

3. Flood Planning and Response

Planning and response for floods, as for any emergency, can be divided into several phases:

- flood prevention and flood damage prevention;
- preparing a flood response plan;
- implementing the flood response plan; and
- post flood management.

Local Authorities and Diking Authorities who follow these phases should be ready to react effectively and efficiently when a flood situation arises. This will minimize loss of life, injury and trauma, reduce property damage and result in a speedier recovery from the flood. The roles and responsibilities of individuals and governments are described in Part 1, Appendix A.

To paraphrase an old saying, an ounce of planning is worth a pound of response.

3.1 Flood Prevention and Flood Damage Prevention

In most cases, the occurrence of a flood resulting from a climatic condition or a geomorphic process cannot be prevented. In some instances, however, especially when humans are in-part the cause, floods can be prevented. Flood damage prevention measures are designed, not to stop floods from occurring, but to prevent, or at least reduce the consequences.

Nature to be commanded must be obeyed. (from Sir Francis Bacon, "Novum Organum" 1620)

Passive measures are those that don't involve any actual construction. Examples include:

- **land use restrictions, zoning and by-laws**, for example by zoning where, on a floodplain, individuals can, and cannot, build;
- **protection of wetlands and riparian areas**, for example by leaving the area adjacent to watercourses in the natural state;
- **building codes and building use regulations**, for example by requiring flood proofing of new or existing buildings;
- **tax and insurance incentives and disincentives**, for example by encouraging individuals to build in safe areas;
- **recovery incentives and disincentives**, for example by limiting assistance for new buildings which do not meet floodproofing standards;
- **flood forecasting**, to provide advance warning of possible flooding events; and
- **in-house and public education**, for example by training staff what to do when a flood is imminent, and educating the public about flood damage prevention.

Except for flood-forecasting and education, passive measures generally require both the necessary legislation and enforcement. The former, without the latter, does not work.

Active measures are those that usually involve construction or some form of action. Examples include:

- **diking or other flood protection works**, for example dams, storage reservoirs, diversions, channel modifications, erosion protection;
- **flood proofing methods**, for example raising structures; and
- **removal of rubbish from streams and drainage ditches**, for example shopping carts, tires, and brush cuttings.

Active measures require appropriate design, construction, inspection and maintenance.

Regardless of whether preventative measures are in place and/or carried out, a flood response plan should form a component of a Local Authority emergency plan, and is standard management practice for Diking Authorities.

3.2 Preparing a Flood Response Plan

The flood response plan should be prepared well in advance of any possibility of a flood threat. When a flood is imminent, it's often too late to prepare a flood response plan. Since no one knows well in advance when a flood is going to occur, the best time to start preparing a flood response plan is NOW!

A flood response plan should be designed to suit the local area. It can range from very simple to extremely complex, depending on the size and geographic complexity of the jurisdictional area. It can also vary depending upon local conditions such as the potential type(s) of flood(s) the local area may be subject to, and whether there are or are not existing flood protection works.

When you're up to your rear in alligators, it's too late to start wondering why you're draining the swamp!

A typical flood response plan document should contain at least the following:

- aim: a brief statement of the purpose of the plan
- description of flood type(s), hazard(s) and risk(s)
- names of the **Emergency Coordinator** (Flood) and **Emergency Operations Group** (Flood Response) members
- authority: the legal basis for the **Emergency Operations Group** (Flood Response) to take charge of private resources and issue orders
- names of any support groups, volunteer groups and special skill groups
- responsibilities: who does what
- implementation procedures: how the **Emergency Operations Group** (Flood Response) will function, how the plan will be implemented (who, what, where, when and how)
- contact lists
- contingency plans
- evacuation routes
- a directory of required/available equipment, supplies and services
- how to request provincial and/or federal assistance
- distribution of the flood response plan.

There is nothing worse than individuals being told to do two different things in the same emergency situation.

If other government agencies, hospital, schools, businesses, families or individuals don't have a flood response plan, they should be encouraged to prepare one. If they do have a flood response plan, it should be kept up-to-date and should be compatible, or at least not in conflict, with the flood response plan of the Local Authority or Diking Authority.

Consult with the Provincial Emergency Program and MELP - Water Management regional offices for information on flood response plans that may already exist in neighbouring local areas.

