

HYDROLOGIC DROUGHT RESPONSE PLAN: Town of Herbert

Prepared by the Saskatchewan Association of
Watersheds (SAW) and the Town of Herbert Drought
Response Committee





Hydrologic Drought Response Plan: Herbert

INTRODUCTION

Pre-season and regional drought information is provided by the Water Security Agency (WSA) in two main reports – the **Conditions at Freeze-Up Report** and the **Spring Runoff Outlook Report**. The Conditions at Freeze-Up Report provides information on the precipitation levels and current moisture conditions during the late fall/early winter. Information on precipitation amounts and conditions leading into freeze-up provide valuable information for this plan. The Conditions at Freeze-up Report can provide a suggestion of potential above or below normal runoff conditions for the spring; however, more accurate information regarding spring runoff is provided in the Spring Runoff Outlook report. The initial Spring Runoff Outlook report is issued in early February or March each year. Spring runoff depends on the moisture conditions leading into winter, snowpack water content and how quickly the snow melts. The report provides information on the potential for runoff in the province by watershed, which provides an important outlook for moisture conditions going into the growing season. For example, looking at the Hydrological Drought Map for the Old Wives Lake Watershed is an important regional preparedness step. If spring runoff holds off until April, there may be an early April Report, reflecting a revised spring runoff forecast. WSA also produces a monthly

Water Supply Conditions and Outlook Report, which describes hydrological conditions including drought conditions. The Conditions at Freeze-Up Report, Spring Runoff Outlook Report and Conditions Report can be found here: <https://wsask.ca/recreation-environment/provincial-forecast/>

The Hydrologic Drought Response Plan has been developed for those who rely on the Town of Herbert for their water supply. A Drought Response Committee (DRC) has been established to deal with current or future drought conditions, and the DRC will adhere to the Drought Response Plan. The committee includes a Chair, elected officials, the Town Administrator/Chief Administrative Officer (CAO), and town employees. The Town of Herbert Hydrologic Drought Response Plan describes the monitoring required to determine drought levels, the specific actions that the Town will take to reduce the impacts of the drought, and who will be responsible for completing identified actions. The plan also outlines the provincial agencies who will provide support to Herbert during emergency situations.

The Town of Herbert Drought Response Plan is a living document that will be reviewed every four years and updated as needed with any changes to Town Administration and Council.





LOCAL INDICATORS

The Town of Herbert uses multiple sources for their drinking water supply including a blend of groundwater and surface water sources. The water supply was surface water only until 2011, when water quality issues moved the town to drill water wells and upgrade the Water Treatment Plant (WTP) to treat groundwater. The groundwater wells do not supply enough good quality water during the times of peak water usage. High organic matter content in the surface water supply causes the filters in the reverse osmosis units of the WTP to clog, which reduces the efficiency of the plant and increases treatment costs. Upgrades and changes to the treatment process have reduced the amount of water wasted in treatment.

The surface water the Town of Herbert uses is pumped into the WTP from Herbert's dugout north of town. The dugout is 466.2 dam³ with a catchment area of 580 acres. The dugout is filled via a 6 km long pipeline from the Herbert Reservoir, a formerly AAFC controlled reservoir that is 2,700 dam³. Water from the reservoir is used to irrigate adjacent land. There is some local runoff into the reservoir, the catchment area is approximately 640 acres. Most of the water in the Herbert Reservoir comes from Highfield Reservoir through the Herbert Main Canal. Water is pumped from Herbert Reservoir to the town's dugout two to three times a year as needed. The Herbert Main Canal runs 30 km from Highfield Reservoir to Herbert Reservoir and supplies water to the Rush Lake irrigation district. Water is run in the canal

late May-early June and late July-early August; timing depends on water levels and irrigation requirements. The indicator (Table 1) is based on water levels in Duncairn Reservoir. The same indicator in table from can be found in *Appendix I* at the end of this plan. Water levels in Duncairn Reservoir were selected as the drought indicator for the Town of Herbert because of the data record available for the reservoir, its position as the starting point for Herbert's surface water and because of its role as a regional reservoir reflecting drought and precipitation conditions within the greater watershed and area. The indicator is based on the water levels recorded at Duncairn Dam from 1975 – 1995, and 2019 – 2024. This reservoir has the longest available data record. Water levels are not recorded at Herbert Reservoir, and water levels at Highfield Reservoir are only available from 2018 onwards.

