



# **Recommendations for Optimal Implementation of the Elk/Beaver Lake Watershed Management Plan**

An ELC Clinic report prepared for:  
Veins of Life Watershed Society

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## Background

Elk/Beaver Lake Regional Park in the Colquitz River watershed is one of the most highly treasured and popular parks in the Capital Region, attracting nearly two million visitors each year.<sup>1</sup> This ecosystem supports extensive social, cultural, recreational and environmental values.<sup>2</sup> The Park includes popular swimming beaches, and Elk Lake is the most heavily used fishing lake on Vancouver Island. Elk Lake has, until recently, been the location of the Olympic Rowing Team, National Rowing Team Training Centre, and the University of Victoria and Victoria City rowing clubs.

However Elk/Beaver Lake is in trouble. As a result of increased human settlement and activity in the Colquitz River watershed, water quality in the lake has been declining since at least 1972.<sup>3</sup> The steady deterioration of water quality in the lake is primarily driven by nutrients, in particular phosphorus, that have accumulated from the surrounding watershed as a result of increasing agricultural and residential activities.<sup>4</sup> In the last 40 years, nutrient overloading has accelerated at an unprecedented pace, and continues to worsen each year.<sup>5</sup>

In 2016, the Capital Regional District (CRD) established the Elk/Beaver Lake Initiative to address deteriorating water quality and other ecological conditions at Elk/Beaver Lake.<sup>6</sup> In February 2020, the CRD released the draft 'Elk/Beaver Lake Watershed Management Plan' (the "Draft Plan"), which seeks to "facilitate and support partnership and collaboration with government agencies to support sustainability of the plan and future improvement of water quality in the lake to support its many environmental, social, recreational, cultural and economic values."<sup>7</sup> The primary goal of the Draft Plan is to improve water quality in Elk/Beaver Lake.<sup>8</sup> The Draft Plan largely focuses on external sources of nutrient pollution, and will be complemented by a planned in-lake remediation plan that will address internal sources of excess nutrients, amongst other issues.<sup>9</sup>

We commend the CRD for its development of the Draft Plan, and are confident that, with the support of government and stakeholder partners, it will be well-positioned to coordinate and guide efforts to improve water quality in Elk/Beaver Lake.

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<sup>1</sup> Capital Regional District, "Elk/Beaver Lake Initiative" (24 August 2018), online: <[www.crd.bc.ca/project/elk-beaver-lake-initiative](http://www.crd.bc.ca/project/elk-beaver-lake-initiative)> [CRD].

<sup>2</sup> Ibid.

<sup>3</sup> Nordin, Rick, "Water Quality Sampling Program for Elk Lake 2014-2015: Overview Status and Phosphorus Budget" (2015), online: <[www.crd.bc.ca/docs/default-source/initiatives-pdf/gwi-pdf/other-reports/2015waterqualityreportelklake-rnordin.pdf?sfvrsn=7d1255ca\\_6](http://www.crd.bc.ca/docs/default-source/initiatives-pdf/gwi-pdf/other-reports/2015waterqualityreportelklake-rnordin.pdf?sfvrsn=7d1255ca_6)>.

<sup>4</sup> Capital Regional District, "Draft Elk/Beaver Lake Watershed Management Plan" (February 2020), online: <[www.crd.bc.ca/docs/default-source/es-watersheds-pdf/elk-beaver-lake/elkbeaverlake\\_wmp\\_draft\\_feb2020.pdf?sfvrsn=d0da45cc\\_6](http://www.crd.bc.ca/docs/default-source/es-watersheds-pdf/elk-beaver-lake/elkbeaverlake_wmp_draft_feb2020.pdf?sfvrsn=d0da45cc_6)> [CRD].

<sup>5</sup> CRD, supra note 4.

<sup>6</sup> Capital Regional District Parks and Environmental Services, "Elk/Beaver Lake Technical Report: Investigation of In-Lake Remediation Options" (August 2018), online: <[www.crd.bc.ca/docs/default-source/es-watersheds-pdf/elk-beaver-lake/1-ebli\\_techreport\\_aug2018.pdf?sfvrsn=3188f7ca\\_2](http://www.crd.bc.ca/docs/default-source/es-watersheds-pdf/elk-beaver-lake/1-ebli_techreport_aug2018.pdf?sfvrsn=3188f7ca_2)> at p. 9.

<sup>7</sup> CRD, supra note 4.

<sup>8</sup> Draft Plan, supra note 4, p. 13.

<sup>9</sup> Draft Plan, supra note 4.

The purpose of this report is to identify opportunities to strengthen and supplement the Draft Plan, in order to address key issues and support the overall goal of improving water quality and lake health. The recommendations in this report were identified through consultation with local stewardship groups, academic literature, and lake remediation case studies – and are intended to provide suggestions for further consideration by the CRD. Ultimately, the CRD and its government, Indigenous and stakeholder partners will be best positioned to determine the appropriateness and viability of these recommendations.

In sum, our recommendations to the CRD in the finalization of the Draft Plan are as follows:

1. Consider Additional Strategies to Reduce Residential Sources of Phosphorus;
2. Consider Additional Strategies to Reduce Agricultural Sources of Phosphorus;
3. Integrate Principles of Community-based Watershed Management;
4. Manage Internal and External Nutrient Sources Together, and Prioritize Source Control;
5. Enhance Cyanobacterial Monitoring and Warning Signage;
6. Create Opportunities for Indigenous Co-Management and Co-Governance;  
and
7. Increase Level of Detail in Proposed Actions.

Each of these recommendations is discussed in more detail in the sections below.

## Recommendation 1: Consider Additional Strategies to Reduce Residential Sources of Phosphorus

Residential sources of nutrient pollution, including leaking septic systems and runoff from lawn fertilizers, are a significant source of external nutrient inputs into Elk/Beaver Lake.<sup>10</sup> Fertilizers are rich in phosphorus and subject to runoff into the watershed. In addition, the CRD has estimated that up to 20% of septic systems in the regional district are likely malfunctioning due to poor maintenance.<sup>11</sup>

The Draft Plan proposes the following actions to reduce residential sources of nutrient pollution:

- Action 1(a): Improve rural/urban land management practices to reduce and manage the source of phosphorus inputs into the watershed;
- Action 1(c): Ensure proper function of septic + sewerage systems to reduce phosphorus; and
- Actions 2(a) – 2(c): Restore and enhance stream and watershed function.

The Draft Plan proposes a number of strategies to achieve these actions, including:

- **Landowners:** adopt nutrient best management practices; ensure compliance with septic bylaws;
- **CRD:** provide public access to resources on importance of nutrient reduction; continue providing septic educational resources to local residents; provide incentives for landowners to comply with CRD bylaw; and
- **All:** restore stream and watershed function to reduce erosion and increase nutrient uptake.

These broad strategies – in particular, financial incentives and public education – are fundamentally sound. We support the proposed actions that prioritize source control and ecological restoration of riparian areas that will collectively reduce the amount of nutrients entering Elk/Beaver Lake. However, they must be vigorously implemented in order to effectively reduce residential sources of nutrient pollution.

In the sections below, we offer recommendations to support robust implementation of two areas of concern: public education programs and financial incentives. We also identify other actions to reduce residential sources of nutrients.

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<sup>10</sup> CRD, supra note 4, p. 27.

<sup>11</sup> Capital Regional District, “Protecting Your Septic System,” online: <[www.crd.bc.ca/education/stormwater-wastewater-septic/at-home/protecting-septic-system](http://www.crd.bc.ca/education/stormwater-wastewater-septic/at-home/protecting-septic-system)>.

## 1(a) Enhance Existing Proposed Strategies

### 1(a)(i) Public Education

Many water quality improvement/watershed restoration projects have identified public education as one of, if not the most effective and low-cost strategies to effect environmental change. There are many examples of successful efforts to improve water quality through public education programs. At the Chain of Lakes in Minneapolis, for example, the Clean Water Partnership (CWP) led a large public education program to promote voluntary adoption of best management practices and watershed awareness of drainage into the Chain of Lakes.<sup>12</sup> The CWP delivered educational materials in the forms of bookmarks, table tents/paper place mats in restaurants, utility bill inserts, pet waste posters, billboards, newspaper articles, and lawn care mailings.<sup>13</sup> These education efforts led to significant reductions of phosphorus in streams and lakes.<sup>14</sup> In the Quamichan watershed, in North Cowichan, public education about nutrient runoff and septic systems is a significant component of water quality improvement efforts coordinated under the *Quamichan Watershed Management Plan* (2009).<sup>15</sup> In the District of Highlands, on the Saanich Peninsula, the Highlands Stewardship Society and the BC Lake Stewardship Society partnered with the Ministry of Environment to create a public education document, *Tips to Keep Fork Lake Healthy*, which includes detailed pollution prevention guidelines for yard maintenance, agriculture, sewage systems, auto maintenance, boating.<sup>16</sup>

Public environmental education programs can also be powerful opportunities to partner with community stewardship groups and local businesses. A local example of a public-private environmental education partnership is between the Greater Victoria School District, Eagle Wing Tours and the BC Royal Museum, who deliver a field-based 'floating classroom' program on a catamaran to teach school groups about the Salish Sea ecosystem.<sup>17</sup> There are also numerous examples of lake-based floating classrooms, including in Vermont,<sup>18</sup> New York,<sup>19</sup> and Peterborough, Ontario.<sup>20</sup> A floating classroom at Elk/Beaver Lakes could create a powerful focus for community awareness of the need to protect the lakes.

The CRD currently operates the Septic Savvy program, which, in addition to educational resources, periodically offers a free two-hour workshop on how to properly care for a residential septic

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<sup>12</sup> United States Environmental Protection Agency, "Minnesota: Minneapolis Chain of Lakes, Nutrient Concentrations Nearly Returned to Presettlement Conditions" (updated 6 March 2012), online: <<https://perma.cc/KUS6-SQJJ>>.

<sup>13</sup> Ibid

<sup>14</sup> Ibid

<sup>15</sup> Quamichan Watershed Working Group, "Quamichan Watershed Management Plan: the Jewel of North Cowichan" (2009), online: <[quamichanlake.ca/sites/default/files/QuamichanWatershedManagementPlanFinal-October2009\\_0.pdf](http://quamichanlake.ca/sites/default/files/QuamichanWatershedManagementPlanFinal-October2009_0.pdf)>.

<sup>16</sup> BC Lake Stewardship Society, "BC Lake Stewardship and Monitoring Program: Fork Lake 2000-2006," online: <[www.bclss.org/cms/wp-content/uploads/2017/05/fork\\_lake\\_00-06.pdf](http://www.bclss.org/cms/wp-content/uploads/2017/05/fork_lake_00-06.pdf)>.

<sup>17</sup> Eagle Wing Tours, "All About our Floating Classroom!" online: <[www.eaglewingtours.com/articles/aboard-floating-classroom/](http://www.eaglewingtours.com/articles/aboard-floating-classroom/)>.