The *Local Authority Planning Guide (1996 Revision)* provides a great deal of useful background information on how a Local Authority can prepare an effective local emergency plan. Many Local Authorities may already have a local emergency plan. Much of the flood response plan may be modified from the local emergency plan, and may form an addendum to the local emergency plan.

The steps to prepare a flood response plan include:

- **prepare the aim;**
- **gather the necessary information;**
- **organize the administration and prepare the plan; and**
- **distribute, train, educate and review.**

PART 2 – FLOOD RESPONSE contains a Template for a Flood Response Plan, that can be used by any Local Authority or Diking Authority to assist them in preparing a flood response plan, or modifying an existing flood response plan.

3.2.1 Prepare the Aim

The aim of the flood response plan can be as simple as “to prevent any loss of life, to minimize injury and trauma to individuals, and to minimize damage to, and loss of property resulting from flooding on the _____ River(s) or Areas(s).” In general, the simpler the aim is, the better.

3.2.2 Gather the Necessary Information

To a large extent, most of the information required to prepare a flood response plan is already available. The trick is knowing what information is necessary and where to find it. Following that, the information has to be gathered and compiled. In some cases, information will not be readily available and will have to be created.

The necessary information can be expressed as a series of questions:

- What types of flood events may occur, what types have occurred?
- What are the risks to individuals and property from a flood?
- How can an impending flood be predicted?
- How can risks to individuals and property be reduced?
- How can flood warnings to individuals be disseminated?
- What evacuation strategies are there?
- What human and material resources are required/available to reduce the affects?

Some of this information is included in the following sections and in the Appendices. Additional sources of information can be found in PART 1, Section 4. Provincial Emergency Program and MELP - Water Management regional offices may know the whereabouts of additional information specific to the local area.

What types of flood events may occur, what types have occurred?

First identify types of floods the local area may be subject to, and the likelihood of those events occurring in the future. This can usually be done by determining the types of past flood events and the frequency of their occurrences. Check with MELP - Water Management, Ministry of Transportation and Highways and Provincial Emergency Program regional offices and long time residents.

If the local area is subject to more than one type of flood, determine the risks from the different types of floods separately.

What are the risks to individuals and property from a flood?

Next determine what geographic areas would likely be affected by various flood levels. This can best be done by using the most up-to-date detailed topographical maps available. Topographical TRIM (Terrain Resource Information Management) maps exist for the entire province at 1:20,000 scale or larger. Check with MELP, Geographic Data BC, in Victoria.

The Local Authority or the MELP - Water Management regional office will know whether floodplain mapping is available for the local area (available through Crown Publications in Victoria). (The location of floodplain mapping information is available at on the Internet at www.env.gov.bc.ca/).

Then assess the likely consequences, for various flood levels, to:

- individuals (health and safety);
- property (in rough order of importance): emergency response facilities, emergency access/evacuation routes, hazardous goods storage areas, hospitals and care facilities, water/sewage treatment plants, schools, churches and community halls, government buildings, commercial buildings, full time residences, part time residences, outbuildings with livestock, outbuilding without livestock, public roads, public utilities, private roads, agricultural land (cultivated, pasture, cleared), other;
- social and economic impacts; and
- environment (if applicable).

Consequences can be simply summarized in tabular form by area, land use, number of homes and residents or businesses and occupants, developed area and estimated value of development. For example:

Area	Land use	Homes / Residents	Businesses Occupants	Developed area	Value\$
1	Residential	100 / 300		50 ha	20 M
1	Sewer/water			10 lineal km	15 M
2	Commercial	2/90		5 ha	10 M
2	Treatment plant			1 ha	15 M
3	Agriculture	20/60		1000 ha	7 M

How can an impending flood be predicted?

Some types of floods are more predicable than others. For situations where a flood is predictable, determine the most practical methods of predicting a flood for the local area. As a simple example, river levels can be correlated with rainfall, and then with the information provided by Environment Canada's three to five day weather forecasts (available on the Internet at www.weatheroffice.com), the likelihood of flooding can be predicted.

Local Authorities and Diking Authorities can make use of the following information:

- Environment Canada, Hydrometric and Environmental Data (Water Survey of Canada gauge information);
- Ministry of Environment, Lands and Parks Snow Survey information;
- tide tables, in combination with Environment Canada's three to five day weather forecasts;
- establish, maintain and monitor one or more water level gauges upstream of the area of interest;
- inspect dikes, with increased frequency during periods more prone to flooding; and
- comparison with historical flood levels.