The Duncairn reservoir's operating guidelines set an irrigation cut-off level at 803.72m. When the reservoir reaches this level, all irrigation at the reservoir and downstream releases for irrigation must stop. This maintains roughly half the reservoir's capacity for municipal use and to support the lake's fisheries. (Water Security Agency, Irrigation Expansion from Duncairn Reservoir, Water Security Agency). The irrigation cutoff level should not be used as the most critical drought level, because WSA has specifically reserved water in the reservoir for municipal water use and the fishery.



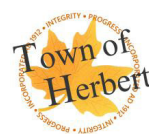
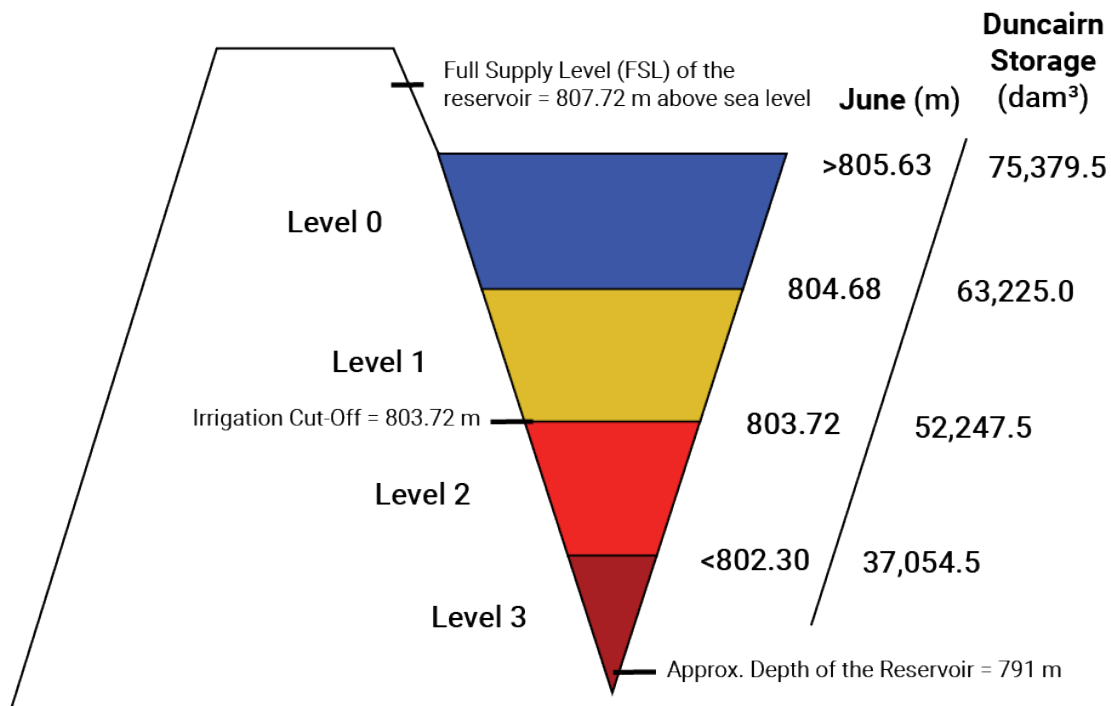
Duncairn Reservoir has been below the irrigation cutoff 13 times in 59 years of record, outside of the period from 1952 through 1954 when there was a dam safety incident requiring the reservoir to be lowered.

Monitoring water levels in May is important because the majority of runoff into the reservoir has already occurred at this point. The level of water in the reservoir is unlikely to increase substantially into the summer so the water level in May represents the baseline amount of water available for the open water season, through to the next spring runoff. An indicator for June is also provided to evaluate the available water supply. By June, all major runoff from upstream sources is typically complete. Re-evaluating water supply based on expected water levels for June reflects updated conditions as the season progresses. Continuing to monitor the drought indicator in the summer is important. Evaporation and drought risk are the highest in the summer. Water levels at Duncairn Dam should be compared to the drought indicator to determine the current level of drought

A similar drought indicator was developed for Highfield Reservoir based on the water storage capacity of Highfield Reservoir. The indicator can be found in *Appendix I* at the end of this plan. The Highfield Reservoir Capacity graphic can be used as an additional measure for monitoring drought risk. If water levels are above 722.0 m in Highfield Reservoir there is significant water supply in the reservoir. 720.8 m is the spring backflood irrigation release cutoff; however, at this point water levels are augmented with a diversion from Swift Current Creek into Highfield Reservoir.

