

Operating Procedures

As directed by the Minister's reply to the Vermilion River Operating Review Stakeholders Committee, AENV staff have reviewed the Morecambe Structure Proposed Operation Strategy 1987 and concluded that the scenario provided remains valid although there is still concern regarding the lack of real-time data from the basin. It is the opinion of the Stakeholders Committee and AENV Operations staff that this deficiency can be mitigated through the conservative operation of the various structures and improved communication between the stakeholders, local authorities and AENV.

Strategy

The proposed operating strategy is identical to that stated in the 1987 report and is directed to reducing flood levels in the Two Hills and Mannville floodplains by utilizing the storage potential of the Vermilion chain of lakes to attenuate the flood events. The structures and principally the Morecambe structure will be operated to distribute the benefits and flood risk upstream and downstream of Morecambe. The floodplain downstream of the Vermilion Dam will receive a reduced benefit through the conservative operation of the structure, which may reduce the flood volume but will not increase the flood water levels of various events.

Guidelines

The proposed guidelines apply for both the spring and summer flood events, however, operating procedures will vary. Drawdown of the lakes will be limited to a maximum target flow of 11.3 cubic metres per second (cms) or 400 cubic feet per second (cfs).

Normal spring floods are of less concern to the stakeholders. Damages occur and concerns increase with the larger floods which cause excess flooding and do not return to normal operating levels within a reasonable time period. Mitigation will be limited to post flood release of floodwater. Post-release refers to operations after flooding has occurred and excess water being held in the basin can be released to return the lakes to the normal full supply level with little or no negative effect on stakeholders.

Summer flooding will require both pre-release and post-flood operation. Pre-release will occur on notification of possible flood events. If the flood is large enough to cause an increase in the Lake 1 water level to approximately one metre over the normal full supply level, the gates will be closed and water levels will follow the natural conditions. After passing the major portion of the flood flow, a decision will be made regarding post-flood operation. If warranted, the gates at Morecambe may be re-opened to reduce the lake level to FSL as quickly as possible. This will only be done if flow can be contained within the downstream channel and does not negatively impact any flood cleanup efforts that may be undertaken.

Morecambe Control Structure Operating Procedures

Spring Flood Operations

Ice buildup at the structure and on the river limit effective operation of the Morecambe structure to mitigate spring floods. Except in cases where it is judged that operation of the structure will provide significant flood protection, and ice removal from the structure is possible, mitigation will be limited to post-release of floodwaters. Post-release refers to operation after flooding has occurred to remove excess water from the Two Hills floodplain, return the lakes water level to the normal full supply as soon as possible. This will provide the required back flood irrigation for the floodplain as well as removing excess water from the fields in a timely manner. Releases would be controlled to ensure flows are contained within the river's permanent banks.

- Allow normal spring flooding to occur.
- Immediately following spring flood operations, remove all stop logs.
- When spring floodwater remains on the Two Hills floodplain after May 1, structure operations could be similar to summer post-flood operations.

Summer Flood Operations

On notification of a possible flood event, the Morecambe structure will be operated to draw down the Vermilion Lakes level from FSL of 599.08 m (1965.5 feet). Outflow will be restricted to the maximum target of 11.3 cms until the water level in Lake #1 (immediately upstream of the Morecambe structure) increases in elevation 600.10 m (1968.8 ft). The gates will then be closed and the flow will follow the natural conditions. After passing the major portion of the flood flow, a decision will be made regarding post-flood operation. After evaluation of damages and clean-up requirements, the gates at Morecambe may be re-opened to reduce the lake level to FSL as quickly as possible.