Besides Environment Canada's three to five day weather forecasts, other government agencies also provide some information that is useful for flood prediction:

- MELP River Forecast Centre, in Victoria, gathers and can provide information on snow pack and predicted freshet water levels for certain rivers in the province;
- MELP and Ministry of Transportation and Highways regional offices may be able to provide information on past flood events including snowpack, rainfall amounts, water levels and extent of flooding;
- Provincial Emergency Program is associated with the Tsunami Warning System in the Pacific, an international program to provide timely information and warnings of tsunamis; and
- Links with other Local Authorities or Diking Authorities upstream may be able to provide advance warning information.

If the local area is subject to more than one type of flood, several different types of predictive methods may be required.

How can risks to individuals and property be reduced?

Based on the type and severity of risks to individuals and property determined above, identify all the methods that can be used to reduce the affects.

With regards to individuals, this will involve keeping them informed and may involve disseminating warnings and possibly evacuation. Warnings and evacuation are discussed in the following sections. Determine what are the likely needs and special needs (medical and physical) of those in the area. Are hospitals, care facilities, schools likely to be affected?

With regards to property, this may involve flood fighting measures such as constructing temporary dikes or temporarily raising existing dikes in strategic locations, or preventative measures such as shutting off certain utilities or carrying out precautionary actions so that storm and sanitary sewers don't back up, identifying storage areas for hazardous materials, or providing safe havens for pets and livestock.

Plan to get the lives of individuals, the activities of the Local Authority or Diking Authority and local utilities, such as hydro, gas, water and sewer back to normal as quickly as possible after the flood.

How can flood warnings to individuals be disseminated?

There are numerous ways to disseminate warnings to individuals in a potential flood area. There is no single correct method. It depends upon many things, such as, the time available, the existing infrastructure and the human resources available.

Figure 1 summarizes several methods including: radio and television; Internet website, mass warning systems (sirens, whistles, church bells); mobile public address systems; fan out (or pyramid) systems; and door to door, and lists the advantages and disadvantages of each.

Warnings sometimes lead to evacuations. A Local Authority has the power to order evacuation under the provisions of the *BC Emergency Program Act*.

There are standard evacuation stages, and these should be incorporated into the warnings:

- **Evacuation Alert:** Prepare to evacuate your premise. Monitor news sources, such as radio, and keep your telephone free. Move children, disabled persons, pets and livestock out of the potential flood area.
- **Evacuation Order:** Everyone must leave the area immediately. The area will have controlled access, and a pass may be required to access the area. The police will enforce the evacuation order.
- **All Clear:** You are allowed to return to the area. There is a possibility, however, the emergency may re-occur. Continue to monitor news sources.

Identify the best one or two alternatives for disseminating flood warnings and prepare any necessary maps and handouts beforehand. Determine when to issue various levels of warning as well as what to include in each level of warning. It is useful to have some typical warnings already written that can be modified for the situation. For examples, refer to Figures 2 and 3.

What evacuation strategies are there?

Flood evacuation strategies will change with flood levels. Land, water and air strategies should all be considered. Land evacuation routes at lower flood levels may be impassable at higher flood levels. Determine the most practical and safest flood evacuation strategies, routes and alternate routes for the entire range of potential flood levels.

Other things to consider include:

- How are individuals with special needs such as elderly, physically challenged, school children, medical emergencies going to be evacuated?
- Have essential utilities and communication facilities been protected?
- How should individuals prepare their house or business before they leave?
- What should individuals bring with them and what should they leave?
- What about pets and livestock?
- Where are individuals going to be evacuated to, and how safe is that location from higher flood levels?
- How many people can the evacuation site handle?
- What is required at the evacuation centre: registration, heat, food, bedding, first aid, counselling, and entertainment or other diversions?
- What additional supplies are needed?
- Where are checkpoints going to be established, and by whom?
- What about security of the evacuated area following an evacuation?
- Who provides the security and how are they identified?

Some information that can be provided to individuals before evacuation is included in PART 1, Section 4.

What human and material resources are required/available to reduce the flood affects?

Depending upon the jurisdictional area, and the type and magnitude of the flood, some, or perhaps a great many human and material resources will be required during a flood. In the information gathering phase, determine both the required human and material resources, identify the available resources and determine how any shortfall of resources will be overcome. Consider first those human and material resources available in the local area, and then those available from neighbouring areas, including the practicality of obtaining them when necessary.