<sup>18</sup> Green Teacher, "How-To Float a Classroom" (28 April 2016), online: <[greenteacher.com/how-to-float-a-classroom/](http://greenteacher.com/how-to-float-a-classroom/)>.

<sup>19</sup> Lake George Association, "The LGA Floating Classroom - Hands-on Aquatic Learning for All Ages," online: <[www.lakegeorgeassociation.org/educate/floating-classroom/](http://www.lakegeorgeassociation.org/educate/floating-classroom/)>.

<sup>20</sup> Guthrie, Steve, "'Floating classroom' Adventures in Awareness wraps up at Curve Lake First Nation" (2 September 2017), *Global News* online: <[globalnews.ca/news/3713181/floating-classroom-adventures-in-awareness-wraps-up-at-curve-lake-first-nation/](http://globalnews.ca/news/3713181/floating-classroom-adventures-in-awareness-wraps-up-at-curve-lake-first-nation/)>.



system.<sup>21</sup> However, more needs to be done in order to improve septic awareness and maintenance in the watershed. We therefore recommend continuing to offer these workshops – and expanding the public education program in the ways described below.

**In addition to strategies currently underway and those proposed in the Draft Plan, we recommend the CRD consider the following strategies to reduce residential sources of nutrients:**

1. Develop a ‘Septic Social’ program;
2. Develop a ‘Welcome Wagon’ septic education package for new homeowners; and
3. Create a watershed stewardship award program.

Each of these proposed strategies is discussed in greater detail below.

### **1. Septic Social Program**

A septic social is a public septic education model that has become a popular tool to reduce pollution caused by septic leaks. The septic social concept involves homeowners hosting neighbours to learn about the operation and maintenance of septic tanks with the assistance of a septic technician.<sup>22</sup> Septic socials have been adopted as an environmental education tools throughout North America, including the Comox Valley<sup>23</sup> and Sooke Basin’s Anderson Cove (where Veins of Life incorporated the concept into a water quality improvement project).<sup>24</sup>

Septic socials can be an effective, low-cost strategy to increase residential awareness about proper maintenance and repair of septic systems. As a community-driven model, septic socials also have the potential to contribute to ongoing community relationship building, knowledge sharing, and collective environmental values – which can dramatically extend the benefits beyond the events themselves.

In the Colquitz River watershed, septic socials could be hosted in conjunction with the CRD’s Septic Savvy program, which offers free septic education workshops for septic owners. Done right, they could be a fun way of building community while reducing pollution in the watershed.

### **2. Septic Welcome Wagon**

The Welcome Wagon concept is based on a practice performed by the frontier settler community in the Canadian prairies in the late 1800s, who greeted new settlers by bringing wagons filled with local supplies. Today, the Welcome Wagon idea has been adapted in many places to welcome new residents to a neighbourhood with local information and/or discounts and gifts. In the Colquitz

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<sup>21</sup> Capital Regional District, “Septic Savvy Workshop,” online: <[www.crd.bc.ca/about/events/event/2015/10/03/default-calendar/septic-savvy-workshop](http://www.crd.bc.ca/about/events/event/2015/10/03/default-calendar/septic-savvy-workshop)>.

<sup>22</sup> King, Tery, “Hot New Party Trend: Throw a ‘Septic Social’” (2000), *DJC Environmental Outlook* online: <[www.djc.com/special/environment2000/septic.html](http://www.djc.com/special/environment2000/septic.html)>.

<sup>23</sup> Broten, Delores, “Pulling the Plug on Pollution in the Salish Sea” (4 October 2012), online: <[watershedsentinel.ca/articles/pulling-the-plug-on-pollution-in-the-salish-sea/](http://watershedsentinel.ca/articles/pulling-the-plug-on-pollution-in-the-salish-sea/)>.

<sup>24</sup> Veins of Life Watershed Society, *An Assessment of Hutchinson, Roche and Anderson Coves for Suitability for Open Shellfish Harvesting*, (2002) [Veins of Life].

River watershed, this concept can be adapted to educate new landowners who may know nothing about septic systems and their required proper operation and maintenance.

Consultation with local stewardship groups indicated there is a concern that while there has historically been good compliance with nutrient best management practices in the Colquitz River watershed, turnover in property ownership has eroded community knowledge. As a result, many of the long-established farms and landowners operate in compliance with best nutrient management practices, while there is a significant knowledge gap among many newer residential and farm landowners.<sup>25</sup>

To address the gradual erosion of property owner knowledge about nutrient best management practices, the CRD could consider developing a septic Welcome Wagon to provide new property owners with information about septic systems, such as maintenance, repairs and compliance with bylaws. A Welcome Wagon could also provide advertising for local inspectors, and offer discounts for septic inspection services.

The Welcome Wagon approach has already been successfully used in our region. In the Sooke Basin, septic maintenance information packages and discounts for septic emptying services were distributed to 160 properties as part of a broader water quality improvement project in the early 2000s.<sup>26</sup> The success of that water quality improvement project – which led to the successful reopening of local shellfish beds – was attributed largely to public education initiatives such as the door-to-door septic information packages.<sup>27</sup>

### **3. Watershed Stewardship Recognition Awards**

Stewardship recognition awards are programs that recognize landowners who act as environmental stewards of their lands. Stewardship recognition awards have been used as a conservation incentive tool in watersheds across the country. The Conservation Halton Watershed Stewardship Award in Ontario, for example, recognizes landowners who manage their land in a way that protects the health of the watershed and preserves the natural features and watercourses on their property.<sup>28</sup> The award includes a sign that can be displayed at the property's entrance.

Recognition awards can help motivate landowners to become involved – and stay involved – in land stewardship.<sup>29</sup> In addition, they serve an important educational function, acting as a conversation starter about environmental conservation among neighbours and passers-by.

A Colquitz River watershed stewardship award program could be a tool to recognize and incentivize landowners to adopt watershed-friendly practices on their properties, including nutrient best management practices. Roadside recognition signs could promote collective environmental values and a watershed identity by emphasizing owner's contributions to the entire

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<sup>25</sup> Jill Robinson, CRD Regional Parks, personal communication, 5 February 2020.

<sup>26</sup> John Roe, personal communication, 11 September 2020.

<sup>27</sup> Veins of Life Watershed Society, *supra* note 4.

<sup>28</sup> Conservation Halton, "Watershed Stewardship Award," online: <[conservationhalton.ca/watershed-stewardship-award#:~:text=Halton%20Watershed%20Stewardship%20has%20a,natural%20features%20of%20their%20property](https://conservationhalton.ca/watershed-stewardship-award#:~:text=Halton%20Watershed%20Stewardship%20has%20a,natural%20features%20of%20their%20property)>.

<sup>29</sup> Sandborn, Calvin, *Green Space and Growth: Conserving Natural Areas in B.C. Communities* (Canada: Commission on Resources and Environment, 1996).

Elk/Beaver Lake watershed. For example, roadside signs could read: “We are Elk/Beaver Lake Protectors” or “I’m a Friend of Colquitz River watershed.”

### **1(a)(ii) Financial Incentives**

Financial incentives can be powerful tools to encourage landowners to be good environmental stewards. We support the use of financial incentives, and offer the examples below as financial incentive models that could be adapted to the Colquitz River watershed.

At Seattle’s Green Lake, the Green Lake Improvement District (the “Improvement District”) operates a grant program that provides funding to lakeside landowners to restore eroded or non-buffered shorelines.<sup>30</sup> The Improvement District estimated that restoration of private riparian areas could reduce the total amount of phosphorus entering the lake by 44%.<sup>31</sup> While Green Lake has more riparian private properties than Elk/Beaver Lake, this estimate points to the importance of riparian wetlands as buffers against nutrients.

There are also a number of examples of using financial incentives specifically to improve septic maintenance. Washington State, for example, operates a grant and low-interest loan program that provides funding to local governments to help facilitate the repair and replacement of broken and failing private septic systems within their jurisdiction.<sup>32</sup> Similarly, at Anderson Cove in the Sooke basin, the Veins of Life partnered with the CRD in the early 2000s to provide and *subsidize* septic tank emptying and inspections. Significant water quality improvements in the Cove have been attributed to this initiative.<sup>33</sup> We strongly support the proposal in the Draft Plan to offer incentives such as these to promote compliance with the septic bylaw.

## **1(b) Consider Other Strategies to Reduce Residential Runoff**

**In addition to the actions currently proposed in the Draft Plan, we recommend the CRD consider the following strategies to address residential nutrient runoff.**

### **1(b)(i) CRD Septic By-law Enforcement**

The CRD has a number of bylaws that govern landowner nutrient management. Bylaw 3479 (the “Bylaw”),<sup>34</sup> for example, requires owners in the District of Saanich and other prescribed municipalities to have their septic system maintained by an authorized person, as defined under

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<sup>30</sup> Green Lake Improvement District, “Shoreline Restorations,” online: <[www.greenlakemnid.com/shoreline-restorations.html](http://www.greenlakemnid.com/shoreline-restorations.html)>.

<sup>31</sup> Ibid

<sup>32</sup> State of Washington Department of Ecology, “On-Site Sewage System Projects,” online: <[ecology.wa.gov/About-us/How-we-operate/Grants-loans/Find-a-grant-or-loan/Water-Quality-grants-and-loans/On-site-sewage-projects](http://ecology.wa.gov/About-us/How-we-operate/Grants-loans/Find-a-grant-or-loan/Water-Quality-grants-and-loans/On-site-sewage-projects)>.

<sup>33</sup> John Roe, personal communication, 11 September 2020.

<sup>34</sup> Capital Regional District, Bylaw No 3479, A Bylaw to Regulate the Maintenance of Onsite Sewage Systems in the Capital Regional District.

the *Sewerage Systems Regulation*, BC Reg 326/2004, at least once per calendar year and make maintenance reports available to the CRD.<sup>35</sup>

Enforcement of this and other bylaws related to nutrient management is guided by the Regional Source Control Program Enforcement Policy (“Source Control Enforcement Policy”), which provides that cooperative and educational enforcement measures should be used whenever it is possible and reasonable to do so, but that punitive measures are also available depending on the severity and frequency of the violation(s).<sup>36</sup>

During our research, the ELC heard concerns about lax enforcement of the Bylaw and other CRD bylaws related to nutrient management. A septic expert we consulted raised the concern that inspections do not occur as frequently as the Bylaw requires, and that routine CRD review of maintenance reports does not necessarily pick up the most problematic septic releases – which are frequently caused by physically broken systems that mere maintenance checks may not detect. There is an opportunity for CRD inspectors or others, such as community groups, to actually be put into the field to ensure that broken systems get detected.

To alleviate these concerns, we recommend that the CRD commit in the Draft Plan to stringent enforcement of its septic and nutrient management bylaws – in accordance with the approach set out in the Source Control Enforcement Policy.

