

Revisions to the SCRSPA Assessment Report – Section 5
Revisions related to Wallaceburg Nitrate Issue

White Cells- original text
Grey cells- new text
Yellow highlight- area of original text to be changed
Bright Green highlight- area of new text

Section 4 – Vulnerability Assessment

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| 5.2 Impact of Identifying an Issue | 5-6 | <p>If an <i>issue</i> is identified, the <i>activities</i> that contribute to the identified <i>issue</i> and the areas where they occur (within <i>vulnerable areas</i>, as described above) must also be identified. A third intake protection zone (<i>IPZ-3</i>) for surface water intakes may be delineated to include the <i>activity</i> and area known to contribute to the drinking water quality <i>issue</i>.</p> <p>For the <i>activities</i> or <i>conditions</i> contributing to <i>issues</i> that are deemed to be <i>significant threats</i> as described above, the <i>risks</i> the <i>activities</i> or <i>conditions</i> pose must be reduced through the source protection plan.</p> | To document the potential for an issue under the Act and differentiate it from an Issue under the Rules | |
| | | <p>Should an <i>issue</i> be identified as per Technical Rule 114, the <i>issue</i> contributing area must be delineated as per Rule 115. Also as per rule 115, activities that contribute to the <i>issue</i> within the <i>issue</i> contributing area must be identified and are deemed to be a <i>significant risk</i> to the source of drinking water for those systems included in the Terms of Reference for the SCRSPA. <i>Significant risks</i> must be mitigated through the <i>Source Protection Plan</i>. If the information required to delineate the ICA and identify the activities contributing to an issue are not readily ascertained, rule 116 allows for a work schedule to be identified to ascertain the information specified in rule 115.</p> <p>As per Technical Rules 68, 130 and 131, a third intake protection zone (<i>IPZ-3</i>) for surface water intakes may be delineated to include the activities and area known to contribute to the drinking water quality <i>issue</i>.</p> <p>In addition to the identification of an issue by rule 114, rule 115.1 allows for the identification of an issue which is not identified in accordance with rule 114. This is often referred to as an issue identified under that Act to differentiate it from an issue identified under the rules (specifically rule 114). Issues identified as per rule 115.1 do not require the delineation of an ICA and cannot have significant threats identified which contribute to the issue. They may however be addressed through specify action policies and be the subject of monitoring and reporting.</p> | | |
| 5.2 | 5-6 | Further, <i>issues</i> in <i>HVAs</i> or <i>SGRAs</i> or those linked to a system not identified in the Terms of Reference may lead to the identification of moderate drinking water threats (not significant threats). Systems not identified in the Terms of Reference may be those included in the source protection planning process through municipal council resolution or by the Minister (MOE). | | |
| | | Further, <i>issues</i> in <i>HVAs</i> or <i>SGRAs</i> or those linked to a system not identified in the Terms of Reference may lead to the identification of moderate drinking water threats (not significant threats). Systems not identified in the Terms of Reference may be those included in the source protection planning process through municipal council resolution or by the Minister (MOE). No additional systems in the SCRSPA have been identified in this manner. | | |
| 5.3 Issues Evaluation Methodology | 5-6 | Identifying <i>issues</i> is a key step in the overall process of protecting drinking water quality. <i>Issues</i> were identified in the St Clair Region Source Protection Area by following the Thames-Sydenham and Region Issues Evaluation Methodology (May 14, 2009), depicted in Figure 5-1. The methodology is provided in Appendix 8. | To document potential for issue under the Act and differentiate from Issue under the Rules | |