Rushlake Creek supplies the water to Highfield Reservoir with minor contributions from local runoff. Water levels in Highfield Reservoir can be supplemented with water from the Swift Current Creek via the Swift Current Main Canal. The Swift Current Main Canal runs 30 km from Swift Current to Highfield Dam and also supplies water to the Waldeck Irrigation district.

Table 1. Duncairn Storage Dam Levels Drought Indicator



DROUGHT RESPONSE PLAN

The roles and responsibilities of the DRC are outlined in Table 2, which details the specific duties and functions of each committee member in managing different drought level conditions for the Town of Herbert. This table serves as a guide to ensure all DRC members are clear about their roles and responsibilities and can act quickly and efficiently when a drought level is declared for the community. For each drought level, the specific actions required from each committee member are provided in Table 3.

In addition, Table 4 outlines potential water conservation actions that can be implemented during a drought. These actions are designed to reduce water consumption, minimize waste, and maximize the efficient use of available water resources. Table 5 highlights the specific monitoring activities by month that need to be considered to assess the ongoing situation and inform decision-making. These activities are crucial for tracking the progression of drought conditions and ensuring that timely interventions are made by the DRC based on real-time data.

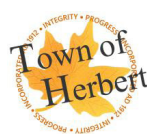
It is suggested that the following individuals make up the Drought Response Committee: two council representatives (mayor and councillor) to be the Drought Committee Chair and Vice-Chair, the Chief Administrative Officer (CAO), the Water Treatment Operator (WTO) and the Fire Chief. The implementation of the plan through bylaws is the responsibility of Town Council.

Table 2. Drought Response Committee (DRC) Roles and Responsibilities.		
Role	Description	Name/Contact
Drought Response Committee Council Representatives (one to be Chair of Committee, and one to be the Vice-Chair)	Are responsible for conducting and scheduling DRC meetings, contact between SPSA (Saskatchewan Public Safety Agency) and WSA, to activate the plan when Level 1 Drought is reached. The Drought Committee and Town Council work together to either escalate or deescalate the plan depending on current and expected conditions.	Ron Mathies, Mayor - Chair of Committee Phone: 306 - 784 - 7482 Email: mayormathies@townofherbert.ca Pat Gammel, Councillor - Vice-Chair of Committee Phone: 306 - 629-7720 Email: councillorgammel@townofherbert.ca
Chief Administrative Officer (CAO)	Is responsible for adding updates to council agenda and updating residents on the drought levels. Is also responsible for scheduling Drought Committee Meetings in collaboration with the Drought Response Committee Chair.	Michelle Mackow - CAO Phone: 306 - 784 - 2400 Email: cao@townofherbert.ca
Water Treatment Plant/Water Infrastructure Operator	Is responsible for coordinating monitoring of the Town's water usage data and the process of reporting that data to the WSA, and for monitoring the water supply in Herbert Reservoir and the Town of Herbert's Dugout.	Terry Voth - Water Treatment Plan Operator Phone: 306 - 741 - 4899 Email: herberttwp@townofherbert.ca
Fire Chief/Official	Is responsible for monitoring fire conditions, the amount of water available for fire control, developing policies for firefighting in drought, recommending fire bans early and often, coordinating emergency water access with producers, and reviewing evacuation plans.	Brad Cornelson - Fire Chief Phone: 306 - 784 - 7580 Email: darbnoslenroc@hotmail.com