Ideally, bylaw enforcement should complement community-based public education initiatives, such as the existing ‘Septic Savvy’ program, which can minimize non-compliance.

### **1(b)(ii) Connecting Residents to Municipal Sewage Systems**

It is widely recognized that from environmental and public health perspectives, septic systems are problematic.<sup>37</sup> Ensuring septic systems are maintained and repaired throughout the watershed is an immediate priority. Long term, however, as the population grows in the Colquitz River watershed, connecting properties to municipal sewage systems should be a priority for the District of Saanich and Central Saanich. While extending sewage lines can be costly, reducing the number of properties relying on individual septic systems will support the long-term ecological health of the watershed and Elk/Beaver Lake, and reduce the need for ongoing oversight by the CRD. Indeed, sewer service has been an essential component of large-scale water quality improvement projects at Glen Lake (Langford)<sup>38</sup> and in the Okanagan, where the Okanagan Basin Water Board provided over \$40 million in funding to upgrade and replace sewage treatment facilities and extend community sewers.<sup>39</sup>

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<sup>35</sup> Most of the properties in the Colquitz River watershed are located in the District of Saanich, and as a result are subject to this bylaw. A small portion of the watershed is located in the District of Central Saanich, which would not be subject to the Bylaw.

<sup>36</sup> Capital Regional District Environmental Services, “Regional Source Control Program Enforcement Policy” (2006), online: <[www.crd.bc.ca/docs/default-source/source-control-pdf/policy\\_sourcecontrolenforcement.pdf?sfvrsn=fade89c9\\_2](http://www.crd.bc.ca/docs/default-source/source-control-pdf/policy_sourcecontrolenforcement.pdf?sfvrsn=fade89c9_2)> p. 4.

<sup>37</sup> Hobson, Jeremy and Allison Hagan, “Increased Use Of Septic Tanks Raises Concerns For Environment, Public Health” (15 May 2020), *WBUR* online: <[www.wbur.org/hereandnow/2020/05/15/septic-tanks-climate-change](http://www.wbur.org/hereandnow/2020/05/15/septic-tanks-climate-change)>.

<sup>38</sup> BC Lake Stewardship Society and the British Columbia Ministry of Water, Land and Air Protection, “Langford Lake (1973-2004),” online: <[www.bclss.org/cms/wp-content/uploads/2017/05/LangfordLake.pdf](http://www.bclss.org/cms/wp-content/uploads/2017/05/LangfordLake.pdf)>.

<sup>39</sup> Okanagan Basin Water Board, “History of the SFA Program,” online: <[www.obwb.ca/overview-grants/sfa/history/](http://www.obwb.ca/overview-grants/sfa/history/)>.

### **1(b)(iii) Dye Tracing**

Dye tracing is a technique used to identify septic leaks by adding dye to a septic system and monitoring surrounding areas for visible signs of leaks. Dye tracing has been used in other watersheds as an effective water quality improvement strategy. Veins of Life, for example, has led successful nutrient dye testing programs in the Gorge and Sooke watersheds in the early 2000s by going door to door to seek out volunteer residential septic owner participants.<sup>40</sup> Veins of Life commented that in their study, when dye tests indicated leaks, they found septic owners generally were willing to repair their septic systems.

In the Colquitz River watershed, a voluntary dye tracing program could be delivered through a community stewardship organization, with technician support, alongside other public education programs developed to reduce residential sources of nutrients.

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<sup>40</sup> John Roe, personal communication, 11 September 2020.



## Recommendation 2: Consider Additional Strategies to Reduce Agricultural Sources of Phosphorus

The Draft Plan proposes the following actions to reduce agricultural sources of nutrient pollution:

- **Action 1(a):** Improve rural/urban land management practices to reduce and manage the source of phosphorus inputs into the watershed;
- **Action 1(c):** Improve agricultural land use practices to reduce and manage nutrient use;
- **Actions 2(a) – 2(c):** Restore and enhance stream and watershed function.

The Draft Plan proposes the following strategies to implement these actions:

- **Farmers:** comply with Code of Practice for Agricultural Environmental Management (“AEM”), adopt Nutrient Management Plans (“NMPs”) as needed, enrol in Environmental Farm Plan (“EFP”), adopt best management practices
- **Saanich/Central Saanich:** improve awareness of compliance requirements for AEM Code and NMPs, support landowners to enrol in EFP, adopt beneficial farm management practices, maintain open/vegetated ditches, contact local landowners to share information about nutrient use reduction and best management practices
- **CRD:** improve public access to resources on important of nutrient reduction
- **All:** restore stream and watershed function to reduce erosion and increase nutrient uptake

These actions provide a strong foundation to reduce agricultural sources of nutrients. We support the implementation of the proposed actions in a manner that prioritizes source control measures, such as promoting on-site best management practices, implementing nutrient retention landscaping,<sup>41</sup> and restoring creek habitats.

**In addition to these actions, we recommend the CRD consider the viability of the following strategies, many of which have been applied in other watersheds to reduce agricultural sources of nutrients:**

- a. Development of educational tools for agricultural operators;
- b. Initiation of an Environmental Farm Plan Group Planning process;
- c. Development of financial incentives for compliance with best management practices;

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<sup>41</sup> See, for example, the Delavan Lake Watershed Initiative Network (WIN) in Wisconsin, which completed input management projects such as grassed waterways (which absorb runoff from agricultural fields), cover crops (which protect agricultural fields from erosion, which allows better absorption of runoff), and grass waterways (which include channels to collect and divert runoff water). For further information, refer to:

1. Environmental Law Centre, “Cleaning Up Elk and Beaver Lakes: What Can be Learned from Other Lakes,” online: <[elc.uvic.ca/wordpress/wp-content/uploads/2016/04/CleaningUpElkandBeaverLakes.pdf](http://elc.uvic.ca/wordpress/wp-content/uploads/2016/04/CleaningUpElkandBeaverLakes.pdf)>.
2. Delavan Lake Watershed Initiative Network, “What is the Delavan Lake Watershed Initiative Network?” online: <[www.delavanlake.org/Delavan\\_Lake\\_WIN\\_Narrative\\_030712.pdf](http://www.delavanlake.org/Delavan_Lake_WIN_Narrative_030712.pdf)>.

- d. Provincial enforcement of the new Code of Practice for Agricultural Environmental Management, supplemented by strong new local rules;
- e. Development of a nutrient best management practices self-assessment tool;
- f. Adaptation of the Farm Water Planning Toolkit to the Colquitz River watershed; and
- g. Bylaw enforcement.

Each of these strategies is discussed below.

## 2(a) Educational Programs

Education can be an effective and inexpensive approach to achieving changes in on-site practices. In the Colquitz River watershed, many local residents and stewardship groups have identified a lack of awareness of best nutrient management practices as a primary reason for poor nutrient practices.<sup>42</sup>

Education can take many forms, ranging from informational pamphlets to workshops, self-assessment tools, and on-site assessments with professionals. Many of the proposed education programs for residential nutrient management, such as welcome wagons and stewardship recognition awards (see Recommendation 1, above) could be adapted for agricultural operations.

Placing an emphasis on education for agricultural operators could provide a cost-effective approach to achieving water quality improvements – by addressing knowledge gaps in the watershed about both bylaw requirements and other nutrient best management practices.

## 2(b) Environmental Farm Plan Group Planning

EFP Group Planning (“EFPGP”) is a provincial group-based agri-environmental risk assessment program. Whereas the EFP program supports individual farms, the EFPGP program enables a group of farmers within a watershed to “assess agricultural impacts on soil, water quality, water quantity, biodiversity, and climate change issues within the project area and work towards increasing the participants['] general awareness of agri-environmental risks and the benefits of reducing or eliminating those risks.”<sup>43</sup>

Completion of an EFPGP allows members of the group to apply for financial incentives through the Canada-British Columbia Beneficial Management Practices Program to “help them focus their collective efforts in a coordinated plan to strategically address a specific agri-environmental priority issue that is important to the producer group through the adoption of beneficial management practices.”<sup>44</sup>

In the Cowichan Valley, the Cowichan Watershed Board (CWB) facilitated the development of an EFPGP for dairy farmers in the watershed. According to the CWB, the program allowed farmers to

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<sup>42</sup> Ian Bruce, personal communication, 2 September 2020; John Roe, personal communication, 11 September 2020.

<sup>43</sup> BC Dairy, “Environmental Farm Plan: Group Planning in British Columbia,” online: [bcdairy.ca/uploads/bcdairy/DairyFarmerInitiatives/GF2\\_EFP\\_Group\\_Plan\\_Final\\_Fillable\\_3.pdf](https://bcdairy.ca/uploads/bcdairy/DairyFarmerInitiatives/GF2_EFP_Group_Plan_Final_Fillable_3.pdf) [BC Dairy].

<sup>44</sup> BC Dairy, *supra* note 39.

identify best management practices and provided funding support to improve nutrient management.<sup>45</sup>

The Draft Plan identifies enrolment in EFPs as a strategy to reduce agricultural sources of nutrients. EFPGP is an alternative approach that may offer advantages over individual EFPs by coordinating a risk assessment on a broader watershed basis and simplifying the process for individual farm operations.

## 2(c) Financial Incentives

Financial incentives can be an effective tool to promote environmental stewardship on agricultural operations. The United States Department of Agriculture, for example, administers the Conservation Reserve Enhancement Program, which provides farm operators with compensation when they enter into 10- to 15-year contracts to preserve ecologically valuable lands and undertake restoration projects.<sup>46</sup>

In the Colquitz River watershed, financial incentives could be used to promote voluntary adoption of best management practices beyond what is required by provincial and local authorities.

## 2(d) Enforcement of the Code of Practice for Agricultural Environmental Management, Supplemented by Strong New Local Bylaws

The *Code of Practice for Agricultural Environmental Management*, BC Reg 8/2019 (“*Code of Practice*”), is a provincial regulation introduced in 2019 that contains environmental operational standards for agricultural operations in BC. The *Code of Practice* includes a number, but not all, of the best management practices proposed by the ELC and others in our 2017 “Recommendations for Creating an Optimal Area Based Management Plan for the Hullcar Aquifer” report.<sup>47</sup>

Part 4 of the *Code of Practice* contains requirements for setbacks between various agricultural activities and watercourses.<sup>48</sup> Under the *Code of Practice*, agricultural by-products must be stored in a manner that prevents contaminated runoff, leachate, wastewater and solids from escaping, and if they do escape, they must be prevented from entering a watercourse.<sup>49</sup> In high precipitation areas, which includes Vancouver Island, manure and other forms of agricultural composting must be stored with a roof overtop between October 1 and April 1.<sup>50</sup> The *Code of Practice* also imposes record-keeping for applications of nutrients to areas greater than two hectares and for all applications to crops.<sup>51</sup> When nutrients are applied to agricultural lands, soil must be tested at

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<sup>45</sup> Cowichan Water Board, “Estuary Health Target,” online: <[cowichanwatershedboard.ca/estuary-health-target/](http://cowichanwatershedboard.ca/estuary-health-target/)>.

