3118/Fax: (514) 868-0330

E-mail: [sgarde@cam.org](mailto:sgarde@cam.org) Internet: [www.safeguard.ca](http://www.safeguard.ca)

Safe Guard is a national information program to increase public awareness of emergency preparedness in Canada. It brings together government, private and voluntary organizations that are part of the emergency planning, response and recovery community.

## 4.2 Videos

*Planning for Floods, another look at rising water* (30 minutes, 1993) Produced by the (US) Environmental Defence Fund, available with a \$20 donation

Tel: 1-800-684-3322

Internet: [www.edf.org/pubs](http://www.edf.org/pubs)



Sandbag dike at Mission Creek



## FIGURE I: WARNING DISSEMINATION METHODS

### **Mass warning systems: sirens, whistles, church bells, etc.**

#### **Advantages**

Often already available in the fire department  
Reaches large numbers of people rapidly in urban areas  
Instils sense of urgency

#### **Disadvantages**

Cannot convey explanation of problem or instructions on what to do  
May suddenly fail if dependent on telephone and electrical power for operation  
Expensive for use in rural areas

### **Radio, television, and cable systems**

#### **Advantages**

Receivers widely available  
Low or no initial investment  
Reaches large numbers of people rapidly during daylight and evening hours  
Suitable for both urban and rural areas  
Can convey explanation of problems and instructions for action

#### **Disadvantages**

Dependent on electrical power  
Few people listening during late night and early morning  
Local stations may be off the air during late night and early morning hours  
Local station transmissions may not reach deep valleys

### **Internet Website**

#### **Advantages**

Computers widely available  
Reaches large numbers of people rapidly during daylight and evening hours  
Low or no initial investment  
Suitable for both urban and rural areas  
Can give residents written instructions  
Can convey explanation of problems and instructions for action

#### **Disadvantages**

Dependent on electrical power  
All people do not have computers and/or Internet access

## Mobile public address systems

### Advantages

- Reaches large numbers of people rapidly
- Conveys sense of urgency
- Usually low or no initial investment
- Can convey explanation of problem and instructions for action
- Suitable for both urban and rural areas
- Person giving the warning can adapt procedures to the situation

### Disadvantages

- Local travel or flying may be prevented by weather or flooding conditions
- May tie up police or other vehicles when they are needed

## Fan out systems: telephone trees, block captains, etc.

### Advantages

- Low or no initial investment
- Can convey explanation of problem and instructions for action
- Suitable for both urban and rural areas

### Disadvantages

- Messages may become garbled through many relays
- Vulnerable to rumours and speculation
- Slow
- Vulnerable to telephone system disruption

## Door-to-door contact

### Advantages

- Can convey explanation of problem and information on what to do
- Can give residents written instructions
- Conveys sense of urgency
- Persuasive
- Suitable for both urban and rural areas
- Low or no initial investment

### Disadvantages

- Slow
- May interfere with other essential duties

**Reference:**  
**Flood Fighting, 1985 -**  
**Illinois Department of**  
**Transportation and**  
**Illinois Emergency**  
**Services and Disaster**  
**Agency**

## FIGURE 2: EXAMPLE OF WHEN TO ISSUE FLOOD WARNINGS

### City of Floodville

#### Flood Warning Instructions

##### **Actions to be taken by the Police Department Dispatcher when a flood warning is issued. Call:**

- Emergency Coordinator (Flood Response) (telephone number)
- John Smith (telephone number) and ask him to monitor the river guage and call the Emergency Coordinator (Flood Response) when it reaches \_\_\_ metres.
- St James Hospital (telephone number) and ensure they know of the watch. (Note: St James Hospital was identified on the flood stage forecast map as a vital facility needing extra warning time to prepare itself for flooding.)

