

Final Meeting Notes

South Shawnigan Creek Water Quality Monitoring Study

Meeting on Draft Monitoring Study Design

June 28, 2016

Meeting Highlights

- A draft monitoring study design prepared by Brenda Miskimmin (independent qualified professional) was reviewed for the South Shawnigan Creek Water Quality Monitoring Study and feedback was provided by meeting participants on monitoring sites, parameters and timing. Highlights of this discussion included:
 - **Sites:** Agreement was reached on eight monitoring sites to address two key monitoring interests within the budget for the study, namely the interest to assess how surface water quality does or does not degrade along South Shawnigan Creek and the interest to determine if Lot 21 and Lot 23 on Stebbings Road are impacting downstream water quality. Monitoring at these sites is dependent on being able to access the sites safely, which will be determined in the first sampling trip.
 - **Parameters:** Parameters added to the monitoring study included turbidity, dissolved ortho-phosphate, and dissolved metals. Discussion focused on how to monitor for organic contaminants, which are expensive to analyze and many of which are not soluble in water.
 - **Timing:** Participants emphasized the importance of sampling during or shortly after rain events because this is the time when contaminants in soil will enter the water column in the creek. It was noted that arranging to sample on short notice has some challenges, but that the weekly sampling during the wet period will likely result in a sampling trip during or shortly after a rain event.
- The schedule for the monitoring study was reviewed and key milestones highlighted, such as monitoring to begin in mid-July, quarterly summary reports on results, a mid-point meeting to review results in January 2017, a report on the full year of results, and a final workshop to review the results and outcomes of the study.
- Space was reserved at the end of the meeting for discussion on topics outside of the scope of the monitoring study (as per the final Terms of Reference for the study) and of interest or concern to meeting participants. These topics were identified throughout the day and included: (1) sediment monitoring, (2) groundwater monitoring, (3) the Shawnigan Lake watershed water quality objectives monitoring program, and (4) how the government determines what are acceptable changes in water quality.
- The meeting was closed with a go-around of all meeting participants. There was general feedback that the meeting was productive and that the monitoring study will be a step forward. There was also feedback that the absence of sediment monitoring in the scope of the monitoring study is a significant gap because this is a more appropriate method for detecting low solubility organic contaminants.

Meeting Objectives

- Review and seek input on a draft Water Quality Monitoring Study Design prepared by an independent qualified professional.
- Review and discuss the next steps for implementing the Monitoring Study and reporting the results.

Meeting Pre-reading

The following documents were distributed one-week prior to the meeting as pre-reading:

- Draft Monitoring Study Design for South Shawnigan Creek Water Quality Monitoring Study
- Final Terms of Reference for South Shawnigan Creek Water Quality Monitoring Study (in appendix of Draft Monitoring Study Design)

Meeting Agenda

June 28, 2016		
<i>Item</i>	<i>Lead</i>	<i>Time*</i>
Welcome	Cindy Meays, Ministry of Environment	10:30 a.m.
Introduction, Meeting Objectives & Agenda Review	Sally Rudd, Compass Resource Management (Facilitator)	10:40 a.m.
Draft Monitoring Study Design (Presentation) <ul style="list-style-type: none"> • Monitoring sites • Monitoring parameters • Monitoring frequency • Reporting results • Mid-point meeting to review results 	Brenda Miskimmin, Ph.D., R.P.Bio, Associated Environmental Consultants Inc. (Monitoring Study Contractor)	11:00 a.m.
LUNCH 12:00 to 1:00		
Draft Monitoring Study Design (Group Discussion)	Facilitator / Monitoring Study Contractor	1:00 p.m.
Parking Lot Topics (other monitoring needs and interests)	Facilitator	3:00 p.m.
Wrap-up & Next Steps	Facilitator	3:45
4:00 pm – Adjourn		
*Times are approximate, breaks will be taken at appropriate times and the meeting will be adjourned early if all material is covered.		

