

Final Research Paper

Kelly L. Musselwhite

ENVP 691 – Environmental Practice

Dr. Leslie King

Royal Roads University

December 1, 2017

“In the end, we will conserve only what we love;

we will love only what we understand;

and we will understand only what we are taught.”

(Baba Dioum, 1968).

Abstract

The objectives of this paper are to investigate the current governance model in Shawnigan Lake, to identify its problems and consequences, and to recommend improvements. As such, two research questions will be considered: What is the current governance model for Shawnigan Lake, BC? and what other models might promote better environmental outcomes to maintain a healthy community and economy? The significance of this topic cannot be overstated: Shawnigan Lake is the largest populated unincorporated electoral area in the province and perfectly characterizes how fragmented jurisdictions prevent a cohesive environmental, social, economic, and political commons. With forty-five distinct regulatory authorities, collaborative and place-based decision-making is prevented while cumulative ecological impacts are enhanced. By undertaking a quantitative and qualitative analysis, this paper compares alternative governance models to that being developed by the Shawnigan Basin Society, a local NGO working toward participatory ecological governance designed to overcome fragmentation, implement long-term sustainability, and achieve a holistic approach to land and watershed management.

The Shawnigan Community Watershed

What is a community?

1) A community has place...

it knows where it belongs and can identify the ecosystems that support it.

2) A community contains a diversity of values, interests, and knowledge... together this diversity provides the foundation for solutions to complex issues.

3) A community takes responsibility for its decisions and activities...

individuals, groups, and the community as a whole are accountable for protecting each other, developing a healthy environment, and maintaining the ecosystems that sustain the community.

(Hammond, 2015, p. 20)

This research project is about a place called Shawnigan Lake, “an unparalleled jewel” and place where ecological threats to its well-being, with the exception of climate change and invasive species, are still open to solution (Fraser, Musselwhite, K., Musselwhite, B., & Musselwhite, C., 2017, p. 153). Not unique in terms of the cumulative environmental impacts for which the community is now faced, Shawnigan’s long list of unique qualities make it very worthy of the necessary efforts to achieve a positive ecological, economic, and social legacy. However, the current governance model – an electoral area - bring jurisdictional and departmental fragmentation. Succinctly, there is no single agency overseeing and integrating long-term land and watershed management, thoughtful planning and development, or multi-level regulatory enforcement. As a result, Shawnigan citizens remain largely without voices, incapacitated, to politically address the issues at hand.

The story of Shawnigan’s self-organization effort, which began in 2011 under the newly elected leadership of a forest ecologist and lifelong resident is an interesting one. Growing concerns over the community’s most precious resource – Shawnigan Lake – were building momentum. Citizens had become aware of an application to the Ministry of Mines and the Ministry of Environment to receive and remediate contaminated soil in the headwaters of

Shawnigan's designated drinking-water watershed. A dichotomous situation was in the making: While on the one hand, the Area Director introduced the notion of 'thinking like a watershed' and the need for earth-centered, holistic, long-term decision-making, and ecologically-sensitive policy implementation; on the other, local business proprietors and the B.C. province (under the guise of the professional reliance model) worked to support the permits necessary to receive 100,000 tons of contaminated soil per year for 50 years in a location a mere five km from the Lake's surface water intake. Although the location would support the provincial economy, it placed approximately 12,000 people's drinking water at risk indefinitely. Shawnigan Lake, the very heart of the community, was in jeopardy.

In October of 2011, the Shawnigan Basin Society (SBS) was formally incorporated. With an established annual tax base of \$50,000 supported by the citizens of the area, both a unique scenario and opportunity was created. Residents demonstrated their willingness to contribute to the cause and objectives of a local NGO whose purpose was twofold: 1) to establish a model of participatory ecological governance for the Shawnigan Community Watershed; and 2) to ensure that the ecosystems, streams, wetlands, and lakes of the Shawnigan Community Watershed be maintained in proper functioning condition to provide, in perpetuity, a sufficient quantity and quality of water for domestic, agricultural, commercial, and industrial needs of basin residents (BC Registry, SBS Constitution, 2011). Although self-appointed and supporting a particular interest in the community, the group's original Board of Directors consisted of a handful of long-term residents who, together, formed an impressive body of local environmental knowledge. They were determined to incur change at the scale where change was possible. A shift in thinking was beginning to occur in the community, for not only had residents galvanized against

the approval of the contaminated soil permit, there was an increasing need to recognize the human footprint made by those living in the community.

Over the subsequent six years, two expensive litigations ((one initiated by the Cowichan Valley Regional District (CVRD) and second initiated by the local Residents' Association)), the longest Environmental Appeal Board Hearing in the history of the province, and a significant resource distraction commanded the community's attention. Then, in 2017 after a long and arduous fight and just prior to the 2017 provincial election, the contaminated soil permit was rescinded by the (then) Minister of Environment and a stop-work order was issued. To date, hundreds of thousands of tons of contaminants remain in the Shawnigan Lake watershed. Many residents believe those contaminants are already leaching into the community's drinking water source.

Social unrest also resulted from the provincially upheld decision, which worked to increase local environmental knowledge and residents' awareness of the short-comings of Shawnigan's governance model, particularly involving the watershed. Where once it was believed that the provincial, and federal governments would listen, collaborate, and support the desires of the community and their well-being, it was quickly learned that senior government is not only significantly limited in its resources and bylaw enforcement efforts, it also holds the authority to both download responsibility and trump local and regional regulations as illustrated in Figure 1. Therefore, local bylaws, specifically those preventing the province from having jurisdictional authority over any revenue generating industry, can be rendered meaningless. In fact, the scope of limitations within the political system and the degree in which the community of Shawnigan Lake was fragmented became clear. Without the strategic organizing of voices

within a formalized and locally initiated NGO, the long-term ecological health (and therefore economic and social health for which they are dependent), was grim.

CVRD News Release

Posted on: June 15, 2017

Supreme Court of Canada Denies CVRD Application for Leave

Duncan, BC - The Supreme Court of Canada dismissed today the Cowichan Valley Regional District's (CVRD's) application for leave to appeal from the judgment of the BC Court of Appeal in the case of CVRD vs. Cobble Hill Holdings et al. The application for leave was filed with the Supreme Court of Canada on December 29, 2016.

"We are disappointed the Supreme Court of Canada has dismissed our application as the CVRD felt it was important the November 3, 2016 BC Court of Appeal decision on this matter be reviewed," states Chair Jon Lefebure.

"The BC Court of Appeal decision has significantly limited local government's ability to regulate certain activities associated with mining, as the Court found was the case with Cobble Hill Holdings' contaminated soil landfill facility at their rock quarry operation in Shawnigan Lake. That is not in the best interest of our communities."

The Supreme Court of Canada was the CVRD's final avenue of appeal. The CVRD will continue to advocate for provincial ministries to respect the interests and concerns of local communities when considering approval of similar facilities in the future.

Figure 1. CVRD News Release of their Supreme Court Litigation Results.

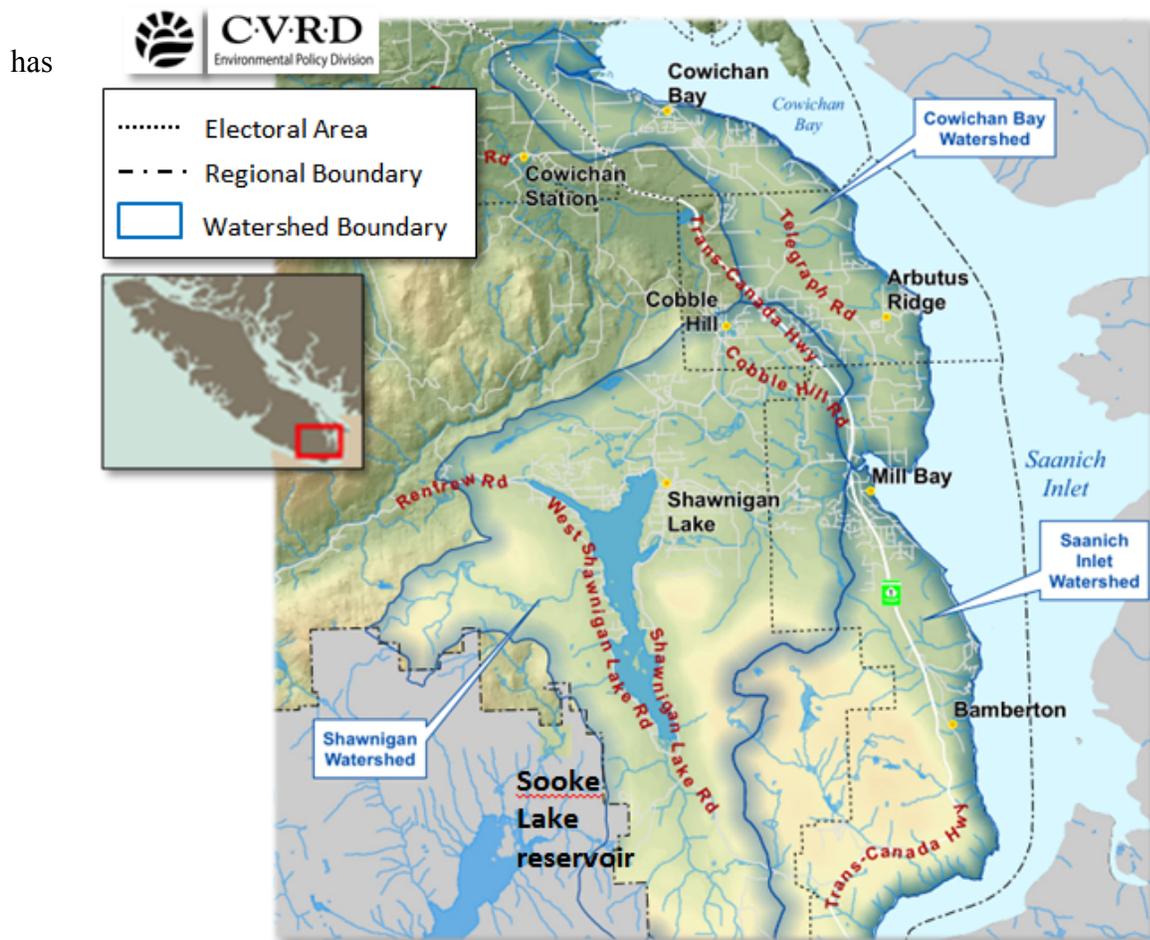
My bias in this paper is carried by my role in the community between January 2011 and December 2013 as the Alternate Area Director for Shawnigan Lake. Subsequently, in January 2014, I moved into the role of Executive Director for the Shawnigan Basin Society (SBS) and appointed member of the Advisory Planning Commission (APC), a group of citizens who make advisory recommendations to the Area Director for development and rezoning applications. My developing local knowledge married beautifully with the academic knowledge gained from enrolling in the Masters of Environmental Practice Program at Royal Roads University in

January 2013. With a growing grasp of the problems in Shawnigan Lake, it was important to learn how to best contribute to political and systematic improvements for my community...

Background and History of the Study Area:

Shawnigan Lake, located just north of the Capital Regional District (CRD) on southern Vancouver Island (Figure 2), is the largest populated unincorporated electoral area in the province of British Columbia (Fraser, Musselwhite, K., Musselwhite, B., & Musselwhite, C., 2017, p. 163). With a current population of 8,127 (2011 census, CVRD, n.d.), Shawnigan Lake

Figure 2. Map of the South Cowichan Watersheds (CVRD, n.d.).



absorbed the largest population increase (565 people or 7.9%) within the Cowichan Valley Regional District (CVRD) since 2006 (Statistics Canada, 2012). Projected population growth to

the year 2026 in Shawnigan indicates an increase of 1,822, to an anticipated 9,949 people (CVRD, 2007, p. 24), and an increase from 1070 to an anticipated 4,145 dwellings (CVRD, 2007, p. 61). Because of its rural lifestyle, moderate climate, and convenient commute to Victoria, Shawnigan Lake proves both a popular bedroom community to BC's capital and a desirable place to call home.

Like all communities, Shawnigan Lake has a story. Human settlement dates back over 4,000 years to the Quw'utsun' people who fished, hunted, and had several seasonal villages in the area (CVRD, 2007, p. 18). Additionally, East Shawnigan Lake Road, one of the three major roads in the community, was part of the Goldstream Trail (built in 1862), was based on a much older Native trading route (Shawnigan Lake Historical Society (SLHS), 2017). Asian settlement began with the building of the E&N railway in the late 1800's; however, the development of logging and sawmilling industries as well as the construction of two large shoreline hotels brought a steady increase in settlement (SLHS, 2017).

By the early 1900's, the railroad transported Victoria elite to Shawnigan to recreate on weekends, Europeans began to retire in the community, the economy grew with the steady purchase of land, and the construction of private schools encouraged seasonal living (SLHS, 2017). Although the 1901 census indicates a population of just 265, the building of the Trans-Canada Highway and the improvement of Malahat Drive brought a further influx of people throughout the 50's and 60's and even more permanent residential growth into the 70's (SLHS, 2017). By 1986, the population increased to 3,725; by 1991 to 5,435; by 1996 to 6,591; by 2001 to 7,081; by 2006 to 7,562; and by 2011 to 8,127 (Statistics Canada, 2012). Shawnigan's population has always been on the rise, which has initiated a variety and continuum of

complexities resulting from a short-term environmental, social, and economic vision and development plan.

Today, Shawnigan Lake suffers from the unfortunate consequences brought about by the accumulation of human footprints stemming from hundreds of residential/privately zoned lots in addition to agricultural, forestry, commercial, parks and institutions, industrial, comprehensive, and water use zones, crown land (recently acquired and logged by First Nations due to treaty negotiations), and a handful of woodlots (Musselwhite, K., local knowledge). These footprints occur in a relatively small geographical area where the lake, located entirely in Area B, embodies half the total basin (Musselwhite, K., local knowledge).

Shawnigan Lake at a Tipping Point:

Considering and combining the cumulative and long-term durational effects of categories, which include bureaucracy, climate change, human footprint, invasive species, pollution, and water quality (Table 1), quickly equate to an understanding of a rapidly declining situation for Shawnigan Lake, the community, and its citizens.

Table 1 illustrates those seven categories and their total of thirty-seven current and growing environmental externalities being suffered.

Table 1. Thirty-Seven Environmental Issues Suffered in Shawnigan Lake, B.C.

<i>Bureaucracy</i>	
1	Fragmented jurisdictional authority
2	Traditional top-down governance structures i.e. limited local decision-making capacity
3	An Official Community Plan seen as a rigid rather than living document, which (at times) hinders appropriate developmental decision-making

<i>Climate Change</i>	
4	An increased risk of wildfires, which would contribute ash nutrients brought by air
5	Warmer and drier summers and colder and wetter winters with less snow pack in the mountains
6	Longer durations of a warmer lake leading to increased likelihood of invasive species
7	Spring Brown Algae Blooms
<i>Human Footprint</i>	
8	Increasing development done through subdividing lots
9	Industrial deforestation (First Nation and two Timber Companies who own the largest land parcels in the watershed) i.e. limited water storage and wildlife habitat
10	Multiple water licenses and people drawing water directly from the lake
11	Foreshore erosion caused by wave energy from wakeboarding
12	Hundreds of non-compliance docks along the lake's perimeter
13	Destruction of lakeside ecology and replacement with riprap and/or cement walls
14	Lack of toilet facilities in parks leading to using the lake as a washroom
15	Noise and engine pollution from increasingly powerful boats in the summer
16	Monocultures of forests creating lack of biodiversity
<i>Infrastructure</i>	
17	Urban sprawl (Cougar Ridge, Goldstream Heights, and South Shawnigan Station)
18	A weir that keeps more water in the lake for longer periods thus increasing water amounts and the resulting wave energy water levels
19	Limited paths for walking and limited public transit
20	Limited amenities so shopping even for basics must be done in adjoining communities
21	Damaged and narrow roads caused from volumes of traffic and lack of maintenance, which do not support bike riding
<i>Invasive Species</i>	
22	An increase of pests and pathogens to affecting young forests

23	Invasive aquatic and terrestrial plant species (Eurasian Milfoil, Scotch Broom, Small-Mouthed Bass, Perch, and Sunfish)
<i>Pollution</i>	
24	Nutrient loading (eutrophication) resulting from very small private property lots at the foreshore, aging septic systems, and grandfather clauses
25	Several illegal contaminated soil dumping grounds, and a 50-year permitted contaminated soil reception facility in the headwaters of the watershed, a mere 5 km from Shawnigan Creek, the mouth of the lake (recently pulled by the Ministry of Environment)
26	Fragmentation of private property with, in some cases, too small lot sizes are too small to and do not comply with water and septic bylaws at the foreshore
27	Chlorine treated water in one of the two regulated facilities, which creates a carcinogenic byproduct when mixed with organic matter from the lake (decaying plants)
28	Recreational lake use, which brings human waste, garbage, fuel, and noise
29	Agricultural run-off, which adds to nutrient loading
30	Illegal dumping of garbage
31	Industry run-off, which compromises storm water paths
32	Seventy-four road ends, land encroachment, and weekend parties
<i>Water Quality</i>	
33	Abandoned gravel pits resulting in plumes of sediment, which then collect and store contaminants entering the lake
34	Water treatment facilities using chlorine when mixed with decaying organic matter result in a carcinogenic byproduct (one at the north end and a second at the northeast side)
35	Only one outflow, Shawnigan Creek, with a full circulation of water occurring once annually
36	Evidence of Ibuprofen and fecal counts (mostly wildlife) in the lake water
37	Increasing amounts of certain contaminants found in water since contaminated soils received in headwaters

Sooke Lake Reservoir, Shawnigan’s Counterpoint:

Unlike its adjoining neighbor, the Sooke Lake Reservoir (solely owned and managed by the Capital Regional District), which is capable of comprehensive management to provide clean and abundant drinking water to hundreds of thousands of Victoria residents, the Shawnigan Lake watershed exemplifies an opposing scenario (Musselwhite, K., local knowledge). Shawnigan Lake carries only two formal water licenses: a public intake at the north end that supplies the Beach Estates residents (managed by the CVRD) and a private intake at the north-east end that supplies the Village and surrounding area (managed by Village Waterworks) (Musselwhite, K., local knowledge). It is worth noting that Village Waterworks is currently undertaking a massive federally regulated upgrade, which will incur a 70% per month increase in costs to those supplied (Musselwhite, K., local knowledge). Additionally, there are a multitude of foreshore houses pumping drinking water directly from the lake. With water quality (and quantity?) on the decline, concerns are on the rise, as well as the need for holistic and long-term solutions.