<sup>46</sup> Department of Ecology Committees, Boards, and Workgroups, “Puget Sound Nutrient Source Reduction Project,” online: <[www.ezview.wa.gov/DesktopDefault.aspx?alias=1962&pageid=37106](http://www.ezview.wa.gov/DesktopDefault.aspx?alias=1962&pageid=37106)> at p. 3C-43

<sup>47</sup> Environmental Law Centre, “Recommendations for Creating an Optimal Area Based Management Plan for the Hullcar Aquifer” (2017), online: <[elc.uvic.ca/wordpress/wp-content/uploads/2017/05/2015-03-05-FINAL-HULLCAR-REPORT-2017May17.pdf](http://elc.uvic.ca/wordpress/wp-content/uploads/2017/05/2015-03-05-FINAL-HULLCAR-REPORT-2017May17.pdf)>.

<sup>48</sup> *Code of Practice for Agricultural Environmental Management*, BC Reg 8/2019, ss. 15-19.

<sup>49</sup> *Ibid.*, s. 34.

<sup>50</sup> *Ibid.*, s. 25(1).

<sup>51</sup> *Ibid.*, s. 52(2).

least once every three years, or annually if high nitrate levels are detected.<sup>52</sup> Provincial inspectors have authority to verify compliance with the *Code of Practice*.

The *Code of Practice* is a powerful regulatory code that can be relied upon to ensure that agricultural operations in Colquitz River watershed comply with minimum environmental standards. We recommend that the CRD seek a commitment from the Province of BC to vigorously promote awareness of and compliance with the *Code of Practice* in the Colquitz River watershed, and to enforce the *Code of Practice* as necessary.

We finally recommend that local government partners in the Draft Plan consider adopting bylaws to reflect recommendations in the Hullcar report and other expert reports that were not fully incorporated into the *Code of Practice*. Doing so would close gaps in the *Code of Practice* and strengthen the overall regulatory framework governing environmental standards for agricultural operations.

## 2(e) Nutrient Best Management Practices Self-Assessment Tool

A nutrient best management self-assessment tool would allow agricultural operators to complete a survey comparing their farming practices against best management practices for nutrient control. This approach can help farmers identify exactly how to move their operations towards best management practices.

Self-assessment tools have been applied in various contexts to promote compliance with environmental best management practices. In 2013, the then-Burrard Inlet Environmental Action Program (BIEAP) developed a pilot self-assessment tool for automotive shops in North Vancouver to compare their operations against stormwater best management practices to reduce pollution.<sup>53</sup> The pilot tool consisted of a voluntary online questionnaire about the business' specific stormwater practices. At the end of survey, the tool assigned a score based on the overall compliance with best management practices, and generated a customized set of recommendations to improve operations. The BIEAP pilot project was promoted using summer students, who travelled door-to-door and distributed invitations to participate in the pilot study. Similar self-assessment tools have also been developed for dairy farmers to assess compliance with environmental best practices in Australia<sup>54</sup> and at the national level in Canada.<sup>55</sup>

A self-assessment tool has the potential to achieve improvements in nutrient management practices among farmers in the Colquitz River watershed with a relatively low cost. A self-assessment tool would likely best be used in conjunction with other approaches proposed in the Draft Plan and in this report to achieve improvements in agricultural practices in the watershed.

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<sup>52</sup> Ibid, s. 53(1)(a).

<sup>53</sup> Freyman, Elizabeth, "Auto Repair Shops' Perspectives on Storm Drain Protection," online: <[viurrspace.ca/bitstream/handle/10170/751/freyman\\_elizabeth.pdf?sequence=1&isAllowed=y](http://viurrspace.ca/bitstream/handle/10170/751/freyman_elizabeth.pdf?sequence=1&isAllowed=y)>.

<sup>54</sup> Dairy Australia, "Dairy Self-Assessment Tool," online: <[www.dairyaustralia.com.au/farm/land-water-carbon/sustainability-reporting](http://www.dairyaustralia.com.au/farm/land-water-carbon/sustainability-reporting)>.

<sup>55</sup> Dairy Farms +, "Learn and Assess," online: <[dairyfarmsplus.ca/](http://dairyfarmsplus.ca/)>.

## 2(f) Farm Water Planning Toolkit

In April 2014, the Cowichan Valley Regional District developed the 'Farm Water Planning Toolkit' as a pilot tool to guide producers through their current operations, identify water issues and opportunities, and develop practical strategies to improve operations.<sup>56</sup> The toolkit may be completed as a self-assessment, but is intended to be guided by a facilitator who can provide tailored advice. The Farm Water Planning Toolkit is intended to complement other existing water planning programs, such as the EFP program. The Farm Water Planning Toolkit has been adapted and applied in other watersheds, including the Okanagan watershed and the Delta region,<sup>57</sup> and could be adapted to the Colquitz River watershed as an education tool in conjunction with one or more other strategies proposed in the Draft Plan and in this report.

## 2(g) By-law Enforcement

We recommend the District of Saanich and the CRD commit to diligent enforcement of bylaws related to agricultural waste management. Local and regional bylaws are strong legal tools that can be relied upon to ensure minimum legal environmental standards are upheld in the Colquitz River watershed. Section 6 of the District of Saanich Bylaw No 7501, for example, prohibits discharging agricultural waste, among other forms of waste, into watercourses.<sup>58</sup>

By-law enforcement is often best used where educational approaches are unsuccessful, or where there are serious and/or frequent violations. In the context of Colquitz River watershed, enforcement is likely best relied upon in conjunction with educational approaches.

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<sup>56</sup> Cowichan Valley Regional District, "Cowichan Integrated Farm Water Planning Pilot Phase 1" (2014), online: <[www.bcagclimateaction.ca/wp/wp-content/media/CW06-CVRD-Farm-Water-Planning-Pilot-ph1-summary.pdf](http://www.bcagclimateaction.ca/wp/wp-content/media/CW06-CVRD-Farm-Water-Planning-Pilot-ph1-summary.pdf)>.

<sup>57</sup> Climate Action Initiative, "Fraser Valley: BC Agriculture & Climate Change Regional Adaptation Strategies Series" (2015), online: <[www.fvrd.ca/assets/Government/Documents/RegionalStrategies-FraserValley.pdf](http://www.fvrd.ca/assets/Government/Documents/RegionalStrategies-FraserValley.pdf)>.

<sup>58</sup> District of Saanich, Bylaw No 7501, For the Regulation and Protection of Natural Water Courses, Ditches, and Drains.



## Recommendation 3: Integrate Principles of Community-based Watershed Management

Community-based watershed management is particularly suited to address nutrient problems in this watershed. Community-based watershed management closely involves local communities and stakeholders in watershed planning processes and implementation of watershed-related initiatives.<sup>59</sup> Such management entails stakeholders and communities becoming full partners in implementing solutions. We recommend incorporating principles of community-based watershed management in order to:

- promote involvement and buy-in from local landowners; and
- create cost-effective opportunities to achieve environmental education, restoration and monitoring objectives.

There are a number of ways in which principles of community-based watershed management could be incorporated into the Draft Plan. We recommend:

- a. Creating more opportunities for local stewardship organizations to co-implement the Draft Plan, and
- b. Establishing a multi-government and stakeholder watershed roundtable.

Funding for community-based approaches could be generated by introducing a stormwater utility charge, as recommended in the ELC report *Re-inventing Rainwater Management in the Capital Regional District*.<sup>60</sup> The City of Victoria established a similar charge in 2016 to incentivize landowners to adopt stormwater-friendly practices.<sup>61</sup> In New Jersey, stormwater utility district charges have been proposed as a source of funding for infrastructure projects to mitigate cyanobacteria.<sup>62</sup>

### 3(a) Create Opportunities for Community Stewardship Involvement

In the Colquitz River watershed, there are several environmental stewardship organizations with interest in and experience delivering community-based watershed restoration and environmental education projects. We recommend incorporating principles of community-based management by

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<sup>59</sup> Southeast Alaska Watershed Coalition, "Community Based Watershed Management," online:

<[www.alaskawatershedcoalition.org/cbwm/](http://www.alaskawatershedcoalition.org/cbwm/)>.

<sup>60</sup> Environmental Law Centre, "Re-Inventing Rainwater Management" (2010), online: <[elc.uvic.ca/wordpress/wp-content/uploads/2014/12/Re-Inventing-Rainwater-Management\\_2010Feb.pdf](http://elc.uvic.ca/wordpress/wp-content/uploads/2014/12/Re-Inventing-Rainwater-Management_2010Feb.pdf)>.

<sup>61</sup> Partnership for Water Sustainability in BC, "City of Victoria Implements Stormwater Utility + Rainwater Rewards Program" (2016), online: <[waterbucket.ca/wscblog/2016/10/25/city-of-victoria-implements-stormwater-utility-rainwater-rewards-program/](http://waterbucket.ca/wscblog/2016/10/25/city-of-victoria-implements-stormwater-utility-rainwater-rewards-program/)>.

<sup>62</sup> Robinson, P, "Stormwater Utilities Urged at Algae Bloom Seminar" (2020), online: <[www.newjerseyhills.com/stormwater-utilities-urged-at-algae-bloom-seminar-copy/article\\_37bc8729-d619-5a4f-9a18-fc05b2d3e89b.html](http://www.newjerseyhills.com/stormwater-utilities-urged-at-algae-bloom-seminar-copy/article_37bc8729-d619-5a4f-9a18-fc05b2d3e89b.html)>.

creating meaningful opportunities for local stewardship organizations to become partners in the finalization and implementation of the Draft Plan.

Partnering with community organizations to achieve environmental restoration goals can offer many advantages over government-driven approaches. First, community organizations can often achieve significant results with limited financial resources by relying upon community volunteer networks.<sup>63</sup> Second, stewardship groups very often bring together residents with extensive local and/or scientific knowledge.<sup>64</sup> Third, approaches that center stewardship groups can have positive spill-over effects by building community and fostering a common environmental ethic.<sup>65</sup> Finally, community-driven approaches often enjoy high degrees of public buy-in and compliance with restoration efforts.<sup>66</sup>

Many stewardship organizations have experience and interest in doing watershed restoration, in and around the Colquitz River watershed. Some recent examples include:

- *Veins of Life Watershed Society*: riparian vegetation restoration at Durrell Creek (Saanich);<sup>67</sup> willow wattle fence construction to fence cattle out of O'Donnell Creek;<sup>68</sup> construction of manure platforms for farms to reduce nutrient release;<sup>69</sup>
- *Golden Rods and Reels Society*: fundraising for ecological restoration projects in Elk/Beaver Lake Regional Park;<sup>70</sup> water quality sampling in Elk/Beaver lake;<sup>71</sup> mobilization of government and stewardship groups to address water quality issues;<sup>72</sup>
- *Peninsula Streams Society*: ecological health assessments in Colquitz River watershed;<sup>73</sup> stream restoration;<sup>74</sup> water quality monitoring in O'Donnell Creek, including volunteer training; riparian wetland construction for habitat restoration;<sup>75</sup>
- *Sea Change Marine Conservation Society and WSÁNEĆ*: ecological restoration of Tod Inlet;<sup>76</sup>

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<sup>63</sup> Roka, Krishna, "Community-Based Natural Resources Management" in Walter Filho *et al.*, eds, *Life on Land* (Springer, 2019).

