

Appendix B: FLOOD PLANNING AND RESPONSE TIPS

GENERAL

1. Information on Emergency Planning is available from the Provincial Emergency Program Local Authority Planning Guide (1996 Revision) and the Provincial Emergency Program webpage.
2. Consider the type of flood and potential damaging scenarios to estimate response resources and techniques as part of the planning exercise.
3. Flood response planning is particularly critical for areas protected by dikes as failure of these works can actually increase the hazard and threat to life.
4. Identify flood prone roads in advance and limit/prevent public access in flooded areas (most serious injuries and deaths from flooding are associated with vehicle use).
5. Ensure the flood response plan is documented with regularly updated contact lists and available to senior public officials (these events always occur when key personnel are on vacation, holiday weekend, etc.).
6. Inspect flood protection works, bridges, culverts, intakes and outlets, pipeline crossings well in advance of high flow periods to ensure they will not be damaged by erosion or high flood level.
7. Undertake advance measures in potentially high freshet years to protect essential public services such as water supplies, sewer services, etc.
8. Set priorities for deployment of flood response resources:
 - threat to life;
 - threat to infrastructure;
 - damage to property; and
 - damage to environment.
9. Don't take on more that you can handle! It may not always be realistic to prevent flooding. Other measures to reduce damage include evacuation, moving valuable goods, sandbagging, and temporary water barriers.
10. **Safety of the public and personnel is the Number 1 priority in any flood response.**

FRESHET FLOODS - FLOOD PLANNING AND RESPONSE TIPS	
Affected Watercourses	All streams, lakes and rivers, particularly larger systems with snow accumulation
Timing	Generally in the spring. Larger systems tend to peak later in the season
Warning/Forecasting	Weather forecasts, Atmospheric Environment Service, MELP Snow Survey Bulletin
Characteristics	<ul style="list-style-type: none"> -rise and recede gradually -may be debris and accretion blockage -longer warning periods -potential for saturation of dike fill materials with subsequent piping and boiling occurring
Planning Tips	<ul style="list-style-type: none"> -identify floodprone areas, and safe areas -prepare a flood response plan -identify safe evacuation routes -work with the responsible Local Authority under the <i>Emergency Program Act</i> -may be able to plan for local sandbagging, temporary water barriers and debris interception
Special Hazards	<ul style="list-style-type: none"> -dike failure concerns for areas protected by dikes -internal drainage accumulation in low areas
Information	<ul style="list-style-type: none"> -floodplain maps may be available for larger streams -www.elp.gov.bc.ca/wat/flood/floodmgt.html

FLASH FLOODING - FLOOD PLANNING AND RESPONSE TIPS	
Affected Watercourse	Small to moderate streams and rivers
Timing	Coastal - fall/early winter Other - spring/summer rainstorms
Warning/Forecasting	Weather forecasts, Atmospheric Environment Service web page
Characteristics	-rise and recede rapidly -debris and accretion blockages along streams and at bridges/culverts can increase flood levels and erosive forces -little warning -may be high velocity on steep slopes -threat to life
Planning Tips	-identify potential blockage areas, erosion and avulsion paths -small streams can be confined to streets to reduce damages to development -no time for sandbagging, riprap and supplies must be stockpiled in the most critical areas -patrol critical blockage areas
Special Hazards	-avulsions on alluvial fans can create high velocity flows remote from channel -high erosion potential on steep streams -potentially very life threatening

DEBRIS FLOWS - FLOOD PLANNING AND RESPONSE TIPS	
Affected Watercourse	Generally smaller, steep streams on alluvial and colluvial fans
Timing	Coastal - during fall/ winter rains Other - spring/summer rainstorms
Warning/Forecasting	Weather forecasts, Atmospheric Environment Service, web page
Characteristics	-not generally predictable -rise and recede rapidly -debris and accretion blockages -little warning -high water velocity -threat to life
Planning Tips	-identify potential erosion and channel avulsion areas -small streams can be confined to streets to avoid damaging development -control of displaced water flow after a debris flow can limit damage
Special Hazards	-avulsions on alluvial fans can create high velocity flows remote from the channel -debris itself can cause significant damage in addition to water damage
Information	-see PART 2 - Flood Response Practices - Debris Flows