Governance Structure:

Electoral Area B, known as Shawnigan Lake, is just one of nine electoral areas and six municipalities within the Cowichan Valley Regional District (CVRD, n.d., Electoral Areas and Municipalities). As the offspring of the provincial government, the CVRD has authority over basic services including liquid and solid waste management; emergency services; and, in some cases, recreation and water delivery (Musselwhite, K., local knowledge). However, within CVRD jurisdiction, there is no comprehensive environmental management plan for land use. Rather, it relies on Official Community Plans (OCP) and multitude of zoning allocations specific to each region when making decisions.

Area Directors and Mayors, elected at the local level of government every four years (as of 2011), hold only one of fifteen votes within the Regional District's Board of Directors (who can override a position taken by the Area Director/Mayor of a particular region); are solely responsible for the entire electoral area; currently receive a \$28,000 annual wage; are supported by one appointed Alternate Director (a volunteer position); and have no council, staff, or office. Additionally, the Area Director has almost no decision-making capacity within the political hierarchy; yet, in Shawnigan, is responsible for the health, welfare, and services of all residents (CVRD, n.d., Electoral Area B). Finally, the short duration of their leadership leaves little room for endeavours beyond the basic requirements of public relations and a physical representation at meetings.

In terms of land management, Shawnigan Lake integrates rural residential, forestry, agriculture, light industry, and commercial zoning into its 30,605-hectare land base (CVRD, n.d., Electoral Area B). Historically, development applications consistent with the OCP were single-dimensional processes offered no consideration to systems thinking or an environmental carrying capacity (Musselwhite, K., local knowledge). In fact, prior to 2011, no site visits to the land in question were done. Rather, decisions were made by the local APC based on arguments presented from the landowner, one-dimensional maps, the OCP (often viewed as a static document), and the designated zoning of the parcel (Musselwhite, K., local knowledge). No thought was given to environmental conditions or its place within the hole of the watershed. However, in 2011, advances were made toward adopting a multi-dimensional, holistic, and long-term ecosystems-based approach to development application recommendations (Musselwhite, K., local knowledge). Examples of this ecologically-based evolution include: 'thinking like a watershed'; recognizing the community's OCP as a living document; visiting development

application sites where both Advisory Planning Commission (APC) members and Ecological Design Panel (EDP) members evaluate the property from their various lenses; acquiring environmental assessments from qualified professionals (where necessary); consulting neighbouring property owners; and requiring that applications requesting rezoning (from F1 primary forest to RR2 rural residential) prove a “net ecological gain to the community Treloar, 2017)” before being considered (Musselwhite, K., local knowledge).

Until two years ago, enforcement was the job of a single bylaw officer responsible for nine municipalities and six electoral areas within the Cowichan Valley Regional District. Now there are two bylaw enforcement officers. As there is still no method to manage the region in a proactive fashion, bylaw officers respond to non-compliance issues following a reactive model, a complaint-driven system, which in many cases leads to litigation, one of the leading tax draws throughout the region (Musselwhite, K., local knowledge).

Lastly, all budgets (known as tax functions) are managed at the CVRD. Shawnigan Lake has thirty-eight functions for which all residents contribute and an additional six functions, which are specific to certain residents (Smith, 2017). This mechanism of budgeting tax dollars exemplifies a second form of fragmentation as each function is self-contained and cannot be moved for new projects, expenses, or be used to offset other functions. Whereas municipalities hold one budget from which they can draw from regardless of the expense, electoral areas and the Corporate Services Department at the CVRD are responsible for multiple functions, are limited in how they can be distributed, and are legislated into significant and increasing complexity.

Given the shortcomings of the current governance model, Shawnigan Lake has become a forgotten political area caught between the realities of the *Local Government Act* and the growing difficulties of the real world. Systemic fragmentation at all levels work to reinforce a top-down governance structure, the exclusion of local knowledge, and a ‘silver bullet one-size fixes all’ false ideology. It also ignores the importance of place attachment and place identity within local communities (Devine-Wright, 2013). “In other words, the ability of local groups to make the current system work better is inhibited by the system itself (Day & Cantwell, 1998, p. 80).” For these reasons, and due to the multiplying human-induced insults occurring after more than one hundred years of growing settlement in a radically changing climate, the community’s water source is moving toward a tipping point. “We are running down the ‘natural capital’ instead of simply living off the ‘interest’ – a recipe for ecological bankruptcy (Brandes, 2005, p. 91).”

Governance in Shawnigan extends beyond the local Area Director and Cowichan Valley Regional District: governance is multi-jurisdictional and includes federal, provincial, local, and First Nations regulations and bylaws. In fact, the community of Shawnigan Lake has eighteen formal and permanent jurisdictional authorities comprising its governance structure. Added to these are another twenty-seven unofficial or ‘as needed’ organizations making decisions within their own framework and goals. These agencies, however, are “solitudes, silos, and stovepipes”, and their fragmentation and dramatically limited resources both prevent collaborative decision-making opportunities and, in many cases, the ability to enforce their own regulations (Dale, 2001, pp. 95 – 116).

Below is Table 2, which illustrates forty-five multi-level jurisdictional authorities responsible for Shawnigan Lake’s environmental, social, and economic welfare.

<i>Provincial, Local Government Act</i>		
1	Cowichan Valley Regional District and Staff	Municipalities and regional districts provide British Columbians with essential local and regional services such as clean water, sewer systems, parks and recreation and fire protection. These local governments plan, adopt bylaws and shape communities. Whether you live in a rural area, a small town, or a big city, locally elected officials represent citizens and taxpayers; they make decisions together to meet your community’s needs now and in the future. Link.
2	Electoral Area Director	Elected by the citizens on a four-year rotation or as necessary by-election basis. The Area Director makes up 1/15 of the decision-making authority on the Board of Directors within the Cowichan Valley Regional District (Fraser and Musselwhite, 2017, p. 166). Link.
<i>Provincial</i>		
3	Ministry of Agriculture	Production, marketing, processing and merchandising of agricultural products and food. Link.
4	Attorney General	Administers justice, delivers public safety services and programs, leads emergency management, and provides legal advice to Government. Link.
5	Ministry of Energy, Mines, and Petroleum Resources	British Columbia’s electricity, alternative energy, mining and mineral exploration sectors...The Ministry is responsible for the following Crown Corporations: BC Hydro, Columbia Power Corporation and Columbia Basin Trust. Link.
6	Ministry of Environment and Climate Change Strategy	Effective protection, management and conservation of B.C.’s water, land, air and living resources. Link.
7	Ministry of Finance	Establishing, implementing and reviewing government’s economic, fiscal, financial management and taxation policies. Link.
8	Ministry of Forests, Lands, Natural Resource Operations, and Rural Development	Stewardship of Provincial Crown land and natural resources, and protection of B.C.’s archaeological and heritage resources. Link.
9	Ministry of Health	Has overall responsibility for ensuring that quality, appropriate, cost effective and timely health services are available for all British Columbians. Link.
10	Ministry of Indigenous Relations and Reconciliation	Leads the B.C. Government in pursuing reconciliation with the First Nations and Indigenous peoples of British Columbia. Link.

11	Ministry of Municipal Affairs and Housing	Supports local governments, not-for-profits organizations and residents to build vibrant and healthy communities that are well governed, livable, safe, economically resilient, and socially and environmentally responsible. Link .
12	Ministry of Transportation and Infrastructure	Plans transportation networks, provides transportation services and infrastructure, develops and implements transportation policies, and administers many related acts and regulations as well as federal-provincial funding programs, including the Building Canada Fund. Link .
Federal		
13	Cowichan Tribes	Have long-standing interests as traditional territory in the Shawnigan watershed (Fraser and Musselwhite, 2017, p. 168). Link .
14	Department of Fisheries and Oceans	Responsible for all on the water activities; fisheries; science and research; ecosystems; aquatic species including species at risk and invasive species; aquaculture; and Canadian Coastguard. Link .
15	Environmental and Climate Change Canada	Water regulation, legislation, policy, water quality, water management, First Nations reserves. Link
16	Malahat Nation	Te'mexw Treaty Association (TTA) is negotiating with Canada and British Columbia in the BC treaty process on behalf of its 5 member bands: Malahat, Scia'new (Beecher Bay), Songhees, Snaw-aw-as (Nanoose) and T'sou-ke First Nations, are currently in stage 5 of treaty negotiations, and have several forestry agreements on Crown Land in Shawnigan Lake. Link .
17	RCMP	Manage public safety services including policing of laws governing boating on the lake (Fraser and Musselwhite, 2017, p. 168). Link .
18	Transport Canada	(Canada Shipping Act) governs inland water navigation and buoyage (Fraser and Musselwhite, 2017, p. 168). Link .
Major Upland Forest Property Owners		
20	TimberWest	Owns the bottom of Shawnigan Lake and are aware of the growing liability given the number of foreshore docks piled into their property. The irony is that to sell this parcel to the CVRD (for \$1), they are required to conduct and pay a consultant to verify property boundaries, which out prices the desire to do so. They are also one of the two major landowners in the community and own 16.2% the Shawnigan watershed (presentation, Oct. 14, 2017) and 11% of Vancouver Island land base (Musselwhite, K., local knowledge). Link .
21	Island Timberlands	Conducts industrial forestry operation in the watershed, which are disconnected in terms of cumulative impacts (Fraser and Musselwhite, 2017, p. 168). Island Timberlands owns 7.7% of the Shawnigan watershed (presentation, Oct. 14, 2017). Link .
British Columbia Board Appointments		
22	Agricultural Land Commission	Is an independent provincial agency responsible for the administration of the <i>Agricultural Land Commission Act</i> and is responsible for administering the provincial land use zone in favour of agriculture – the Agricultural Land Reserve. The commission adjudicates land use changes related to the ALR and reviews plans and bylaws to ensure consistency with provincial objectives. Link .

23	Audit Council of the Auditor General for Local Government	Is and independent office appointed and funded by the province. The Auditor General conducts performance audits of the operations of local governments. The purpose is to provide Local Governments with objective information and relevant advice that will assist them in their accountability to their communities for the stewardship of public assets and the achievement of value for money in their operations. Link.
24	BC Assessment Authority	Each year provides and independent, uniform, and efficient valuation and classification of all properties in BC. This information provides a stable base for real property taxation for the public and all levels of government. Link.
25	BC Railway Company	Manages land assets across the province including railway lands, port lands, and surplus lands. Link.
26	Environmental Appeals Board	Established under the Environmental Management Act, it is an independent agency which hears appeals from administrative decisions related to environmental issues. The EAB plays a role in ensuring the protection of the environment by providing a final quasi-judicial access point for public and industry to appeal administrative decisions. Link.
27	Forest Practices Board	Oversees compliance with the <i>Forest and Range Practices Act</i> and the achievement of its intent. The Board's main roles are: auditing forest practices of government and license holders on public lands, auditing government enforcement, investigating public complaints, undertaking special investigations of forestry issues, participating in administrative appeals, and providing reports on the Board's activities, findings, and recommendations. Link.
28	Private Managed Forest Land Council	An independent provincial agency established under the Private Managed Forest Land Act to administer the Managed Forest Program and protect key environmental values on private managed forest land in British Columbia. Link.
29	Vancouver Island Health Authority	Authority for the governance and management of most health services. Link.
<i>Other Decision-Making Bodies in the Shawnigan Lake</i>		
30	Shawnigan Improvement District	Separately taxes for and provides for fire services with bylaws developed separately from the CVRD (Fraser and Musselwhite, 2017, p. 167). Link.
31	Shawnigan Basin Society	Represents a portion of the public interest in the Shawnigan basin and is working toward establishing a participatory model of ecological governance to secure clean and abundant drinking water for the community at large (Musselwhite, K., local knowledge). Link.
32	Shawnigan Residents Association	Represents a portion of the public interest in the Shawnigan basin and was forefront in the protest and organized litigation against SIA/CHH (Musselwhite, K., local knowledge). Link.

33	Shawnigan Lake Historical Society	Is currently fostering the expansion of the museum and central meeting amenities in Elsie Miles park in the village (Fraser and Musselwhite, 2017, p. 168). Link .
34	Shawnigan Lake Business Association	Represents Shawnigan Lake village businesses (Fraser and Musselwhite, 2017, p. 168). Link .
35	Shawnigan Village Waterworks	A private firm with a major water license of the lake water, provides water to the Village Core and surrounding residents. AKA, Lidstech Holdings. (Musselwhite, K., local knowledge). Link .
36	Cougar Ridge Strata	An area southwest of the lake provides for its own roads and infrastructure (Fraser and Musselwhite, 2017, p. 166).
37	Mill Bay Water Improvement District	Holds the water license of the Shawnigan Creek that resulted in the weir that affects the water level of the lake (Fraser and Musselwhite, 2017, p. 167). Link .
38	Area A (Mill Bay) Area Director	Deals with the lower reaches of the Shawnigan Creek watershed (Fraser and Musselwhite, 2017, p. 166).
39	Island Corridor Foundation	Owns the track and right of way lands of the E&N Railway (Fraser and Musselwhite, 2017). Link .
40	Invasive Species Council of BC	Is dealing with invasive species identification and controls within the community watershed (Fraser and Musselwhite, 2017, p. 169). Link .
41	Douglas Fir Conservation Partnership	Deals in partnerships with the conservation of endangered Coastal Douglas Fir habitats (Fraser and Musselwhite, 2017). Link .
42	The Mill Bay and District Conservation Society	Lead by Ken Gray, manages the introduction of salmon to the watershed annually (Musselwhite, K., local knowledge).
43	Butler Brothers	Maintains a limestone quarry in the headwaters (Fraser and Musselwhite, 2017, p. 168).
44	Mid Island Aggregates	Manages a large gravel quarry operation in the headwaters of Shawnigan Lake (Fraser and Musselwhite, 2017, p. 168).
45	South Island Aggregates/Cobble Hill Holdings	Maintains a rock quarry and was granted a permit to landfill contaminated soil in the headwaters of Shawnigan Lake, both by the Ministry of Environment and the Ministry of Mines, over the objections of the CVRD and the local community (Fraser and Musselwhite, 2017, p. 168).

Table 2. Demonstrated Political Jurisdictional Fragmentation.

Research Questions and Objectives

The objective of this research paper is to investigate various governance models with the potential of promoting an improvement in environmental management practices (grounded in ecological best practices and policy) in Shawnigan Lake, BC. Accordingly, two questions will be considered: What is the current governance model for Shawnigan Lake, BC? and What other governance models might promote better long-term environmental outcomes to maintain a healthy community and a healthy economy in Shawnigan Lake, B.C.? An emphasis on solution-based findings with researched recommendations will ultimately respond to the detailed shortcomings of the current governance model and will be addressed later in the paper.