Meeting Participants

Group	Affiliation	Representatives
Regional Government	Cowichan Valley Regional District	Kate Miller
Provincial Government	Ministry of Environment	Cindy Meays
	Vancouver Island Health Authority	Mark Hall
Residents	Shawnigan Residents Association	Jerrod Pinder
	Shawnigan Community Members	Dave Hutchinson
		Linda Gregory
Industry	Cobble Hill Holdings	Mike Kelly
	South Island Resource Management	Rahim Gaidhar
Contractors for South Shawnigan Creek Monitoring Study	Associated Environmental Consultants Inc. (monitoring study contractor)	Brenda Miskimmin
		Cole Basaraba
	Compass Resource Management (facilitator)	Sally Rudd
Other	Aqua-Tex	Patrick Lucey

Invitees that did not attend the meeting:

- Malahat First Nation
- Cowichan Tribes
- Ministry of Energy and Mines
- Environment Canada

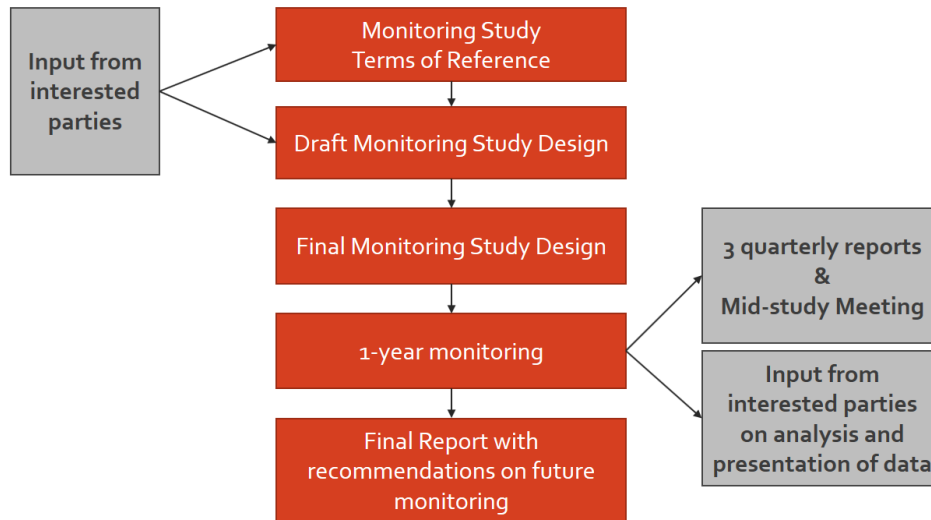
Note that the facilitator distributes all materials related to the monitoring study to interested parties, except for Draft Meeting Notes, which are only distributed to meeting participants for comment. Final meeting notes are distributed to all interested parties.

Discussion Summary

Overview of Meeting and Monitoring Study

Sally Rudd, facilitator for the South Shawnigan Creek Water Quality Monitoring Study (called “the monitoring study” from hereafter), provided an overview of the meeting and background information on the monitoring study (see Appendix 1 for presentation). Sally reviewed the process for the monitoring study (see Figure 1), which included inviting input from all interested parties on the draft Terms of Reference (TOR) for the study in March 2016. Sally explained that the final TOR guides the work for the contracted independent qualified professional to carry out the study (Brenda Miskimmin). Sally described the scope of the monitoring study as outlined in the Terms of Reference. The group agreed that to allow for a focused conversation on the monitoring sites, parameters and timing described in the draft monitoring design, any topics raised by participants that fall outside of the scope of the monitoring study would be discussed during the one hour “Parking Lot” session at the end of the day.

Figure 1: South Shawnigan Creek Monitoring Study Process



Draft Monitoring Design

Dr. Brenda Miskimmin, independent qualified professional contracted to design and implement the monitoring study, presented the draft monitoring design and group discussion occurred for each of the following major topics in the study design: (1) monitoring sites, (2) monitoring parameters, (3) monitoring timing, and (4) schedule for reporting results. Brenda’s presentation is appended to these meeting notes as Appendix 2. Note that a number of changes to the design as described in this presentation have been made based on meeting discussions. Please see the final monitoring study design document for the final monitoring sites, parameters, and frequency.

Monitoring Sites

Brenda started the discussion on monitoring sites by reviewing maps of disturbances in the Shawnigan Lake watershed. It was noted that significant logging has taken place in the watershed, new logging activities are ongoing in areas close to South Shawnigan Creek, and in addition to the permitted Cobble Hill Holdings (CHH) contaminated soil treatment facility and contaminated soil landfill¹, there are also non-permitted soil dumping sites in the southern area of the Shawnigan Lake watershed. The representatives from CVRD and CHH referenced a sediment sampling study of these non-permitted soil dumping sites that was undertaken by the Ministry of Environment in November 2012. Following the meeting, CVRD provided a map of the sites monitored (Appendix 4).