<sup>64</sup> Bennett, Nathan *et al.*, "Environmental Stewardship: A Conceptual Review and Analytical Framework" (2018) 61 *Env Management* 597.

<sup>65</sup> Dresner, Marion *et al.*, "Environmental Identity, Pro-Environmental Behaviors, and Civic Engagement of Volunteer Stewards in Portland Area Parks" (2014) 21:7 *Environmental Education Research* 991.

<sup>66</sup> Moreto, William, Rod Brunson and Anthony Braga, "Anything We Do, We Have to Include the Communities': Law Enforcement Rangers' Attitudes Towards and Experiences of Community–Ranger Relations in Wildlife Protected Areas in Uganda" (2017) 57 *Brit J Criminol* 924.

<sup>67</sup> Veins of Life Watershed Society, "Willow "Wattling and Live Staking" in the Courtland-Hastings Flats of Saanich" (2000), online: <[www.salishsea.ca/projects/2000/Willow\\_Wattling.html](http://www.salishsea.ca/projects/2000/Willow_Wattling.html)>.

<sup>68</sup> *Ibid.*

<sup>69</sup> John Roe, personal communication, 21 August 2020.

<sup>70</sup> Victoria Golden Rods and Reels Society, "Elk/Beaver Lake Initiative," online: <[goldenrodsandreels.com/elkbeaver-lake-initiative/](http://goldenrodsandreels.com/elkbeaver-lake-initiative/)>.

<sup>71</sup> *Ibid.*

<sup>72</sup> *Ibid.*

<sup>73</sup> Buchanan, S *et al.*, "Colquitz River Watershed: Proper Functioning Condition Assessment" (2009), online: <[drive.google.com/drive/folders/0B6lpx6WsnzzvchIJbVhmZHQySHM](https://drive.google.com/drive/folders/0B6lpx6WsnzzvchIJbVhmZHQySHM)>.

<sup>74</sup> "Peninsula Streams: Celebrating 10 Years" (2012), online: <[peninsulastreams.ca/wp-content/uploads/2012/09/coffee-table-book-2012-web.pdf](http://peninsulastreams.ca/wp-content/uploads/2012/09/coffee-table-book-2012-web.pdf)>.

<sup>75</sup> *Ibid.*

<sup>76</sup> Sea Change Marine Conservation Society, "SNIDŽEL Resiliency Project," online: <[seachangesociety.com/the-s%E1%B9%89id%C8%BCe%C6%9A-restoration-project/](http://seachangesociety.com/the-s%E1%B9%89id%C8%BCe%C6%9A-restoration-project/)>.

- *Beaver Elk Environmental Stewards (BEES)*: water quality monitoring; stream keeper training;<sup>77</sup> application to the Habitat Conservation Trust Foundation to undertake a multi-year project to restore Haliburton Creek;<sup>78</sup>
- *Habitat Acquisition Trust*: public engagement through community outreach and education programs;
- *Hag-Brown Fly Fishing Association*: stream restoration in O'Donnell Creek and Tetayut (Sandhill) Creek;<sup>79</sup> fish surveys.<sup>80</sup>

Engaging closely with these organizations as key partners in the finalization and implementation of the Draft Plan would allow the restoration of Elk/Beaver Lake to benefit from the extensive local, scientific and institutional knowledge held by local stewardship organizations.

The Draft Plan identifies the following ways in which stewardship groups can support Elk/Beaver Lake restoration:

- **Action 2(b): restore and enhance stream and watershed function (O'Donnell Creek):** initiate stream restoration projects; learn more about stream restoration and opportunities to participate in public workshops to learn best management practices and restoration techniques for stream habitat.
- **Action 2(c): restore and enhance stream and watershed function (Hamsterly Creek):** support stream restoration projects; learn more about stream restoration and opportunities to participate in public workshops to learn best management practices and restoration techniques for stream habitat.
- **Action 3(b) reduce non-native fish populations:** catch and remove any non-native fish caught in Elk/Beaver Lake. Support building awareness of the importance of removing non-native fish from the lake.

Community groups will be essential partners on all such initiatives.

In addition to riparian habitat restoration and non-native fish removal, there are a number of other ways in which local stewardship organizations can support community-based implementation of the Draft Plan. Some examples include:

- Develop and deliver a septic 'Welcome Wagon' program for new homeowners in the watershed, as has been proposed by Ian Bruce of Peninsula Streams Society;
- Develop and deliver a 'Septic Socials' program for septic owners in the watershed;
- Develop other education tools to promote compliance with residential and agricultural compliance with best practices for nutrient management.

In light of the advantages presented by community-driven approaches to restoration, we recommend the CRD:

- Collaborate with local stewardship organizations in the finalization of the Draft Plan to identify opportunities for community groups to partner in mobilizing landowners,

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<sup>77</sup> Mick Collins, personal communication, March 2020.

<sup>78</sup> Purnima Govindarajulu, personal communication, 30 August 2020.

<sup>79</sup> Ian Bruce, Peninsula Streams Society, personal communication, 22 September 2020.

<sup>80</sup> Haig-Brown Fly Fishing Association, "Colquitz River Project," online: <[www.haigbrown.ca/colquitz-river-project.html](http://www.haigbrown.ca/colquitz-river-project.html)>.

- residents, farmers, recreationists and others to take necessary nutrient control stewardship actions;
- Solicit and incorporate feedback from stewardship organizations in determining relative priorities of proposed actions;
- Commit funding in the Draft Plan for community stewardship organizations to develop education, community outreach, and ecological restoration programs; and,
- Monitor implementation of community-based initiatives and use results to inform future watershed management.

### 3(b) Develop a Community Roundtable

Another way to integrate principles of community-based watershed management into restoration of the Elk/Beaver Lake is to develop a community roundtable that is involved in ongoing watershed management. There are numerous examples in neighbouring watersheds of collaborative, community-based watershed roundtables that offer insight into the potential suitability of such structures for the Colquitz River watershed.

Community watershed roundtables provide a forum to bring together residents, stakeholders, Indigenous nations and governments in order to share information, build relationships, and develop solutions for watershed management challenges. More broadly, roundtables are a form of collaborative, participatory environmental management.

In the context of Colquitz River watershed, a community watershed roundtable could be used to bring together provincial, regional, and local governments, Ləkʷəŋən and W̱SÁNEĆ nations, stakeholder groups (eg. recreational fishers, local farms and residents), and stewardship groups. With the Draft Plan in place, a roundtable could be a powerful tool to build momentum across the various levels of government, allow for an integrated and priority-based approach to implementation, and ensure that stakeholders and community groups are meaningfully involved in water quality restoration planning. Finally, a roundtable could provide an opportunity to develop co-management and/or co-governance relationships with Indigenous nations.

There are several examples of collaborative watershed management models in B.C. that could be adapted to Colquitz River watershed. We introduce four models below and recommend the CRD consider how they might be adapted to the Colquitz River watershed.

#### 3(b)(i) Cowichan Watershed Board

The Cowichan Watershed Board (“CWB”) is a formal partnership between Cowichan Tribes First Nation and the Cowichan Valley Regional District developed as a co-governing body.<sup>81</sup> The CWB partners with government agencies and stewardship organizations to work together toward watershed health targets. The CWB is supported by the Cowichan Watershed Society, a non-profit organization established to provide financial and administrative support for the CWB. Finally, the Cowichan Stewardship Roundtable operates as a multi-government and stakeholder roundtable to

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<sup>81</sup> Cowichan Watershed Board, online: <[cowichanwatershedboard.ca/](http://cowichanwatershedboard.ca/)>.

share information, develop partnerships, and apply collaborative approaches to address common problems.<sup>82</sup>

### **3(b)(ii) Coquitlam River Watershed Board**

The Coquitlam River Watershed Roundtable is another excellent example of government, Indigenous, and stakeholder groups coming together to develop a coordinated, collaborative approach to watershed restoration and management. The Coquitlam Watershed Roundtable is open for participation for “anyone who has an interest in the watershed and respects the values of the Roundtable.”<sup>83</sup> The roundtable has a sophisticated governance structure, with a defined mission statement, a common vision and values statement, guiding operating principles and a governance structure.<sup>84</sup> This structure facilitated the development of the Lower Coquitlam River Watershed Plan, which is the chief document guiding the roundtable’s efforts to improve watershed health.<sup>85</sup>

### **3(b)(iii) Okanagan Basin Watershed Board**

The Okanagan Basin Water Board (OBWB) was established in 1970 as a collaboration of the three Okanagan regional districts to identify and resolve critical water issues – including water quality issues similar to those at Elk/Beaver – in the Okanagan watershed.<sup>86</sup> The Board of Directors includes representatives from the three Okanagan regional districts, as well as the Okanagan Nation Alliance, the Water Supply Association of BC and the Okanagan Water Stewardship Council (the “Council”). The Council is a multi-stakeholder group established by the Board to provide independent science-based advice on water issues.

The OBWB provides that its overall purpose is to “undertake strategic projects and programs at the Basin scale that meet the collective needs of Okanagan citizens for long-term sustainable water supplies while supporting the capacity of member jurisdictions to meet their own water management goals.”<sup>87</sup> The OBWB does not have regulatory authority, but seeks to provide links among the various levels of governments in the watershed.<sup>88</sup>

### **3(b)(iv) Salt Spring Island Watershed Protection Alliance**

The Salt Spring Island Watershed Protection Alliance (SSIWPA, formerly the SSIWP Authority) was established in 2013 to address growing concern from residents and business owners about deteriorating water quality in St. Mary’s Lake.<sup>89</sup> The SSIWPA consists of a Steering Committee, which is the main decision-making body, a Technical Advisory Committee, which provides science-

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<sup>82</sup> “Revised Terms of Reference - Cowichan Stewardship Round Table (CSRT),” online: <[www.cowichanstewardship.com/terms-of-reference.html](http://www.cowichanstewardship.com/terms-of-reference.html)>.

<sup>83</sup> Coquitlam River Watershed Roundtable, “Lower Coquitlam River Watershed Plan Final Draft Version: 1.0” (2015), online: <[www.coquitlamriverwatershed.ca/download/watershed-plan/?wpdmdl=512](http://www.coquitlamriverwatershed.ca/download/watershed-plan/?wpdmdl=512)>, at p. 6.