Human resources may include:

- Local Authority, Dam and Diking Authority employees;
- police, fire, search and rescue, medical/ambulance/first aid/military;
- those with special skills such as local construction contractors, helicopter companies, boat operators, bus drivers, ham radio operators, and local professionals;
- other government agencies such as Provincial Emergency Program, MELP, Transportation and Highways, and/or Forests; and
- volunteer groups such as Red Cross, St John's Ambulance, Salvation Army, service clubs, Boy Scouts, church groups.

The safety aspects of flood planning and response activities are very important and must be carefully considered during all phases. Safety requirements should be developed. Supporting information is included in PART 2 – FLOOD RESPONSE.

Material resources may include:

- Local Authority and Diking Authority equipment and supplies such as construction equipment, pumps, empty sand bags, sand, gloves, shovels, VHF radios;
- equipment and supplies that can be rented or purchased locally, including heavy equipment, helicopters, boats and buses;
- equipment and supplies available from government agencies;
- equipment and supplies that can be rented or purchased from neighbouring areas; and
- facilities and supplies for the Emergency Operations Centre (discussed below) and an evacuation centre.

Figure 4 provides a typical resource directory.

As well as the human and material resources required and/or available, determine the estimated costs and any lead time required to procure these resources. If many of these resources are not locally available, investigate developing a mutual aid plan with a neighbouring Local Authority or Diking Authority. They may “be in the same boat”!

3.2.3 Organize the Administration and Prepare the Plan

Once all the questions in the above section on information gathering have been answered and compiled, it's time to organize the administration and prepare the flood response plan. Several types of response organizations are presently being used in the province:

- the Incident Command System;
- the Emergency Operations Centre organization; and
- the departmental organization.

The provincial government and its agencies are adopting the Incident Command System, while some Local Authorities use an organization based on their departmental organization. Both are described briefly in PART 1, Appendix C. This document will use the Emergency Operations Centre organization, as outlined in the *Local Authority Planning Guide (1996 Revision)*.

Who? What? Where? When? How?

Who?

The “who” is the administration organization of the flood response plan. This administration organization should be housed in an **Emergency Operations Centre** (Flood Response), or **EOC**. This is the same **EOC** that has been organized by Local Authorities for their local emergency plans under the *BC Emergency Program Act*. Diking Authorities may wish to follow the same organizational structure or use the Incident Command System or departmental organization outlined in PART 1, Appendix C. For further information on an **EOC**, refer to the *Local Authority Planning Guide (1996 Revision)* and documents and training courses prepared by PEP and the Justice Institute.

The **EOC** should obviously be located in a flood safe area, and be relatively self sufficient with respect to matters such as power, communications, washrooms, and food. It should be large enough for efficient operations including areas for maps, display boards, and a rest area. It is often a good idea to separate the **EOC** from the evacuation centre, the public, and the media.

The entire flood response plan is overseen by the **Emergency Coordinator** (Flood Response). The **Emergency Coordinator** is often an employee or a member of the Local Authority or Diking Authority, and reports to the **Emergency Operations Group** (Flood Response) of the Local Authority or Diking Authority.

The **Emergency Operations Group** (Flood Response) is responsible for directing and controlling the flood response and is composed of officials who are responsible for providing the essential services necessary to minimize the effects of a flood on the area. Many of its members will also be members of the local emergency plan's

Emergency Committee:

- **A senior representative** or two from the Local Authority or Diking Authority;
- **Emergency Coordinator and Assistants**, responsible for all aspects of flood response in specific geographic areas;
- **Human Resources Coordinator**, responsible for providing and deploying human resources;
- **Material and Services Coordinator**, often the Local Authority or Diking Authority Engineer, responsible for providing and deploying equipment, supplies and services;
- **Dispatch Coordinator**, responsible for communications between **EOC** and the various geographic areas, including those individuals affected by the flood;
- **Public Information Officer**, responsible for media and general enquiries; and
- **Administrator**, responsible for cost accounting.

Others that can be included in the **Emergency Operations Group** (Flood Response) include:

- heads of police, fire, search and rescue, responsible for law enforcement, fire fighting, and search and rescue;
- public health officer, responsible for medical/ambulance/first aid, health and safety;
- emergency social services official, responsible for evacuation centre; and
- heads of any other appropriate agencies.

