



Ministry of  
Environment and  
Climate Change Strategy

# Key Documents, Rationale and Information Supporting Government Actions in Response to the Hullcar Issue

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The documents below provide key information supporting government actions and decisions, especially regarding the issuance of orders (verifying compliance and taking enforcement actions) against agricultural operators in the Hullcar Valley. It serves as a companion document to the Hullcar Chronology.

Government is committed to transparency, and with this in mind, many of these documents have already been made widely available to the public through the [Hullcar Aquifer Information](#) site. The annotations below help to highlight the important components of each document.

Document Name	Date	Link and Description
<b>Key Compliance and Enforcement Documents</b>		
ENV Compliance and Enforcement Policy and Procedure	May 2014	<a href="http://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/reporting/reporting-docs/ce_policy_and_procedure.pdf">http://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/reporting/reporting-docs/ce_policy_and_procedure.pdf</a> This document provides guidance to Ministry staff undertaking inspections and investigations.
Record of Decision: Hullcar Pollution Abatement/Prevention Orders	26 Oct. 2016	<a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/pao/2016-10-26_record_of_decisions-hullcar_orders.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/pao/2016-10-26_record_of_decisions-hullcar_orders.pdf</a> This document contains an overview, the legal authority, information about the orders issued to each operator, and lays out the reasons for each operator (or not – two operators did not receive orders).
Orders Handbook	April 2017	See document attached. The Orders Handbook provides staff with an overview on how Orders should be used, as well as specific guidance, templates, and examples of how to use Information Orders, Pollution Prevention Orders, Pollution Abatement Orders, and Compliance Orders. Best practices for issuing orders are included throughout the Handbook.
Director Letter – Order no longer in effect	30 September 2016	<a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/pao/2016-09-30_huxley_letter_acknowledging_pao_requirements_met.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/pao/2016-09-30_huxley_letter_acknowledging_pao_requirements_met.pdf</a> This document is an example of a letter issued from an ENV director (statutory decision-maker) to an operator once the requirements of their order have been satisfied. Several others are available on the Hullcar Aquifer Information site.
Pollution Abatement Order	12 May 2016	<a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/108368-friesen-pao.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/108368-friesen-pao.pdf</a> This document is a pollution abatement order that was issued to an operator in the Hullcar Valley. The document transparently explains the director's reasons for the issuance of the order, and the requirements needing to be satisfied by an operator.

		<p>In total, there were <b>seven</b> pollution abatement orders issued to agricultural operators in the Hullcar Valley, <b>two</b> pollution prevention orders, and <b>one</b> information order. Pollution abatement orders and the Information order are also posted to the Hullcar Aquifer Information site.</p> <p>As of the end of August, 2017, 5 orders are still in effect: 3 pollution abatement orders, 1 pollution prevention order, and 1 information order; 1 pollution abatement order was appealed through the EAB and is no longer in effect, joining 3 pollution abatement orders whose requirements were satisfied, and are also therefore no longer in effect.</p>
<p>Memoranda, Information Sharing Documents</p>		
<p>Memorandum regarding the April 11, 2017 site inspection in Hullcar, BC</p>	<p>24 April 2017</p>	<p><a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/hullcar_memo_april_24_2017_with_appendix_a_redacted.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/hullcar_memo_april_24_2017_with_appendix_a_redacted.pdf</a></p> <p>This memo captures the results of a site visit undertaken by FLNR and ENV staff to inspect the land surface, existing wells and the Steele Springs water system to establish any factors that may contribute to the elevated <i>E. coli</i> levels found in an untreated water sample collected from the SSW community water supply system in March, 2016.</p> <p>While no conclusions were drawn, the memo states: “Given available information, provincial staff find it likely that the elevated <i>E. coli</i> counts could be directly from the surficial aquifer or from the interception of percolating surface water by the intake point.”</p>
<p>FLNR Review: Summary of Ambient Groundwater Monitoring of the Hullcar Aquifers No. 102 and 103</p>	<p>4 March 2016</p>	<p><a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2016_03-04_flnr_hullcar_aquifer_quality_memo.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2016_03-04_flnr_hullcar_aquifer_quality_memo.pdf</a></p> <p>This memo provides an overview of the surficial geology of the Hullcar area and aquifer information, a description of the Hullcar Ambient Groundwater Quality Monitoring Networks (the Networks), a summary of the nitrate data from the Networks, and recommendations for next steps. The recommendations included:</p> <ol style="list-style-type: none"> <li>1. Look for opportunities to expand the Hullcar AGWQMN to other areas of the aquifer, including increasing the density and frequency of sampling in locations with observed elevated nitrate-nitrogen levels, as well as providing additional information on groundwater flow direction across the two aquifers;</li> <li>2. Look for appropriate up-gradient (background) sampling locations, and additional sampling coverage to the north, east, and south of the existing Network area;</li> </ol>