<sup>84</sup> Ibid.

<sup>85</sup> Ibid.

<sup>86</sup> Okanagan Basin Watershed Board, “Working together to protect our common resources,” online: <[www.obwb.ca](http://www.obwb.ca)>.

<sup>87</sup> Okanagan Basin Watershed Board, “What We Do – Overview,” online: <[www.obwb.ca/overview/](http://www.obwb.ca/overview/)>.

<sup>88</sup> Ibid.

<sup>89</sup> Salt Spring Island Watershed Protection Alliance (SSIWPA), online: <[www.ssiwpa.org/](http://www.ssiwpa.org/)>.



based technical advice, and the Public Advisory Committee, which advises the Steering Committee from the perspective of local values.<sup>90</sup> SSIWPA is comprised of member agencies from local, regional and provincial governments. This intergovernmental approach provides a venue for information-sharing and coordination among levels of government and promotes a watershed-based management approach.<sup>91</sup>

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<sup>90</sup> Island Trust, “Salt Spring Island Watershed Protection Alliance” (2019), online: [www.islandstrust.bc.ca/media/347088/ssiwpa-backgrounder-2019-20\\_final.pdf](http://www.islandstrust.bc.ca/media/347088/ssiwpa-backgrounder-2019-20_final.pdf).

<sup>91</sup> Ibid.

## Recommendation 4: Manage Internal and External Nutrient Sources Together, and Make Source Control a Priority

The Draft Plan addresses external nutrient pollution (from surrounding lands and creeks) and provides that an in-lake remediation plan (the “In-Lake Plan”) will guide efforts to reduce internal sources of nutrients.

**We recommend that the Draft Plan and the In-Lake Plan (the “Plans”) be finalized and implemented in a coordinated manner.** Developing and implementing the Plans together aligns with principles of integrated watershed management, which the Canadian Council of Ministers of the Environment (CCME) describes as:

*...a continuous adaptive process of managing human activities and ecosystems at the watershed scale that integrates multiple concepts and methods, including water and land use planning and management (e.g., protected areas, source water protection, etc.), and evaluates and manages cumulative effects from multiple environmental stressors.<sup>92</sup>*

In the context of the Colquitz River watershed, developing and implementing the Plans in concert would allow government resources to target initiatives that will have the greatest overall impact to the goal of reducing nutrient loads and improving water quality. In this way, proposed actions that target external sources and internal sources may be compared side by side.

**In managing internal and external nutrient loading in a coordinated manner, we further recommend that the CRD and other decision-makers make actions targeting external sources a top priority in implementing the Draft Plan.**

The Draft Plan estimates that approximately 30% of elevated nutrient levels can be attributed to external sources, and 70% are accumulated in sediment on the lake bottom.<sup>93</sup> While the majority of nutrients are internal to the lake, prioritizing *external* source control will reduce the continuous input of new nutrients. This will ensure that action to improve the internal nutrient levels is not undermined by ongoing additions of external nutrients. External sources are truly at the root of the problem – because year after year they relentlessly contribute to the internal nutrient load.

Targeting source control actions first is both essential and likely most cost-effective strategy in the long term. Indeed, source control is the approach adopted by the Canada-Ontario Lake Erie Action Plan (the “Action Plan”), which coordinates a large-scale, multi-government effort to reduce phosphorus loads in Lake Erie, Ontario.<sup>94</sup> The Action Plan identifies 13 actions across five

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<sup>92</sup> Canadian Council of Ministers of the Environment, “Summary of Integrated Watershed Management Approaches Across Canada” (2016), online: [www.ccme.ca/files/Resources/water/water\\_conservation/Summary%20of%20Integrated%20Watershed%20Management%20Approaches%20Across%20Canada%20PN%201559.pdf](http://www.ccme.ca/files/Resources/water/water_conservation/Summary%20of%20Integrated%20Watershed%20Management%20Approaches%20Across%20Canada%20PN%201559.pdf).

<sup>93</sup> CRD, supra note 4.

<sup>94</sup> Government of Canada and Government of Ontario, “Canada-Ontario Lake Erie Action Plan Partnering on Achieving Phosphorus Loading Reductions to Lake Erie from Canadian Sources” (2018), online: [www.canada.ca/content/dam/eccc/documents/pdf/great-lakes-protection/dap/action\\_plan.pdf](http://www.canada.ca/content/dam/eccc/documents/pdf/great-lakes-protection/dap/action_plan.pdf).

categories that center on controlling nutrient sources, strengthening legislation and policies, conducting research, and developing public education programs.

In the Colquitz River watershed, source control actions must be prioritized. In-lake remediation options, such as aeration bubblers, can mitigate and delay the effects of eutrophication. However, to achieve long-term water quality improvement, in-lake remediation must be complemented by comprehensive control of the sources that created the problem in the first place.<sup>95</sup>

*A further note:* We support the proposed plans to restore creek and lake riparian habitats, which can play a huge role in filtering nutrients and reduce the total amounts entering the lake.<sup>96</sup> For example, in the Minneapolis Chain of Lakes, constructed wetlands reduced the amounts of nutrients entering lakes by approximately 25-66%.<sup>97</sup>

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<sup>95</sup> Ken Ashley, B.Sc., M.Sc., M.A.Sc., Ph.D., BCIT Rivers Institute, personal communication 28 September 2020.

<sup>96</sup> For example, in 2012 the Nature Conservancy of Canada and the Quamichan Watershed Stewardship Society built or restored seven wetlands near streams that flow into the Quamichan Lake, which is in the Cowichan Watershed on Vancouver Island, BC. The new wetlands help to remove nutrients from run-off that would enter the lake. See more:

- (1) Quamichan Stewards, "The Quamichan watershed has seven new wetlands (node 204)" (accessed 6 November 2015), online: <<http://quamichanlake.ca/node/204>>.
- (2) Katy Fulton, "Volunteers lending a hand to protect the Quamichan wetlands" (3 February 2014), online: Nature Conservancy of Canada <<http://www.natureconservancy.ca/en/blog/volunteers-lending-a-hand-to.html?referrer=https://www.google.ca/#.Vj0TDLerTcs>>.

<sup>97</sup> Monson, Bruce, "Effectiveness of Stormwater Ponds/Constructed Wetlands in the Collection of Total Mercury and Production of Methylmercury" (May 2007), *Report prepared for the Minnesota Pollution Control Agency* online: <[www.pca.state.mn.us/sites/default/files/tdr-g1-05.pdf](http://www.pca.state.mn.us/sites/default/files/tdr-g1-05.pdf)>.

## Recommendation 5: Enhance Cyanobacterial Monitoring and Warning Signage

Some species of cyanobacteria produce cyanotoxins, which pose a number of serious risks to human and animal health.<sup>98</sup> Cyanobacterial blooms, driven by elevated lake nutrient levels, occur frequently throughout the year in Elk/Beaver Lake.<sup>99</sup> Elk and Beaver Lakes have been closed to swimming a number of times, because of public health concerns.

There are an increasing number of reports of suspected animal poisonings from cyanobacteria exposure, both locally and elsewhere. In 2016, for example, four dogs died after swimming in Quamichan Lake in North Cowichan.<sup>100</sup> Cyanobacteria was the suspected cause of death of 100 New Mexico elk in 2013,<sup>101</sup> and of 330 elephants in Botswana this year.<sup>102</sup>

Unlike some jurisdictions, Vancouver Island Health Authority (“Island Health”) has not done routine periodic checks for cyanobacteria,<sup>103</sup> and recently deferred other water quality sampling at Elk/Beaver Lake to the CRD.<sup>104</sup> Communications with CRD indicate that the CRD just tests for cyanobacteria in Elk/Beaver Lakes *in response to public reports of visible algal blooms*.<sup>105</sup> If results indicate high levels, the CRD reports the findings to Island Health, who determines whether to close the lake and beaches.<sup>106</sup> In the event of a closure, Island Health and the CRD normally post physical signs and updates on their websites.<sup>107</sup> CRD indicated that normal practice is to re-open the lake upon two consecutive ‘clean’ samples and no visible algal blooms, with agreement of Island Health.<sup>108</sup>

The Draft Plan proposes monitoring a number of indicators of nutrient loads and algal levels, including total lake nutrients (phosphorus, nitrogen), total nutrient input and export to/from lake, total dissolved oxygen, chlorophyll-a, and water clarity. The Draft Plan also proposes monitoring

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<sup>98</sup> Government of British Columbia, “Cyanobacteria Blooms (Blue-green Algae),” online:

<[www.healthlinkbc.ca/healthlinkbc-files/blue-green-algae](http://www.healthlinkbc.ca/healthlinkbc-files/blue-green-algae)>.

<sup>99</sup> Watershed Management Plan (Draft), p. 24.

<sup>100</sup> Wilson, Deborah, “Toxic Algae Suspected in Cowichan-Area Dog Deaths,” *CBC News* online:

<[www.cbc.ca/news/canada/british-columbia/north-cowichan-quamichan-lake-toxic-algae-dog-deaths-1.3826902](http://www.cbc.ca/news/canada/british-columbia/north-cowichan-quamichan-lake-toxic-algae-dog-deaths-1.3826902)>.

<sup>101</sup> Matlock, Staci, “Toxic Algae Blamed for Elk Deaths in Northeastern New Mexico,” *Santa Fe New Mexican* online:

<[www.santafenewmexican.com/news/health\\_and\\_science/toxic-algae-blamed-for-elk-deaths-in-northeastern-new-mexico/article\\_42e2331f-c9f3-5ae9-9678-89d1d1160eeb.html](http://www.santafenewmexican.com/news/health_and_science/toxic-algae-blamed-for-elk-deaths-in-northeastern-new-mexico/article_42e2331f-c9f3-5ae9-9678-89d1d1160eeb.html)>.

<sup>102</sup> BBC News, “Botswana: Mystery Elephant Deaths Caused by Cyanobacteria,” *BBC News* online:

<[www.bbc.com/news/world-africa-54234396#:~:text=The%20alarm%20was%20raised%20when,as%20a%20cause%20of%20death.>](http://www.bbc.com/news/world-africa-54234396#:~:text=The%20alarm%20was%20raised%20when,as%20a%20cause%20of%20death.>).

<sup>103</sup> Joanne Lum, Senior Environmental Health Officer (Vancouver Island Health Authority), personal communication, 23 September 2020.

<sup>104</sup> Bidal, Devon, “Island Health no Longer Testing Water at Popular Vancouver Island Beaches” (14 August 2019), *Nanaimo News Bulletin* online: <[www.nanaimobulletin.com/news/island-health-no-longer-testing-water-at-popular-vancouver-island-beaches/](http://www.nanaimobulletin.com/news/island-health-no-longer-testing-water-at-popular-vancouver-island-beaches/)>.