Emergency Operations Centre: "Where uncomfortable officials meet in unaccustomed surroundings to play unfamiliar roles making unpopular decisions based on inadequate information and insufficient time."
– Anon

The size and complexity of the **EOC** and the **Emergency Operations Group** (Flood Response) will vary depending upon the size and complexity of the local area and the flood event. For small areas and small flood events, one individual can wear several hats.

What, Where, When and How?

The what, where, when and how is the flood response plan. The **Emergency Coordinator** (Flood Response) oversees the preparation of the flood response plan, delegates the various aspects of the planning process to the appropriate members of the **Emergency Operations Group** (Flood Response) and establishes realistic dates for completion. A good flood response plan assigns specific duties to every member of the **Emergency Operations Group**.

The plan must set objectives, and priorities and strategies to achieve those objectives. Prioritization of activities is very important especially since response activities may be constrained by the available resources. If a table showing the consequences of flooding has been prepared, as discussed in PART 1, Section 3.2.2, response priorities can be based on the number of residents/businesses, type and value of development potential affected.

To assist local decision making, the following priorities form the basis of the provincial response to floods. “In responding to a flood event, the actions and decisions of the province will be based on the priorities to protect the following: human life; provincial infra-structure (roads, communications & utilities); property; environmental resources” *BC Flood Plan (April 1998)*.

It is best to develop a number of phases of flood response and correlate these phases with thresholds, such as river levels, predicted intense storms or some other measure of the potential severity of the flood. As a simple example:

Phase	Activated	Will...
I	by Environment Canada's three to five day weather forecast of a specific intensity of rainfall	<ul style="list-style-type: none"> • alert the Emergency Operations Group (Flood Response) • initiate monitoring of river levels.
II	when river levels reach a certain level	<ul style="list-style-type: none"> • activate the EOC and the Emergency Operations Group (Flood Response) • initiate dissemination of information to individuals in the area likely affected • initiate measures to prevent damage to property • initiate more frequent monitoring of river levels.
III	when river levels reach a certain higher level	<ul style="list-style-type: none"> • activate the dissemination of an Evacuation Alert • initiate preparations of an evacuation centre • initiate actions to minimize further property damage • initiate still more frequent monitoring of river levels.
IV	when river levels reach a still higher level	<ul style="list-style-type: none"> • activate the dissemination of an Evacuation Order • open the evacuation centre • initiate further actions to minimize property damage • initiate continual monitoring of river levels.
V	by subsiding water	<ul style="list-style-type: none"> • activate the post flood activities of the flood response plan.

In this example, Phases I and II are “pre-flood phases”, Phases III and IV are “flood phases”, and Phase V is the “post flood phase”.

In addition to the plan, each **Emergency Operations Group** (Flood Response) member for his/her area of responsibility should prepare a series of CHECKLISTS for each Phase of a flood outlining who should do what, where it should be done, when it should be done, and how it should be done, so that during a flood, **THINGS GET DONE**. See PART 2 – FLOOD RESPONSE, for sample flood response checklists.

The **Emergency Coordinator** (Flood Response) compiles the plans and checklists from the various **Emergency Operations Group** members. Every effort should be made to incorporate, or ensure the compatibility with, the flood response plans of other government agencies, hospitals, schools, businesses or individuals in the area.

The **Emergency Operations Group** (Flood Response) should review the compiled draft flood response plan to ensure that no obvious items have been missed, and the Local Authority or Diking Authority should approve both the plan and the document.

3.2.4 Distribute, Train, Educate and Review

Once the flood response plan is complete, it is important that the document is distributed to all appropriate individuals, such as members of the **Emergency Operations Group** (Flood Response), organizations, such as the school boards, police, fire, search and rescue (if they are not part of the **Emergency Operations Group**), and government agencies such as Provincial Emergency Program and MELP - Water Management regional offices.

Everyone associated with the Local Authority or Diking Authority and everyone involved in the flood response plan should be informed and trained what to do during a flood situation. When new staff are hired, they should be provided with training.

All residents and businesses in the local area should be made aware that a flood response plan exists. A summary document or a press release explaining the main elements of the plan should be distributed to all.