Brenda reviewed the 8 monitoring sites in the draft monitoring study design and explained that no more than 8 sites were identified because the Terms of Reference and the contract limits the study to 6-8 sites. Brenda also mentioned that they would not likely be able to sample more than 8 sites in a day.

There was a lengthy discussion around the purpose of the study and how or whether to balance two of the monitoring interests in the Terms of Reference, namely the interest to determine if Lots 21 and 23 are impacting downstream water quality and the interest to assess how surface water quality does or does not degrade along South Shawnigan Creek. Some suggested that only one of these interests can be met

¹ Note: hereafter, the meeting notes have shortened the name of this site to “CHH contaminated soil facility”

within the scope of this study and so the study should either focus on Lots 21 and 23 - or - focus on the South Shawnigan Creek and tributaries. BC government representatives voiced support for balancing these two interests in this study because the study is a reconnaissance or screening type study that will indicate where future monitoring should be focused and Brenda will be making recommendations in her final report regarding future monitoring. It was also highlighted that these two interests are central to the structure of the Terms of Reference, which all interested parties had an opportunity to comment on in March 2016. The Shawnigan Residents Association and Shawnigan Community members expressed an additional interest in separating the water quality impacts of Lot 21 from Lot 23. In the end, it was decided to move forward with including the two interests in the selection of sites as per the Terms of Reference.

Moving from upstream to downstream, the group agreed to 8 sites for monitoring (see Appendix 3 for map of sites agreed to at the meeting). Monitoring at these sites is dependent on being able to access the sites safely, which will be determined in the first sampling trip. The purpose and context for selecting each site as discussed at the meeting follows:

- **Site 1-South Shawnigan Creek downstream of Elkington Forest, E294426:** this is the furthest upstream site in the study. This site is also used in the Shawnigan Lake Water Quality Objectives Monitoring Program.
- **Site 2 – South Shawnigan Creek just upstream of Lots 21 and 23:** this site captures any water quality parameter sources that are upstream of Lots 21 and 23. There are disturbances upstream of Lot 23, so the site upstream of Lot 23 will ensure that water quality degradation is not incorrectly attributed to Lots 21 and 23. Exact siting will be finalized during first sampling trip to examine topography of area.
- **Site 3 – Ephemeral creek downstream of Lot 23, near SIA/CHH discharge, upstream of the confluence with South Shawnigan Creek:** this site was chosen because it is the closest site to the discharge from Lot 23's settling ponds. Suggestions were made at the meeting to coordinate the sampling of this location with discharge events from the settling pond as there will be times when there is no flow here.
- **Site 4 – South Shawnigan Creek downstream of Lot 21 and upstream of the Lot 23 ephemeral creek inflow:** this site will be downstream of any seepage coming from Lot 21. It was noted that Stebbings Road is also a potential source of water quality degradation between Sites 2 and 4 and will need to be considered in interpreting data and drawing any conclusions.
- **Site 5 – South Shawnigan Creek downstream of the confluence with ephemeral creek and upstream of Van Horne Creek:** this site will represent water quality sources upstream of the confluence of South Shawnigan Creek and the ephemeral creek (that receives discharge from Lot 23). Access to this site and Site 6 may be an issue, and will be determined on the first sampling trip.
- **Site 6 – South Shawnigan Creek just downstream of Van Horne Creek:** comparing water quality at site 6 with site 5 will provide information on the impact of Van Horne Creek to South Shawnigan Creek water quality. The area around Van Horne Creek has several non-regulated soil dumping sites that are believed to increase turbidity and sediments in Van Horne Creek and in South Shawnigan Creek.
- **Site 7 – South Shawnigan Creek at Sooke Lake Road:** this site is the first site with reasonable access downstream of site 6.
- **Site 8 – South Shawnigan Creek at West Shawnigan Road:** this site is the closest accessible point on South Shawnigan Creek to Shawnigan Lake. Between this point and the lake is a wetland. Comparing water quality of site 7 with site 8 will provide information on the water quality impacts of the disturbed area close to South Shawnigan Creek between these sites. This disturbance is believed to be used for a "Tough Mudder" type event. South Shawnigan Creek between sites 7 and 8 was identified as salmon habitat.