##### **Actions to be taken by the Emergency Coordinator (Flood Response):**

1. When the river gage reaches \_\_\_ metres:
  - Report to the Emergency Operations Centre
  - Contact the \_\_\_\_\_ for confirmation and their latest flood prediction.
2. When the gage reaches \_\_\_ metres, or when a flash flood warning is issued:
  - Call the Material and Services Coordinator (telephone number) to initiate sandbagging of the water works.
  - Call Natural Gas Company (telephone number).
3. When the gage reaches \_\_\_ metres or a flash flood on our river is confirmed:
  - Contact the radio/TV stations (CABC: telephone number) and (CDEF: telephone number).
  - Sound the siren for the flash flood warning (two short blasts) to warn people to turn on the radio.
  - Ask the police dispatcher to set up blockades at Bay and Johnson bridges to control traffic and close the bridges when water reaches them.
  - Contact the Fire Department to have standby crews report to Fires Station #3 to be available to assist in rescue operations.
  - Contact County Nursing Home (telephone number) to ensure they have the warning and are initiating their own protection measures in the lower floors.

##### **Reference:**

**Flood Fighting, 1985 -  
Illinois Department of  
Transportation and  
Illinois Emergency  
Services and Disaster  
Agency**

## FIGURE 3: EXAMPLE OF FLOOD WARNING

### City of Floodville

#### Flood Safety Instructions

**You live in a flood hazard area - Keep these safety instructions handy.**

**When a flood warning is issued:**

- Listen to your radio or TV for emergency instructions
- Keep a portable radio, emergency cooking equipment, and flashlights, first aid and medical supplies (prescriptions, insulin, etc.) at hand
- Keep your automobile fuelled
- Fill large containers with tap water for drinking and cooking
- Secure outdoor items that might be washed away
- Move household belongings to upper levels

**When flooding starts:**

- Shut off your utilities: cut off all electric circuits at the fuse panel or disconnect switch. If this is not possible, turn off or disconnect all electrical appliances. Shut off the water service and gas valves in your home.
- If you must evacuate, do so quickly and safely. See the attached map for protected evacuation routes. If you do not have any place to stay, go to one of the shelters shown on the attached map.
- Do not attempt to drive on a flooded road or walk if the water is above your knees or moving. If your vehicle stalls, abandon it immediately and seek higher ground.
- Do not handle live electrical equipment in wet areas. Beware of fire hazards such as piles of wet hay, feed, or charcoal, gas or oil leaks, and broken electrical wires.

**Reference:**  
**Flood Fighting, 1985 -**  
**Illinois Department of**  
**Transportation and**  
**Illinois Emergency**  
**Services and Disaster**  
**Agency**

Get a free copy of *Protect your Home from Flood Damage* from City Hall or one of the shelters. It has instructions for protecting your property and for cleaning up and restoring property after a flood.



## FIGURE 4: A TYPICAL RESOURCE DIRECTORY

**Your resource directory should include business and residence telephone numbers for contacts at the following agencies and organizations and others.**

Airports	Food Suppliers
Air Services	Fuel Dealers
Ambulances	Funeral Homes
Auxiliary Lighting	Heavy Equipment
BC Rail	Helicopter Services
BC Hydro	Health Services
BC Gas	Hospitals/Clinics
Boats	Pharmacies
Bus Services	Media-print/broadcast
Caterers	Police
Chemicals	Radio Operators
Emergency Social Services	Red Cross
Churches	Salvation Army
Coroner	School Boards
CN Rail	Weather Office
CP Rail	St. John Ambulance
Cellular Phones	Taxis
Divers	Telephone Company
Doctors	Towing Companies
Elected Officials	Utilities/Pipelines
Fire Departments	Volunteer Agencies
	Welders

**Reference:**  
**Local Authority**  
**Planning Guide (1996**  
**Revision) - BC**  
**Ministry of Attorney**  
**General**  
**- Provincial**  
**Emergency Program**



## FIGURE 5: TYPES OF FLOOD RESPONSE EXERCISE

### FIVE TYPES OF EXERCISE

#### **ORIENTATION SEMINAR**

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The orientation seminar is used to introduce or refresh participants to plans and procedures, by lecture, panel discussion, media presentations, or talk through. All levels of personnel (policy, coordination, operations, and field) are involved.

#### **DRILL**

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The drill tests a single emergency response function. It involves actual field response. Its effectiveness lies in focusing on a single, or relatively limited portion of the overall response system in order to evaluate and improve it.

#### **TABLETOP EXERCISE**

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In a tabletop exercise actions and discussion are based on a described emergency situation plus a series of messages to players. Participants practice problem-solving for emergency situations through on-going discussion and critique of the appropriateness of actions taken and decisions made. Participants also practice coordinated and effective response. The tabletop permits breaks before new messages are delivered to discuss proper response. It will involve policy and/or coordination personnel.

