

Report

Date

September 21, 2022

File:

Subject

Septic Tank Management to Support the Health of Water Bodies

PURPOSE

To provide an assessment of the environmental effects of septic tanks in North Cowichan and an analysis of the potential effect of septic tank pumping on surface water quality in North Cowichan. A staff presentation will be provided at the meeting.

BACKGROUND

On July 21, 2021, Councillor Justice introduced a motion on the "Regular Pumping out of Septic Tanks to Support the Health of Water Bodies". The original motion was as follows:

"WHEREAS Council has prioritized the importance of environmental policies and practices to support the future health of North Cowichan;

AND WHEREAS the regular pumping out of septic tanks may be an effective method for preventing nutrients and bacteria from entering nearby water systems;

AND WHEREAS the cost of regular pumping out of septic tanks and effluent disposal may be cost prohibitive for some residents;

THEREFORE BE IT RESOLVED THAT Council direct staff to prepare an analysis of options to reduce the environmental impacts on water pollution caused by private septic tanks or ineffective septic fields."

Council postponed consideration of the motion at its meeting August 18, 2021, until a letter was sent to Island Health and a response received regarding the concerns in Councillor Justice's report and motion. The correspondence is included in Attachments 1 and 2.

The letter sent to Island Health on September 13, 2021 (Attachment 1) had two questions for input:

- Does Island Health feel more should be done to protect our environment from the risks of failed systems?
- Does Island Health have an interest in partnering with North Cowichan on developing a strategy and looking at options for reducing the environmental impacts caused by private septic fields or ineffective septic fields in order to reduce the amount of effluent seeping into our beaches and waterways?

Island Health's response (Attachment 2) acknowledged the risk to the environment of improperly functioning septic systems and supported regular pumping of septic tanks to ensure longevity and protect the environment. They declined to offer direct assistance to the Municipality due to the

pandemic but agreed to meet when resources were available. In the meantime, they suggested we do what some other communities have initiated, such as education programs, a septic tank pumping bylaw, and routine surface water fecal monitoring.

Island Health did not say that more should be done to protect our environment from the risks of failed systems.

DISCUSSION

Considering that Island Health continues to have higher priorities due to ongoing impacts of the pandemic, staff determined that a follow-up report on the initiatives noted in the response from Island Health may provide information for direction to staff in advance of the 2023 budget process.

SEPTIC TANK PUMPING

Septic treatment is regulated under the Sewerage System Regulation. Treatment can be a septic tank and drain field fed by a pump or gravity and could also include more elaborate treatment methods, see Attachment 3, Figure 1⁽¹⁾.

Septic tank systems treat residential wastewater onsite by retaining raw waste for a length of time to allow emulsified fats, oils and grease to float to the surface (scum) and other waste to settle at the bottom of the tank (sludge). The remaining fluid is dispersed into a leaching field that also provides treatment through aerobic digestion and absorption within the stone bed and adjacent soil. Anaerobic digestion continues within the tank. Retention time is affected by the thickness of the floating layer and the settled layer, which can lead to poor treatment and failure of the leaching field due to clogging if not maintained properly.

The Sewerage System Regulation requires that all septic systems be maintained per a maintenance plan approved by Island Health. Residents must have an “authorized person” as defined by the Sewerage System Regulation complete septic system maintenance and repairs, such as a registered onsite wastewater practitioner or a professional engineer⁽²⁾ This does not include routine pump outs.

Septic tanks need to be pumped out regularly to ensure proper function and retention. Appropriate intervals depend on factors such as tank size, waste volume and composition, weather, and type of treatment system. Regularly pumping a septic tank can help mitigate environmental risk and costs associated with maintenance, repairs, and replacement⁽²⁾. Ensuring compliance with maintenance guidelines is achieved by policies like;

- a strict regulatory framework, e.g., the Capital Regional District (CRD)
- public education, e.g., the Cowichan Valley Regional District
- financial incentives, e.g., the Regional District of Nanaimo (RDN).

