



Ministry of
Environment and
Climate Change Strategy

Hullcar Aquifer Chronology: Government Actions to Date

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Prepared for:

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This chronology documents major actions and milestones taken by the BC Provincial government to investigate, monitor, and respond to the ongoing issue with rising concentrations of nitrates in the Hullcar Aquifer. These actions include compliance and enforcement events, key funding announcements, and ministry-specific efforts to address this ongoing issue. This timeline assumes familiarity with the geography of the affected area, as well as each of the parties involved. See also the Hullcar Roles and Responsibilities Matrix for a brief overview of each party’s roles, responsibilities and authorities in the Hullcar Aquifer.

For follow-up on many of the actions identified below, [please visit the Hullcar Aquifer Information site](#). For example, IMWG action plans and key documents have been posted to the site.

Acronyms

AGRI	Ministry of Agriculture	IMWG	Inter-Ministry Working Group (now IAWG)
ARDCorp	BC Agricultural Research and Development Corporation	INAC	Indigenous and Northern Affairs Canada
COS	Conservation Officer Service	IRR	Ministry of Indigenous Relations and Reconciliation
ENV	Ministry of Environment and Climate Change Strategy	MOU	Memorandum of Understanding
FLNR	Ministry of Forests, Lands, Natural Resource Operations and Rural Development	OIPC	Office of the Information and Privacy Commissioner
FNHA	First Nations Health Authority	SDM	Statutory Decision-Maker (provincial government)
IHA	Interior Health Authority	SHAT	Save the Hullcar Aquifer Team
IAWG	Inter-Agency Working Group (formerly IMWG)	SSDW	Steele Springs drinking water
		SSWD	Steele Springs Water District

Date	Type of Action	Description
Aug. 28	Compliance and Enforcement	IHA issued <i>Drinking Water Protection Act</i> orders to two agricultural operators (Grace-Mar Farm and H.S. Jansen & Sons).
Aug. 17	Community Engagement	Hullcar Valley Aquifer govTogether site launched for public input on the Hullcar Aquifer Review.
Aug. 16	Community Engagement	Invitation to contribute comments to the Hullcar Aquifer Review opened (included on the Hullcar Information website).
Aug. 14	Inter-Agency Coordination	IMWG name changed to IAWG. Splatsin joined the IAWG.
Aug. 10	Enforcement	ENV made final determination on one of two administrative monetary penalties against

Date	Type of Action	Description
Aug. 8	Enforcement	Grace-Mar Farms Ltd. Second of two administrative monetary penalty package sent to Grace-Mar, for failure to comply with the <i>Agricultural Waste Control Regulation</i> and <i>Spill Reporting Regulation</i> .
Aug. 3	Sampling, Community Outreach	ENV and IHA offer private well sampling for nitrates, total coliforms and <i>E. coli</i> for the Hullcar area to take place in late August. Information posted to the Hullcar Information website and sent to SHAT and SSWD to distribute. Sampling to be coordinated with FNHA for sampling Splatsin wells.
Aug 2	Review	Minister of Environment and Climate Change Strategy, Honourable George Heyman, called for Review of the Hullcar Aquifer Situation.
July	Data Collection	FLNR initiated 2017 Ambient Groundwater Monitoring study. Annual studies are completed by FLNR through the Ambient Hydrogeological Network.
June 22	Enforcement	First of two administrative monetary penalty packages sent to Grace-Mar Farms for failure to comply with the <i>Agricultural Waste Control Regulation</i> and the still-active Pollution Abatement Order.
June 20	Compliance and Enforcement	Pollution Prevention Order for Purple Springs Nursery concluded.
June 8	Relationship Building	Splatsin, ENV and IRR meet in person to discuss draft MOU.
June 5	Funding	Funding (\$25,000) confirmed to SSWD to complete the alternative drinking water sources study.
June 1	Enforcement	Environmental Appeal Board ruled in favour of the appeal by Curtis Farms: Pollution Abatement Order set aside. (Appeal decision available on EAB website.)
May 25	Information	Report from FLNR released to SSWD re: a visual inspection of the Steele Springs water intake, collection point, and known wells within 0.5 km of the Steele Springs intake.
May 5	Communication	Splatsin sent ENV a draft MOU for review re: water quality protection in the aquifer. ENV released review of the Hullcar Aquifer Water Quality Results.
Spring 2017	Natural Event	Record-setting spring flooding in the Okanagan.
April 24	Information	FLNR memorandum to ENV re: 11 April 2017 well site inspections in Hullcar. (Findings posted to Hullcar Information Site). Memo distributed to the IMWG.
April 11-May 8	Data Sampling	ENV initiated bi-weekly sampling of the SSDW overflow. Additional samples collected weekly along Deep Creek at Hullcar Rd and at Gulch Rd.
April 11	Inspection	FLNR conducted a visual inspection of the Steele Springs water intake and collection point,

