**Backgrounder: Flooding in 2011 and Planned Reviews**

**Introduction – The 2011 Floods**

Runoff in 2011 was extreme in many areas. Examples of the unprecedented nature of the runoff include:

- The duration of high flows, with flooding continuing into July in some areas, especially in the southeast.
- While snowmelt caused widespread flooding as anticipated, the continuation of flooding due to numerous rainstorms was without precedent.
- In the southeast a 2.5 inch rainstorm (June 23-25) on already saturated watersheds produced record flooding on the Souris River beyond the previous one in 500 year flood estimate.
- At Rafferty Dam all previous records were broken.
  - Water levels rose 6 metres as flood waters were stored, from 2.5 metres below full supply level to Maximum Allowable Flood Level.
  - Reservoir level of 554 metres above sea level on June 19 was a new record.
  - Outflow from the reservoir peaked at 508 $m^3/s$, shattering previous records.
  - The reservoir operated above its full supply level for 100 days from April 15 to August 1.
  - 2011 is the first year water had to be spilled through the Rafferty Dam spillway.
  - 2011 runoff volume could have completely filled Rafferty Reservoir twice.
- Alameda Reservoir reached a record level of 566.6 metres above sea level.
- Alameda Reservoir operated above full supply level for an unprecedented 100 days from April 20 to August 1.
- In the Qu'Appelle system, Echo, Pasqua, Mission, Katepwa and Round Lakes reached new record levels. All of these lakes, as well as Last Mountain and Crooked lakes were at record levels through most of the month of July. One in 50 to 1 in 100 year flows were experienced throughout the Qu'Appelle and Assiniboine basins.
- In the north, rainfall brought both Montreal Lake and the Montreal River to record levels in July.
- High water levels were experienced on Candle Lake and the Torch River exceeded a 1 in 100 year flow.
- Fishing Lake reached record levels.

**Special Inspections of Dams Impacted by High Water Levels**

Watershed Authority will undertake special inspections of the following dams that experienced unusually high water flows or reservoir levels in 2011:

1. Avonlea
2. Buffalo Pound
3. Hugonard
4. Brightwater Creek
5. Candle Lake
6. Dellwood Brook
7. Katepwa Dam
8. Lac la Ronge
9. Moose Mountain
10. Spruce River
11. Star City
12. Summercove
13. Wascana
14. Esterhazy
15. West Poplar
16. Kingsway
17. Five Mile
18. Stelcam Weir
19. Boundary*

*SaskPower owns Boundary Dam, but the Watershed Authority will work with SaskPower to assess any impacts from high water.

** Watershed Authority monitors its extreme consequence dams (Gardiner, Qu'Appelle, Rafferty and Alameda) daily and inspects them weekly so special inspections will not be done but needs at these dams will be assessed.

**Infrastructure Renewal Needs**

Watershed Authority will draw on existing knowledge and the special inspections to identify infrastructure renewal needs. A brief report will be prepared on each of the structures to be inspected.

**Saskatchewan Watershed Authority's Dam Safety Program**

The Watershed Authority's Dam Safety Program is guided by the Canadian Dam Association's Dam Safety Guidelines.

The program includes three broad components:

- Rehabilitation of infrastructure
  - This is capital spending to rebuild or do major repairs on the dams.

- Maintenance
  - Ongoing routine work to maintain structures. Timely and adequate maintenance ensures that the life expectancy of the structures is attained.

- Dam Safety, which includes the following six components:
  - Dam Safety Management – Includes general program activities such as preparing and updating dam safety policies, processes and work plans, maintenance of records, and reporting/communication.
  - Analysis and Assessment – Review and assessment of whether the safety of a dam meets present day safety norms. Assessments needed include Hydrotechnical, Seismic, Geotechnical, Structural, Mechanical and Electrical.
  - Emergency Measures Management – preparation, updating and testing of Emergency Preparedness Plans and Emergency Response Plans;
  - OMS Manuals – Preparation and updating of Operation, Maintenance and Surveillance manuals. These manuals document the requirements and procedures for the safe operation, maintenance, and surveillance of a dam.
  - Surveillance – Monitoring of a dam's behaviour, including systematic collection, analysis and interpretation of data through visual inspections, instrumentation and field surveys. Also includes testing of flow control equipment.
  - Dam Safety Reviews – A comprehensive formal review carried out at scheduled intervals to determine whether a dam is safe, and if it is not safe, to determine what appropriate improvements are required.

**Review of operations at Gardiner, Rafferty, Alameda and Boundary Dams.**

Major floods such as those experienced in 2011 are rare occurrences. Operations must always consider a variety of issues, but first and foremost the safety of the dam. Once this consideration is satisfactorily addressed, choices on the manner of operation typically exist. A reservoir may be operated for a variety or of purposes including water supply, flood control and recreation. Maximizing the benefit for any one purpose generally means sacrificing benefits of another purpose. Stakeholders whose benefits are not maximized by operations are often critical of operation decisions especially if they have sustained damages. It is good water management practice to review operations after a significant flood event to learn from the experience and identify opportunities to improve operations during a future flood event. Watershed Authority will identify, in September the process and schedule for reviews of operations in the Souris and Saskatchewan River systems.