During the discussion on monitoring sites, the representative from the Shawnigan Residents Association (SRA) voiced concern about input from Patrick Lucey, who is a local qualified professional that was invited by the Ministry of Environment to provide information based on his local knowledge of the area, especially his knowledge related to whether sites are accessible for monitoring. While Patrick Lucey's expertise on the topics being discussed was acknowledged, it was felt that his participation jeopardized the independence of the monitoring study because he has previously worked for both the SRA and the owners of the CHH site. To resolve this issue, Patrick Lucey agreed to limit his input to matters of accessibility to potential monitoring sites.

During this session, it was also raised that a phrase in the Terms of Reference (on page 3 after purpose bullets) that suggests the study will determine "whether permitted activities on Stebbings Road are contributing to degradation" is not correct because this is beyond the scope of the study. The representative from the Ministry of Environment clarified the wording should have specified water quality degradation.

Monitoring Parameters

Brenda reviewed the list of parameters in the draft monitoring study design.

It was agreed to add turbidity and dissolved ortho-phosphate to the list of monitoring parameters. Turbidity was added because turbid water has been observed in South Shawnigan Creek and tributaries. It was discussed that at high enough levels, turbidity can adversely effect fish. Dissolved ortho-phosphate was added because this is the form of phosphorous that is bioavailable for algae and therefore promotes algae growth (so this parameter tells you more than just measuring for Total Phosphorus). It was discussed that dissolved ortho-phosphate is typically beneficial in streams for providing food for fish, but that at high concentrations, it can be problematic in lakes if it leads to overproduction of algae and eutrophication of the lake. It was also agreed to measure for dissolved metals for the metals that have water quality guidelines in a dissolved form.

The group discussed the list of organic contaminants that are allowable in the soil accepted by the CHH contaminated soil facility. Brenda advised that many of the organic contaminants listed in CHH's permit will not be detected in water because of their affinity to particulates (i.e. many are not soluble in water). She explained that if a substance is not soluble in water, it will not mix into the water. Because the substance doesn't mix throughout the water, there is a significantly decreased probability that the water sample will contain the insoluble substance. Ministry of Environment also advised that lab analyses for organic contaminants is quite costly and there would only be budget to do one round of analysis if all organic contaminants in the permit were measured. A question was raised as to whether it makes sense to measure for insoluble organic contaminants. Brenda explained that it is still possible to detect low solubility organic contaminants in water, and that if they are found, then it can be indicative of a problem.

The representative from the Shawnigan Residents Association and the participating Shawnigan community members all asked if sediment monitoring could be added to the study because this is a more appropriate method for detecting low solubility organic contaminants. The representative from the Ministry of Environment stated that sediment monitoring was not included in the Terms of Reference for the study and that Brenda's contract only includes water quality monitoring, but that Brenda's contract also includes making recommendations on future monitoring after this 1-year study. The group agreed to put the topic of sediment monitoring aside and discuss further in the "Parking Lot" discussion at the end of the day.

Returning to the discussion on what organic contaminants should be measured, the group discussed whether monitoring should focus on the organic contaminants that are known to be present at the CHH site and the organic contaminants that could come from other sources in the watershed (e.g. roadways and other contaminated soil dumps in the area). A representative from South Island Resource Management (operator of the CHH landfill) said that they monitor for all of the organic contaminants in

the CHH permit in their soil and settling pond and that the monitoring results are available in publicly released reports that they can provide to Brenda. SIRM also explained that they do not accept soil with some of the contaminants listed in the permit. A representative from CVRD stated that she could provide information on the monitoring that was done on the 12 soil dumps in the area in 2012 (see Appendix 4 for information from CVRD provided after meeting). Brenda stated that to develop the final list of organic contaminants, she would look at the South Island Resource Management data and the monitoring results for the 12 soil dumps in the area.

Monitoring Timing

Brenda reviewed the monitoring timing over the 1-year sampling period starting in July 2016. The draft monitoring design included monthly sampling except for more frequent sampling (5 samples over 30 days) during late summer (mid August to mid September) and the fall rainy season (late October to November) for the parameters with guidelines requiring this frequency. The draft monitoring design also included an approach to focus monitoring of organic contaminants on a reduced number of sites if they have not been detected either during a low flow period or following a rainstorm event.

The discussion around monitoring timing focused on the importance of doing sampling during rain events because during dry periods, contaminants generally remain in the soil and it takes a rain event to flush contaminants out of soil. A Shawnigan community member also noted that they are interested in data on contaminant loadings in addition to contaminant concentrations because they believe concentrations in stream water will increase within the first couple of hours of a rainfall and will then decrease due to dilution from the rain. Reporting on contaminant loadings controls for the effects of dilution. They added that the interpretation of the monitoring results can not conclude that just because increased concentrations of substances are not found, there are no sources – it can only conclude that the sampling regime did not detect increased concentrations of the monitoring parameters.