Methodology

After conducting a preliminary search on governance models (as well as having a full understanding of the current electoral area governance structure in Shawnigan Lake acquired over seven years of first-hand involvement), a body of articles were considered while narrowing the search criteria. Those searches include the following words and terms, the last two specifically searched as a result of personal local knowledge:

- (ecosystems-based management) AND (watersheds) AND (Canada)
- (localize) AND (sustainability) AND (governance) AND (ecology)
- (localize) AND (sustainability) AND (governance) AND (ecology) AND (Canada)
- (ecosystems-based conservation) VERSUS (ecosystems-based management) AND (governance) AND (ecology) AND (British Columbia)
- (ecosystems-based management) AND (community) AND (implementation) AND (governance) AND (British Columbia)
- (holistic watershed management in Canada)

- (ecosystems-based) AND (conservation) AND (planning) AND (watershed) AND (governance) AND (Canada)
- (ecosystem) AND (conservation) AND (forest) AND (watershed) AND (Canada)
- multi-jurisdiction governance ("multiple stakeholder" OR multi-stakeholder) (water OR environmental OR stewardship)
- (Okanagan) AND (watershed) AND (governance)
- Brandes, O., POLIS

Narrowing the search to keywords including “hybrid” or “multi-stakeholder”, “multi-shareholder”, “multi-governance”, “collaborative”, and “alternative” worked to reduce the volume of material while increasing the focus of articles. Additionally, articles specific to forestry and forest (given their interdependent and interconnected relationship with watershed health) rather than merely watershed were also considered to support alternative governance models, more specifically models that have achieved ecological governance and holistic watershed management – Ecological Governance.

Royal Roads Google Scholar was also used to search key words such as: ecosystems-based conservation planning and governance in B.C. and more specifically, Herb Hammond’s ecosystems-based conservation plan. Lastly, resources from Nowlan and Bakker’s *Delegating Water Governance: Issues and Challenges in the BC Context* (2007) and Davidson and De Loë’s 2014 *Watershed Governance: Transcending Boundaries* lead to their second paper, *The Changing Role of ENGOs in Water Governance: Institutional Entrepreneurs?*, which refutes the watershed as a boundary argument.

Literature Review

In total, sixty-two articles were identified, reviewed, and qualitatively and quantitatively analyzed for the purposes of considering the research questions. Ultimately, primary articles included thirty-nine sources and an additional twenty-three secondary sources. Where primary sources were limited, secondary sources proved valuable as a method to support academic perspectives (peer reviewed and full text articles) involving the topic of governance, sustainability, and necessary adaptations to climate change. See Table 6 for details of those articles. Specifically, seven categories were identified: Author(s), Year, and Source Reviewed; Years of Study; Ecosystem; Methodology (Primary/Secondary); Governance; Outcomes; and Y/N to First Nations Consultation. Finally, the scope of this research proved challenging as keeping it within the province of British Columbia was quickly determined to be too narrow. Consequently, research was broadened to a national and ultimately to a global scale and data between 1993 and 2017 was reviewed.

Broad-based findings of the research indicated that governance models proved both diverse and creative. In fact, Tables 3 and 4 depict a total of twenty-one different governance models; however, for the purposes of this research, it was important to divide them into two distinct philosophies: Human-Centered (Anthropocentric), which are detailed in Table 3 and Earth-Centered (Biocentric), which are detailed in Table 4. Doing so, provides the necessary means of synthesizing and then comparing barriers and outcomes reviewed in these distinct methodologies. Notably, where some literature was found to refute arguments made within Human-Centered philosophies, no literature was found to refute arguments made within Earth-Centered philosophies, which went uncontested. However, they demonstrate a direct opposition to the predominant reductionist myths and metaphors and historical political, social, and

environmental systems and processes contained within a neo-classical – unlimited growth – economic philosophy (Parto, 2000). Whereas Human-Centered models maintain paradigms of command and control methods of management over natural systems (albeit through a variety of potentially progressive conceptual philosophies), Earth-Centered models contrast by fundamentally arguing: watershed governance ought to be determined by nature; by ecological rather than political boundaries; by the unique environmental conditions of a watershed; by the place-based values, cultures, practices, and priorities of a given community; and by the position that ecosystems and the services they provide carry an innate value (Affolderbach, 2011; Grumbine, 1994; Fraser, Musselwhite, K., Musselwhite, B., & Musselwhite, C., 2017; Hammond, 2015). In total forty-four articles conveyed Human-Centered positions with the remaining eighteen supporting Earth-Centered – Ecological Governance, Watershed, and Environmental Bargaining - perspectives. These figures indicate a ratio of roughly 2.5:1 (Human-Centered Governance Models to Earth-Centered Governance Models) and in doing so, demonstrate that management models over natural resources continues as the predominant methodology in the 21st century.

Table 3. Human-Centered (Anthropocentric) Governance/Management Models

Model	Author	Year	Total (44)
Integrated Watershed/Catchment Resource Management (IWRM)	Allan	2008	12
	Bakker & Morinville	2013	
	Cohen	2012	
	Conservation	2001	
	Ontario	2014	
	Cook	2011	
	Furlong & Bakker	2011	
	Johnson & Castleden	2015	
	Keenan	2009	
	Morin	2005	

	O'Boyle, Sinclair, Keizer, Lee, Richard & Yeats Parkes & Horwitz Plummer, De Grosbois, De Loë & Velaniskis	2009 2011	
Environmental Government Organizations/Non- Government Organizations (ENGO/NGO)	Anderson Davidson & De Loë Davidson & De Loë Howlett Lerner Wang	2007 2014 2016 2007 1993 2016	6
Collaborative Co-Management Watershed Partnerships (CWM)	Bakker & Cook Benson, Jordan, Cook & Smith Booth & Muir Cowichan Valley Regional District Levesque	2011 2013 2013 2011 2012	5
Multi-Level Stakeholder Governance (MLG/MSG)	Armitage, De Loë & Plummer Bridges Newig & Fritsch Vigano	2012 2016 2009 2007	4
Community Forest Initiative/Organizations (CFI/CFO)	Furness, Harshaw & Nelson Furness & Nelson	2014 2016	2
Cumulative Effects Assessment and Management (CEA/CEAM)	Dubé, Duinker, Greig, Carver, Sevos, McMaster ... & Munkittrick Noble	2013 2014	2
Integrated Local/Catchment Management (ICM/ILM)	De Loë Erickson	2000 2015	2
Actor Centered Power (ACP)	Krott, Bader, Schusser, Devkota, Maryudi, Giessen & Aurenhammer	2014	1

Community Stewardship/Community-Based Watershed Assessment (CBWA)	Day & Litke	1998	1
Coalition Groups (Bottom-Up Approach)	Day & Cantwell	1998	1
Collaborative Forest Agreement (CFA)	Egunyu, Reed & Sinclair	2016	1
Delegated (devolved, shared or distributed) Watershed Management (DWM)	Nowlan & Bakker	2007	1
Deliberative Democracy (DD)	Holder	2011	1
Adaptive Co-Management (ACM)	Baird, Plummer & Bodin	2016	1
Eco-Industrial Parks (EIP)	Parto	2000	1
Institutional Framework for Sustainable Development (IFSD)	Kanie, Betsill, Zondervan, Biermann & Young	2011	1
Integrated Land-Based Management (ILBM)	Saunders, Rast & Lopes	2014	1
System Dynamics Model (SDM)	Cohen & Neale	2006	1

Table 4. Earth-Centered (Biocentric) Governance/Management Models

Model	Author	Year	Total 18
Ecological Governance	Berkes	2012	14
	Brandes	2005	
	Flotemersch, Leibowitz, Hill, Stoddard, Thoms, & Tharme	2016	
	Fraser, Musselwhite, K, Musselwhite, B, & Musselwhite, C. Grumbine Hammond	2017	
		1994	

	Hammond & Hammond Hammond Jaung, Putzel, Bull, Kozak, & Elliott Lin & Ueta Riddell Slocombe Smith, Prepas, Putz, Burke, Meyer, & Whitson Truitt, Granek, Duvenceck, Goldsmith, Jordan, & Yazzie	1997 2004 2015 2016 2012 2005 1993 2003 2015	
Watershed Governance	Bunch, Parkes, Zubrycki, Venema, Hallstrom, Neudorffer ... & Morrison Morris & Brandes Vigano	2014 2013 2007	3
Environmental Bargaining (EB)	Affolderbach	2011	1

Barriers to Overcome

Dominant Paradigms:

“Management addresses people, not ecosystems, and therefore it is important to provide an institutional structure that organizes (in hierarchy) human activities appropriately” provides evidence that management of the natural environment and ecosystem services they provide is both anthropocentric and ineffective (O’Boyle et al, 2005, p. 600). Further, Davidson and De Loë (2014) clarify the distinction between watershed governance and maintenance by defining governance as “the structures and processes by which people in societies make decisions and

share power” and management as “the operational, on the ground activity to regulate a resource and conditions of its use (p. 368).” Berkes (2012), however, proposes the growing emphasis of moving from a management to a governance structure to achieve a holistic method and ecosystem-based approach for managing natural resources in the context of their environment. In short, “the era of management is over (Berkes, 2012, p. 467).”

Canadian Constitution:

According to the Organization for Co-operation and Economic Development (OECD), Canadians have the highest water use per capita but pay the lowest prices for water consumption in the world (Furlong & Bakker, 2011). Anderson (2007) and Brandes (2005) point out that traditional paradigms of abundant and clean water supplies continue in Canada and perpetuate the need to shift from a supply to a demand model; however, Canada has no federal water strategy to appropriately respond (Dubé et al, 2013). In fact, our constitutional reality is that this is unlikely to change within our four orders of government, which include municipal/regional, provincial, federal, and First Nations (Bakker & Cook, 2011), but rather will continue to result in jurisdictional fragmentation (Cook, 2014). Whereas research suggests the federal government assume a leadership role in providing or collaborating on multiple levels of research and related science in partnership with all levels of government (Morin, 2009), Bakker and Cook argue that provincial leadership is the key of innovation for water governance but is limited in sharing good governance approaches (2011). This constitutional fragmentation at the federal level (horizontal) works to exacerbate provincial and regional fragmentation (vertical) with dire consequences. Saunders, Rast, & Lopes argue that most environmental degradation and over-exploitation can be attributed to governance failures of some type (2014) and Bakker and Cook argue that fragmentation and decentralization to water governance in Canada is directly related to

inadequate management (2011). In the United States (under previous leadership) a regional experiment was undertaken to respond to environmental population and development impacts: The United States' federal government initiated a localized collaborative governance and adaptive management practices effort in shifting from traditional methodologies to ones that were leveraged by individual and stakeholder interests (Erickson, 2015).

Boundary Selection/Scale:

Ecological boundaries versus political boundaries are also in dispute in the academic literature (Bakker & Cook, 2011). Where arguments are made that watershed basins have been managed as boundary objects shaped by three ideologies, scientific, neoliberal, and grassroots communities (Cohen, 2012), this approach has created a mismatch between geopolitical and administrative boundaries versus hydrological boundaries (Bakker & Cook, 2011). Conservation Ontario, in a response paper to the Walkerton Inquiry, reminds that the very characteristics of water defies that it simply be divided into federal, provincial, or municipal responsibility (2001) while Vigano argues, “watershed governance takes ecological governance one step further and implies that existing political boundaries are either replaced by basin boundaries [and thus governance falls within the confines of the basin] or a new governance mechanism is created within the confines of the basin boundaries (2007, p. 12).” This argument, however, is disputed by Davidson & De Loë’s position, “the value of using the watershed boundary for purposes such as identifying critical connections among related systems and organizing data is not in dispute; however, the utility and authenticity of the watershed boundary for water governance should not be assumed (2014, Abstract).” They go on, “Both scholars and practitioners need to carefully consider the circumstances under which watershed boundaries provide an appropriate frame for organizing societies to make decisions... [as well as] take actions to address water problems and

opportunities (Davidson & De Loë, 2014, Abstract).” Finally, another problem of boundary and scale is that the focus remains on local environmental interests versus regional or national interests where consensus leading to politically workable, rather than environmentally optimal, solutions can occur (Nowlan & Bakker, 2007).

Jurisdictional Fragmentation:

Agreement over the problem of jurisdictional fragmentation exists in the majority of research. Allan (2008), Bakker & Morinville (2011), Cohen (2012), Johnson & Castleden (2011), and every author listed in support of Integrated Water Resource Management (IWRM) have determined this issue is a major barrier to integrative, collaborative, participatory, and multi-level government decision-making and policy creation. As previously indicated, jurisdictional fragmentation is both a horizontal and vertical problem at all levels of government. In the words of Dr. Bruce Fraser from *Saving Water: Stewardship of the Shawnigan Community Watershed*, “Too many cooks spoil the broth (2017, p. 166).” Furlong and Bakker argue, progress toward municipal water conservation has been poor as there is little evidence to show that NGO’s and municipalities are, in fact, constrained by factors external to their jurisdiction as they have no localized authority to create bylaws, to act in enforcement, to establish accountability, or to participate in shared governance (2011, p. 221). Interestingly, Cook (2014) refutes Integrated Water Resource Management by suggesting it is the only response, not the proven response, to jurisdictional fragmentation.

At the provincial level, Allen reiterates the importance of changing historical agreements (2008) while Day and Cantwell argue that profound control of provincial agencies to retain power Crown land will seriously limit, if not prevent, local round tables to achieve economic, social, and environmental watershed sustainability without full commitment of cooperation and

long-term support (1998, p. 7). Finally, downloading from the province to the regional government is common but does not equate to a local capacity to meet new responsibilities (Furlong & Bakker, 2011). While local government is responsible for land-use planning, services of water supply, waste water management, development, and conservation, limitations exist and are autonomous in decision and policy making (De Loë, 2000).

Implementation of Governance/Management Model:

Where there remains a multitude of conceptual responses to the many barriers that exist within current water governance and management methods, the question of ‘how’ remains consistent within Human-Centered models. Where Morin (2009) argue there is no clear solution or approach to water management, Van Nijnatten (1996) “questions the market economy and its bias toward consumption patterns, which are seen as the root of environmental degradation and seeks to find a balance between the economy and ecology such that economic activities are not carried out at the risk of the environment. Implementation is strongly connected to the issue of jurisdictional fragmentation, which begin with the Canadian Constitution:

The combined Canadian state at both levels is characterized by a centrifugal scattering of public authority. This fragmentation manifests itself in federalism, in the more than 260 cabinet ministers and their departments of its eleven senior governments, and in a proliferation of government agencies and corporations only loosely connected to the traditional responsible government focus of executive authority. Countless programs, mostly old, occasionally new, and frequently contradictory, are applied by thousands of separate bureaucratic units of the eleven governments. The result is a fragmented state with a fragmenting impact on society (Van Nijnatten, 1996, p. 407).

Berkes, however, argues for the need to shift from a management model to a governance model by arguing that Earth-Centered models, which incorporate adaptive co-management and interdisciplinary contributions, work to address the gap in research and implementation (2012).

This perspective is shared by all the authors supporting Earth-Centered Models - Ecological Governance, Watershed Governance, and Environmental Bargaining.

Exclusion of First Nation Voices/Interests:

Research was also considered in the academic literature to determine where First Nations were included in discussions and decision-making. Sadly, only twenty-two of the sixty-two articles indicated consultation or participation. Below is a list of articles where First Nations involvement was noted and compared in either Human-Centered or Earth-Centered governance models. Notably, there were only eight occurrences where First Nations consultations fell into an Earth-Centered governance model with the remaining falling into Human-Centered governance models. See Table 5 for details.

Model	Author	Year	Total 22
Earth-Centered	Affolderbach	2011	8
	Fraser & Musselwhite,	2017	
	Hammond	1997	
	Hammond & Hammond	2004	
	Hammond	2015	
	Morris & Brandes	2013	
	Riddell	2005	
	Vigano	2007	

Human- Centered	Anderson	2007	14
	Bakker & Cook	2011	
	Booth & Muir	2013	
	Cohen & Neale	2006	
	Cook	2014	
	Day & Cantwell	1998	
	Day & Litke	1998	
	Furness, Harshaw, & Nelson	2015	
	Furness & Nelson	2016	
	Keenan	2015	
	Noble	2014	
	Nowlan & Bakker	2007	
	Parkes & Horwit	2009	
	Wang	2016	

Table 5: First Nations Consultation in the Academic Literature.

Outcomes of Human-Centered and Earth-Centered Governance Models

Note: Earth-Centered Governance models include overcoming the question of implementation - how? - which predominantly exist as an ongoing dilemma in Human-Centered Governance models.

Integration and Collaboration:

When considering holistic, long-term, and comprehensive land and water management planning for the purposes of proactively responding to climate change (Cohen & Neale, 2006; CVRD, 2011; Davidson & De Loë, 2014; and Day & Litke (1998), fresh water quality and quantity, sustainability, and demand (Anderson, 2007; Bakker & Morinville, 2013; and Brandes, 2005) methodologies grounded in integration (O’Boyle et al, 2005; Plummer, De Grosbois, De Loë, & Velanskis, 2011; Saunders, Rast, & Lopes, 2014; and Wang, 2016) and collaboration (Baird, Plummer, & Bodin, 2016; Benson, Jordan, Cook, & Smith, 2013; Conservation Ontario, 2001; and Levesque, 2012) were arguably the most presented in the academic literature.

Integration and collaboration are viewed as crucial to overcoming the issues attached to both jurisdictional and departmental fragmentation and as a result, the limits imposed by Canada's Constitution (Bakker & Morinville, 2013; Brandes, 2005; Cohen, 2012; Day & Litke, 1998; and De Loë, 2000).