Date	Type of Action	Description
April 10	Information	as well as known wells within 0.5 km of the Steele Springs intake. IHA releases public service announcement encouraging private well users to protect their drinking water. (Available on Hullcar Information site.)
April 5	Inter-Ministry Coordination	Representative from INAC joins IMWG to support Splatsin.
March 23	Enforcement	In response to manure effluent spill at Grace-Mar Farm (occurred Feb 16, 2017), two administrative monetary penalties initiated.
March 21	Community Engagement	FLNR presentation Ambient Groundwater Monitoring: Hullcar Aquifers No. 102 and 103; IHA Hullcar Area Nitrates presentation added to Hullcar information Site. Both presentations were given at the March 8 public meeting.
March 17	Community Engagement	ENV presentation re: Surface and Groundwater Quality Review in the Hullcar Aquifers posted to Hullcar Information Site. Presentation was given at the March 8 public meeting.
March 8	Communication	Letter from ENV to IHA summarized Environmental Study Findings: pollution occurring from agricultural waste at Grace-Mar Farm, Fields 103A Hullcar and 101 Barns at H.S. Jansen and Sons Farm Ltd. More studies needed at Ken Regehr Farm and Purple Springs Tree Nursery.
March 4	Review	FLNR review regarding the Summary of Ambient Groundwater Monitoring of Hullcar Aquifers No. 102 and 103.
March 3	Community Outreach	Public meeting held by IMWG to update residents on information and situation in the Hullcar Valley.
March 3	Funding Commitment	<p>Province announced \$950,000 in funding to ensure safe drinking water for Hullcar residents:</p> <ul style="list-style-type: none"> • \$300,000 managed by ARDCorp for a community liaison consultant and to assist producers with development of Nutrient Management Plans and Action Plans; • \$650,000 managed by Fraser Basin Council: <ul style="list-style-type: none"> ▪ \$300,000 for developing an alternative water supply for Steele Springs Water District ▪ \$50,000 for at-tap nitrate conversion for private well owners; and ▪ \$300,000 for infrastructure and water protection for the Splatsin
March 1	Compliance and Enforcement	Pollution Abatement Order amendment issued to Grace-Mar with additional requirements cease any and all applications of agricultural waste and fertilizer to their lands until a nutrient management plan has been developed; until they address a secure, alternative liquid manure storage and/or disposal given that their current facilities are insufficient; to address

Date	Type of Action	Description
		requirements for their existing manure effluent lagoons; and to submit a nutrient management plan designed to meet an agronomic nitrogen balance of zero for each field receiving nutrient applications.
Feb. 24	Information	Golder Associates released Phase 1&2 Integrated Monitoring Study (hydrogeology study). (Available on Hullcar Information website).
Jan. 18	Information	Updated IMWG chart and summary of environmental studies occurring in Hullcar Valley published online: includes information about data analysis/review, groundwater sampling, and soil sampling underway.
Jan – Sept.	Action Plan	Phase 2 of the IMWG Action Plan initiated, including ongoing government to government relationship with Splatins, follow-up from post-harvest nitrate study, working with Hullcar Aquifer agricultural operators, planned public meetings and public engagement, ongoing management of pollution abatement/prevention orders, approving action plans associated with the orders, engaging with the Regional District North Okanagan, Okanagan Basin Water Board and Township of Spallumcheen to ensure a source of drinking water.
2016		
Dec. 21	Communication	AGRI/IMWG issued “Post-Harvest Nitrate Study: Hullcar Valley” progress report.
Nov. 23-24	Appeal	ENV participated in an Environmental Appeal Hearing for Curtis Farms.
Nov. 2	Community Meeting	Second meeting of the Hullcar Aquifer Technical Communications Working Group (includes members from Splatins, FN Health Authority and IMWG).
Oct. 26	Communication	IMWG received Phase 1 draft report for the Integrated Monitoring Study for Hullcar Aquifer Record of Decision (document) from ENV posted to Hullcar Information website, which accounts for information about the provincial government’s legal authority, the pollution abatement and prevention orders issued, and engagement with various operators. Also includes rationale for not issuing orders to two agricultural operators in the Hullcar Valley.
Oct. 19	Information	Western Water Associates Ltd. technical memorandum sent to FLNR re: their reconnaissance of the nitrate contamination in the aquifer for inclusion in the Integrated Monitoring Study being conducted by Golder.
Sept. 30	Compliance and Enforcement; Data Collection and Sampling	<ul style="list-style-type: none"> a) Pollution Abatement Order for Ken and Darlene Huxley concluded. b) Phase II of the Integrated Monitoring Study Field Assessment (Golder Associates) initiated. Set to conclude in February 2017.
Sept. 15	Data Collection	AGRI began Post-Harvest Nitrate Study; set to conclude in July 2017.