Table 3. Drought Response Steps and Roles for Drought Level 0 to Drought Level 3

Drought Level & Description	Action Focus: Preparedness	Role Corresponding to Action
<p>Level 0 Conditions are average or wetter than average</p>	<p>1. Monitor Drought Indicators Compare the current water levels from Duncairn to the drought indicator using the Reid Lake at Duncairn Water Level Station to identify the current drought level. Monitor water supply in Herbert Dugout and Reservoir.</p> <p>2. Monitor Regional Drought Indicators Check water levels in regional reservoirs and lakes (Thomson Reservoir and Junction Reservoir) check drought prediction maps found in WSA reports.</p> <p>3. Monitor Water Use Is the water use within normal levels? If exceptionally high evaluate the ability to supply water.</p> <p>4. Promote Water Conservation Encourage water conservation through educational materials.</p> <p>5. Participate in meetings with WSA Operations Group on the Duncairn Water System Participating in this group will inform the Town on the operations process and allow the town to easily bring forward concerns when they face low water levels.</p>	<p>1. Drought Committee Chair</p> <p>2. Drought Committee Chair</p> <p>3. Water Treatment Operator</p> <p>4. Drought Response Committee</p> <p>5. Drought Response Committee Chair/Town Council</p>

Drought Level & Description	Action Focus: Monitoring and Water Conservation	Role Corresponding to Action
<p>Level 1 Based on the drought indicator data the conditions indicate that there are now drought conditions.</p>	<p>1. Continue Monitoring Compare the current water levels from Duncairn to the drought indicator using the Reid Lake at Duncairn Water Level Station to identify the current drought level. Monitor water supply in Herbert Dugout and Reservoir.</p> <p>2. Information Sharing and Drought Level Raised to 1 Ensure drought information from the Drought Response Committee (DRC) is shared with Town Council. Town declares a drought.</p> <p>3. Water Conservation For example, encourage low water use through messaging. Implement odd-even watering days.</p> <p>4. Monitor Water Use Is the water use within normal levels? If exceptionally high, evaluate the ability to supply water.</p> <p>5. Participate in meetings with WSA Operations Group on the Duncairn Water System Participating in this group will inform the Town on the operations process and allow the town to easily bring forward concerns when they face low water levels.</p>	<p>1. Water Treatment Operator</p> <p>2. Chief Administrative Officer (CAO) and Drought Response Committee brings drought information to Town Council</p> <p>3. Drought Response Committee</p> <p>4. Water Treatment Operator</p> <p>5. Drought Committee Chair or Vice-Chair and CAO</p>



Saskatchewan Association of Watersheds



Table 3. Drought Response Steps and Roles continued

Drought Level & Description	Action Focus: Water Conservation & Mitigation	Role Corresponding to Action
<p>Level 2 Conditions are becoming severely dry.</p>	<p>1. Continue Monitoring Compare Reid Lake at Duncairn levels to the drought indicator. Monitor water supply in Herbert Dugout and Reservoir.</p> <p>2. Information Sharing Ensure drought information from the DRC is shared with Town Council. Town declares severe level of drought. Activation of Telmatik messaging system to notify residents. Public communication via website, social media, and signage.</p> <p>3. Implement Water Restrictions Encourage low water use. Implement odd-even watering schedule. Restrict lawn watering to one day per week. Watering only before 7 am or after 9 pm.</p> <p>4. Monitor Water Use Is the water use within normal levels? If exceptionally high evaluate the ability to supply water.</p> <p>5. Monitor Fire Preparedness Monitor fire water supplies and grass fire risk. Discuss mutual fire aid with neighbouring communities.</p> <p>6. Participate in meetings with WSA Operations Group on the Duncairn Water System Participating in this group will inform the Town on the operations process and allow the town to easily bring forward concerns when they face low water levels.</p>	<p>1. Water Treatment Operator</p> <p>2. CAO and Drought Response Committee brings drought information to Town Council</p> <p>3. Drought Response Committee</p> <p>4. Water Treatment Operator</p> <p>5. Fire Officials</p> <p>6. Drought Committee Chair or Vice-Chair and CAO</p>
Drought Level & Description	Action Focus: Response & Mitigation	Role Corresponding to Action
<p>Level 3 Conditions are becoming extremely dry and adverse socio-economic and ecosystem impacts are likely</p>	<p>1. Continue Monitoring Compare Reid Lake at Duncairn levels to the drought indicator. Monitor water supply in Herbert Dugout and Reservoir.</p> <p>2. Information Sharing Drought Level Raised to 3 Community declares critical level of drought. Organize a public meeting to provide information on the drought. Consider declaring a state of emergency if the drought is beyond the capacity of Herbert to manage. Activation of Telmatik messaging system to notify residents. Public communication via website, social media, and signage.</p> <p>3. Eliminate All Non-Essential Water Use No watering days. Close recreation facilities. Restrict tank-load facility to domestic use only. Committee authorized to turn off water supply (with clear criteria and communication protocols and defined in bylaw). Coordination with provincial authorities if escalation requires emergency declaration.</p> <p>4. Monitor Water Use Monitor the remaining available water supply.</p> <p>5. Monitor Fire Preparedness Monitor fire water supplies and grass fire risk. Discuss mutual fire aid with neighbouring communities. Implement fire bans.</p> <p>6. Participate in meetings with WSA Operations Group on the Duncairn Water System Participating in this group will inform the Town on the operations process and allow the town to easily bring forward concerns when they face low water levels.</p>	<p>1. Water Treatment Operator</p> <p>2. CAO and Drought Response Committee bring drought information to Town Council.</p> <p>3. Town of Hebert Council</p> <p>4. Water Treatment Operator</p> <p>5. Fire Officials</p> <p>6. Drought Committee Chair or Vice-Chair and CAO</p>