ICE JAM RELATED FLOODS - FLOOD PLANNING AND RESPONSE TIPS	
Affected Watercourse	Small to medium streams and rivers, e.g. Bulkley, Vedder, Nicola, Nechako
Timing	Can occur either during fall/winter freeze-up or spring snowmelt
Warning/Forecasting	Weather forecasts including conducive temperatures
Characteristics	<ul style="list-style-type: none"> -can occur rapidly, without much warning -water/ice rises and recedes rapidly -potential for erosion caused by ice push
Planning Tips	<ul style="list-style-type: none"> -identify potential ice jam areas based on past experience -blockages at bridges may be critical -may be able to break up with mechanical equipment
Special Hazards	<ul style="list-style-type: none"> -floating ice floes may be carried well outside the stream channel -release of ice jam may cause sudden flood flows
Information	-see PART 2 - Flood Response Practices - Ice Jams

BLOCKAGE RELATED FLOODS - FLOOD PLANNING AND RESPONSE TIPS	
Affected Watercourse	Smaller to moderate streams and rivers
Timing	Coastal - fall/ winter rains Other - spring/summer rainstorms
Warning/Forecasting	Weather forecasts, Atmospheric Environment Service web page
Characteristics	-rise and recede rapidly -unpredictable, caused by snow/ice, debris and landslides
Planning Tips	-identify potential blockage areas and avulsion paths -small streams can be confined to streets to avoid damaging development -regular patrol of critical areas, bridges/ culverts, intakes/outlets, is necessary -mechanical equipment is required to clear the blockage
Special Hazards	-avulsions on alluvial fans can create high velocity flows remote from channel -life threatening -damage to critical structures, bridges/ culverts, intakes/outlets is possible
Information	

STORM SURGE FLOODS - FLOOD PLANNING AND RESPONSE TIPS	
Affected Watercourse	Low coastal areas exposed to high/storm tides and high winds/waves
Timing	Most common during the winter, at the yearly high tide, around winter equinox
Warning/Forecasting	Weather forecasts, Atmospheric Environment Service, tide tables
Characteristics	<ul style="list-style-type: none"> -combination of high tides, low barometric pressure, wind set-up and high waves and runup -rise and recede rapidly, during the tidal period -limited warning available
Planning Tips	<ul style="list-style-type: none"> -identify areas with storm surge potential -communicate to community
Special Hazards	-vessels, docks, tanks can become floating hazards
Information	



Storm surge and waves - West Vancouver 1982

TSUNAMIS - FLOOD PLANNING AND RESPONSE TIPS	
Affected Watercourse	Outer coast, particularly along inlets and deep fjords
Timing	Anytime, generally remote earthquake generated
Warning/Forecasting	Weather forecasts, Atmospheric Environment Service, BC Tsunami Warning Plan, Provincial Emergency Program, police, local broadcasts
Characteristics	<ul style="list-style-type: none"> -rapid decrease followed by rapidly rising coastal waters well beyond normal sea levels -a tsunami will not be locally evident until it has arrived -the public must be informed
Planning Tips	<ul style="list-style-type: none"> -rapid evacuation of low lying coastal areas (less than 6 hours - dependant on epicentre) -identify safe evacuation routes well in advance and inform public -communicate to community
Special Hazards	<ul style="list-style-type: none"> -floating debris -vessels, docks, tanks, cars can become floating hazards
Information	<ul style="list-style-type: none"> -BC Tsunami Warning Plan (see Provincial Emergency Program website) -BC Tel telephone books - Tsunami and Earthquake information -see PART 2 - Flood Response Practices - Tsunamis