The structure of Canadian federalism may not allow for the formation of a unified (or even harmonized) water policy. What may be possible, however, is the development of a federal water strategy that is integrated and coordinated with provincial, territorial and First Nations' interests and that allows for true participation by engaged citizens (Bakker, 2011, p. 286)

The centrality of integration within the watershed approach is fixed to integrated water resource management (IWRM)—a paradigm that aims to ensure the coordinated development and management of water, land, and related resources by maximizing economic and social welfare without compromising the sustainability of vital environmental systems, and is based on principles of coordination, stakeholder participation, and multiple levels of decision making (Cohen, 2012, p. 2210).

Watershed governance is defined as an institutional shift towards ecologically based water allocation, innovative place-based planning, managing water use with conservation and efficiency as top priorities, and ecosystem-based management and decision-making at the watershed scale. The overarching goal is to provide alternatives to current systems of governance and planning that focus too narrowly on individual sectors, thereby isolating the resource from its broader interactions across sectors and within ecosystems. Watershed governance is emerging as a viable approach to achieving long-term sustainability, and a key factor for its success is improved collaboration and connections between citizens and decision-makers at the appropriate scale. It recognizes that local people and institutions are best situated to monitor environmental feedback and respond with tailored solutions to the context—both ecologically and socially (Morris & Brandes, 2013, p. 4).

Adaptive Co-Management:

The philosophies embedded in integration and collaboration are coined in the movement toward systems thinking, that watersheds ought to be viewed as “the principal jurisdictional focus of management efforts (Benson, Jordan, Cook, & Smith, 2013, p. 748).” Adaptive co-management (Jaung, Putzel, Bull, Kozak, & Elliott, 2016; and Keenan, 2015) was a secondary theme within the literature. Baird, Plummer, & Bodin write:

Adaptive co-management (ACM) is generally understood as a process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, ongoing, self-organized process of trial-and-error. It involves heterogeneous actors interacting across scales and through networks (horizontally and vertically) to undertake actions and learn through feedback. Thus, we define ‘adaptation’ for the purposes of this study as iterative interactions among actors for the purpose of undertaking action, and the actions they undertake with emphasis that adaptation is not limited only to action (2016, p. 748).

Recognizing that stewardship is often oriented towards the assessment, protection, or rehabilitation of local ecosystems, which requires community involvement, commitment, and responsibility, is a responsive and adaptive [governance] approach (Allen, 2008; CVRD, 2011; and Day & Litke, 1998, p. 2). Dubé et al (2013) advance with an argument to develop a framework for regional watershed cumulative environmental assessments by first understanding baseline conditions such that predicting cumulative impacts could support improved and appropriately planned development and watershed management (2013, p. 364).

Multi-Level Stakeholder Participation:

Multi-level disciplinary stakeholder participation and decision-making and the (Johnson & Castleden, 2011; Bridges, 2016; and Armitage, De Loë, & Plummer, 2012), inclusion of all local organizations, interest groups, and First Nations voices (Affolderbach, 2011; Anderson, 2007; Booth & Muir, 2013; and Day & Cantwell, 1998) whose values, beliefs, norms, and cultures (Dubé et al, 2013; Eguny, Reed, & Sinclair, 2016; Furness & Nelson, 2016; and Keenan, 2015) are critical when considering the necessity and process of durational planning and visioning into the future. Holden writes, “attention should be paid to public process design that creates space for core values and personal passions to be shared among citizens (2011, p. 327).” Kanie, Betsill, Zondervan, Biermann, & Young summarize that restructuring for sustainable

development must “clearly articulate the ‘aspirations’ of governance for sustainability including objectives and underlying values and norms and allow for meaningful and accountable participation by a wide range of ‘actors’ to develop solutions ‘from’ people ‘for’ people (2012, p. 292).”

Community, local knowledge, and Relationships:

Local participation (Affolderbach, 2011; Bunch et al, 2014; and Holden, 2011) and localization of scale (Brandes, 2005; Erickson, 2015; and Nowlan & Bakker, 2007) were also major themes running throughout the research. The importance of community building, coordination grounded in the creation of strong partnerships and agreement of roles and responsibilities (Cook, 2014 and Erickson, 2015); the emergence of new actors, creating social learning, and increasing social license; place-based decision-making; and the co-production of local knowledge and conditions (Armitage, De Loë, & Plummer, 2012; Newig & Fritsch, 2009; and Nowlan & Bakker, 2007) were also argued throughout the research. Improving communications, relationships, and a balance of power (Affolderbach, 2011; Holden, 2011; and Lerner, 1993); building trust and addressing competing perspectives (Egunyu, Reed, & Sinclair, 2016 and Nowlan & Bakker, 2007); learning by doing through trial and error and accepting that not all is understood about the social and physical environment (Davidson & De Loë, 2014); and increasing human health and well-being (Bunch et al, 2014 and Parkes & Horwitz, 2009) were also noted as outcomes to alternative governance models. These philosophies can then initiate a paradigm shift from neo-classically driven economics to ecologically-based economics (Parto, 2000 and Van Nijnatten, 1996), thus allowing Earth-Centered attachments and considerations to drive integrated and long-term watershed governance (Bunch, 2014; Morris & Brandes, 2013; and Vigaró, 2007).

Institutional Entrepreneurs:

The question of addressing the gap in research and implementation of alternative watershed governance models founded in local action was recognized by Berkes, 2012; Hammond, 2015; and Fraser, Musselwhite, K., Musselwhite, B.& Musselwhite, C., 2017 in their ecosystems-based conservation literature. This was furthered by Davidson & De Loë (2016, p. 63) in their arguments promoting the work of ENGOs as key actors in influencing regional governance by sharing and framing environmental problems and solutions, which alter relationships among actors as well as the governance framework itself. They argue:

Actors who can create or transform institutions have been described as institutional entrepreneurs (IEs) or actors who ‘make it happen’. They are individuals, but they can also be organizations, group or organizations, or groups of individuals. It is necessary to add emphasis here that IEs can exist as a collective, whether through purposeful design, or as a result of operations within a shared context. Nor are they always the “champions” or “leaders” in a traditional sense. This perspective is consistent with multidisciplinary perspective on institutional change found the social innovation, resilience, socioecological systems, and organizational change literatures...they must initiate divergent changes in the institution, and they must actively participate in implementing these changes. Their strength is a function of their ability to engage and manage the emerging capacity of the system, and of the ways in which they connect their efforts to the activities and interests of other actors in the field, thereby nesting their work in the broader system (p. 64).

Davidson and De Loë depict the type of skill and specific skills found in Institutional Entrepreneurs in the following figure (3).

Type of Skill	Skill
Cultural and Social	Knowledge management
	Sense-making
	Convening
	Visioning
	Conflict resolution, negotiation, bargaining
	Framing
	Trust
	Theorizing
	Invention of new options
	Linking of multiple issues
	Identify and seizing windows of opportunity
	Seeing the system
	Collaboration
	Political
Advocacy	
Lobbying	
Coalition building	
Identification of Political opportunities	
Challenge technical and legal frameworks	
Change flow of political authority	
Resource Mobilization	Financial, social, intellectual, cultural, political
	Build on existing resources

Figure 3. Skills of the Institutional Entrepreneur (Davidson and De Loë, 2016, p. 64).

Outcomes of Earth-Centered Governance Models

Ecological Governance as a Consequence of Ecosystem-Based Management (EBM)

Background of Ecosystem-Based Management:

R. Edward Grumbine's 1994 article *What is Ecosystem Management?* relays that the conceptual evolution of ecosystem management began in the 1930s and 1940s via the work of ecologists in response to the world's "deepening biodiversity crisis (p. 28)." He defines the goal of ecosystem management (EM) as the necessity to maintain ecological integrity by fundamentally reframing how humans interact with nature (Abstract). Dominant themes of ecosystem management include: hierarchical context; ecological boundaries; viable populations; ecosystems patterns and processes; and species reintroduction, which support ecological integrity as well as data collection; monitoring; interagency cooperation; organizational change; adaptive management; humans as part of nature; and values (p. 30). Grumbine concludes,

Ecosystem management, at root, is an invitation, a call to restorative action that promises a healthy future for the entire biotic enterprise. The choice is ours – a world where the gap between people and nature grows to an incomprehensible chasm, or a world of damaged but recoverable ecological integrity where the operative word is hope (p. 35).

The Principles of an Ecosystem-Based Approach:

Herb Hammond of Silva Ecosystem Consultants (2015) describes an ecosystem-based approach to conservation planning as "a system of ecosystem protection, restoration, and human use that, as a first priority, maintains or restores natural ecological integrity, including biological diversity, across the full range of spatial and temporal scales (p. 12)." Hammond goes on to point

out that an important hierarchy exists in this approach to planning: “Economies are part of human cultures and human cultures are part of ecosystems. Therefore, protecting ecosystem functioning or ecological integrity provides for healthy human cultures, and the economies that are part of these cultures (p. 3).”

An ecosystem-based plan provides for the long-term health and well-being (ecological and cultural sustainability) of the ecosystem, human communities and their economies. It presents a picture of the parts and processes of an ecosystem that are necessary to protect to achieve sustainability (the ecological framework), and the ecological limits within which human activities need to be carried out in order to be sustainable (p. 8).

Further, Hammond explains that the roots of ecosystem-based conservation planning (versus short-term development plans) are grounded in both science and Indigenous knowledge, “which are the result of thousands of years of meticulous, repeated observations of how ecosystems function in their response to human activities...and is the only management system that has been proven to be sustainable in the long term (p. 9-10).” Clarification of this terminology follows (Hammond, 2015, p. 12):

- 1) the word natural reflects pre-industrial ecological conditions and includes Indigenous management systems;
- 2) maintaining ecological integrity includes protecting, maintaining, or restoring natural ecosystem composition, structure, and function – the parts, their shapes and arrangements on the landscape, and the processes of ecosystems;
- 3) protection means the maintenance of natural ecological integrity through the establishment of ecological reserves at multiple scales;
- 4) ecosystem-based conservation planning is inclusive of a wide range of human activities, and recognizes that healthy human communities provide the necessary human resources to implement ecosystem-based conservation planning; and
- 5) the sum of community economies is the global economy. Therefore, ecosystem-based planning recognizes that the starting point for the development of sustainable economies needs to be at the community level.

Lastly, it is important to note there are seven interdependent and interconnected principles of an ecosystem-based conservation plan, which is founded in an ecosystem-based approach (Hammond, 2015, p. 12-13).

- 1) Focus on what to protect, then on what to use;
- 2) recognize the hierarchal relationship between ecosystems, cultures, and economies;
- 3) apply the precautionary principle to all plans and activities;
- 4) protect, maintain, and where necessary, restore ecological connectivity and the full range of composition, structure, and function of enduring features, natural plant communities, and animal habitats and ranges;
- 5) facilitate the protection and/or restoration of Indigenous land use;
- 6) ensure that the planning process is inclusive of the range of values and interests;
- 7) provide for diverse, ecologically sustainable, community-based economies; and practice adaptive management.

The principles for an ecosystem-based approach to land and watershed management are reiterated in Dr. Ireland's *Developing a Sustainability Perspective: Recognizing the Guiding Principles of Sustainable Systems* PowerPoint (2013), which asks, "What would it look like if we redesigned our system so humans are good for each other and good for the Earth?", which supports Buckminster Fuller's theory, "You never change things by fighting against the existing reality. To change something, build a new model that makes the old model obsolete (n.d.)." As such, the following is a list of nature's guiding principles, which Ireland argues, ought to be considered and mimicked to help guide our development in both space and time (2013):

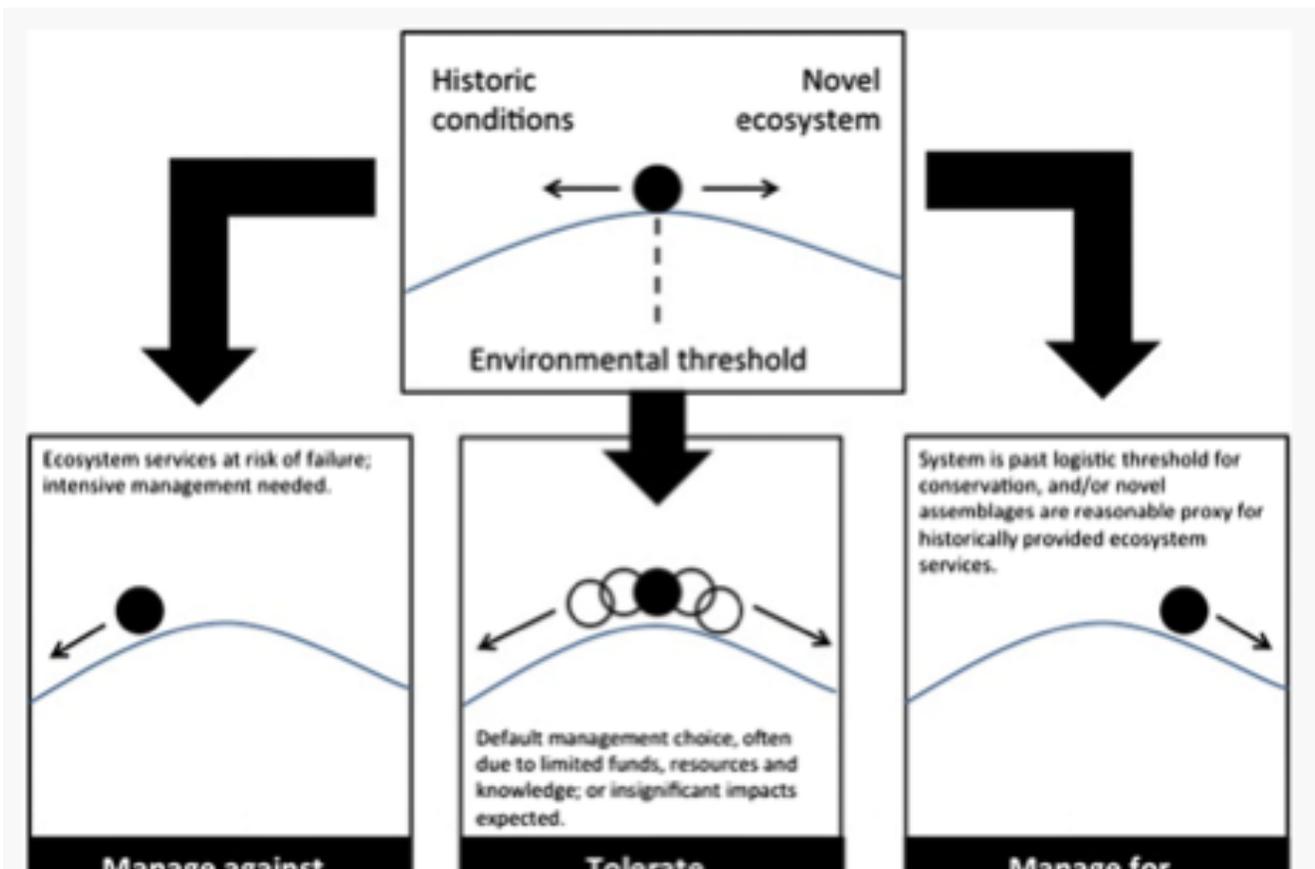
- 1) Use nature as our model, mentor, and measure
- 2) In natural systems, the whole is greater than the sum of its parts
- 3) The environment is completely encompassing of our society, which is then encompassing of our economy
- 4) This is consistent with natural systems, which are systemic and are interconnected and interdependent i.e. ecosystems are encompassing of our habitat, which is then encompassing of a particular plant or animal community
- 5) Diversity (ecological, social, and economic) = Strength
- 6) Closed-looped systems use waste as food
- 7) In natural systems, feedback loops monitor the health of the system
- 8) There is innovation and empowerment at all levels and scales

- 9) There is also interdependence and collaboration
- 10) Natural systems are dynamic, which continually evolve and adapt to new circumstances (Panarchy, n.d.). In this way, communities build resilience
- 11) Within natural communities, the individual exists but they have a responsibility for the integrity and health of the whole

By using these principles, following systemic rather than linear thinking, understanding that society and the economy work interdependently with our natural environment, and designing systems and products that are good for the Earth, sustainability is possible.

Classifying Ecosystems:

Following the argument for the need to strategize about successes and failures in terms of ecosystems-based management and the need for a consistent and adequate cross-sectoral management framework for decision-making, Truitt et al (2015) developed what they determined to be neutral, unambiguous, and consistent terminology in which to classify and describe ecosystems (Abstract). These classifications are reduced to three categories: managing



for, tolerating, and managing against, as shown below in Figure 4, which are intended to meaningfully facilitate decision-making.

Figure 4. Conceptual model for identifying the most appropriate management option: managing against, tolerating, or managing for novel ecosystems (Truitt et al, 2015, p. 1220).