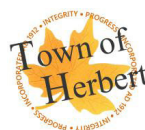


Table 4. List of Potential Water Conservation Actions

Promoting water conservation around the home.	Watering in the evening or early morning to minimize evaporation.	Increasing the fee for tank-load water and close during severe drought.	Promoting Xeriscaping or drought tolerant plants.
Implementing Odd-Even Watering days.	Develop a back-up or emergency water strategy prior to a severe drought situation.	Restricting outdoor watering one-day a week.	Restricting water for non-essential users during severe drought (ex. Car Wash, Pool, Arena).
Promoting citizen involvement in water conservation practices and competitions, like a street based or neighbourhood water conservation competition.		Suggest a Bylaw for water use or drought.	Instituting regular public messaging on the ongoing situation (newspaper ads, radio spots, leaflets to citizens, etc.)

Table 5. Drought Indicator Monitoring Schedule

January	February	March
<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor levels in Herbert Dugout. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor levels in Herbert Dugout. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within in the range of expected volumes. 2. Look at the Spring Runoff Drought Outlook for the year. 3. Monitor levels in Herbert Dugout.
April	May	June
<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor levels in Herbert Dugout. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor water levels at the Reid Lake at Duncairn Station and compare to the drought indicator to evaluate water supply. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor water levels at the Reid Lake at Duncairn Station and compare to the drought indicator to evaluate water supply.
July	August	September
<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor water levels in Herbert Reservoir and the Town of Herbert's dugout. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor water levels in Herbert Reservoir and the Town of Herbert's dugout. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor water levels in Herbert Reservoir and the Town of Herbert's dugout.
October	November	December
<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor water levels in the Town of Herbert's dugout. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range. 2. Look at Conditions at Freeze Up Report to judge drought conditions for next year. 3. Monitor levels in Herbert Dugout. 	<ol style="list-style-type: none"> 1. Monitor Water Usage to determine if it is within the range of expected volumes. 2. Monitor levels in Herbert Dugout.





PROCESS FOR DECLARING DROUGHT

When drought conditions are detected, the DRC convenes to assess the severity of the situation and declare the appropriate drought level based on the current conditions. These conditions should be reviewed every two weeks to ensure that the response remains aligned with the evolving situation. If the conditions worsen, the DRC may elevate the drought level to reflect the increased severity. Conversely, if conditions improve, the drought level may be lowered gradually, and eventually, the drought declaration may be lifted. Any decision to reduce or remove the drought level must be based on substantial and sustained improvement in conditions. This precaution ensures that any decrease in the drought level does not inadvertently undermine the community's resilience to future droughts. It is critical that the DRC ensures the community is adequately prepared for ongoing or potential future drought impacts before adjusting the drought level.