<sup>105</sup> Larisa Hutcheson, P.Eng., CRD Parks and Environmental Services, personal communication 7 August 2019.

<sup>106</sup> Jeff Leahy, Senior Manager, CRD Regional Parks, personal communication 27 August 2020.

<sup>107</sup> Ibid

<sup>108</sup> Larisa Hutcheson, P.Eng., CRD Parks and Environmental Services, personal communication 7 August 2019.

cyanobacteria abundance/diversity annually,<sup>109</sup> and we assume the CRD will also continue to test for cyanobacteria when there are visible algal blooms.

Monitoring these parameters offers a picture of overall lake health that will play an important role in tracking long-term changes in water quality. Analysis of the proposed monitoring strategy as a whole is outside the scope of this report, although we support frequent sampling of water quality indicators and recommend identifying options to improve the frequency of water quality sampling wherever technologically and financially viable. In Quamichan Lake, for example, the Municipality of North Cowichan recently introduced oxygen and temperature data loggers that take hourly measurements at the surface, midwater, and lake bottom.<sup>110</sup>

**However, we propose the additional following recommendations to specifically reduce the public health risks associated with cyanobacteria blooms:**

- Assess the feasibility of conducting regular sampling of Elk/Beaver lake for toxin-producing species of cyanobacteria, with support from Island Health;
- Develop a public water quality monitoring data platform; and,
- Improve cyanotoxin advisory signage at key lake access points and at parking lots.

## 5(a) Regular Sampling for cyanobacteria

There are several potential concerns associated with the proposed monitoring plan as it relates to public health risks associated with cyanotoxins.

First, testing for cyanobacteria annually, and in response to visible algal blooms, is likely insufficient to ensure early detection of and response to harmful levels of cyanotoxins.<sup>111</sup> Dangerous levels of cyanotoxins can exist even where there is no visible algal bloom.<sup>112</sup> Also, members of the public may not realize that authorities are dependent on them to report visible algal blooms. This may reduce public reporting – and create a lag between the onset of a harmful algal bloom and subsequent testing and closing of beaches and the lake.

Second, the other parameters proposed for sampling, while providing useful information about overall lake health, are not direct indicators of cyanobacteria levels.<sup>113</sup> For example, chlorophyll-a levels provide an indication of algal biomass – but do not provide an indication of the presence or levels of cyanotoxins because not all species of algae produce cyanotoxins.<sup>114</sup>

To reduce the public health risks associated with cyanobacteria,<sup>115</sup> we recommend the CRD assess the feasibility of performing regular (e.g. weekly) testing for cyanobacteria, particularly during

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<sup>109</sup> CRD, supra note 4, at pp. 75-76.

<sup>110</sup> Preikshot, Dave, “Management Options and Monitoring Programs for Persistent Blue-Green Algae Blooms in Quamichan Lake,” *Municipality of North Cowichan* online: <[www.northcowichan.ca/assets/Departments/Engineering/PDFs/Final%20Quam%20BGA%20mgt%20and%20ctrl%20-%20Preikshot%202019.pdf](http://www.northcowichan.ca/assets/Departments/Engineering/PDFs/Final%20Quam%20BGA%20mgt%20and%20ctrl%20-%20Preikshot%202019.pdf)>; Dorothy Chambers, personal communication, 22 September 2020.

<sup>111</sup> David Clough, R.P. Bio., personal communication 18 August 2019.

<sup>112</sup> Oregon State, “Upper Klamath Lake Recreational Health Advisory Lifted October 3), online: <[www.oregon.gov/oha/ERD/Pages/2019-October-Upper-Klamath-Lake-Recreational-Health-Advisory-Lifted.aspx](http://www.oregon.gov/oha/ERD/Pages/2019-October-Upper-Klamath-Lake-Recreational-Health-Advisory-Lifted.aspx)>.

<sup>113</sup> Ken Ashley, B.Sc., M.Sc., M.A.Sc., Ph.D., BCIT Rivers Institute, personal communication 28 September 2020.

<sup>114</sup> Hanson, Dennis, “Chlorophyll Analysis,” online: <[www.ohiowea.org/docs/Wed0900Lab\\_Chlorophyll\\_Analysis.pdf](http://www.ohiowea.org/docs/Wed0900Lab_Chlorophyll_Analysis.pdf)>.

<sup>115</sup> World Health Organization, “Water-Related Diseases,” online: <[www.who.int/water\\_sanitation\\_health/diseases-risks/diseases/cyanobacteria/en/](http://www.who.int/water_sanitation_health/diseases-risks/diseases/cyanobacteria/en/)>.



peak season for public use (June-September), and peak season for cyanobacteria (November-March). A similar model is applied in Devil's Lake, Oregon, where samples are collected and tested for cyanobacteria levels at multiple locations in the lake each week during the peak summer months.<sup>116</sup> This approach also aligns with Health Canada's *Guidelines for Canadian Recreational Water Quality*, which recommends at minimum sampling for cyanobacteria once per week during swimming season, and supports daily testing in order to "allow monitoring bodies to more reliably observe water quality trends, make more informed decisions regarding the suitability for swimming of recreational water bodies, react more quickly to water quality problems, and track chronic water quality issues."<sup>117</sup> Two water quality experts we consulted also supported regular sampling for cyanobacteria.<sup>118</sup>

Cyanobacteria sampling should be conducted in accordance with standard methods and best available technologies for sample collection, transportation, and processing.<sup>119</sup> A review of sampling and processing methods is outside the scope of this report.

To save costs and promote a community-based approach, cyanobacteria sampling could be done in partnership with local stewardship groups. This is the model adopted by the Regional District of Nanaimo (the "Regional District"), where the Regional District partners with the provincial government to provide technical sampling training to 16 community stewardship groups, who carry out water quality sampling.<sup>120</sup> Green Lake, in Seattle, operates a similar citizen science-based water quality monitoring program.<sup>121</sup> In Elk/Beaver Lake, the CRD could offer water sampling training to stewardship groups. Island Health, though no longer involved in water sampling,<sup>122</sup> could be a key partner to fund the additional lab services that would be required, and disseminate the results.

Although cyanobacteria testing carries additional costs for lab testing, regular testing could significantly reduce the public health risks associated with cyanobacteria by enabling earlier detection of dangerous cyanobacterial levels and closure of the lake and beaches. Without regular

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<sup>116</sup> Devils Lake Water Improvement District, "Water Quality," online: <[dlwid.org/water-quality/#:~:text=What%20does%20DLWID%20do%3F,the%20use%20of%20Devils%20Lake](http://dlwid.org/water-quality/#:~:text=What%20does%20DLWID%20do%3F,the%20use%20of%20Devils%20Lake)>.

<sup>117</sup> Swim Drink Fish Canada, "Canada Beach Report 2017: First Edition," online: <[static1.squarespace.com/static/5266049fe4b08e763cc00c4b/t/5953ee9815d5dbb3765b3215/1498672800450/Canada+Beach+Report+%E2%80%932017+\(1\).pdf](http://static1.squarespace.com/static/5266049fe4b08e763cc00c4b/t/5953ee9815d5dbb3765b3215/1498672800450/Canada+Beach+Report+%E2%80%932017+(1).pdf)>.

<sup>118</sup> David Clough, R.P. Bio., personal communication 18 August 2019; Ken Ashley, B.Sc., M.Sc., M.A.Sc., Ph.D., BCIT Rivers Institute, personal communication 28 September 2020.

<sup>119</sup> For an overview of best sampling practices for cyanobacteria, see: Government of Canada, "Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Cyanobacterial Toxins," online: <[www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-cyanobacterial-toxins-document.html#6\\_0\\_Analytical\\_methods](http://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-cyanobacterial-toxins-document.html#6_0_Analytical_methods)>. United States Geologic Survey, "Guidelines for Design and Sampling for Cyanobacterial Toxin and Taste-and-Odor Studies in Lakes and Reservoirs," online: <[pubs.usgs.gov/sir/2008/5038/pdf/SIR2008-5038.pdf](http://pubs.usgs.gov/sir/2008/5038/pdf/SIR2008-5038.pdf)>.

APHA, AWWA and WEF (2012). *Standard methods for the examination of water and wastewater* (Washington, D.C.: American Public Health Association, American Water Works Association and Water Environment Federation).

<sup>120</sup> Note though that this program does not test for cyanobacteria.

Regional District of Nanaimo, "Community Watershed Monitoring," online: <[www.rdn.bc.ca/community-watershed-monitoring](http://www.rdn.bc.ca/community-watershed-monitoring)>.

<sup>121</sup> Green Lake Association, "2019 Annual Report," online: <[320772e0-57be-4495-9108-17a35d2b3333.filesusr.com/ugd/9969fa\\_2ba0c42c4d754f63b26cd6473631b193.pdf](http://320772e0-57be-4495-9108-17a35d2b3333.filesusr.com/ugd/9969fa_2ba0c42c4d754f63b26cd6473631b193.pdf)>.

<sup>122</sup> Bidal, Devon, "Island Health no Longer Testing Water as Popular Vancouver Island Beaches" (14 August 2019), *Nanaimo News Bulletin* online: <[www.nanaimobulletin.com/news/island-health-no-longer-testing-water-at-popular-vancouver-island-beaches/](http://www.nanaimobulletin.com/news/island-health-no-longer-testing-water-at-popular-vancouver-island-beaches/)>.

testing, cyanobacteria presents a growing threat to public health and safety, including injury or death to pets and wildlife.<sup>123</sup>

Sampling regularly for cyanobacteria could also be a useful performance indicator in the implementation of the Draft Plan. Testing for cyanobacteria at regular intervals would allow the CRD to build a long-term dataset that could be used to report to the public about improvements to water quality resulting from the implementation of the Draft Plan and forthcoming In-Lake Plan.

One of the challenges associated with cyanobacterial monitoring is that harmful blooms can sometimes develop invisibly and rapidly. The currently proposed testing parameters will help reduce, but not eliminate, health risks. Therefore, the ELC recommends introducing regular cyanobacteria testing – while continuing to respond to public reports of visible algal blooms.

## 5(b) Water Quality Data Sharing

An essential component of effective environmental monitoring is developing tools to make monitoring results publicly accessible and understandable. In addition to signage and advisories, we recommend developing a centralized water quality data monitoring platform that compiles ongoing monitoring results and allows users to both access current water conditions and understand how water quality is changing over time. Disseminating water quality monitoring data is important because it supports public transparency throughout the implementation of the Draft Plan.

The Community Watershed Monitoring Network (CWMN) is a partnership between the Regional District of Nanaimo, the Ministry of Environment and Climate Change Strategy, Island Timberlands LP, and 16 community watershed stewardship groups that undertakes robust water quality monitoring across the watershed in the summer low flow and fall flush periods.<sup>124</sup> The CWMN publishes water sampling data on its website using datasheets, summary reports, and maps. The CWMN provides a strong example of making water quality data publicly available in a variety of accessible formats, and could be adapted to the Colquitz River watershed.