		<ol style="list-style-type: none"> <li>3. Compile available surface water quality data and compare to groundwater quality for trends in the parameters of interest related to land use and aquifer setting;</li> <li>4. Sample locations reporting higher nitrate concentrations for nitrogen isotopes to clearly separate manure from other nitrogen sources;</li> <li>5. During future sampling events, attempt to measure static water levels and survey well casing tops to assist with developing groundwater flow maps; and</li> <li>6. Look for opportunities to develop collaborative research projects with the Okanagan Basin Water Board and UBC Okanagan.</li> </ol>
<p>Updated ENV Review of Hullcar Water Quality Results</p>	<p>4 May 2016</p>	<p><a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2016-05-05_moe_data_update_hullcar_aquifer.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2016-05-05_moe_data_update_hullcar_aquifer.pdf</a></p> <p>This document provides an update to an earlier review of the water quality in the Hullcar Valley, including updated recommendations for actions to respond to the nitrate contamination in the drinking water. In addition to the four recommendations (below), a fifth was added:</p> <ol style="list-style-type: none"> <li>5. Further monitoring be undertaken to increase our understanding of water chemistry of the aquifer and interaction with surface conditions as well as assess the potential sources of contamination.</li> </ol>
<p>ENV Review of the Hullcar Aquifer Water Quality Results</p>	<p>15 Feb. 2016</p>	<p><a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2016-02-15_moe_data_hullcar_aquifer.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2016-02-15_moe_data_hullcar_aquifer.pdf</a></p> <p>This document provides a review of the water quality in the Hullcar Valley, including recommendations for actions to respond to the nitrate contamination issue. The environmental impact assessment biologist who undertook the review recommended the follow four actions:</p> <ol style="list-style-type: none"> <li>1. ENV data collected on nitrate levels in the aquifer be shared with IHA to support its assessments of risks to human health.</li> <li>2. Well owners using the Hullcar aquifer should test their drinking water regularly. If nitrate concentrations are higher than the drinking water guideline, owners should consult the IHA.</li> <li>3. There are numerous and complex factors that influence the potential for nitrate contamination of the Hullcar aquifer. A more definitive study would likely require the expertise of a hydrogeologist with experience in agricultural areas.</li> <li>4. Qualified Professionals providing future assessment of</li> </ol>

		<p>the application of nutrients to lands above the Hullcar aquifer should take into account the current nitrate levels recorded at SSWD Overflow and the potential cumulative contributions of other land use activities to nitrate levels.</p>
<p>Inter-Agency Working Group Action Plans</p>	<p>11 March 2016</p>	<ol style="list-style-type: none"> <li>1. <a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/hullcar-inter-ministry-action-plan-march11.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/hullcar-inter-ministry-action-plan-march11.pdf</a></li> <li>2. <a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2017_03_29_newsletter.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/2017_03_29_newsletter.pdf</a></li> </ol> <p>The Inter-Agency Working Group coordinates efforts between all agencies in the group to respond to the Hullcar Aquifer issue. These action plans document the actions to be taken as of the date, and updates.</p>
<p>Nutrient Management Plan</p>	<p>16 June 2017</p>	<p><a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/nmp/2017/2017_nutrient_management_plan.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/nmp/2017/2017_nutrient_management_plan.pdf</a></p> <p>Nutrient Management Plans (NMPs) were one of the requirements of the orders issued to the large agricultural operators in the Hullcar Valley. This is an example of the extensive nutrient management plan that was prepared by a qualified professional with the Jansen Farm. NMPs from other years and for other operators are also included on the Hullcar Aquifer Information site.</p> <p>This NMP contains information on all nitrogen sources on the farm, and nitrogen requirements for crops in 2017 based on estimated crop uptake and residual soil nitrate levels. NMPs are designed with the goal of a zero or negative nitrogen balance on all fields: the supply of crop-available nitrogen in manure and other nitrogen inputs will be equal to or less than the estimated crop requirements for nitrogen.</p>
<p>ENV Inspection Record</p>	<p>10 Feb. 2016</p>	<p><a href="http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/inspections/ir25729_purple_springs_awcr_notice.pdf">http://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-permitting-and-compliance/hullcar/inspections/ir25729_purple_springs_awcr_notice.pdf</a></p> <p>The Ministry of Environment has undertaken several inspections to verify compliance throughout the duration of responding to the Hullcar Aquifer issue. Inspection Records are prepared for each operation that has been inspected, with each component inspected identified and assessed.</p> <p>The example given here is the Inspection Record for the Purple Springs Nursery, and shows that there were no non-compliances.</p>
<p>Integrated</p>	<p>24 Feb. 2017</p>	<p><a href="http://www2.gov.bc.ca/gov/content/environment/air-land-">http://www2.gov.bc.ca/gov/content/environment/air-land-</a></p>