A neighbourhood flood preparedness program, a logical component or extension of a neighbourhood emergency preparedness program, should be considered. This will allow individuals in flood prone neighbourhoods to know, well before the threat of a flood, what to do before, during and after a flood.

It may be useful to organize and hold a flood planning response workshop for the general public. It may also be useful to test the plan. Five types of flood response exercises are summarized in Figure 5.

A flood response plan should be considered a living document: things change, people change. The flood response plan should be reviewed and amended if necessary, at least once a year, or more frequently if there is a change of **Emergency Operations Group** (Flood Response) members. Lists should be prepared on separate pages so that they can be easily updated when contact names and numbers change.

3.3 Implement a Flood Response Plan

When and where a flood event is predictable, a flood response plan can be implemented as one or more “pre-flood phases” and “flood phases”. Pre-flood phases usually begin when a flood threat is predicted or is imminent. For unpredictable flood events, these phases may be very short, or may not exist, and the flood response plan proceeds directly to the “flood phases”.

3.3.1 Pre-flood Phases

The pre-flood phases initially alert the **Emergency Operations Group** (Flood Response) of the possibility of a flood, and then activate the **EOC** (Flood Response). To the maximum extent possible, checklists should be used to ensure that all the tasks within each phase are carried out as planned. An example checklist for flood fighting is provided as Figure 6.

Once the flood response plan, the **EOC** and the **Emergency Operations Group** are activated, begin regular meetings, review the plan, begin record keeping, both secretarial and financial.

Then, depending on the flood response plan and size of the predicted flood, a whole series of activities may begin. For example:

- begin periodic monitoring/forecasting. Monitoring logs, such as the Dike and River Assessment Information Log provides a checklist for inspectors/technicians. Ensure that sufficient copies are prepared beforehand;
- alert police, fire, search and rescue, medical/first aid if they are not on the **Emergency Operations Group** (Flood Response);
- alert the Provincial Emergency Program, other appropriate government agencies and neighbouring jurisdictional areas;
- alert the owners of the local utilities;
- review specific activities associated with utilities and sewers, and alert public works;
- prepare staging areas, check availability of human resources and material resources. If necessary, alert human resources and either start to collect or order material resources;
- review flood fighting methods and alternative;
- check dispatch communications (phones, cells, VHF radio, ham radio operators), and begin communication between the **EOC** and field;
- keep hospitals, care facilities, schools, businesses and individuals informed and begin media releases. If appropriate, accredit media and offer media tours;
- check warning systems and review evacuation strategies;
- check preparedness of evacuation facilities;
- advise the public and provide them with guidance (news releases); and
- continually monitor and assess the situation and consider all contingencies.

With all these activities taking place, it is easy to see why it's so important to have a well thought out flood response plan and a series of checklists.

3.3.2 Flood Phases

The flood phases of a flood response plan are usually activated immediately before the flood occurs or, if there is little or no warning, immediately after the flood event has begun. If there is little or no warning of the event, still review the pre-flood phases

of the flood response plan. Although many of the pre-flood activities may not be necessary, or are now inappropriate, there may be some important activities that may be otherwise overlooked.

"If you don't think things
can get worse, just wait."
– Anon

As for the pre-flood phases, to the maximum extent possible, use checklists to ensure all that all the tasks within each phase are carried out as planned.

Depending on the flood response plan and size of the actual flood, many more activities may begin or those underway may continue or increase in scope. For example:

- increase the frequency of monitoring/forecasting;
- call upon the police, and if necessary, fire, search and rescue, medical/ambulance/first aid for law enforcement, crowd and traffic control, evacuation of an area, checkpoints and security patrol, fire fighting, search and rescue of missing persons, medical/first aid services;
- keep the Provincial Emergency Program, other appropriate government agencies and neighbouring jurisdictional areas informed;
- put staging areas into operation, call upon and deploy human resources as required, and deploy equipment, supplies and services as required;
- address safety issues;
- carry out required activities associated with utilities and sewers;
- ensure that structures, such as bridges and culverts are kept clear of debris;
- begin flood fighting methods, such as sandbagging, if required. Refer to PART 2 – FLOOD RESPONSE for examples of flood fighting methods;
- notify the local offices of the MELP and federal Department of Fisheries and Oceans of flood response activities;
- don't commit all the resources at first, the situation may escalate or the scope may widen;
- continually assess the effectiveness of resources used and be prepared to change the resource allocation(s) depending on the priority issues and areas that are or become subject to flooding;
- continue dispatch communications (phones, cells, VHF radio, ham radio operators) between the EOC and field, including residents;
- continue to keep hospitals, care facilities, schools, businesses and individuals informed;
- if necessary, issue Evacuation Alert or Evacuation Order, and follow evacuation strategies;

- if necessary, open evacuation centres, with registration and emergency social services and considerations for pets and livestock;
- continue media releases, hold news conferences (possibly at specific times), arrange interviews, correct misinformation; and
- as for the pre-flooding phases, continually assess the situation and consider all contingencies.