Given that organic contaminants are costly to measure and are not very soluble in water, there was general support for reducing the number of sites to measure organic contaminants if they are not found during a low flow period or rain event.

Schedule for Monitoring Study

Brenda reviewed the schedule for the monitoring study (Table 1). She explained that to capture summer low flows, monitoring is set to start in mid-July and mid-August. For this reason, she asked for any additional written comments on the draft monitoring study to be submitted by June 30. She also pointed out that her contract includes two additional meetings to review results – a mid-point meeting after 6 months of monitoring and a final meeting after one year of monitoring.

Table 1: Monitoring Study Schedule

Activity	Scheduled Date(s)
Study design workshop	June 28
Final date for comments on study design	June 30
Finalized study design submitted to group	July 8
Regular sampling dates (proposed): 5-in-30 day sampling dates:	Mid months: July 2016 through June 2017 5 dates from August 16 - September 15 (dry) 5 dates from October 18 – November 15 (rainy)
Quarterly summary reports	Within 2 weeks of receipt of lab results Approximately mid-October, mid-January, mid-April
Meeting to present results (6 month) – discussion of results to date	Late January 2017
Final report (following receipt of June sampling trip lab results)	July 2017
Final workshop on results of study and next steps	Late July 2017

Parking Lot Topics

Throughout the meeting, as topics were raised that were identified as outside of the scope of the monitoring study, they were listed as parking lot topics and time was reserved at the end of day for discussion. Four parking lot topics were identified and discussed: (1) sediment monitoring, (2) groundwater monitoring, (3) coordination and linkages between this monitoring study and the water quality objectives monitoring program, (4) determination of what's an acceptable change in water quality.

Sediment Monitoring

The Shawnigan community members participating in the meeting re-iterated that they would like to see sediment monitoring included in the scope of the current study. Some participants stated that they believe most of the potential contaminants coming off of Lot 21 and 23 (metals and organic contaminants) will attach to particulates and will settle when they reach slower moving sections of the creek. Rain events could then stir up these sediments and move them towards the Lake. If the contaminants reach the Lake sediments, they can be re-released into the water column under certain conditions. The group discussed the mechanisms by which contaminants in the Lake's sediment may be released into the water column and that sediment monitoring is an effective method for detecting issues of long-term contamination. A Shawnigan Community member stated that they would like to see sediment monitoring where settling might occur near Lot 23 – for example, it was suggested that the wetland on the west side of Lot 23 that receives runoff from the Lot 23 settling ponds would be a good location to do sediment monitoring. Brenda added that if you are looking for sediment contamination, another good location to monitor would be at the inflow of South Shawnigan Creek into Shawnigan Lake.

In response to comments that water is coming from contaminated soil into the creek, the representative from CHH emphasized that their studies indicate this is not happening and all runoff water that comes into contact with the soil is being captured and treated. Shawnigan community members explained that the community needs further assurances that the contact water is being captured and treated.

The representative from the Ministry of Environment (MOE) added that there is sediment monitoring in the Water Quality Objectives (WQO) monitoring program at the inflow of South Shawnigan Creek into Shawnigan Lake. The report summarizing the most recent round of WQO monitoring will be finalized shortly and can be distributed to the group. MOE will also be able to present on this report to the group at the mid-point meeting. The representative from CVRD stated that the last round of WQO sediment sampling found some exceedences of guidelines for extractable petroleum hydrocarbons (EPHs) and some metals.

The representative from the Shawnigan Residents Association stated that soil monitoring should be done near the seepage coming off of Lot 21 because they are very concerned with what is buried in Lot 21. He stated that another concern he has is settling of suspended sediments in the lower portion of South Shawnigan Creek, which is sensitive salmon habitat. He explained that coho salmon spawn in this area and if there's a big rain event and high turbidity, sediment can cover the eggs, leading to low survival of eggs.

Patrick Lucey mentioned that there is a large log jam 30 metres upstream of where West Shawnigan Road passes over South Shawnigan Creek and that highways is very concerned about this log jam and has plans to remove the log jam. It was noted that if this log jam is removed, then it could potentially affect the water quality downstream.