Date	Type of Action	Description
Sept. 14	and Sampling	
Sept. 10	Agency Coordination	First meeting of the Hullcar Aquifer Technical Communications Working Group (includes members from Splatsin, FN Health Authority and IMWG).
	Information	
Aug. 25	Compliance and Enforcement	Pollution Abatement Order for Wilma and Thys Hammbuckers concluded.
Aug. 15	Data and Sampling	<ul style="list-style-type: none"> a) In addition to monthly water samples of SSDW overflow, ENV conducted surface water sampling of Deep Creek. Sampling concluded in August, with data analysis following in September. b) FLNR initiates 2016 Ambient Hydrogeological Network Sampling. Data analysis to follow for September.
July 29	Monitoring Study	ENV enters into a contract with Golder & Associates to conduct an integrated monitoring study.
July 26	Compliance and Enforcement	Pollution Abatement Order for Alfred Giesbrecht concluded.
July 12-14	Inspections	ENV staff conducted inspections on five of the agricultural operators who received pollution abatement/prevention orders.
July 5	Communication	ENV led a call with order recipients, SSWD, SHAT, the Township of Spallumcheen, and Splatsin to advise of ENVs response to the OIPC report, and to discuss the concept of development of an Area Based Management Plan for Hullcar Valley and area.
July 4	Data Collection and Sampling	ENV staff begin monthly groundwater sampling from the SSDW overflow. No end date set for sampling. Continues to present.
June 29	Communication	Office of the Information and Privacy Commissioner released the report “Clearly in the public interest: The disclosure of information related to water quality in Spallumcheen,” directing the ENV to release soil test results from the Hullcar Aquifer. Minister of Environment, Honourable Mary Polak, released statement in response to OIPC report.
June 8	Compliance and Enforcement	Pollution Prevention Order issued to Ken Regehr Farm (cancelled previous pollution abatement order send 18 May 2017).
June 7	Compliance and Enforcement and	<ul style="list-style-type: none"> • Pollution Prevention Order issued to Purple Springs Nursery Inc. • IMWG issued a request for proposal for an Integrated Monitoring Study of Hullcar

Date	Type of Action	Description
June 6	Contract	Aquifer.
June	Compliance and Enforcement	Draft Pollution prevention order sent to Ken Regehr Farm.
May 19	Data and Sampling	ENV began monthly sample collection at the SSDW overflow that includes <i>E. coli</i> , phosphorus, water hardness and metals.
May 18	Compliance and Enforcement	Draft pollution abatement order issued to Purple Springs Nursery Inc.
May 17	Compliance and Enforcement	Pollution Abatement Order issued to Ken Regehr Farm.
May 16	Compliance and Enforcement	Letters provided to two agricultural operators (Heavenly Feathers and Ivan and Annette Card) stating that their pollution abatement orders will not be issued.
May 16	Communication	IMWG meets with Brian Upper, SSWD, and Doug Geller (Senior Hydrogeologist/President of Western Water and Associates Ltd.; WWAL) to discuss WWAL data and technical information that supported their open letter.
May 13	Community Outreach and Compliance Promotion	ENV led discussion in separate meetings with agricultural operators, SSWD, Township of Spallumcheen and SHAT, introducing the concept of developing an area based management plan for the Hullcar Valley and clarifying the requirements of orders.
May 12	Compliance and Enforcement	ENV issued Pollution Abatement Orders to seven agricultural operations. (Copies of the orders are available on Hullcar Information website.) There are three different levels of Orders where the higher level orders contain a number of requirements, including, in some cases, retain a qualified professional, submit a nutrient management plan, submit an annual summary, undertake an environmental impact study, and submit an action plan addressing the issues identified in the environmental impact study. The medium and lower level orders required the operators to ensure proper storage of agricultural waste.
May 6	Compliance and Enforcement	Note: Environmental impact studies conducted by agricultural operators are novel requirements, and have not been done before. They require both deep soil and surface soil data collection, and groundwater sampling, with the associated data analysis and review.
May 4	Information	Draft Pollution Abatement Orders issued to 10 agricultural operations in the area.
May 4	Information	Update to Memorandum from ENV RPBios Carrie Morita and Dennis Einarson that advised of an increased trend of nitrates in surface water at SSDW source, Deep Creek at Gulch Rd,