Operating procedures are proposed as follows:

- River Forecast Centre (AENV Edmonton) and AENV Operations staff will monitor precipitation and river flow in the Vermilion River headwaters and on determining that an event likely to cause flooding will begin to activate the operating procedures.
- AENV Operations staff will notify Vermilion River Operating Advisory Committee, and other stakeholders, of possible flood events through the agreed callout system.
- AENV Operations staff will begin draw down of Vermilion Lakes at a maximum of 3 cms (105 cfs) immediately after notifications are made, increasing at intervals to a maximum of 10 cms (350 cfs).
- When water elevations at Morecambe Structure (greater than 600.10 metres) indicate an outflow of greater than 11.3 cms (400 cfs), gates will be closed until the peak has passed
- When water level at Morecambe Structure indicates an outflow has returned to 11 cms or less, the gates may be operated to stabilize the lakes to geodetic elevation 599.10 metres (1965.5 feet) as soon as possible.
- During all flood operations, AENV Operations staff and other monitoring staff will take gauge readings at locations between Ben's Lake and the WSC site near the

Vermilion River-North Saskatchewan River confluence and relay these readings to the River Forecast Centre.

Riparian Operations

Summer (July – August) target water level at 599.10 metres (1965.5 feet)

No allowance will be made for evaporation losses.

On August 15 or after flow through riparian channel ceases:

- ❑ Begin riparian release at 0.2 cms (7 cfs) until lake level reaches a minimum elevation of 598.95 metres (1965.0 feet).
- ❑ After September 15, if lake water elevation is above 598.80 metres (1964.5 feet), riparian release will increase to inflow plus 1.0 cms (35 cfs) to a maximum of 4 cms (140 cfs) until October 15 in an attempt to reduce the Vermilion Lakes winter operating level to 598.80 metres (1964.5 feet).
- ❑ No release through the gates will be allowed for riparian flow after the lake levels are at or below 598.80 metres (1964.5 feet) except where flood events are predicted to increase the level above 599.10 metres (1965.5 feet).
- ❑ No operations to release excess water will be attempted after October 15 to reduce the likelihood of unsupported channel ice downstream of Morecambe.

After October 15, stop logs will be installed to elevation 598.95 metres (1965.0 feet) or 150 mm below top of closed gates, and the gates will be opened.

Gates will be closed as soon as possible in spring after ice has cleared.

Vermilion Dam Operating Procedures

The Vermilion Dam operating procedures will improve flood protection downstream of the dam to a minor degree. Some benefit will be realized in co-ordination of operation with the Morecambe structure by increasing the limited attenuation the relatively small reservoir, and passing some excess flow through the small riparian gate.

Flood Operations

- ❑ On a decision to begin flood operations at Morecambe Structure, the Vermilion River Operating Advisory Committee will notify landowners downstream of Vermilion Dam.
- ❑ The day following first notification, AENV Operations staff will open the riparian gate at Vermilion Dam to allow 0.8 cms (25 cfs) to be released and will be gradually increased to allow a maximum outflow of approximately 3.1 cms (110 cfs).
- ❑ When outflow begins over the Vermilion Dam weir, AENV Operations staff will close the riparian gate and the flow over the weir will return to normal operation.
- ❑ During flood operation, AENV Operations staff will continue to monitor the water levels at Vermilion Dam and in the river channel.

Riparian Operations

- ❑ On September 1 or as advised by the advisory committee, the structure will be operated to allow a maximum of 0.2 cms (7 cfs) to be passed through the structure.

- ❑ On October 1, the structure will be operated to pass a maximum outflow of reservoir inflow volume plus 0.5 cms (17 cfs) until October 15, or until reservoir levels have reached the minimum elevation of 575.50 metres (1888.0 feet).
- ❑ Operations will not draw the reservoir below geodetic elevation of 575.50 metres (1888.0 feet).

Implementation

Implementation of this strategy will require an efficient system of stakeholder notification, as recommended in the Stakeholder Committee report and as acknowledged by the Minister's reply. The notification procedures are discussed in a separate document and will be incorporated into the operating guidelines on acceptance.

In the future, an improved precipitation and flow-monitoring network is recommended. These improvements will depend on the departmental priorities of Alberta Environment and possibly partnerships with other government departments or non-government organizations.

Other considerations:

- ⇒ Sewage Lagoon releases (Vegreville and Two Hills may be affected by low levels at Morecambe, release rate and duration may not be sufficient for the town of Vermilion. Some coordination with the towns would be required.)
- ⇒ Downstream channel obstructions
- ⇒ Riparian release from Morecambe may be too early, in dry years no riparian flow would be available for later use.