Throughout the duration of the drought, it is expected that there will be heightened support from provincial agencies, including the WSA and the Saskatchewan

Public Safety Agency (SPSA). These agencies play a vital role in providing resources, expertise, and assistance to mitigate the impacts of the drought for the Town. If the level of drought exceeds Herbert's capacity to manage, a State of Emergency may be declared. In such a case, it will be necessary to consult with the relevant provincial agencies to coordinate a more extensive response and mobilize additional resources to address the crisis effectively. This collaborative approach ensures that the community receives the necessary support to manage the situation appropriately. Table 6 provides a list of emergency contacts that should be contacted in the event of a severe drought event, ensuring that communication flows smoothly and that appropriate assistance is mobilized quickly. Table 7 includes a list of drought preparedness planning resources for the Town of Herbert. These resources offer valuable tools, guidelines, and references to help the committee and community better prepare for and respond to drought situations, ensuring long-term resilience and effective drought management.



Table 6. Emergency Contacts

Contact Name	Role	Phone No.
Saskatchewan Public Safety Agency (SPSA) Contact: SPSA Officer	Support for community in an emergency, guidance for declaring a state of emergency and responsible for provincial disaster assistance program https://www.saskpublicsafety.ca/emergencies-and-response	P: 1 - 800 - 667 - 9660 P: 911 - Dispatch directly (second choice) P:
Water Security Agency Water and Sewage Works Upset Reporting Line	Responding to infrastructure failures and loss of supply	P: 1 - 844 - 536 - 9494
WSA- Environmental Officer (EO) Contact: WSA EO	Checking water quality, helping communities manage the safety of their water supply	P: 306 - 741 - 5421
WSA Operations Group		

Table 7. A list of Resources for Drought Preparedness Schedule.

Resource	Website Link
WSA – Conditions at Freeze Up	https://www.wsask.ca/lakes-rivers/provincial/
WSA – Monthly Water Supply Conditions and Outlook	https://wsask.ca/recreation-environment/provincial-forecast/
WSA – Stream and Reservoir Conditions for the Old Wives Lake Watershed and Swift Current Creek Watershed (part of the South Saskatchewan River Watershed)	https://www.wsask.ca/hydrographs/old-wives-lake-watershed/ [check current flow volumes and levels for: Highfield Reservoir at Highfield Dam 05JB009, and Rushlake Creek above Highfield Reservoir 05JC004] https://www.wsask.ca/hydrographs/south-saskatchewan-river-watershed/ [check current levels for Reid Lake near Duncairn 05HD033]
WSA – Nearby Reservoirs (Junction Reservoir and Thomson Reservoir)	Junction Reservoir near Maple Creek https://wsask.ca/recreation-environment/lakes-and-rivers-overview/stream-flows-and-lake-levels/cypress-hills-north-slope-watershed/ and Thomson Lake near Lafleche Dam https://wsask.ca/recreation-environment/lakes-and-rivers-overview/stream-flows-and-lake-levels/old-wives-lake-watershed/
Agriculture and Agri-Food Canada – Canadian Drought Monitor	https://agriculture.canada.ca/en/agricultural-production/weather/canadian-drought-monitor/current-drought-conditions [shows drought across Canada, updated monthly]
North American Drought Monitor – Canada, USA, and Mexico	https://www.ncei.noaa.gov/access/monitoring/nadm/maps [see the broader regional drought situation across the border]