Date	Type of Action	Description
		<p>and Deep Creek above Hullcar Rd. Update includes more historical data. An additional recommendation was made in this updated memo:</p> <ol style="list-style-type: none"> 5. Further monitoring should be undertaken to increase understanding of water chemistry of the aquifer and interaction with surface conditions as well as assess potential sources of contamination.
Spring 2016	Natural Event	Record spring flooding in the Okanagan.
April 20	Information	Hullcar Aquifer Information Site launched. Information updates posted to website on an ongoing basis, including bi-weekly IMWG newsletters, agricultural operators’ nutrient management plans and inspection information. Information back to initiation of response to the situation also shared on the site (to 2014).
April 20	Inspection	On-site inspection of H.S. Jansen and Sons Ltd. conducted to review compliance with the <i>Agricultural Waste Control Regulation</i> .
April 14	Community Outreach	IMWG lead a community meeting in Hullcar Valley to share environmental and health related information and government’s plan to address the water quality issue.
March 21	Information and Community Outreach	<ol style="list-style-type: none"> a) IMWG met with Splatsin, Township of Spallumcheen, SSWD, and SHAT to discuss their concerns with the high nitrate levels in SSDW source. b) IMWG met with agricultural operators in Hullcar Valley; to identify the problem with nitrate contaminated drinking water and appeal to them to apply best practices to manage agricultural waste.
March 15	Monitoring Plan	IMWG created an integrated cross-ministry monitoring plan for identification of sampling points, by whom, schedules of samples and more in the Hullcar Aquifer.
March 14	Review	IMWG review of <i>Environmental Management Act, Drinking Water Protection Act, Health Act</i> and other instruments to encourage collective action for improvement of water quality.
March 4	Information	<p>Memorandum from FLNR regional hydrogeologists Skye Thomson and Dave Thomson, providing information similar to the 2006 Golder Report: an overview of the surficial geology of the Hullcar area and aquifer, a description of the Hullcar Ambient Groundwater Quality Monitoring Networks (AGWQMN), a summary of nitrate data from AGWQMN, and recommendations for next steps. Recommendations included:</p> <ol style="list-style-type: none"> 1. Look for opportunities to expand the Hullcar Ambient Groundwater Quality Monitoring Networks to other areas of the aquifer [...] as well as providing additional information on groundwater flow direction across the two aquifers. 2. Look for appropriate up-gradient (background) sampling locations, and additional

Date	Type of Action	Description
		<p>sampling coverage to the north, east and south of the existing Network area.</p> <ol style="list-style-type: none"> 3. Compile available surface water quality data and compare groundwater quality for trends in the parameters of interest related to land use and aquifer setting. 4. Sample locations reporting higher nitrate concentrations for nitrogen isotopes to clearly separate manure from other nitrogen sources. 5. During future sampling events, attempt to measure static water levels and survey well casing tops to assist with developing groundwater flow maps. 6. Look for opportunities to develop collaborative research projects with Okanagan Basin Water Board and UBC Okanagan.
March 1	Review	ENV/IMWG initiated review of all water quality data available from IHA, FLNR and ENV, including Environmental Monitoring System information.
March-Dec. Feb. 23	Action Plan Data and information	IMWG Phase 1 Action Plan released to public (available on Hullcar Information website). ENV staff conducted field assessments of agricultural operations in the Hullcar area. After, a report issued findings of the field assessments and a briefing held with the SDM.
Feb. 16	Inter-Ministry Coordination	ENV became lead agency in integrated Hullcar Aquifer water quality response (IMWG).
Feb. 15	Review	ENV published review of Hullcar Aquifer Water Quality results.
Feb. 15	Information	<p>Memorandum from ENV RPBio Carrie Morita advised of an increased trend of nitrates in surface water at SSDW source, Deep Creek at Gulch Rd, and Deep Creek above Hullcar Rd. Memo made several recommendations, including:</p> <ol style="list-style-type: none"> 1. ENV data collected on nitrate levels should continue to be shared with IHA to support its assessments of risks to human health; 2. Well owners using the Hullcar aquifer should test their drinking water regularly. If nitrate concentrations are higher than drinking water guidelines, owners should consult with the IHA. 3. Numerous and complex factors influence the potential for nitrate contamination of the Hullcar aquifer. A more definitive study would require the expertise of a hydrogeologist with appropriate experience. 4. Qualified Professionals providing future assessment of the application of nutrients to lands above the Hullcar aquifer should take into account the current nitrate levels recorded at the SSWD overflow and the potential cumulative contributions of other land use activities to nitrate levels.