<p>Monitoring Study: Hullcar Hydrogeology Study – Phase 1 and 2 Assessment</p>	<p><a href="#">water/site-permitting-compliance/hullcar-aquifer</a> The objectives of the hydrogeologic study were to:</p> <ol style="list-style-type: none"> <li>1. Map and characterize the physical and geochemical hydrogeology of the Hullcar aquifer system using available information in order to refine the existing conceptual hydrogeological model for the Hullcar Study Area; and</li> <li>2. To evaluate nitrate-nitrogen sources, loading to groundwaters and fate and transport processes in order to develop a conceptual contaminant (nitrate) flow model of the Hullcar Study Area.</li> </ol> <p>This report delivers an updated technical account of the current state of information on the Hullcar Aquifer.</p>
<p>Tracking Post-Harvest Soil Nitrate in Agricultural Fields in the Hullcar Valley</p>	<p>21 Dec. 2016 <a href="http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/agricultural-land-and-environment/soil-nutrients/600-series/post-harvest_nitrate_study_-_progress_report_-_dec_2016.pdf">http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/agricultural-land-and-environment/soil-nutrients/600-series/post-harvest_nitrate_study_-_progress_report_-_dec_2016.pdf</a></p> <p>This document provided an interim update on progress with the integrated monitoring study.</p> <p>The questions posed by the study were:</p> <ol style="list-style-type: none"> <li>1. Overlying Aquifer 103 and the nearby area, how many agricultural fields have elevated levels of post-harvest soil nitrate in the 0-90 cm depth of soil?</li> <li>2. Does nitrate leach through the 0-90 cm depth of soil between growing seasons, in the area overlying Aquifer 103? [To be addressed in the final report in 2017.]</li> </ol> <p>Hypotheses at the time included:</p> <ol style="list-style-type: none"> <li>1. Most agricultural fields in the area have less than 100 kg N ha<sup>-1</sup> of post-harvest soil nitrate (0-90 cm soil depth).</li> <li>2. Soil nitrate leaches through the top 90 cm of soil between growing seasons. [To be addressed in the final report in 2017].</li> </ol> <p>Secondary objectives include the following:</p> <ol style="list-style-type: none"> <li>1. Provide soil test results to the producers to help optimize nutrient application rates.</li> <li>2. Determine whether nutrient application and crop yield records can be used to predict post-harvest soil nitrate levels.</li> </ol> <p>Conclusions and Next steps: “Almost 40% of sampled fields had high amounts of post-harvest soil nitrate that have the potential to leach over the winter, and all were in silage corn or cereals in 2016. Assuming there were no factors limiting crop growth in these fields, annual monitoring of PHNT will help guide adjustments of nitrogen applications to optimize crop yields, if these fields will have the same crop in subsequent years. On these fields, nitrogen applications can</p>

		<p>likely be reduced without risks to crop quality or yield, assuming there were no factors limiting crop growth in 2016. Conversely, the other 60% of the fields were less significant sources of potential nitrate leaching between growing seasons. It appears as though some nitrate had leached within the 0-90 cm depth prior to the post-harvest sampling, indicating the need to optimize the application of irrigation water to retain nitrogen in the root zone for crop use.”</p>
<p>Other Agencies – Key Documents</p>		
<p>IHA Water Quality Advisory for residents who may draw water from the Hullcar Aquifer in Spallumcheen</p>	<p>14 July 2014</p>	<p><a href="https://www.interiorhealth.ca/YourEnvironment/DrinkingWater/Documents/Hullcar_Area_WQA_Notific_Dr_Corneil-Jul14-2014.pdf">https://www.interiorhealth.ca/YourEnvironment/DrinkingWater/Documents/Hullcar_Area_WQA_Notific_Dr_Corneil-Jul14-2014.pdf</a></p> <p>This document, undersigned by an IHA Medical Health Officer, notified residents of the Hullcar Valley of the high nitrates in the drinking water, and gave health recommendations against drinking the water for particular segments of the population (e.g. pregnant women, babies, individuals with weakened immune systems). The document notifies residents that IHA and ENV are investigating, and will provide more information and updates as results become available. The notification also recommends that residents test their water to verify nitrate concentrations, and provides information on how to do so.</p>
<p>IHA Hazard Abatement Orders</p>	<p>28 August 2017</p>	<p>(These documents were emailed to POLIS by AGRI staff on Monday, 25 Sept. 2017 and are not included in this package to reduce redundancy.)</p> <p>A Medical Health Officer from the IHA issued two Hazard Abatement Orders to two agricultural operators (Grace-mar Farm and Jansen Farm), stating:</p> <ul style="list-style-type: none"> <li>a) “The nitrate levels in the Hullcar 103 aquifer has remained consistently and significantly above acceptable levels set in the Health Canada Guidelines for Canadian Drinking Water Quality. This water is currently used as drinking water source for the Steele Springs Waterworks District and a number of private well owners.</li> <li>b) It is my opinion that your nutrient management practices significantly contributed to the drinking water health hazard based on the information communicated with me as a summary of the multidisciplinary investigation conducted by the Hullcar Aquifer Inter-Ministry Working Group.</li> <li>c) In my opinion, preparation of an annual nutrient management plan and full compliance with the approved plan is necessary to abate the drinking water health hazard.”</li> </ul> <p>As with orders issued under <i>EMA</i>, these orders have several requirements of the affected agricultural operators.</p>