Ecological Governance in Practice:

Examples where Ecological Governance is being practiced as per Hammond and Hammond's 2004 *The Power of Community: Applying Ecosystem-Based Conservation Planning Across Canada* include: Haida Gwaii, Fraser Headwaters/Robson Valley, Nemiah Valley, Fountain Valley and Yalakom Valley, Lillooet, Cortes Island, Denman Island, Slokan Valley, Harrop-Procter, Creston, North Central Saskatchewan, and Labrador. Further, examples where ENGOs and NGOs are supporting earth-centered collaboration and co-adaptive management techniques to secure local watersheds in British Columbia include the Fraser River Basin Council (FBC), the Okanagan Basin Water Board, the Cowichan Stewardship Roundtable, the Salmon River Watershed Roundtable, the Shawnigan Basin Society, and the Koksilah Watershed Society (Wang, 2016; Cohen & Neale, 2006; Anderson, 2007; Day & Cantwell, 1998; Fraser, Musselwhite, K., Musselwhite, B., & Musselwhite, C., 2017; and Musselwhite, K., local knowledge) . It is important to note that each of these ENGOs/NGOs carry authority as either a municipality or a First Nation, with the exception of Harrop-Procter, which is a unique cooperative whereas authority within the Fraser River Basin Council, the Cowichan Stewardship Roundtable, and the Salmon River Watershed Roundtable is the result of Regional District and First Nations partnerships (Fraser, 2017). The exception is the Okanagan Basin Water Board where authority was gained as the result of Regional District collaboration along with multiple municipalities (Fraser, 2017). The Shawnigan Basin Society and the Koksilah Watershed

Society, however, hold no jurisdictional authority as both are limited within their respective electoral areas by the Cowichan Valley Regional District.

The Role of Institutional Entrepreneurs and Hope:

Lastly, the dedicated work achieved by NGOs exemplifies how Institutional Entrepreneurs working within ENGOs and NGOs have successfully altered relationships between governance and a diversity of actors in shaping and framing environmental solutions:

Ultimately, this research suggests that considerable scope exists for actors in environmental governance to govern in new ways using their existing resources. It is not what the ENGOs in the case have achieved, but how they achieved it that provides lessons for governance. These lessons are not limited to other ENGO actors, but hold meaning for government actors as well. In this instance, government actors were open to working with the evident capacity of nongovernment actors, without ceding authority. This case demonstrated the power of a positive sum game, as opposed to the negative sum game that traditional hierarchical and market governance processes have lent themselves (Davidson & De Loë, 2016, p. 77).

The importance of NGO contributions to watershed governance and environmental stewardship are not new as Lerner shares in 1993, “The voluntary sector is a sector of hope in an age of diminishing expectations” and hope is vital when confronting and overcoming a decaying world (p. 41). Interestingly, D.W. Orr distinguishes between optimism and hope in his paper *Optimism and Hope in a Hotter Time*:

Optimism is the recognition that the odds are in your favor; *hope* is the faith that things will work out whatever the odds. *Hope* is a verb with its sleeves rolled up. Hopeful people are actively engaged in defying or changing the odds. *Optimism* leans back, puts its feet up, and wears a confident look knowing that the deck is stacked (2007, p. 1392).

Orr reminds that hope requires action or the ‘how’ to go about achieving Ecological or Watershed Governance. “The EBCP is complementary to, and provides a practical, community-based way of implementing the ecological governance approach to watershed stewardship that ought to be replicated across the Canadian landscape (Hammond, 2015, October 29).”

Ecosystem-based conservation planning (EBCP) and accompanying interpretive maps offer a means for a public plan review and discussion, and development of a public consensus for implementation (Hammond, 2015, October 29). It is a dynamic and adaptive plan that both overcomes impeding barriers (dominant paradigms; Canadian constitution; boundary selection/scale; jurisdictional fragmentation; implementation of governance/management model; and exclusion of First Nation voices/interests) and incorporates the necessary conditions (integration and collaboration; adaptive co-management; multi-level stakeholder participation; community, local knowledge, and relationships, institutional entrepreneur influences via ENGOs/NGOs; and Ecological Governance) to create favourable environmental, social and economic outcomes. Action is critical and consistent with the merits of the land and the natural environment, which ought to be uniquely assessed when applying Earth-Centered Governance models (Grumbine, 1994; Brandes, 2005; and Hammond, 1997).

Hope, authentic hope, can be found only in our capacity to discern the truth about our situation and ourselves and summon the fortitude to act accordingly. We have it on high authority that the truth will set us free from illusion, greed, and ill will, and perhaps with a bit of luck, it will save us from self-imposed destruction (Orr, p. 1395)

Recommendations

Throughout the world and on multiple scales, examples, growing complexities, realities of an altering climate, and a quickly declining ecology demonstrate the need for significant and timely change. That change is founded in overcoming the “influence of prevailing paradigms, myths, and metaphors as well as of the powerful vested interests committed to maintaining the status quo and (Dale, 2001, p. 97)” and governance structure status quo:

It is obvious that radical changes are urgently needed in the structure and processes of public service systems of administration, which are originally established to exploit and export natural resources as efficiently and effectively as possible, not to sustain them (Dale, 2001, p. 98).

“Perhaps the greatest weakness of sustainable development...lies in the fact that we have not yet begun to invent a politics to go with the concept (Dale, 2001, p. 103).” This paper focuses on alternative governance models and, in particular, the current governance model for Shawnigan Lake, B.C. “It is appropriate now to assess how effective the current system of governance is in promoting local communities in their efforts to achieve economic, social, and environmental sustainability (Day & Cantwell, 1998, p. 80).”

Following the proceeding literature review, an analysis of barriers to overcome, outcomes of both Human-Centered and Earth-Centered Governance models, and a detailed description of shortcomings (and subsequent ecological deterioration) of Electoral Area B, known as Shawnigan Lake, five recommendations are made to support much needed governance improvements:

- 1) With the support of the Area Director who carries the authority, the process of moving forward with incorporation ought to be made. Having the Phase 1 study completed in 2009, the Phase 2 study ought to be pursued so that objective information can be presented to Shawnigan residents before moving to Phase 3, a referendum (Musselwhite, K., local knowledge). Should incorporation be supported by the voters, Shawnigan Lake would become a municipality and thus an increased authority and decision-making capacity
- 2) Should incorporation occur, a Shawnigan Basin Authority (SBA) responsible for technical ecological land and watershed planning ought to be invoked through a democratic process, be given legal standing, and be consulted in collaboration with the elected Mayor and Council
- 3) Partnerships with Malahat Nation, the creation a coalition of local NGOs, representation of the broader Shawnigan Lake public, and integration with CVRD policy and procedures ought to be encouraged to overcome the current barriers of jurisdictional and departmental fragmentation
- 4) Implementation of the Ecosystems-Based Conservation Plan acquired by the Shawnigan Basin Society (in 2015 from Silva Ecosystem Consultants) ought to be made an immediate priority through a concerted and comprehensive public outreach program to all Shawnigan Lake citizens
- 5) With multi-level stakeholder participation and the support of the *Water Sustainability Act*, the province of B.C. ought to recognize Shawnigan Lake's process of local decision-making and efforts to achieve Ecological Governance, thus acting as a partner toward that end

Conclusions

The objectives of this paper were to investigate the current governance model in Shawnigan Lake, B.C., to identify its problems and consequences, and to recommend improvements. In detailing the current governance model and researching alternative governance models for the purpose of promoting a sustainable environmental, social, economic, and political commons, this paper has demonstrated that the current governance model in Shawnigan Lake is broken. Although jurisdictional fragmentation is only partially to blame, it is one of the root problems within the current governance model. It is also an issue that has the potential of being addressed by Shawnigan citizens. For not only are there currently forty-five distinct authorities responsible for decision-making, there are also thirty-seven environmental impacts being suffered by Shawnigan Lake with no single agency looking at the resulting cumulative and durational environmental consequences. Yet, “the conventional response let’s make the current system ‘work better’” is no solution if the system itself is the problem (Day and Cantwell, 1998, p. 7)” while “the notion of characterizing an ‘ideal’ governance network structure is unrealistic (Baird, Plummer, & Bodin, 2016, p. 748).” Following a rigorous literature review, research determined that by acquiring and implementing an ecosystems-based conservation plan (a living document intended to be “developed through an open, transparent, and inclusive community process”), following the guiding principles of Nature, and adopting a holistic approach to land and watershed management, the Shawnigan Basin Society is on the path to achieving their goal of participatory Ecological Governance (Hammond, 2015, October 29).

Sources Reviewed

Note: Most information below was quoted directly from their respective documents, which in turn, are fully cited in the reference section.

<i>Author(s), Year, and Source Reviewed</i>	<i>Years of Study</i>	<i>Ecosystem</i>	<i>Methodology Primary/ Secondary</i>	<i>Governance</i>	<i>Outcomes</i>	<i>FN Y/N</i>
1) Affolderbach, J. (2011). Environmental Bargains: Power Struggles and Decision Making over British Columbia's and Tasmania's Old-Growth Forests.	1995-2006	British Columbia Great Bear Rain Forest Tasmania Styx Valley and Tarkine Wilderness	Primary BC: 18 interviews and secondary sources Tasmania: 65 interviews, informal meetings, and site visits	Environmental bargaining framework (political economy and ecology approaches) i.e. nonindustrial value of resources using multiple perspectives, strategies of actors, and regional context	BC: Collaborative, participatory, and balanced decision-making leads to improved relationships, communication, and balance of power Australia: ENGO confrontation did lead to change through agitation but ended as a “lose-lose” relationship	BC: Y T,A: N
2) Allan, A. (2008). Integrating Watershed Management - Connecting People to Their Land and Water.	NA	Alberta’s “Water for Life” initiative, which claims to set example for western Canada	Secondary Book review	In addition to collaboration between agencies to overcome jurisdictional fragmentation, it is important to change historical agreements at the provincial level. Integrated watershed management initiatives (land use and water management) as a tool is inextricably linked to governance.	A paradigm shift must occur in Canada to alter the current myth of limitless abundance of water systems and supply. Advancing research and regulatory activities as well as adaptations for water protection including conservation in all sectors, conjunctive management of surface and ground waters, and increased vigilance in upstream and riparian areas. Criticism that specific solutions are not offered in book.	N
3) Anderson, T. (2007). Partnerships and Collaboration - Moving from Concept to Reality.	2007	Municipal water supply for Duncan, North Cowichan, and Crofton, BC	Secondary Presentation to Showcasing Innovation in the Cowichan Basin in response to 2003 Cowichan water crisis and to adopt ‘Basin Thinking’	Cowichan Basin Water Advisory Council (CBWAC) in partnership with the CVRD, Cowichan Tribes, DFO, MoE, Catalyst Paper Corp, Pacific Salmon Commission; Water Mgmt Forum: 26 people of varied interests and locations in the Basin; Consulting Term: Led by Westland Resource Group, and the Public who inform plan content and support implementation.	1 Vision, 6 Goals, 23 Objectives, and 89 Actions. The 6 Goals include: demand management; increase supply; protect aquatic ecosystems; reduce flooding impacts; research, education, public outreach; and improved water governance. Doing so will respond to public concerns, increase public voice in water mgmt., assure year-round water supply, reduce risk to economy and ecosystems, protect surface and groundwater quality, protect recreation, improve knowledge of water and its use, reduce waste in a proactive governance model.	Y

Governance for Sustainability

<p>4) Armitage, D., De Loë, R., & Plummer, R. (2012).</p> <p>Environmental Governance and its Implications for Conservation Practice.</p>	<p>NA</p>	<p>Global examples</p>	<p>Secondary Review of mainstream environmental governance literature, which are consistent with concerns of other scholars.</p>	<p>Environmental: emergent hybrid and network models. Multi-stakeholder processes with uncertain outcomes.</p>	<p>Confront key issues of: institutional fit and scale; adaptiveness; flexibility and learning; coproduction of knowledge from diverse sources; emergence of new actors/roles; and changing expectations about accountability and legitimacy.</p>	<p>N</p>
<p>5) Baird, J., Plummer, R., & Bodin, O. (2016).</p> <p>Collaborative Governance for Climate Change Adaptation in Canada: Experimenting with Adaptive Co-Management.</p>	<p>Dec. 2, 2010 for 1 year and Jan. 31, 2012</p>	<p>Niagara Region of Canada</p>	<p>Primary Case study using snowball sampling where 32 actors (three levels of government, quasi and NGO, advocacy groups, private companies, and citizens</p>	<p>Calls for a collaborative and adaptive co-management (ACM) governance approach is increasingly being recognized as one strategy to address the increasing urgency of climate change. Coordinated efforts of diverse users and inclusion of diverse knowledge for policy solutions: there is a lack of legal and institutional frameworks that correspond to the scope of climate change in space and time.</p>	<p>ACM is a process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, ongoing, self-organized process of trial and error. Process is necessary where actors can develop social ties to bring about agency and collective action, yet implementation of action remains challenging. Problem: complexity of addressing climate change, funding constraints, competing initiatives, and the lack of common views highlight that beneficial network structural features and relational patterns are necessary but not sufficient for the development of ACM.</p>	<p>N</p>
<p>6) Bakker, K., & Cook, C. (2011).</p> <p>Water Governance in Canada: Innovation and Fragmentation.</p>	<p>NA</p>	<p>Revised legislation in: Alberta, Quebec, and Ontario as well as revamped water quality standards in Manitoba, Quebec, and Ontario (response to Walkerton)</p>	<p>Secondary Outlines Key Issues of Water Management, Water Governance, Reforming Water Governance: Current Debates and Innovations, and draws Conclusions.</p>	<p>Constitutional reality of federal and provincial authority over water unlikely to change. There are also 4 orders of government: municipal, provincial, federal and FN. Collaboration, integration, and cooperation is key to effect harmonization amongst 4 levels but must also include citizens. Provinces are the key locus of innovation of water governance but are limited to sharing 'good governance' approaches.</p>	<p>Challenge is that current fragmented decentralized approach to water governance in Canada is directly related to inadequate management. Further, it creates challenges of integration, coordination, and data availability. Both water quality and quantity are a concern. Issues: 1) competition between users 2) vertical coordination over multiple scales and management 3) mismatch between geopolitical and administrative boundaries vs hydrological boundaries. Good chart of fragmented authorities in Ontario</p>	<p>Y</p>

Governance for Sustainability

<p>7) Bakker, K. & Morinville, C. (2013). The Governance Dimensions of Water Security: A Review.</p>	<p>2013</p>	<p>NA Conceptual to water security and IWRM</p>	<p>Secondary An analysis of variable and proactive vs reactive water management models.</p>	<p>IWRM (Integrated water resources management i.e. the unified or holistic management of water, land and other resources within the boundaries of river basins) Review of governance in relation to water security, adaptive, polycentric, social learning, multi-level, and social power governance models. Explores commonalities and synergies between governance and risk-based approaches to water security.</p>	<p>Little attention over past decade paid of governance dimension of water security addressed. IWRM = comprehensive mgmt (responsive) vs water security = uncertainty in knowledge and ability to control fresh water systems i.e. responding to risk and consideration of thresholds (proactive). Question: are these positions distinct? 1) What are the consequences of power imbalances with respect to equitable water access? 2) Do potential advantages of polycentric and multi-level water governance outweigh the disadvantages? 3) Which aspects of water-related governance should remain under the control of state actors?</p>	<p>N</p>
<p>8) Benson, D., Jordan, A., Cook, H., & Smith, L. (2013). Collaborative Environmental Governance: Are Watershed Partnerships Swimming or are they Sinking?</p>	<p>2009</p>	<p>USA and UK</p>	<p>Primary Broad-based survey/questionnaire through England and Wales, 39 non-statutory interviews and 8 statutory groups.</p>	<p>Collaborative environmental governance i.e. watersheds as the principle jurisdictional focus (collaborative watershed partnerships).</p>	<p>Question of travel: if theories in the US work in a different political structure i.e. UK. Collaborative approaches more common in past decade/ecological issues/viable solutions. Travelling partnerships occur between countries.</p>	<p>N</p>
<p>9) Berkes, F. (2012). Implementing Ecosystem-Based Management: Evolution or Revolution?</p>	<p>NA</p>	<p>5 Global Examples in a Fisheries Context</p>	<p>Secondary Prescriptive analysis.</p>	<p>Ecosystem-based approach to produce holistic ways of managing resources in the context of their environment. Emphasis of moving from management to governance structure. Movement from evolutionary to revolutionary governance model. "The era of management is over (Ludwig, 2001)."</p>	<p>Broadening management from single species and single sector to a large ecosystems scale and to a multi-sector (all-sector) regime. Adaptive, co-management, and interdisciplinary contributions. Addresses gap in research and implementation. Revolutionary governance includes: co-operative, decentralized partnerships, social learning, and knowledge co-production. Encourages social/ecological reciprocal relationships/place attachment.</p>	<p>N</p>
<p>10) Booth, A. L., & Muir, B. R. (2013).</p>	<p>Feb., July, and</p>	<p>Little Prairie Community Forest/</p>	<p>Primary Grounded in an indigenous-based research approach.</p>	<p>Co-management and joint venture agreements within a community forest tenure encourages the integration</p>	<p>Substantial institutional, social, and cultural obstacles prevent integration of FN participation in forest industry management even</p>	<p>Y</p>