#### **FUNCTIONAL EXERCISE**

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The functional exercise is a simulation of an emergency that includes a description of the situation, a timed sequence of messages, and communication between players and a simulation group. For example EOC members could practice coordinated, effective response in a time-pressured, realistic emergency situation. Individual and system performance is evaluated. It will involve policy and coordination personnel.

#### **FULL-SCALE EXERCISE**

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The full-scale exercise adds a field component to interact with a functional exercise through actual and simulated messages. It tests the deployment of seldom used resources and will involve policy, coordination, operations and field personnel.

Training in the development of an exercise program is available through the provincial emergency program academy at the Justice Institute of BC.

**Reference:**  
**Local Authority**  
**Planning Guide (1996**  
**Revision) - BC**  
**Ministry of Attorney**  
**General**  
**- Provincial**  
**Emergency Program**

## FIGURE 6: AN EXAMPLE CHECKLIST

This checklist includes many different possible flood fighting activities that should be considered for a flood fighting plan. Not all of these activities will apply to any one Local Authority or Diking Authority. Select those appropriate to local flood situations that can be implemented given available resources during a period of haste, tension, and power outages.

- Send rain and river gage readers out to monitor their gages.
- Check pumps and other equipment to ensure they are available and will operate. (This should also be done at least once each year.)
- Open the Emergency Operations Centre.
- Begin periodic dike patrols. Check gates for rust, ice, or anything that may keep dikes and works from working (this should also be done at least once each year). check for sand boils and flood heights that approach overtopping. Do not attempt to cover boils, they should be encircled with sandbags. The MELP can provide technical assistance on dike patrols and dealing with seepage, boils, and other dike problems.
- Begin schedule of regular meetings of key personnel to review and plan flood fighting operations.
- Send status reports to the Provincial Emergency Program.
- Organize search and rescue squads to check flooded areas for stranded residents (especially in flash flood areas).
- Provide traffic control services along designated evacuation and access routes.
- Control access into flooded area and watch for looters. If necessary, institute an identification tag system so that only authorized personnel move through the flooded areas.
- If access to the other side of the river will be cut off, move fire truck(s) and other essential services to be able to cover both parts of town.
- Establish central fuel depot to ensure enough fuel for pumps, generators, trucks and other flood fighting equipment.
- Fill bulk fuel tanks to prevent floating.
- Mark gas station pumps with floats so boats can avoid them.
- Mark fencelines with floats to provide warning for rescue boats.
- Order evacuation of threatened areas, provide assistance to the elderly, physically challenged, and others needing it.

- Assist elderly or physically challenged in shutting off gas and electricity and securing threatened buildings.
- Order/supervise removal of mobile homes and other property that can be removed before the flood arrives.
- Move or otherwise protect valuable city property, especially files, records, motors, vehicles, and wooden furniture.
- Have volunteers or emergency workers fill sandbags.
- Arrange for feeding and sleeping facilities for volunteers.
- Open temporary shelters.
- Arrange for centrally controlled ferry service for people who must get in and out of their flooded properties.
- Close businesses that could be hazardous when flooded such as gas stations and facilities with hazardous materials.
- Close businesses such as liquor stores, bards, and entertainment centres to facilitate area control.
- Close schools that are threatened by the flood, especially high schools and colleges that can release able-bodied volunteers for flood fighting.
- Coordinate with utility companies to ensure that main shut offs will be in time and will not interfere with your flood fighting activities.
- Implement alternate water use rules if wells are shut down.
- Close sewer lines that will cause flooded basements in areas not flooded by surface water. Manual stoppers can be made of lumber, sandbags, and plastic sheeting. They should be placed at the discharge end of the outfall pipe. There are commercially sold pipe plugs which are inflated to seal a sewer line. Manholes may have to be sandbagged to keep backed up sewers from flooding the streets.
- Monitor bridges and culverts and keep them cleared of debris which may plug them up.
- Maintain gage watching to be alert for a second crest.
- Keep the public informed. Issue announcements periodically via mass media, community bulletin board, or personal contact on:
  - latest predictions on flood crest and duration,
  - where to go for medical care and emergency assistance,
  - location of shelters,
  - what evacuation routes are open,
  - any new or special hazards such as downed power lines.