Alternatively, the CRD could host water quality data on an existing platform. The Province of BC (the “Province”), for example, maintains a database of long-term lake water quality data through the Provincial Ambient Water Quality Monitoring program. The Province currently samples Elk/Beaver Lake biannually and posts the data, along with data from 52 other lakes, on an interactive online map.<sup>125</sup> The Water Rangers program is another web-based platform that relies on citizen science data to address gaps in water quality data in freshwater systems across Canada. The Water Rangers program hosts an interactive, web-based mapping application that includes analysis of water quality trends in a given location over time.<sup>126</sup>

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<sup>123</sup> Ken Ashley, B.Sc., M.Sc., M.A.Sc., Ph.D., BCIT Rivers Institute, personal communication 28 September 2020.

<sup>124</sup> Regional District of Nanaimo, “Community Watershed Monitoring,” online: <[www.rdn.bc.ca/community-watershed-monitoring](http://www.rdn.bc.ca/community-watershed-monitoring)>.

<sup>125</sup> Government of British Columbia, “Provincial Ambient Water Quality Monitoring,” online: <[www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/lake-monitoring/long-term-lake-trends/provincial-ambient-water-quality-monitoring](http://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/lake-monitoring/long-term-lake-trends/provincial-ambient-water-quality-monitoring)>.

<sup>126</sup> Canadian Freshwater Alliance, “Water Rangers Does Citizen Science,” online: <[www.freshwateralliance.ca/water\\_rangers\\_citizen\\_science](http://www.freshwateralliance.ca/water_rangers_citizen_science)>.

## 5(c) Improving Advisory Signage

In addition to introducing regular cyanobacterial sampling, we recommend the CRD improve cyanobacteria advisory signage at Elk/Beaver Lake. Communications with the CRD indicated that there are general advisory signs at main public beaches, which are replaced with beach closure signs when Island Health has closed the lake because of dangerous cyanobacterial levels.

Local stewardship groups call for larger and clearer advisory signs placed at beaches and parking lots with the following advisory information:

- Description of general risks associated with algae blooms;
- A red-yellow-green scale indicating severity of the current risk;<sup>127</sup>
- Notice to avoid swimming where there are visible algal blooms using signage such as ‘Look Before You Leap’<sup>128</sup> or ‘When in Doubt, Stay Out’<sup>129</sup>;
- Notice to avoid eating any fish caught while there is a cyanobacteria advisory in place; and,
- Request to report visible algal blooms to the CRD, making it clear that blooms can develop in hours and the CRD relies on public reporting between sampling dates.

Large, clear and strongly-worded signage could be an effective strategy to promote public awareness of cyanobacteria health risks and reduce public exposure to cyanotoxins. Most important, better and more frequent signage can ensure that members of the public are aware that they bear a responsibility to report visible algal blooms in order to protect community health.

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<sup>127</sup> US Environmental Protection Agency, “Assessing the Effectiveness of the Beaches Environmental Assessment and Coastal Health (BEACH) Act Notification Program” (2011), online: [nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100B9DU.TXT](http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100B9DU.TXT) at p. 27.

<sup>128</sup> Preservation Association of Devils Lake, “Water Quality,” online: [www.devilslakeor.us/waterquality.html](http://www.devilslakeor.us/waterquality.html).

<sup>129</sup> Oregon Health Authority, “Cyanobacteria Blooms,” online: [www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RECREATION/HARMFULALGAE/BLOOMS/Pages/index.aspx](http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RECREATION/HARMFULALGAE/BLOOMS/Pages/index.aspx).

## Recommendation 6: Create Opportunities for Indigenous Co-Management and Co-Governance

Indigenous peoples in British Columbia have historically, and in most places continue to be, excluded from local, regional and provincial water and watershed management frameworks.<sup>130</sup>

Increasingly, Indigenous nations and others are calling upon governments to move away from a centralized, colonial water governance model to one that recognizes the inherent jurisdiction of Indigenous nations and closely involves them in decision-making processes.”<sup>131</sup>

The Draft Plan identifies that Elk/Beaver Lake and the surrounding watershed are located on the traditional territories of the Ləkʷəŋən and W̱SÁNEĆ peoples, and the “[c]ontinued consultation and collaboration with First Nations will be supported throughout the [Draft Plan’s] implementation.”<sup>132</sup> While consultation and collaboration are important starting points for relationship-building, **we recommend shifting the water governance approach adopted in the Draft Plan toward one that aligns with the growing movement toward deeper and more meaningful engagement with local Indigenous communities by creating opportunities for co-management and co-governance.**

Involving Indigenous nations in watershed decision-making is an opportunity to recognize the legitimacy of Indigenous governance, integrate traditional ecological knowledge (TEK) into decision making, build government-to-government relationships, and move away from top-down approaches to watershed management.

To create opportunities for Indigenous co-management and co-governance, we recommend the CRD:

- a. Engage with the Ləkʷəŋən and W̱SÁNEĆ nations to determine if there is interest in pursuing a co-governance or co-management model in the Colquitz watershed;
- b. If so, collaborate with Indigenous nations and other levels of government to develop a co-governance or co-management model (e.g. roundtable, decision-making protocol); and,
- c. Work with other levels of government to provide Indigenous nations with sufficient capacity funding to enable meaningful long-term engagement.

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<sup>130</sup> Simms, Rosie *et al.*, “Navigating the Tensions in Collaborative Watershed Governance: Water Governance and Indigenous Communities in British Columbia, Canada,” *Geoforum* (73), 6-16 [Simms *et al.*].

<sup>131</sup> *Ibid.*

<sup>132</sup> CRD, *supra* note 4.

## Recommendation 7: Increase Level of Detail in Draft Plan Proposed Actions

The Draft Plan applies the following structure to guide the response to the overall goal of improving water quality in Elk/Beaver Lake:

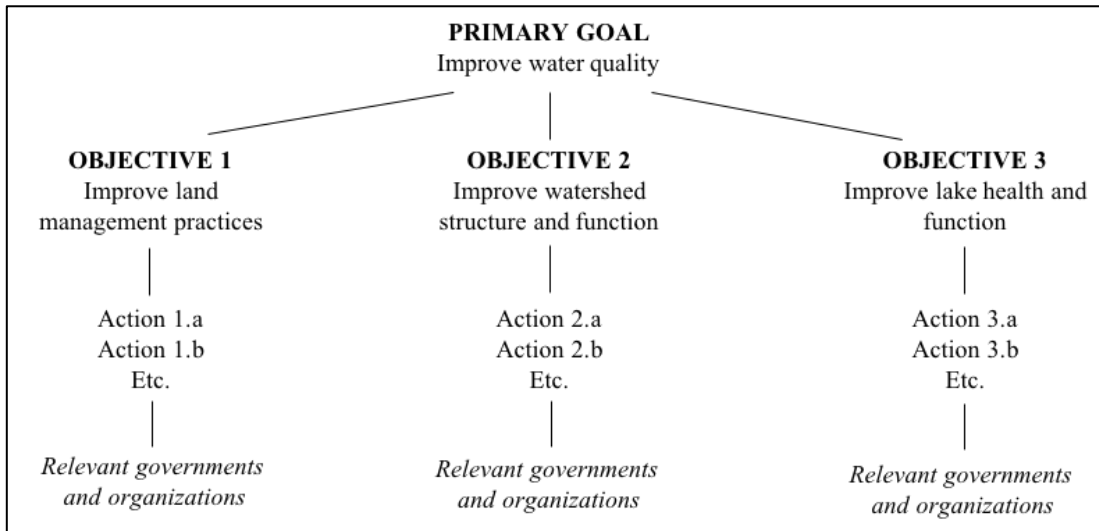


Fig. 1: Overview of Draft Plan structure

This goal/objective/action structure is a valuable planning tool to guide efforts to improve water quality. As drafted, the framework offers a number of strengths. As drafted, each proposed action includes a list of bodies responsible for implementation, the area of primary focus (geographic, by species or other), the overall priority, a proposed timeframe and a performance indicator.

In the finalization and implementation of the Draft Plan, we **recommend building upon this framework by:**

- a. **Estimating cost of proposed strategies and actions, and factoring cost into the overall priority analysis; and**
- b. **Placing ultimate responsibility for implementation of actions upon governments.**

Each of these recommendations is discussed in more detail below.

### 7(a) Factoring Cost of Proposed Actions into Priority Analysis

The Draft Plan specifies the relative priority of proposed actions and approximate timelines for implementation. Identifying the priority of proposed actions is critical to ensuring that efforts are guided by their relative importance. As drafted, the proposed actions seem to be prioritized based

on their anticipated contribution to improving water quality. While this is undoubtedly the primary factor that ought to be used to determine priority, the ELC also recommends estimating the time, resources and costs associated with each proposed action and factoring them into the priority analysis. In this way, the Draft Plan can be implemented in both a priority-based manner that favours low-cost approaches. Given limited resources among governments and Draft Plan partners, this approach could lead to greater long-term ecological outcomes.

## 7(b) Placing Ultimate Responsibility on Governments

The Draft Plan recommends ways in which governments, stakeholders and stewardship organizations may be involved to achieve each proposed action. For example, Action 1.c, “ensure proper function of septic & sewerage systems to reduce phosphorus inputs,” provides that landowners should ensure compliance with septic bylaws and adopt practices that support a healthy septic system, and that the CRD should continue providing educational resources and incentives to septic owners.

While this approach is useful to map out the various actors that should be involved in achieving each action in the Draft Plan, **we recommend shifting the ultimate responsibility for implementation of each action from non-governmental actors and bodies, such as local residents and community stewardship organizations, to governments.** The Draft Plan must be clear that stakeholders and partners are essential to ultimate success, but in a democratic system, government must be ultimately accountable to enforce the laws and implement the programs. This approach also requires obtaining commitments from relevant levels of government to undertake the actions proposed in the Draft Plan.

Doing so would allow the recommended strategies in the Draft Plan to become specific responsibilities borne by governments. Using the example above, this approach would shift the ultimate accountability from landowners to adopt best management practices, to governments or other bodies who can commit in the Draft Plan to specific actions, such as creating septic education programs and enforcing existing by-laws.

**We also recommend drafting the strategies for implementation, as well as performance indicators, in specific terms that will enable straightforward monitoring of implementation of the Draft Plan.** For example, the performance indicator under Action 1.a (“Improve rural/urban land management practices to reduce and manage the source of phosphorus inputs into the watershed”) is contacting 90% of landowners in the watershed.<sup>133</sup> This performance indicator could be drafted more specifically to define “contact,” and could be strengthened by including other performance indicators that would indicated levels of compliance with nutrient best management practices.

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<sup>133</sup> Draft Plan, supra note 4, p. 38.