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| | | Identifying <i>issues</i> is a key step in the overall process of protecting drinking water quality. <i>Issues</i> were identified in the St Clair Region Source Protection Area by following the Thames-Sydenham and Region Issues Evaluation Methodology (May 14, 2009), depicted in Figure 5-1. This methodology was developed to guide the technical work to assess an issue under the Rules (rule 114). The methodology is provided in Appendix 8. | | |
| Table 5-5 | | Update to add reference to ICA report | to add reference to SCRCA nitrate ICA work | |
| | | Add to table Issue Contributing Area (ICA) for Wallaceburg Intake, SCRCA, 2014 | | |
| Table 5-6 | | System: Wallaceburg, Issue : Nitrates Description: In the St. Clair Watershed Characterization report, there were two exceedances of the half MAC of 5 mg/L, identified for nitrate. The elevated levels were in 5.9 mg/L in 1990 and 9.3 mg/L in 1992 (data from 1990 to 2005). Also, nitrates have been identified by the water treatment plant manager as being a significant concern, and hence are considered a drinking water quality issue. It is recommended that additional raw water quality data illustrating the elevated levels of nitrates be analyzed. Natural or Anthropogenic Source: Possibly both natural and anthropogenic causes, further investigation required | Inference from the ICA study, 2014 | |
| | | System: Wallaceburg, Issue : Nitrates Description: In the St. Clair Watershed Characterization report (Dec 2008), there were two exceedances of the half MAC of 5 mg/L, identified for nitrate. Also, nitrates have been identified by the water treatment plant manager as being a significant concern, due to increasing occurrences of events producing elevated nitrate levels in raw drinking water at the intake. The treatment system is not able to remove nitrate from the source water. As a result Nitrates are considered a drinking water quality issue in the approved Assessment Report and work proceeded to identify the ICA. Modelling was undertaken to assess nitrate contributions from the subwatersheds of the Sydenham River. The Sydenham River flows by the intake when hydraulic conditions result in the reversal of flow north up the Chenal Ecarte past the intake. It was determined that all of the subwatersheds contribute relatively equally to the issue, however there was considerable uncertainty as to the relative contribution of areas connected to the watercourses by transport pathways. Common sources of nitrate include fertilizer and agricultural source material applied to land, septic system and waste water treatment effluent and storm water runoff. Further, through analysis of more recent data it was found that nitrates in the Sydenham River may be leveling off and possibly decreasing. A longer period of record is required to determine if nitrates should continue to be considered an issue for Wallaceburg. Further it became apparent that increasing occurrences in the number of elevated nitrate events may possibly be attributed to more frequent water quality sampling. Without a long term record of frequent sampling it is not possible to determine if the trend suggested by operators is supported in the limited data. The report therefore recommends continued and improved monitoring to allow future assessment of the nitrate issue and delineation of the ICA (if warranted). A work plan to collect and analyze this data is identified in the Work Plan and Data Gaps sections of this report pursuant to rule 116. It is also prudent to determine the outcome of the ongoing Environmental Assessment which is considering alternative drinking water sources and upgrades to infrastructure at the intake and treatment plant. Natural or Anthropogenic Source: Both natural and anthropogenic causes. | | |
| System Summary, Wallaceburg | | Update to reflect ICA work | | |
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| Issues | | Update to reflect ICA work | | |

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| Section Summary | | | | |
| 5.6 Work Plan | | If a <i>drinking water</i> quality <i>issue</i> is identified as per Rule 114, the area and the <i>activity</i> contributing to a <i>drinking water</i> quality <i>issue</i> must also be identified as per Rule 115. In the Lower Thames Valley SPA, some of the <i>issues</i> are naturally occurring and are therefore understood to not be subject to Rule 115. The sources or causes of the rest of the <i>issues</i> are yet to be determined. If more information becomes available to the SPC it may be possible to determine the source or cause of an <i>issue</i> . If it is determined that an <i>issue</i> (identified as per Rule 114) is wholly or partially due to anthropogenic sources, the work (to identify the area and activities contributing to the <i>issue</i> , as per Rule 115), or the work plan (as per rule 116) would be included in a subsequent Assessment Report. | Minor edit | |
| | | If a <i>drinking water</i> quality <i>issue</i> is identified as per Rule 114, the area and the <i>activity</i> contributing to a <i>drinking water</i> quality <i>issue</i> must also be identified as per Rule 115. In the St Clair Region SPA, some of the <i>issues</i> are naturally occurring and are therefore understood to not be subject to Rule 115. The sources or causes of the rest of the <i>issues</i> are yet to be determined with the exception of the nitrate issue for Wallaceburg. If more information becomes available to the SPC it may be possible to determine the source or cause of an <i>issue</i> . If it is determined that an <i>issue</i> (identified as per Rule 114) is wholly or partially due to anthropogenic sources, the work (to identify the area and activities contributing to the <i>issue</i> (as per Rule 115), or the work plan (as per rule 116) would be included in a subsequent Assessment Report. | | |
| 5.7 Data Gaps | 5-12 | As mentioned in Section 5.5, the sources or causes of some of the <i>issues</i> are yet to be determined. This is a data gap. Details of how to accomplish this determination is provided in Table 5-7. Filling of this data gap, as more information becomes available to the SPC, may help identify <i>issues</i> as per Rule 114, and therefore lead to identifying the area and activity contributing to those <i>issues</i> as required by rule 115. | Results from a Recent study of Nitrate issue | |
| | | As mentioned in Section 5.5, the sources or causes of some of the <i>issues</i> are yet to be determined. This is a data gap. Details of how to accomplish this determination is provided in Table 5-7. Filling of this data gap, as more information becomes available to the SPC, may help identify <i>issues</i> as per Rule 114, and therefore lead to identifying the area and activity contributing to those <i>issues</i> as required by rule 115. Through work to delineate and ICA it was determined that the information available left too much uncertainty in the extent of the ICA and the activities contributing to the issue. Further, the analysis of more recent water quality results identify the potential for the nitrate levels in the Sydenham River to be leveling off or possibly declining. It is noted that the source water for this intake is from the St Clair River, however, the intake gets its water from the Sydenham water during flow reversal events. More recent water quality analysis suggest this may be occurring more frequently, however, monitoring has increased in the recent years. Additional data for a longer period of record is required to determine if these events are occurring more frequently. Further, additional monitoring is required to be able to determine if nitrate should remain an issue and to be able to determine the contribution of areas connected to the watercourse by transport pathways such as tile drainage. Monitoring at the intake undertaken by the PUC should also be coordinated with monitoring in the Sydenham River which is undertaken by the SCRCA Efforts to capture water quality during events and areas contributing to the issue under the event should be considered. Additional water quality monitoring should be incorporated into existing programs or added as new programs. As such additional monitoring and analysis is required as identified in the Work Plan section of this report. | | |