The CRD has an “Onsite Sewage System Maintenance Bylaw,” which requires residents of Saanich, Langford, Colwood and View Royal to pump out gravity and pump-type systems every five years. Violators of the bylaw can be fined up to \$2,000 per incident⁽⁴⁾. No enforcement has been necessary to date, as bylaw action is not taken unless compliance falls below 80%. Bylaw compliance is tracked through receipt of a tank pump-out record for a given property. The CRD sends septic tank pump out

reminder letters twice a year to ~7600 properties with septic systems. Implementation of the "Onsite Sewage System Maintenance Bylaw" costs the CRD approximately \$230,000, and involves 650 hours of staff time per year ⁽⁵⁾.

Septic Systems Pumping and Repair Costs

The cost of pumping out a septic tank depends on the amount of waste removed, the type of system and the job's complexity. Cost for pumping and disposal of the sewage ranges from \$400-\$700 for tanks 600-1,000 gallons in size, respectively ⁽¹⁴⁾.

Septic system repair costs range from \$600 to \$3,000 ⁽³⁾. Depending on the system type, a new septic system can cost anywhere from \$10,000-\$50,000 to install ⁽¹⁵⁾.

EDUCATION

The CRD also has 'Septic Savvy' initiatives, providing residents with online educational material on proper care, maintenance, and inspection of septic systems. Septic Savvy is also used to complement the enforcement program in the CRD.

The RDN has a 'Septic Smart' initiative which offers online educational material, a Septic Smart workshop and a maintenance rebate program. The RDN maintenance rebate program will cover 75% of eligible costs on pre-existing systems to a maximum of:

- Up to \$100 to install an effluent filter
- Up to \$200 to install/replace a distribution box
- Up to \$300 to install risers

The RDN also offers a rebate to repair/replace older septic systems - up to \$600 for a repair that costs more than \$5000 ⁽⁶⁾.

Septic Tanks in North Cowichan

Currently, there are 13,074 civic addresses (residential, commercial, industrial, agricultural, etc.) within the Municipality of North Cowichan. Approximately 4,117 of these addresses use a septic system, and 1,896 of these are residential properties, see Attachment 1, Figure 2.

Potential Septic Tank Environmental Impacts

Onsite wastewater treatment systems are extremely effective, capable of removing 70-95% of pollutants when designed, installed, used and maintained properly. Septic systems reduce wastewater's nutrients, pathogens and other pollutants via bacterial digestion and seepage through the drain field. Fine substrate materials force effluent to move slower, thus improving pollutant remediation ⁽⁹⁾. Coarse substrates can have lowered efficiency. Failing septic systems can cause negative environmental impacts such as nutrient runoff and E. coli contamination in water bodies ⁽¹⁰⁾.

There are varying types of septic system failures; hydraulic, subsurface and treatment. Hydraulic failure is when the system becomes clogged or overloaded and backs up into the house or pools on the surface of the drainage field. Subsurface failure occurs in drain fields consisting of sandy soils, when partially treated wastewater travels through larger openings in the soil, resulting in excess nutrients entering waterways. Treatment failure is the insufficient removal of nutrients and pathogens when water is seeping through the drainage field due to insufficient soil conditions ⁽⁸⁾.

ROUTINE WATER QUALITY MONITORING

The Environmental Department conducts regular water sampling of Quamichan Lake and its tributaries. This information can be used to assess the potential input of nutrients from different sources. For example, Elkington Creek drains a large number of residential properties with septic systems. Regular sampling by staff shows that nutrient concentrations in Elkington Creek are within the range set by the Province to protect aquatic habitat ⁽¹²⁾. Stream nutrient data has also been collected by Environmental staff from Stanhope Road, Stamps Road, Martin Place, Aitken Creek and McIntyre Creek. These other streams are within close proximity to agricultural land and all contain higher concentrations of total nitrogen and total phosphorous than Elkington Creek (Table 1) ⁽¹³⁾.

Table 1. Average nutrient concentration (mg/L) in Quamichan Lake Tributary Streams from 2018-2022. Concentrations above provincial water quality standards are in **bold**.