<p>How Far Do You Have to Walk to Find Peace Again?: A Case Study of First Nations' Operational Values for a Community Forest in Northeast British Columbia, Canada.</p>	<p>Oct. 2011</p>	<p>North-east British Columbia West Moberly First Nations and Saulteau First Nations</p>	<p>Iterative process using 17 focus groups, 2 interviews, and 20 archived interviews from 4 years before (2007). A second focus group contained 25. Verification of data was achieved through a draft report where additional comments were incorporated into final report.</p>	<p>of a wider variety of cultural values outside of typical provincial regulations. These occur with forest industries and provincial or territorial governments. Looking for compromise in timber extraction, consideration of ecosystem integrity, and enhancement of FN cultural values (i.e. protection of wildlife and traditional stewardship approaches). But how? EBM.</p>	<p>though 80% of FN in Canada live in forested ecosystems. Assimilation is the expectation whereby FN traditions, customs, and practices are distinct within commercial forest practices. Perpetuates submission to dominant culture, conformity to management, and overlooks constitutionally and court upheld land and resource treaty rights. Industry ought to develop an adaptive process (vs static tradeoff of values) and to expand ability to listen and learn from FN practices.</p>	
<p>11) Brandes, O. M. (2005). At a Watershed: Ecological Governance and Sustainable Water Management in Canada.</p>	<p>NA</p>	<p>National proposal for Canada</p>	<p>Secondary Prescriptive analysis.</p>	<p>Ecological governance – from abundance invoked supply management to scarcity invoked demand management.</p>	<p>Develop an enabling institutional environment where ecosystem health and social sustainability are fundamental to a long-term, integrated and comprehensive approach to water management. A national approach with local solutions – EBM.</p>	<p>N</p>
<p>12) Bridges, A. (2016). The Role of Institutions in Sustainable Urban Governance.</p>	<p>NA</p>	<p>NA</p>	<p>Secondary Systematic review explores research that addresses how new sustainably-oriented structures of engagement between economic, political and civic institutions are changing the way urban development transpires.</p>	<p>Multilevel governance of environmental issues can be situated both vertically, which concerns the division of responsibilities and jurisdictions of political authorities, and horizontally, representing networks of actors that influence local policy without a direct form of authority.</p>	<p>Meadows suggested that within a complex system, there are points at which a small change could produce exponentially larger effects; decision-making and reflective policy ought to be supported at local levels given capability of action-oriented analysis.</p>	<p>N</p>

<p>13) Bunch, M. J., Parkes, M., Zubrycki, K., Venema, H., Hallstrom, L., Neudorffer, C., ... Morrison, K. (2014). Watershed Management and Public Health: An Exploration of the Intersection of Two Fields as Reported in the Literature from 2000 to 2010</p>	<p>2000-2010</p>	<p>NA</p>	<p>Primary Two librarian supported searches resulting in 40 and 84 papers for analysis. Analysis of literature of interface between watershed management and human well-being with the purpose of: (1) characterizing an integrated field (2) attempting a new conceptual model i.e. Watershed Governance.</p>	<p>Watershed Governance: water governance for ecosystems and well-being i.e. moving from reductionist thinking and planning to holistic systems thinking.</p>	<p>Human health and well-being are fundamentally dependent on the governance and management of land and water for sustainability. Local programs engaging the community in recreational paths, stream cleaning, tree-planting, and community water monitoring link to health outcomes, which are most effective when they are participatory and community-building. Framing issues in public health has a vital role in connecting humans and their environment.</p>	<p>N</p>
<p>14) Cohen, A. (2012). Rescaling Environmental Governance: Watersheds as Boundary Objects at the Intersection of Science, Neoliberalism, and Participation.</p>	<p>Jan. to Sept. 2010</p>	<p>Canada's 10 provinces and 3 territories and interviews from 4 specific provinces: Ontario, Alberta, New Brunswick, and Nova Scotia.</p>	<p>Primary Canadian Case Study (used to support argument in US article) using research of a comprehensive policy and legislative review and 49 in-depth interviews with representatives from government (federal and provincial), watershed-scale organizations, NGO, and independent experts.</p>	<p>Integrated water research management (IWRM) argues for watershed context approach (function as boundary objects) to governance that aims to ensure the coordinated development and management of water, land, and related resources by maximizing economic and social welfare, which is based on principles of coordination, stakeholder participation, integration, and multiple levels of decision making. It emphasizes the importance of smaller scales of governance models, particularly municipalities.</p>	<p>Watersheds, as particular forms of rescaled environmental governance, have increased in popularity because of their status as boundary objects i.e. a common concept interpreted differently by different groups. The approach is shaped by three ideologies: scientific, neoliberal, and grassroots communities. IWRM is argued to overcome: jurisdictional and departmental fragmentation, poorly integrated land and water management programs, the exclusion of economic incentives for water conservation, etc. All watersheds have at least some element of social construction.</p>	<p>N</p>

Governance for Sustainability

<p>15) Cohen, S. & Neale, T. eds. (2006). Participatory Integrated Assessment of Water Management and Climate Change in the Okanagan Basin, British Columbia.</p>	<p>2006 (Building on earlier work reported in 2004)</p>	<p>Okanagan Basin, BC 2004 Town of Oliver, City of Penticton, and City of Kelowna.</p>	<p>Secondary Final Report Primary 2004 Case Study, a multi-attribute analysis that used scenarios, constructed with available data, to explore the combined impacts of a variety of future water demands.</p>	<p>Participatory Integrated Assessment (PIA) of Water Management and Climate Change is intended to plan for future municipal water demands, urban development patterns, and changes in water demands resulting from a warming climate. This was done using a System Dynamics Model (SDM).</p>	<p>Goal: expand the dialogue on implications of adaptation choices for water management to include domestic and agriculture uses and in-stream conservation flows, for the basin as a whole, and for particular sub-regions in response to climate change. Outcomes of SDM: 1) shared learning experience for invited participants from a diverse and balanced stakeholder representation of various organizations related to water management 2) a resulting simulation model, decision support tool for increasing knowledge about the system and for exploring plausible future scenarios/adaptation opportunities.</p>	<p>Y</p>
<p>16) Conservation Ontario. (2001). The Importance of Watershed Management in Protecting Ontario's Drinking Water Supplies.</p>	<p>March 2001</p>	<p>Walkerton, Ontario</p>	<p>Secondary Final Report of the provincially sanctioned Walkerton Inquiry. Recommendations made by Conservation Ontario on behalf of all conservation authorities, specifically in partnership with Saugeen Conservation and Grant River Conservation Authority</p>	<p>Integrated Watershed Management (IWM), which requires the collaborative efforts of all stakeholders with interests in a watershed, the appropriate scale at which to manage both surface and groundwater resources. IWM is a place-based approach with boundaries that make environmental sense and facilitate a cumulative approach to watershed management. Reminds that water defies simple division into federal, provincial, or municipal responsibility.</p>	<p>Addresses end of pipe solutions (treating the problem) by focusing on reducing or eliminating problems at their source and attempts to influence how water is managed at each of contact. It overcomes a fragmented context by taking a holist view and exploring the cause/effect relationships of human activities on natural functions and processes that extend across jurisdictional boundaries. Its goal is to find solutions that minimize negative environmental externalities/impacts through the implementation of a watershed action plan. 5 specific recommendations are made.</p>	<p>N</p>
<p>17) Cook, C. (2014). Governing Jurisdictional Fragmentation: Tracing Patterns of Water Governance in Ontario, Canada.</p>	<p>1912-2012</p>	<p>Great Lakes Basin, trans-continental boundaries</p>	<p>Primary Case study analyzing moments in water quality and quantity management</p>	<p>Water governance done in the context of jurisdictional fragmentation may best be directed at institutional arrangements rather than a general pursuit of integration is IWRM (Integrated Water Resources Management). Fragmentation ought to be understood as a feature of the institutional complexity of water management that can be</p>	<p>The need to integrate water governance to overcome fragmentation is highlighted in literature but it infrequently indicates how and what to integrate. This study provides insight on how the presence and absence of institutional arrangements in the context of jurisdictional fragmentation produced different governance patterns and outcomes. Specifically, the study focused on: the facilitation of coordination; agreement of roles</p>	<p>Y</p>

Governance for Sustainability

				<p>mobilized to develop unique solutions to multi-scalar water governance challenges.</p>	<p>and responsibilities; agreement on the issue management plan; and the scope of the issue. Constitution invokes fragmentation. Integration (IWRM) only a response, although not proven, to fragmentation</p>	
<p>18) CVRD 22 residents contributed (2011). South Cowichan Official Community Plan (OCP).</p>	<p>2006-2011</p>	<p>Mill Bay, BC (Area A), Shawnigan Lake, BC (Area B), and Cobble Hill, BC (Area C)</p>	<p>Primary Collaborative workshops and discussions from a cross-section of residents, business owners, and stakeholders (i.e. local knowledge).</p>	<p>Regional District (CVRD) Offspring of the BC Provincial Government</p>	<p>Provides goals, principles, objectives, and policies for environmental (and watershed) protection, climate change and energy efficiency, economic development, social sustainability, heritage conservation, and village containment boundaries.</p>	<p>N</p>
<p>19) Davidson, S. & De Loë, R. (2014). Watershed Governance: Transcending Boundaries.</p>	<p>NA</p>	<p>Lake Simcoe Watershed, Ontario</p>	<p>Primary Single, in-depth case study approach that involves a highly complex set of jurisdictional interactions, significant environmental governance challenges, and a diverse and interconnected set of actors. Legislation was announced in 2007, passed in 2008, and finalized in 2009. Also, 6 interviews regarding the application of watershed boundaries were conducted with staff from the provincial gov and conservation authority.</p>	<p>Water governance can transcend the watershed boundary. Governance defined: the structures and processes by which people in societies make decisions and share power vs Management defined: the operational, on the ground activity to regulate a resource and conditions of its use. Note: Shawnigan Lake watershed is an exception to this refute. Ontario passed the Lake Simcoe Protection Act (LSPA) 2009 and is the first provincial law in Canada to provide coordinated protection and planning for an individual watershed. REREAD</p>	<p>Refute: The value of using the watershed boundary for purposes such as identifying critical connections among related systems and organizing data collection is not in dispute; however, the utility and authenticity of the watershed boundary for water governance should not be assumed. Both scholars and practitioners need to carefully consider the circumstances under which watershed boundaries provide an appropriate frame for organizing societies to make decisions and take actions to address water problems and opportunities. 5 Challenges: boundary selection; accountability; public participation and empowerment; problemsheds, and policysheds. See Table pg. 379/380. Example illustrates an important advancement in water governance as it demonstrates a focus on process, specifically, the case illustrates the principles of adaptation, learning by doing, and accepting that not all is</p>	<p>N</p>

Governance for Sustainability

					understood about our physical and social environment. Also, that these systems are in constant flux, and our capacity to govern them is dependent upon our ability to become dynamic, responsive, and adaptable governance actors.	
20) Davidson, S., & De Loë, R. (2016). The Changing Role of ENGOS in Water Governance: Institutional Entrepreneurs?	2005-2015 (a 10 year period)	Lake Simcoe region, Ontario	Primary Mixed methods approach to an analytical framework derived from recent studies on institutional entrepreneurs, to examine the skills of ENGOS are applying in order to orchestrate change and actively pursuing their own governance agendas. 3 data sources: documentation of actions; key informant interviews, and a survey of key actors that provided survey data/social network data (SND).	Changing role in state for policy makers, scholars, and the public with increasing recognition among governance scholars that nongovernment actors are exerting new kinds of influence over governance systems and contributing in novel ways to governance processes. ENGOS are particularly pertinent given their collaborative, adaptive, and co-management governance across contexts and regions.	ENGOS in Lake Simcoe have taken on a role as an institutional entrepreneur and have altered the relationship between governance and actors in this setting. Key outcomes of their actions are a more dominant, engaged, and influential role for ENGOS in a critical regional governance system. ENGOS are becoming important actors in shaping and framing environmental problems and solutions and altering both relationships among actors as well as the governance framework within the region.	N
21) Day, J., & Cantwell, M. (1998). Citizen Initiated River Basin Planning: The Salmon Watershed Example [Salmon River	1993-1995 with Federal Gov. support and interviews conducted Aug. to	Coalition of Okanagan and Shuswap Nations as well as an advisory group created by the District of Salmon Arm, BC	Primary Case Study of the SaRRT (Salmon River Watershed Round Table), survey, participant interviews and discussions with key government personnel from 9 ministries	Unified body of FN and local advisory group with government representation created the SaRRT in 1992. Membership is open to all composed of citizens, interest groups, FN, and gov. reps. It is a shared decision-making forum that provides a means for generating and exchanging ideas and information while trying to	Facilitation of a stewardship plan for the Salmon Arm watershed to combine interests of implementing restoration along the river to revive salmon runs (FN) and to investigate environmental and land use issues on behalf of the District (advisory). Together these groups devised a set of operating principles forming the basis of a concerted planning and action approach to the restoration of the	Y

Governance for Sustainability

Watershed Round Table].	Sept. 1995			ensure that the goals and objectives of the community are reflected in all land use decisions.	Salmon Arm River Basin. Problem: 1) continued profound control of provincial agencies to retain power over Crown land will seriously limit, if not prevent, local round tables to achieve economic, social, and environmental watershed sustainability without full commitment of cooperation and long-term support.2) time	
22) Day, J. C., & Litke, S. (1998). Building Local Capacity for Stewardship and Sustainability: The Role of Community-Based Watershed Management in Chilliwack, British Columbia.	NA	Chilliwack, BC	Primary via appreciative inquiry and ground-truthing. The resulting Watershed Snap Shot Report concludes four critical issues of watershed sustainability: alterations to stream channels and flows; water quality degradation; fish and wildlife habitat degradation; and risk to private property. Goal: develop a vision, inform planning and decision making, and support sustainability on the ground.	Emerging model in BC is Community Stewardship: “the act of taking responsibility for the well-being of the environment and local biophysical and cultural features.” Five basic challenges are presented here for current management institutions involved in watershed planning and management: adopt a watershed-based approach; increase communication and collaboration; raise awareness and understanding; raise collective will and commitment; and build capacity amongst all stewardship groups are addressed in a community-based watershed assessment (CBWA).	Overcomes jurisdictional fragmentation within multi-levels of government and considers the interdependence of use and impact and the importance of community planning (holism); diversity/multi-stakeholders encourages multiple and equal footing of all voices i.e. government agencies, academic disciplines, private industries, and special interest groups. Further information gathering and bring forward for appropriate land use planning and decision making processes. Stewardship is often oriented towards the assessment, protection, or rehabilitation of local ecosystems, which requires community involvement, commitment, and responsibility. Build a common knowledge base for the benefit of all community interests. This is a responsive and adaptive approach.	Y
23) De Loë, R. (2000). Moving Down the Food Chain: The Increasing Importance of Local-Level Water Management.	ND	Three communities in Ontario	Secondary and broad ranged analysis	Integrated local government water resource management, specifically ground water protection and flood plain management. Community members are aware of how land use behavior impacts water – ground and surface – and can overcome constraints by partnering with other organizations.	Five key dimensions considered to analyze capacity of local government water resource management: technical, financial, institutional, political, and social. Although three levels of government play a jurisdictional part (Fed., Prov., and Local), while local government is responsible for land-use planning, services of water supply, waste water management, development, and conservation, yet limitations exist within all three levels. Integration is necessary. Increase public, private, and political commitments.	N