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| 5.7 Data Gaps | 5-12 | Technical studies on <i>issues</i> evaluation for Kettle and Stony Point First Nation intake on Lake Huron commenced in spring 2011. Estimated timeline of completion of that study is provided in Section 9. | Work completed | |
| | | Delete paragraph | | |
| 5.7 Data Gaps | Table 5-7 | <p>Nitrate is a naturally occurring ion that is part of the global nitrogen cycle and is ubiquitous in the environment. There are two main land uses that have the potential to contribute nitrate to surface water: wastewater treatment plant discharge and agriculture activities.</p> <p>Nitrates are soluble in water and areas that have characteristics for increased potential of runoff generation (clay soil, elevated slope) may allow for nitrates to be transported during spring melt events, high precipitation events or events that cause land to water body drainage (Bhumbla, 2009). The upland vulnerable areas for the Wallaceburg water treatment plant are composed of mainly Thames clay loam, Brookston silt loam, Brookston clay loam and Brookston clay (Agriculture and Agri-Food Canada, 2008) and thus have the characteristics of generating runoff.</p> <p>The manager of the Chatham-Kent Public Utilities Commission indicated concerns pertaining to the increase in nitrate levels at the water treatment plant during spring melt events, high precipitation events when there are no crops in the agricultural fields, or events that cause land to river drainage. The manager noted that the wastewater treatment plant at Wallaceburg was maintaining the required discharge limits for nitrates.</p> <p>Sampling for nitrates in the tributaries discharging near the intake, at the tributary outfalls, sewer outfalls, nearshore and in the intake raw water would need to be conducted to help determine the cause of nitrates. Sampling to establish background levels and to determine levels after events such as high precipitation should be conducted. Reverse flow conditions may also need to be considered.</p> | Results from a Recent study of Nitrate issue | |
| | | <p>Nitrate is a naturally occurring ion that is part of the global nitrogen cycle and is ubiquitous in the environment. There are two main land uses that have the potential to contribute nitrate to surface water: wastewater discharge (treatment plant or septic systems) and agriculture activities.</p> <p>Nitrates are soluble in water and areas that have characteristics for increased potential of runoff generation (clay soil, elevated slope) may allow for nitrates to be transported during spring melt events, high precipitation events or events that cause land to water body drainage (Bhumbla, 2009). The upland vulnerable areas for the Wallaceburg water treatment plant are composed of mainly Thames clay loam, Brookston silt loam, Brookston clay loam and Brookston clay (Agriculture and Agri-Food Canada, 2008) and thus have the characteristics of generating runoff.</p> <p>The manager of the Chatham-Kent Public Utilities Commission indicated concerns pertaining to the increase in nitrate levels at the water treatment plant during spring melt events, high precipitation events when there are no crops in the agricultural fields, or events that cause land to river drainage. The manager noted that the wastewater treatment plant at Wallaceburg was maintaining the required discharge limits for nitrates.</p> <p>Further monitoring is required to delineate the extent of issue contributing area and identify activities that contribute to the issue. A collaborative effort from Chatham-Kent PUC, St. Clair Region Conservation Authority and MOE should be undertaken to improve existing water quality programs and monitoring efforts should be directed at, but not limited to: event based water quality monitoring, correlation between the various monitoring programs, and contributions through transport pathways.</p> <p>Sampling for nitrates in the tributaries discharging near the intake, at the tributary outfalls, sewer outfalls, nearshore and in the intake raw water would need to be conducted to help determine the cause of nitrates. Sampling to establish background levels and to determine levels after events such as high precipitation should be conducted. Reverse flow conditions may also need to be considered.</p> | | |