	Total Nitrogen (mg/L)	Total Phosphorous (mg/L)
Provincial Standard	3 ⁽¹¹⁾	0.015 ⁽¹¹⁾
Elkington Creek	1.47	0.014
Stanhope Road	0.14	0.011
Stamps Road	0.91	0.24
Aitken Creek	2.93	0.016
McIntyre Creek	3.00	0.89

Regular sampling of lake water and lake sediment conducted by environment staff shows that the sediment at the bottom of Quamichan Lake is the main source of nutrient loading in the lake, >90% of phosphorus causing blue-green algae blooms. The nutrients in the lake sediment are a legacy of land clearing in the late 1800's combined with poor urban runoff management and the excessive use of fertilizers in both urban and farm applications during the 20th Century. Therefore, staff's opinion is that inputs of nutrients from sources like septic tanks, do not have a significant impact on nutrient concentrations in the lake given the much larger amount of nutrients stored in the lake sediments than input from surface runoff and the evidence that of that surface runoff there are significantly more nutrients associated with rural inputs to Quamichan Lake than the potential from septic tanks.

Routine surface water monitoring for fecal coliforms could be used to identify potential effects from failing septic systems, though pinpointing sources can be difficult, as effects are often localized. Although such an analysis could help determine if waterbodies are safe for human use, it would not be a good indicator of environmental health. Currently, this type of sampling is within Island Health's responsibility. Augmenting Island Health's work with a municipal fecal coliform sampling program would require a significant increase in staff capacity as an addition to our existing surface water quality sampling program. An expanded water quality sampling program would require increasing the number

of sampling sites and increased staff time for sample collection. It should also be noted that local water bodies often have numerous waterfowl that put feces into surface water, as well as pets and farm animals. Therefore, a genetic analysis of water samples may be required to determine if the coliforms are from human septic waste or animals. This would create additional work and require additional funding.

OPTIONS

1. **(Recommended Option)** THAT Council direct staff to work with Island Health to make available on the municipal website educational resources for residents about septic systems, including; material on septic tank maintenance and repairs; a virtual workshop on caring for septic systems; and, information on the benefits of regular septic tank pumping.

This option has the following benefits:

- strengthens the North Cowichan Environment program goal of collaboration with the local community and stewardship groups on restoration work in lakes, streams, and wetlands;
- encourages residents to partake in septic system best management practices to help protect aquatic habitat from localized nutrient runoff due to failing septic systems;
- does not incur costs for added administrative tasks and enforcement;
- recognizes the desire by many residents to protect local aquatic habitat;
- does not assume a responsibility by the Municipality for compliance with the Sewage System Regulation; and,
- is consistent with advice received in response from Island Health dated September 22, 2021.

The motion put forth by Councillor Justice on July 21, 2021, would be redundant if Council approves this option.

2. THAT Council direct staff to assess the cost and staffing resources necessary to implement a Septic Tank Pumping Bylaw, which requires residents of North Cowichan to pump out their septic tanks every five years.
 - This option enforces regular maintenance via pumping out septic tanks, lowering the risk of potential system failures.
 - A database would be needed to track all properties that have a septic system, all pump-out reports, reminders to residents for pumping out their septic systems and anyone who is non-compliant with the bylaw.
 - This option would require significant costs, and personnel to inventory all septic systems and additional costs and personnel for monitoring and enforcing this bylaw.
 - Staffs initial assessment is that the cost of this is in the order of in excess of \$200,000 based on the information obtained from the CRD.
 - The current configuration of the Joint Utilities Board lagoon does not have the ability to accept septic tank waste.
 - Waste processing at the Joint Utilities Board lagoon is not configured for the type of materials generated by septic pumping.

IMPLICATIONS

Option 1:

- Minor costs of staff time to provide septic system educational resources through the municipal website, and mail out pamphlets. This can be achieved using existing Environmental and Communications staff, resources and budgets.

Option 2:

- Potential cost of research to obtain the exact number of septic fields in the Municipality of North Cowichan,
- Additional staff time to enforce a bylaw and administer a program,
- Cost of hiring new staff, need for more office space and vehicle,
- Additional financial and personnel commitments may be required to reconfigure the physical layout at the Joint Utilities Board lagoon to accept and process waste from septic pumping, and,
- Potential negative public feedback given the lack of justification for a septic pumping bylaw in North Cowichan.

RECOMMENDATION

THAT Council direct staff to work with Island Health to make available on the municipal website educational resources for residents about septic systems, including; material on septic tank maintenance and repairs; a virtual workshop on caring for septic systems; and, information on the benefits of regular septic tank pumping.

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Attachments:

- (1) Letter from Municipality to Island Health, dated September 13, 2021
- (2) Letter from Island Health to Municipality, dated September 22, 2021
- (3) Figures
- (4) References