<p>24) Dubé, M. G., Duinker, P., Greig, L., Carver, M., Servos, M., McMaster, M., ... Munkittrick, K. R. (2013). A Framework for Assessing Cumulative Effects in Watersheds: An Introduction to Canadian Case Studies.</p>	<p>2008-2013</p>	<p>7 watersheds in 4 provinces and 2 territories in Canada: Fraser River, BC; Athabasca River, AB; The Peace and Slave Rivers, NT; Yukon River, YT; South Saskatchewan River, AB and BC; Grant River, ON, and the Saint John River, NB.</p>	<p>Primary: addressed common problem of determining baseline conditions, which requires an understanding of a priori vs a posteriori data/knowledge. By systematically working through watersheds, a layered understanding was developed and then applied to the next watershed. Demonstrates how information can be integrated in an effects-based assessment.</p>	<p>Develop a framework for regional watershed cumulative effect assessment and monitoring program(CEA) whereby three goals are achieved: an accumulated state assessment, stressor-response relationships, and development of predictive cumulate effects scenario models. Core values, indicators, threshold, and use of consistent terminology are considered in the CEA, which also emphasizes both accumulated state quantification and predictive scenario forecasting supported by a regional and multi-scale monitoring program.</p>	<p>Develop a framework for watershed cumulative environmental assessments, implement a portion of the framework in multiple river basins in Canada, and develop legacy tools for ongoing use and uptake by water stakeholders. Understanding baseline or existing watershed conditions and predicting cumulative impacts would support improved and appropriately planned development and watershed management. Holistic space and time research for decision making i.e. character and condition assessment key. No Federal water strategy. Focus was on water quality and quantity. The scope of CEA has been limited to local development projects seeking regulatory approval.</p>	<p>N</p>
<p>25) Egunyu, F., Reed, M. G., & Sinclair, J. A. (2016). Learning Through New Approaches to Forest Governance: Evidence from Harrop-Procter Community Forest, Canada.</p>	<p>June to July 2013</p>	<p>Harrop-Procter Community Forest, BC (established in 1999)</p>	<p>Primary: in-depth study where 28 personal interviews, 2 focus group meetings, and participant observation. Interviewees were asked 43 questions. Qualitative research was used with a case study strategy of inquiry. Influenced by EBCP (SFF, 2015).</p>	<p>Collaborative forest agreement (CFA) where participants' values, desired forest conditions are considered and changes stemming from logging, land conservation, climate change impacts, pest and disease become better understood. Governance is adaptable and learning-oriented requiring both internal and external actors. Extended periods of time are required for social learning processes and outcomes to become established i.e. build trust, understand, address competing perspectives, dialogue, etc.</p>	<p>Promising for sustainable forestry, supports local participation and management, places resource use and protection in the hands of citizenship, enhances effective responses as social learning is increased such that complex problems can be appropriately addressed. Study outlines how social learning outcomes changes over time i.e. where little management knowledge occurs to start, this develops over time and through direct contribution. Findings were that learning became restricted with increased compliance of forestry legislation and opportunities for ongoing social learning and involvement were reduced over time.</p>	<p>N</p>

Governance for Sustainability

<p>26) Erickson, A. (2015). Efficient and Resilient Governance of Social-Ecological Systems.</p>	<p>NA</p>	<p>Comparison of state institutions in Washington, Oregon, Idaho, and California</p>	<p>Primary A regional scale of analysis in two hydrological regions using 2000 (ratio of 20:1) primary and secondary resources to reduce social and ecological variability i.e. case studies</p>	<p>Following regional experimentation to respond to environmental population and development impacts, Federal government initiated localized collaborative governance and adaptive management practices by shifting from traditional command and control methodologies. Need to overcome competition between property rights and regulation, which dominate legal/political spheres.</p>	<p>By leveraging individual and stakeholder interests, optimal solutions were achieved through repeated interactions of local watershed groups. By developing new institutions founded in a bottom-up model, increased resilience can be achieved in social-ecological systems. Results determined that state institutional efficiency and resilience are key in watershed group activity and stability. Unification, funding portfolios, low agency conflict, support for economic growth, creative partnerships, research, and implementation capacity are essential to success.</p>	<p>N</p>
<p>27) Flotemersch, J. E., Leibowitz, S. G., Hill, R. A., Stoddard, J. L., Thoms, M. C., & Tharme, R. E. (2016). A Watershed Integrity Definition and Assessment Approach to Support Strategic Management of Watersheds.</p>	<p>NA</p>	<p>USA</p>	<p>Secondary Developed an operational index to evaluate the level of watershed integrity by identifying six key watershed functions: hydrologic regulation, regulation of water chemistry, sediment regulation, hydrologic connectivity, temperature regulation, and habitat provision.</p>	<p>Governance/management of watersheds ought to support ecological integrity whose definition in this paper is the capacity of a watershed to support and maintain the full range of ecological processes and functions essential to the sustainability of biodiversity and of the resources and services provided to society. Supports strategic adaptive management (protection and restoration) using appropriate scale.</p>	<p>Watershed integrity must include the capacity to assess/measure the source of impairment as reference conditions as truly unaltered conditions cannot be described due to human-related alterations. Watershed integrity as an assessment tool means identifying functions of unimpaired watersheds, which can be used to model and map integrity by incorporating risk factors (human-related) shown to interfere and degrade key ecological functions. This is done by constructing an index to assess watershed integrity.</p>	<p>N</p>
<p>28) Fraser, B., Musselwhite, B., C., & K. (2017). Saving Water: Stewardship of the Shawnigan Community Watershed.</p>	<p>NA</p>	<p>Shawnigan Lake, BC</p>	<p>Secondary Local, organizational, and professional knowledge.</p>	<p>Ecological governance driven by ecosystems-based conservation plans and community outreach (kitchen table discussions) and incorporation of the community. A hybrid model of governance.</p>	<p>A repository of Shawnigan's story as well as the integration of three generational voices in describing the need for a new model of governance to secure drinking water for the community watershed.</p>	<p>Y</p>
<p>29) Furlong, K., & Bakker, K. (2011). Governance and Sustainability at</p>	<p>2011</p>	<p>Ontario, British Columbia, Alberta, Quebec, and Nova Scotia</p>	<p>Primary Case study survey to support issues related to jurisdictional fragmentation that characterizes water</p>	<p>Shared governance and accountable delegation to municipalities and non-state actors are central governance strategies for improving water conservation. Municipal</p>	<p>Problem: progress toward municipal water conservation has been poor; there is evidence to support that conservation efforts on the part of water utilities (NGO's and sometimes municipalities) are often</p>	<p>N</p>

Governance for Sustainability

<p>a Municipal Scale: The Challenge of Water Conservation.</p>			<p>governance in Canada. Two-phase research project examining 18 municipalities representing different business models (1) and leadership on conservation (2).</p>	<p>water conservation is increasingly promoted as a key dimension of environmental sustainability at the municipal scale. (FN included within 4 levels of government: local, FN, provincial, and federal).</p>	<p>constrained by factors external to their jurisdiction i.e. no localized authority to create bylaws, enforcement, accountability, or shared governance. Also, downloading from provincial levels does not equate to a local capacity to meet new responsibilities. Canada= highest water use per capita and lowest prices as per OECD.</p>	
<p>30) Furness, E., Harshaw, H., & Nelson, H. (2015). Community Forestry in British Columbia: Policy Progression and Public Participation.</p>	<p>2014</p>	<p>British Columbia, Canada</p>	<p>Primary Census of all active members of the BC Community Forest Association to evaluate the program guided by the original aims of the policy – the Community Forest Initiative of BC. Representative of 38 active Community Forest Organizations (CFO) who are members of the BC Community Forest Association (BCCFA).</p>	<p>Community Forest Initiative (CFI) defined: “community involvement in local forest lands for community benefits. It is a means of maintaining forest-related community lifestyles and values, while providing jobs and revenue that contribute to community stability.” Global movement from top-down management of government owned forests toward various models of community control. BC’s Community Forest Pilot Program formally introduced Community Forest Agreements within the provincial forest policy framework (1998).</p>	<p>Community forests in BC assess themselves as having been broadly successful in terms of policy aims of public participation and environmental stewardship of forests; however, policy has not enabled economic diversification. Encouraging participation requires sustained effort, diversifying from conventional forestry is desired but not usually achievable, and that motivations for involvement are diverse. Community forests in BC also responsible for conflict mitigation over resources and homelands, community empowerment, the implementation of ecologically-based forestry, and the restoration of community links with the environment. Criticized as unrealistic and undeliverable.</p>	<p>Y</p>
<p>31) Furness, E., & Nelson, H. (2016). Are Human Values and Community Participation Key to Climate Adaptation? The Case of Community Forest Organizations in British Columbia.</p>	<p>NA</p>	<p>British Columbia</p>	<p>Primary Natural, human, economic, physical and social capital values, attitudes, and observations as independent variables in the research framework assessment of adaptive capacity in community forest organizations. Used audit not parsimony over 3 mnths of data collection. Telephone surveys collected data from 38 organizations.</p>	<p>Community based (defined as a structure representing local residents who vote for a voluntary board/administer in consultations with other local stakeholders) organizations that are managing natural resources given community governance and involvement are considered significant tools in the context of adaptive capacity in response to climate change. Also, social and community relationships and values in adaptation are under researched.</p>	<p>Community forest organizations (CFO) in BC usually hold a Community Forest Agreement (CFA) with the provincial government and are constituted as shareholding or membership organizations such as corporations, cooperatives, societies or partnerships, with shares by various combinations of Municipalities, First Nations, small NGOs, and individuals. CFOs are small bodies governed by a voluntary committee of 6-7 local people, which manage between 418-120,000 ha of forest. Surprising to find that economic or human capital in CFOs offers little impediment to engaging in adaptation but by social capital and values (‘transcendence’ values drive motivation)</p>	<p>Y</p>

Governance for Sustainability

<p>32) Grumbine, R. (1994). What Is Ecosystem Management?</p>	<p>NA</p>	<p>Global biodiversity and ecosystem sustainability</p>	<p>Secondary Ecosystem Management is in direct response to the deepening biodiversity crisis. Requires integration of scientists, policy makers, manager, and citizens.</p>	<p>Ecosystem Management (EM) Goal: to maintain ecological integrity and to fundamentally reframe how humans interact with nature. The philosophies date back to the early 30's. "Ecologists must use every means to educate the public as to the value of sanctuaries" i.e. structure and function of natural systems = integrity.</p>	<p>5 specific goals in this model: 1) maintaining viable populations 2) ecosystem representation 3) maintaining ecological process (natural disturbance regimes) 4) protecting evolutionary potential of species and ecosystems 5) accommodating human use in light of the above. Long-term policy implications: reframing environmental values, fostering cooperation and evaluating success. See table for 10 dominant themes of EM</p>	<p>N</p>
<p>33) Hammond, H. (1997). What is Ecoforestry?</p>	<p>NA</p>	<p>Global</p>	<p>Secondary Follows the philosophy that the forest sustains humans not vice versa.</p>	<p>Eco-forestry practice is achieved in following two principles: ecological responsibility (human activities are carried out in ways that protect, conserve, and restore structure and function at all scales) and balanced use (that all living entities have fair access to carry out their function within the ecosystem). Primary consideration given to what land not to use, which in turn allows an understanding of what to use.</p>	<p>Recognition that eco-forestry is an approach to human interaction with the forest that places the forest ecosystem (eco) ahead of its use for human purposes (forestry). It recognizes that human economies are a subset of cultures which are a subset of ecosystems. By protecting the ecosystem (forest), we protect our cultures, and in turn our economies. Supports the consideration that eco-forestry provides an alternative to industrial forestry practices and recognizes that forests and humans = a whole system.</p>	<p>Y</p>
<p>34) Hammond, H.&S. Silva Forest Foundation (2004). Power of Community: Applying Ecosystem-based Conservation Planning Across Canada.</p>	<p>1993-2003</p>	<p>Haida Gwaii, Fraser Headwaters/ Robson Valley, Nemiah Valley, Fountain Valley and Yalakom Valley, Lillooet, Cortes Island, Denman Island, Slokan Valley, Harrop-Procter, Creston, North Central</p>	<p>Primary Quantitative mapping and qualitative information gathering using local and historical oral details as passed by First Nations peoples. This information is then integrated with western science to produce a unique ecosystem-based conservation plan as per the goal of protecting land, water, oceans, forests, and animal life.</p>	<p>Appreciative Inquiry is a visionary strategy that focuses on what is working and how to maintain or heighten that framework, which then enhances public participation and positive commitment.</p>	<p>Engaging with multi-stakeholders, particularly those with purely economic interests proves challenging to those with opposing interests. In this case, "Aboriginal communities are using their plans as part of their assertion of title and rights through treaty negotiations and legal actions" (p. 1).</p>	<p>Y</p>

Governance for Sustainability

		Saskatchewan, and Labrador				
35) Hammond, H. Silva Ecosystem Consultants (2015). Ecosystems-Based Conservation Plan (EBCP) for Shawnigan Lake Watershed.	2013-2015	Shawnigan Lake, BC	Primary Satellite and ground-truthing of the character (pre-contact) and condition (post-contact) of the watershed.	Ecological governance driven by ecosystems-based conservation plans and gradually supported community implementation.	Lead by the SBS, this is the tool used as the evaluation framework by the Advisory Planning Commission (APC), and is the vision of the Ecological Design Panel and Shawnigan Watershed Roundtable (50-year watershed plan).	Y
36) Holden, M. (2011). Public Participation and Local Sustainability: Questioning a Common Agenda in Urban Governance.	Oct. 2005 to Apr. 2006	Vancouver, BC region	Primary Action research/study group project where 150 people of diverse positions and backgrounds to develop sustainability indicator systems (SIs) to deliver on participatory promises for citizens and the local state. Study-circle method.	Demand for more intensive and higher quality public participation in democratic decision making sphere of urban governance. This is known as deliberative democracy and the connection between participatory means and sustainability ends within context of climate change adaptability. Attention ought to be paid to public process design that creates space for core values and personal passions to be shared among citizens.	Deliberative democracy depends on quality of participatory exercises i.e. that build rational consensus grounded in root values and visions. Determined a willingness to suspend narrow self-interest and to contribute in issues out of expertise with unfamiliar participants. Some would classify an eroding democratic process and practice while others argue potential toward democratically enlivened cities, yet the purpose is to make recommendations pertaining to local sustainability. Better information sharing = better decisions.	N
37) Howlett, M. (2007). Analyzing Multi-Actor, Multi-Round Public Policy Decision-Making Processes in Government: Findings from Five Canadian Cases.	Data collected in 5 issue areas from 1988-2005	Policy domains: environment (Species at Risk); aboriginal affairs (reforms to the Indian Act); trade (Free Trade Area of the Americas Agreement); reforms to the Bank Act (freedom of information/privacy to	Primary 1) identifying cases to be investigated 2) constructing chronologies and descriptions of them over 10 years 3) constructing databases of actors/activities in each case 4) analyzing results This was done in 2 phases	Depending on number and type of actors involved in decisions and their resources, public policy decisions can proceed in several different styles. Found that different rounds of decision making in the 5 areas varied and were not straightforward, which limited support for hypotheses. I.e. 1) inconsistency due to publicness of issue 2) NGO activity in all cases driven by opposition to proposed bills 3) NGO behavior remained focused on the media and public. Therefore, behaviors both	Hypotheses: 1) Government is a relative constant while non-government (NG) is linked to resources available, interest in an issue, and the stage of deliberation 2) Discordance between agencies witness higher levels of NG participation 3) activities of NG change as rounds of decisions progress from focus of context to influencing decision makers	N

Governance for Sustainability

		public sector)		more and less predictable in decision making arenas.		
38) Jaung, W., Putzel, L., Bull, G. Q., Kozak, R., & Elliott, C. (2016). Forest Stewardship Council Certification for Forest Ecosystem Services: An Analysis of Stakeholder Adaptability.	Four surveys March to August 2012.	Representing 57 countries	Primary 270 Forest Stewardship Council (FSC) stakeholders surveyed to quantify the capacity of FSC certification bodies, to audit Forest Ecosystem Services (FES) delivery, the preferences of FSC enabling partners, to provide training, and the experience and expectations of FSC holders to manage/sell FES.	Results of survey may help Forest Stewardship Council establish priorities for capacity development of Forest Ecosystem Services. FSC developed to reduce deforestation and biodiversity loss in the early 1990s. Since then, the expectation has been to expand FSC to support the delivery of valuable forest ecosystem services management.	Stakeholder adaptability was high for biodiversity conservation, carbon storage, and provision of non-timber forest products. Results show medium adaptability for watershed protection services and low for ecotourism and agricultural products	N
39) Johnson, L., & Castleden, H. (2011). Greening the Campus Without Grass: Using Visual Methods to Understand and Integrate Student Perspectives in Campus Landscape Development and Water Sustainability Planning.	2011	University of Victoria, BC	Primary 98 Undergraduate Geography students in a second-year introductory natural resource management course. Survey of open-ended and closed questions as well as a selection of campus photos using a “total design method”.	Integrated approach to natural resource management (water) at multiple scales with broad stakeholder involvement and agreement is critical. Governance and decision making of one of the largest users of potable water in the urban landscape – universities – ought to include its major stakeholders, students, in the evaluation and mapping of future land use development on campus. Recognizes that the value of natural resources changes with one’s perception.	Implications of communication barriers between students and policymakers are discussed for the purpose of integrating student values identified through the use of alternative landscape imagery. Sharing information through community mapping can be utilized to facilitate unique, inclusive, and sustainable landscape planning as well as help integrate future student-directed sustainability projects. The ability to participate and influence decision making and policy that directly affects personal livelihood. Results have potential to shape future water management objectives on campus toward stewardship.	N
40) Kanie, N., Betsill, M. M., Zondervan, R., Biermann, F., & Young, O. R. (2012). A Charter Moment: Restructuring Governance for Sustainability.	May to Sept. 2011	Hakone, Japan	Primary: two workshops which employed the world café approach, a social technology for engaging in important conversations i.e. questions asked and brainstormed in 20 min rounds where harvest ideas emerge.	Hakone Vision on Governance for the 21 st century. Calls for a restructuring of the institutional framework for sustainable development (IFSD). Suggest that proposals for a Sustainable Development Council in the United Nations warrants consideration. Requires a shift from development to a	1) clearly articulates the aspirations of governance for sustainability including objectives and underlying values and norms 2) accounts for meaningful accountable participation by a wide range of actors to develop solutions from people for people 3) creates an architecture to include better configuration of actors, actor groups and their networks, as well as improved institutions and decision-making mechanisms. Problem: How?	N