REFERENCES

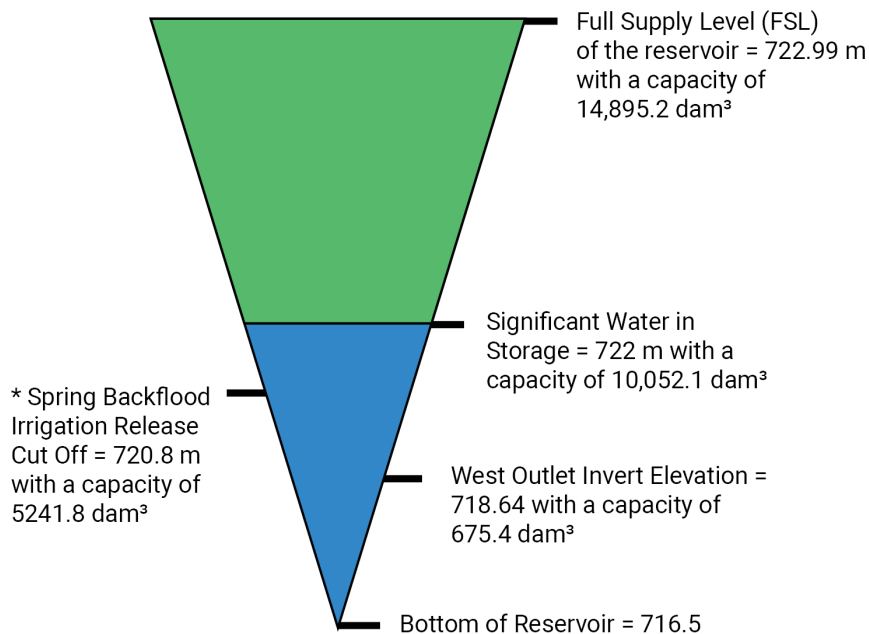
1. SCCWS. (2018). Herbert Source Water Protection Planning Committee Final Report. Swift Current Creek Watershed Stewards. March 15, 2018. pp 1 – 47.

APPENDIX I

Drought Level Description	Thresholds	May	June
Non-Drought Conditions	Level 0	>805.830	>805.633
Drought Conditions now present	Level 1	804.75	804.68
Conditions are becoming severely dry	Level 2	803.72	803.72
Conditions are extremely dry	Level 3	802.5	802.3

APPENDIX II

Highfield Reservoir Capacity



Elevation (m)	Capacity (dam ³)	Notes:
722.99	14895.2	Full Supply Level
722.5	12476.1	
722	10052.1	Significant Water in Storage
721.5	7900.2	Average Water Level from Figure 1.
721	5905.8	
720.8	5241.8	Spring Backflood Irrigation Release Cut-Off
720.5	4245.8	
720	2912.0	
719.5	1799.8	
719	1072.3	
718.64	675.4	West Outlet Invert Elevation

* All of the intensive irrigation in the Rush Lake Drainage Basin can be augmented with a diversion from Swift Current Creek into Highfield Reservoir when insufficient volumes are available from the Rush Lake Drainage Basin.

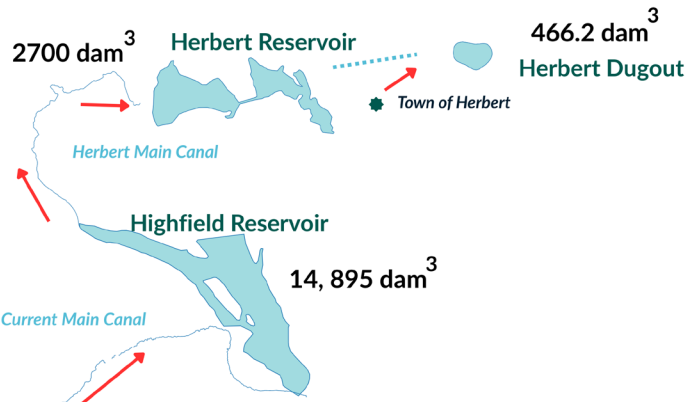
APPENDIX III

How Water gets to Herbert

The surface water that the Town of Herbert uses is pumped into the Water Treatment Plant from the Town's Dugout north of the community.

The dugout is filled via a pipeline from Herbert Reservoir which was built by the PFRA and is now owned by WSA. Highfield and Duncairn Reservoirs are also owned and operated by WSA.

Water from Highfield Reservoir is brought into Herbert Reservoir to maintain water levels for irrigation.



The Town of Herbert, on average annually uses about 143 dam³.
 The City of Swift Current, on average, annually uses about 2953 dam³.
 There are three irrigation districts that receive water from: Highfield/Herbert Reservoirs: Herbert Irrigation District, Rush Lake Irrigation District, and North Waldeck Irrigation District.
 There is also irrigation directly out of Duncairn Reservoir.

The full capacity in cubic decametres of each reservoir is listed beside each reservoir.
 1 cubic decametre (dam³) = 1000 cubic metres = 1 million litres

*reservoirs are not to scale



When water levels in Highfield are low water is brought in from Duncairn Reservoir via Swift Current Main Canal which diverts out of Swift Current Creek.