Checklists make things happen.

3.3.3 Environmental Considerations

During flood response activities, care should be taken to protect natural environmental resources to the greatest extent possible. Where possible, advance notice of possible flood response works should be given to both MELP and federal Department of Fisheries and Oceans for their consideration and advice.

For flood events declared under the authority of the *BC Emergency Program Act*, the province has defined special requirements under the Section 9 Regulation of the *BC Water Act*. Works for flood protection and the clearing of obstructions by a provincial or municipal government during a flood emergency must be reported to a habitat officer of the MELP within 72 hours of making the change, in accordance with Section 40(4) of the Regulation. Further information is available in the publication *A Users Guide To Working In and Around Water*, see PART 1, Section 4. Note that the regulation does not extend to the federal Department of Fisheries and Oceans.

3.4 Post Flood Management

"It ain't over 'til it's over." – Yogi Berra

3.4.1 Recovering from a Flood

One of the major goals of a flood response plan is to lead to a speedy recovery. Therefore the flood response plan should have a section on how to recover from a flood. The sooner the recovery process begins after a flood, the sooner the local area will return to its pre-flood condition. Often flood recovery can begin even before the flood itself has past, as the water is subsiding.

The post flood phase of the flood response plan should address two elements:

- getting hospitals, care facilities, schools, infrastructure, business and individuals back to normal as quickly as possible
- getting the activities of the Local Authority or Diking Authority back to normal business as quickly as possible.

After a flood, and if an evacuation order has been issued, before a Local Authority or Diking Authority issues an “all clear” it should:

- take an inventory of all the damage in the local area;
- document high water levels and the extent of flooding with bench marks, photographs and maps;
- identify ongoing hazards and risks;
- prioritize its activities;
- consider Environment Canada’s three to five day weather forecast;
- ensure safe access and safe and adequate utilities (hydro, gas, water, sewer); and
- inform the public as to the appropriate precautions (see below).

Communications are an important aspect in the post flood section of the flood response plan.

Individuals will want to return to their residences and businesses as soon as possible. There are certain precautions returnees should take, and these should be provided to homeowners, landlords, individuals and business owners. These include:

- assessing any structural damage;
- ensuring utilities are safe (hydro, gas, water and sewer);
- ensuring domestic wells are safe;
- cleaning flood soaked clothing and bedding;
- considering contamination of shelf food, refrigerator food, and frozen food;
- ensuring personal hygiene during clean-up;
- considering special procedures for cleaning up basements and other flooded rooms;
- using disinfectants for flooded basements;
- disposing of hazardous materials;
- following appropriate disaster assistance programs, such as those offered through the Provincial Emergency Program (PEP), that may be available;
- considering physical and psychological damage (trauma).

PART 1, Section 4 includes sources of additional information that cover various topics associated with returning to a flood scene and cleaning up from a flood.

The Local Authority or Diking Authority should also consider damage assessment of its facilities. Although usually the task of a government agency, other topics that should be considered in post flood phases of a flood response plan include:

- temporary housing;
- health and safety information;
- physical restoration;
- disposal of sandbags (biodegradable bags are easiest to dispose);
- reconstruction;
- counselling;
- media relations (reports of flooding can affect tourism and media coverage may be necessary to reassure the public); and
- insurance and/or disaster financial assistance programs that may be available.

These topics are beyond the scope of this guide.

3.4.2 Debriefing and Review

Debriefing and review of the flood response plan should take place some time after the flood and when the post flood recovery phase is complete or nearing completion.

At this point, the Local Authority or Diking Authority can review and evaluate the strengths and weaknesses of its flood response plan, and make improvements. It can design and carry out mitigative studies and works to reduce the risks from the next flood.

No one knows when, but if one flood occurred, another flood is likely.



Ice Jam removal at bridge