Groundwater Monitoring

Shawnigan community members indicated that the liners at the CHH contaminated soil facility will not last forever and therefore there's potential for the contaminants in the soil to enter groundwater. They stated that they've also received an expert opinion that it may only take a short-period (e.g. 5 years) for contaminants in groundwater to reach Shawnigan Lake, not thousands of years as it has been suggested by other assessments. The representative from CHH challenged this opinion. It was discussed that a possible research question for the groundwater issue would be something like "if the liner breaks down, how long does it take for contaminants in the soil at this site to enter groundwater and enter the Lake?". The representative from CHH added that they do test groundwater wells around the facility and so far they have all "come up clean".

The representative from Shawnigan Residents Association asked whether community members have what they need if they wanted to do their own testing of groundwater wells (e.g. what parameters should be tested for). The representative from South Island Resource Management (SIRM) stated that in the community section of their website (www.sirm.ca), all of the reports with monitoring results are published. Community members can look at these reports to determine what parameters to measure for (and SIRM tests for all parameters included in the draft monitoring design developed by Brenda Miskimmin).

Shawnigan community members stated that it is good that the operator is doing groundwater monitoring but that it would also be good for future independent monitoring to be done to provide assurances to the community.

The representative from SIRM stated that the facility has multiple redundancies to prevent contaminants from entering groundwater including: (1) the permit does not allow the CHH facility to accept anything that's leachable according to standards in BC's Hazardous Waste Regulation, and (2) there is a layer of clay under the liner, and so the liner provides additional mitigation to this clay layer.

The representative from Vancouver Island Health Authority stated that they do not have authority to do the groundwater monitoring being discussed. CVRD also stated that for them to do groundwater monitoring it would need to fall under a drinking water or waste management plan.

The group discussed whether community members could pool resources to do their own groundwater monitoring and through coordination with Provincial agencies and/or CVRD, they could ensure that the monitoring methods were sufficient to obtain reliable and useful data. There was indication that this is a possible mechanism for undertaking groundwater monitoring.

Water Quality Objectives Monitoring

The representative from CVRD emphasized that Brenda should be provided with the water quality objectives (WQO) report to inform the South Shawnigan Creek monitoring study and analysis of results from this study. The representative from CVRD also asked whether the Province can confirm when the next round of water quality objective attainment monitoring and reporting will be undertaken. The representative from Ministry of Environment stated that this is a question for MOE staff responsible for Shawnigan watershed WQO monitoring. A Shawnigan community member stated that typically the water quality objective attainment monitoring is done every 3-4 years and that this frequency of monitoring seems too long to be able to react to the changing conditions in the watershed.

Determination of acceptable changes in water quality

Re-occurring questions during the meeting were how does the Provincial government determine what are acceptable changes in water quality (for example, a statistical change detected in paired samples of upstream and downstream sites), and what does the Province do when exceedences to water quality

guidelines are found? The representative from the Ministry of Environment provided a brief explanation of how the Ministry of Environment develops water quality guidelines and how water quality data is compared to guidelines and water quality from reference sites to identify if there are any issues. The group agreed to have a more fulsome discussion on this topic at the mid-point (6 month) meeting when additional representative(s) from the Ministry of Environment can be invited to speak to these questions.

Closing

The meeting was closed with a go-around of all participants on any final thoughts on the monitoring study or the meeting. There was general feedback that the meeting was productive and that the monitoring study will be a step forward. There was also feedback that the absence of sediment monitoring in the monitoring study is a significant gap in scope because this is a more appropriate method for detecting low solubility organic contaminants.

Other issues mentioned in the go-around included:

- If any monitoring results suggest any immediate human health concerns, this should be communicated directly with Vancouver Island Health Authority and Ministry of Environment.
- Protection of the fish habitat in the lower South Shawnigan Creek is very important and we may need to involve other interested parties related to this fish habitat in the monitoring study.

The facilitator closed the meeting and asked everyone for any additional written comments on the draft monitoring study design to be submitted by June 30.

Appendices

Appendix 1 – Overview presentation by facilitator, Sally Rudd, Compass Resource Management

Appendix 2 – Presentation by independent qualified professional, Brenda Miskimmin, Associated Environmental

Appendix 3 – Map of monitoring Sites agreed to at June 28, 2016 meeting

Appendix 4 – Map of soil dumps monitored by Ministry of Environment in November 2012