Date	Type of Action	Description
Feb. 10	Inspections	ENV staff conducted on-site inspection of the Curtis Feedlot, Grace-Mar Dairy, Purple Springs Nursery, and the Ken Regehr Farm to review compliance with the Agricultural Waste Control Regulation. (Inspections reports subsequently posted to the Hullcar Aquifer website.)
Feb. 4	Inter-Ministry Coordination	AGRI reactivated inter-ministry technical working group with membership from ENV, FLNR and Interior Health Authority.
Jan-Feb	Compliance Promotion	ENV staff conducted promotional compliance activities in Hullcar area to increase agricultural operators' awareness of the requirements in the Agricultural Waste Control Regulation, and AGRI best management practices.
2015		
Dec. 11	Communication	ENV response concluded to Freedom of Information request by the University of Victoria's Environmental Law Center.
Nov. 10, 11	Communication	ENV received FOI request from University of Victoria's Environmental Law Centre re: Hullcar Aquifer nitrate contamination.
Aug. 31	Approval	ENV approved nutrient application for 6,000 gal/acre to Jansen field of concern.
July 15	Approval	ENV approved nutrient application for 6,000 gal/acre to Jansen field of concern.
June 12	Approval	ENV denied nutrient application for 8,000 gal/acre to Jansen field of concern.
Feb	Inter-Ministry Coordination	AGRI initiated Inter-Ministry Working-Group to coordinate inter-ministry responses to the Hullcar Aquifer issue. First and only meeting to take place at this time, due to illness of AGRI lead.
2014		
Aug. 27	Approval	ENV approved nutrient application for 12,000 gallons/acre to Jansen field of concern.
July 14		IHA issued a Water Quality Advisory for users of Hullcar aquifer (Advisory remains active today). Advisory remains in effect until the nitrate levels fall below 10 mg/L.
July	Data Collection	ENV took over monthly water sampling for IHA. The water samples were collected to monitor the trends in nitrate concentrations. All monthly sampling results are shared with Steele Springs Water Board and the Inter-Agency Working Group.
April 16	Approval	ENV approved nutrient application for 15,000 gallons/acre to Jansen field of concern, in accordance with the nutrient management plan.
March 6	Compliance and Enforcement	ENV issued a s.112 Inspection Order under <i>EMA</i> to H.S. Jansen & Sons Dairy; ENV also issued an <i>EMA</i> Information Order (107156) to Doug Regehr Feedlot.
March	Data collection	IHA began monthly water sample collection to test for nitrate concentrations. ENV took over

Date	Type of Action	Description
Feb. 13	Inter-Ministry Coordination	monthly sampling later in the year (July). ENV staff requested assistance from several AGRI staff regarding soil trend analysis provided by Okanagan Fertilizer. As well, requested advice and recommendation regarding types of crops planted.
Feb. 11-13	Correspondence	ENV staff corresponded with IHA staff regarding the Guidelines for Canadian Drinking Water Quality for Nitrates and the health impact for high nitrate levels.
February 3	Data and Communication	ENV staff received water sample results from SSWD overflow and provided them to IHA staff, Dr. Brian Upper, co-chair SSWD and Conservation Officer Service.
February 2	Compliance and Enforcement	ENV staff initiated pre-investigative referral to Conservation Officer Service for H.S. Jansen Dairy.
January 21	Compliance and Enforcement	ENV staff responded to a complaint from Brian Upper, Co-Chair of high nitrates in Steele Springs drinking water overflow, inspected the area including H.S. Jansen & Sons dairy farm.
Pre-2014		
Aug. 1, 2006	Information	Golder Associates' Evaluation On Groundwater Potential In The Hullcar Area (Report). Completed For The Township of Spallumcheen

Background/Ongoing

This table provides a brief snapshot of background work undertaken by government outside of the scope, but intersecting with the Hullcar Aquifer issue.

Date	Type of Action	Description
1985 to present	Data Collection and Monitoring	In 2010 FLNR took responsibility for the operational running of the Ambient Hydrogeological Monitoring Network. FLNR maintains the sampling and monitoring for the Network, which includes several sample sites in the Hullcar aquifer.