				discourse of planetary stewardship.		
41) Keenan, R. J. (2015). Climate Change Impacts and Adaptation in Forest Management: A Review.	NA	Focus heavily on North America but particularly Canada	Primary Review of literature on climate change impacts on forest and adaptation options for forest management of papers and reports between 1945-2013. 1172 in total. Note: majority of paper published from 1986 onwards with the earliest paper from 1949.	Forest management requires adaptation in the face of climate change in the contexts of forests, industries, and communities. Predictions and incorporation of multiple forms of knowledge through partnerships and the integration of managers and local actors can support and facilitate improved decision making and new approaches to sustainability. Planning no longer empirically based but must yield uncertainty. Important to determine common goals.	Important themes: 1) predicting species and ecosystem responses to future climate 2) adaptation actions in forest management 3) new approaches and tools for decision making under uncertainty and stronger partnerships between researchers and practitioners 4) policy arrangements for adaptation of forest management. Research focused on impacts/vulnerability but not necessarily leading to improved management. Multi-disciplinary approaches emerging and research/policy/practice relationships that integrate needs with indigenous knowledge and science facilitate improved decision making.	Y
42) Krott, M., Bader, A., Schusser, C., Devkota, R., Maryudi, A., Giessen, L., & Aurenhammer, H. (2014). Actor-centred Power: The Driving Force in Decentralized Community-Based Forest Governance.	NA	Five case studies for community forestry: Nepal, Indonesia, Namibia, Germany, Cameroon have applied the actor-centred approach successfully	Secondary Developed a theory-based, empirically applicable framework for assessing actor-centred power as a driving force in community forestry and a decentralized mode of forest governance.	ACP is a specific social relation distinct from other influences that produce outcomes; is linked to actors in specific issues directly; specifies three elements of the general term power (see outcomes); and the specified power elements are linked to observable facts, which include the action of power but also threats and sources. Power of actors to misuse the community forest approach a major obstacle.	Actor-centred power (ACP) has three definitions of core elements of social relationship to alter behaviours: coercion (force) i.e. decision based on threat about the removal of forest user rights); ((dis)-incentives (dis)-advantage)) i.e. financial support to carry out a natural resource assessment; and dominant information (unverified information) i.e. expert knowledge about management in a participatory community forestry project. Can be used as a tool for assessment of power networks or preliminary information for designing forestry policy.	N
43) Lerner, S. (ed.) (1993). Environmental Stewardship: Studies in Active Earthkeeping,	1993	Canada	Secondary Book Review	Grassroots induced leadership of environmental stewardship. “The voluntary sector is a sector of hope in an age of diminishing expectations (Langton, S.)”	Recognizes the limited amount of publications in Canadian literature and the rare documentation of triumphs and struggles of grassroots groups, which everyone can learn. The focus remains largely academic and without a sense of clear action. The fight against apathy continues in the hands of a committed and resourceful group of people.	N
44) Levesque, M. (2012).	1996-2008	Hamilton, Ontario	Primary Case Study using community	Collaborative Method where both interest groups, which have often become	Goal is to overcome tensions between interest groups and citizens as governments at all	N

Governance for Sustainability

Mapping a Way Forward: Interest Group Selection and Roles Performed in Engagement Processes.			newspapers to determine water problems: excessive water use and water permit consultation procedures. 89 environmentally active stakeholders asked to respond to a questionnaire.	marginalized, and “ordinary” citizens work to create an inclusive and informed engagement process. The need for consultations and links between stakeholders to affect change in policy. Methodology: 1) issue id 2) interest group id 3) mapping linkages between groups/id potential roles 4) data analysis for selection of interest groups and role assignments.	levels are challenged with how to engage both in a balanced manner, to increase trust with government, to reduce hierarchal relationships, and to increase transparency. 3 archetypes: engaging interest groups and experts; engaging citizens and excluding interest groups; and including advice from both sets of actors while keeping them separate.	
45) Lin, H., & Ueta, K. (2012). Lake Watershed Management: Services, Monitoring, Funding and Governance.	2002-2006	16 countries Bolivian PSW used as an illustration and an interactive governance interpretation used	Primary Evidence from 46 advanced Payments for Watershed Services (PWS) projects	Adaptive lake management from the perspective of ecosystem services (ES). Need for management regime shifts in monitoring, funding, and governance by incorporating values of ES into watershed management efforts. This is a top-down and bottom-up model. (Eco-Asset Management)	Three levels of services for watershed management are determined 1) Monitoring subsystem - ES provided by ecosystems 2) Funding subsystem - land-water conservation services (CS) provided by upstream citizens 3) Governance subsystem - intermediary organizing services (OS) provided by watershed management organizations. Each level is individually and uniquely responsible for the health of the whole.	N
46) Morin A, (2009). Strengthening Integrated Water Resource Management in Canada.	March 2009	Canada	Secondary National Policy Research Initiative Suggests that the federal government assume a leadership role in providing or collaborating on research and related scientific activity (data collection, monitoring, and mapping) through partnerships with all levels of government.	Integrated Water Resource Management (IWRM) offers a place-based, flexible model to respond to challenges at the appropriate watershed level of scale. This model brings together the authorities responsible for making water management decisions with all the interests that depend on that water. Complements a general shift toward adaptive management and criteria that facilitate it: decentralization of decision-making; self-organization and social networking; and multi-stakeholder deliberation.	Encourages implementation of local and citizen-driven stewardship and accountability of those most impacted by water quality and quantity issues based on the health, economic, environment, and culture of a particular community. Challenges of implementation of IWRM: no clear solution or approach to water management; defining a scale; jurisdiction; decisions can often not be made due to a lack of data and monitoring and limitations in knowledge around appropriate use of water to manage the resource (both surface and groundwater) to ensure sustainability and quality; research gaps; potential impact of climate change; and information sharing.	N
47) Morris, T. & Brandes, O. (2013).	March 2013	British Columbia	Primary Survey to over 230 water groups and 10 key informant interviews with 11	Watershed Governance: institutional shift towards ecologically based water allocation, innovative place-based planning,	Challenges: regional variations in knowledge and capacity for local watershed governance, the need to identify models for sustainable funding for new watershed	Y

<p>The State of the Water Movement in British Columbia: A Waterscape Scan & Needs Assessment of B.C. Watershed-Based Groups.</p>			<p>11 selected water champions were conducted over the phone for one hour each. Also, an online survey was sent to 239 potential respondents and 61 (26%) completed the survey.</p>	<p>managing water use with conservation and efficiency as top priorities, and ecosystem-based management and decision-making at the watershed scale. Overarching goal is to provide alternatives to current systems of governance and planning that focus too narrowly on individual sectors, thereby isolating the resource from its broader interactions across sectors and within ecosystems. This is an emerging viable approach to achieving long-term sustainability via collaboration between citizens and decision-makers.</p>	<p>institutions, and a provincial government that has lost significant capacity for freshwater protection in recent years. Key needs identified by the groups: 1) support and training to inform decision-makers 2) capacity to engage and educate local communities 3) opportunities to learn from peers and build stronger networks and collaborations 4) funds to do so. Recommendations: 1) a coordinating body 2) ongoing gathering/communications of groups 3) local pilot projects with FN participation 4) training and resources for community engagement 5) grassroots-driven provincial water campaign.</p>	
<p>48) Newig, J., & Fritsch, O. (2009). Environmental Governance: Participatory, Multi-level - and Effective?</p>	<p>1970-2007</p>	<p>Canada, USA, and Western Europe</p>	<p>Primary Meta-analysis of 47 case studies and use the case survey method to provide qualitative and quantitative insights, which allows for generalizations in the form of correlation analysis.</p>	<p>Mult-level Governance (MLG): 1) Adapt the level and spatial scale of governance to that of the environmental problems 2) enhance participation and collaboration of non-state actors in environmental decision-making. Doing so incorporates locally held knowledge and opens up the political arena for environmental interests. Author points out that ambiguity about this claim exists in empirical findings and conceptual frameworks from different academic fields.</p>	<p>Conclusions: predominantly environmental preferences of the involved actors determine the environmental outputs (and outcomes) of decision-making. Face-to-face communication appears to positively influence the ecological standards of decisions and polycentric governance systems yield higher environmental outputs than monocentric governance. Yet, correlations between governance effectiveness and decision-making scale as well as policy delivery and institutional fit to ecosystem could not be identified. Increases acceptance of decision, fosters social learning, and improves compliance and implementation on the ground of decisions made.</p>	<p>N</p>
<p>49) Noble, B. (2014). Toward Cumulative Effects Assessment and Management in the Athabasca Watershed,</p>	<p>2013</p>	<p>Athabasca Watershed, Alberta</p>	<p>Primary Focus Group and semi-structured interviews with 30 key informants from government, industry, NGOs, and FN</p>	<p>Watershed Cumulative Effects Assessment and Management (CEAM). Examined based on 8 requisites to support CEAM: the presence of a lead agency; enabling legislation; financial and human resources; data management and coordination; multi-scale monitoring, CEAM</p>	<p>Results show that while there was broad agreement amongst participants concerning the necessity for these requisites, there was also considerable uncertainty respecting these requisite performances in this watershed. I.e. Lack of willingness to share data, lack of confidence in the integrity of water monitoring data, absence of coordination and leadership,</p>	<p>Y</p>

Governance for Sustainability

Alberta, Canada.				baselines, indicators, and thresholds, multi-stakeholder collaboration; and vertical and horizontal linkages.	which contributes to financial, human, and technical capacity limitations as well as power asymmetries in multi-stakeholder engagement. Advancement requires greater attention to institutional requisites to implement and sustain CEAM programs.	
50) Nowlan, L., Bakker, K., (2007). Delegating Water Governance: Issues and Challenges in the BC Context.	Nov. 2007	British Columbia	Secondary Paper for the BC Water Governance Project, a partnership of the Fraser Basin Council, Ministry of Environment, Fraser Salmon and Watershed Program, Georgia Basin Living Rivers Program, and Fisheries and Oceans Canada.	Delegated (devolved, shared, or distributed) Water Governance. Three key trends: new watershed-based delegated governance management models in many provinces; supply in many jurisdictions; and greater citizen involvement in environmental policy making and management resulting from shift in role and mandate of governments; new legal requirements (particularly FN); introduction of environmental laws; expertise outside of government resources; new approaches to citizen participation; increased emphasis on integrated management of environmental issues and watershed-based management; and climate change concerns for water resources and supply.	Key Findings (p. 10): 1) current provincial approach to delegated water governance is fragmented and ad hoc 2) policy and legislative gaps exists on key issues 3) performance of the delegated governance partnerships which have been created is mixed 4) significant barriers exist to devolved water governance 5) constructive pathways for legislative and policy reform are available 6) the province should retain decision-making authority in key areas. Advantages: local expertise, consideration of local conditions, empowerment of stakeholders, reinforcement of social trust, reduction of competing uses, cooperation and information sharing, greater political legitimacy/enforceability, higher buy-in and support from influential interests. Disadvantages: focus on local environmental interests vs regional or national, consensus leading to politically workable vs environmentally optimal solutions, unequal representation at local level, volunteer burn out i.e. unsustainability over duration, greater costs and more time to produce outcomes such as water use or watershed plans. (p. 17).	Y
51) O’Boyle, Sinclair, Keizer, Lee, Ricard, and Yeats (2005). Indicators for Ecosystem-Based Management on	2004	Scotian Shelf, off Canada’s east coast	Primary Integrated management is conducted using extensive dialogue and the determination of operational objectives, namely cumulative impacts and a reference	Sequential steps ought to be taken between national conceptual objectives and lower-level operational ones:” identifying the relevant local conservation issues; identifying ecosystem components, characteristics, and relevant conceptual objectives; identifying the	“Management addresses people, not ecosystems, and therefore it is important to provide an institutional structure that organizes (in hierarchy) human activities appropriately, a point raised in consultations with the Scotian Shelf fishing industry” (p. 600).	N

the Scotian Shelf: Bridging the Gap Between Theory and Practice.			point at which point management action is activated. Second, is the tracking and monitoring of a specific ecosystem feature as a determination of its health.	appropriate ocean industries to be involved in implementation; and defining operational objectives for both the integrated management area and for each ocean industry” (p. 601).		
52) Parkes MW, & Horwitz P. (2009). Water, Ecology and Health: Ecosystems as Settings for Promoting h Health and s Sustainability.	2009	NA Conceptual for local and global scale implementation	Secondary Analysis specific to catchments which draws attention to the links between general laws of ecology, systems thinking, and the properties and behaviours of water (interconnectedness and complexity; inter-relationships and reciprocity; integration (knowing comes from parts and whole); feedbacks; self-organization; nestedness; interdependence; nonlinearity; uncertainty)	ICM (Integrated catchment management). Need for integration of ecosystem approaches to improve health and well-being, which demands a reciprocal exchange between different modes of thinking and a flow of new ideas where such thinking has been non-traditional. Propose network mechanisms for governance (intersectoral) and a language grounded in equity-focused health promotion:	Building on conceptual, methodological and operational strengths, we see health promotion as making an important contribution to the collective thinking and action that will characterize the converging terrain between public health, sustainability governance and ecosystem management. Recognizing ecosystems as settings for health promotion provides new reminders of the need for the health sector to ‘share power with other sectors, other disciplines and most importantly with people themselves’ (WHO, 1986).	Y
53) Parto, S. (2000). Industrial Ecology and Regionalization of Economic Governance: An Opportunity to ‘Localize’ Sustainability?	NA	Waterloo, Ontario	Secondary Analysis of the Region of Waterloo’s <i>Regional Policies Plan</i> which demonstrates a large gap between policy plans and what could be achieved in a local planning framework that employs EIP	Eco-Industrial Parks (EIP) is the amalgamation of industrial ecology and ecological economics and moves from an open-looped neoclassic model of economics to a closed-loop ecological integrity based model knowing that without a healthy environment, there cannot be healthy economic or social systems. i.e. Earth-centered systems thinking.	Attaining sustainability at the local and regional levels requires collective effort by industrial organizations toward common goals including resource conservation, production efficiency, economic viability, and social responsibility. Sustainable development requires sustainable human communities that act like natural ones. Problem: ongoing and exclusive neoclassical economics perpetuates literature and practice that is unecological and apolitical. Close-looped vs open-looped industrial practices that consider localized characteristics and values.	N

Governance for Sustainability

<p>54) Plummer, R., De Grosbois, D., De Loë, R., & Velaniškis, J. (2011).</p> <p>Probing the Integration of Land Use and Watershed Planning in a Shifting Governance Regime.</p>	<p>2000</p>	<p>Grand River, Upper Thames, and Lake Simcoe, Ont.</p>	<p>Primary Multicase study approach used, focusing on the specific objective of protection of drinking water sources. Three case study watershed in Ontario were analyzed in addition to interviews with planners and managers. New approach developed in response to Walkerton water contamination: 2300 ill and 7 deaths.</p>	<p>Integrated water resource management (IWRM) is a holistic approach involving a diverse group of stakeholders, an orientation toward action and achievement of goals, collaborative relationships, and understanding that water has multiple functions and is valued differently by stakeholders. Integration of water management with land use planning has led the necessary shift in governance regimes for drinking water safety in Ontario.</p>	<p>Goal: to identify which regions had source water protection components and indicators expressed in their land use and watershed-based planning documents. Proactive and ongoing efforts are required to ensure that integration occurs at the same time as barriers addressed. Timely guidelines, incentives-based tools, up-to-date and accurate information, and adequate financial resources are all essential to the success of this governance model. Both quality and quantity of sources of drinking water are affected by countless activities (cumulatively so) that take place on the landscape and at the local scale.</p>	<p>N</p>
<p>55) Riddell, D. (2005).</p> <p>Evolving Approaches to Conservation: Integral Ecology and Canada's Great Bear Rainforest.</p>	<p>1997 - 2001</p>	<p>Great Bear Rainforest, BC</p>	<p>Primary Case Study using a working knowledge of Ken Wilber's Integral Theory and his four quadrant, multiple level approach i.e. Experiences, Behaviours, Cultures, and Systems integration.</p>	<p>Integral Ecology used to analyze broad range of strategies environmentalists have undertaken to create protected areas and change forest practices. Solutions are aimed to be win-win and this study demonstrates effective implementation of large-scale ecosystems-based planning.</p>	<p>Promotion of conservation, holistic, transdisciplinary solutions and foster agreement among diverse stakeholders using a local and global scale. Transformations took place at personal and cultural levels, which enabled solutions 20 millions of acres of land. Recognition of ecological limits and need for transformation of human consciousness, values, and behavior.</p>	<p>Y</p>
<p>56) Saunders, B. A., Rast, W., & Lopes, V. (2014).</p> <p>Stakeholder Evaluation of the Feasibility of Watershed Management Alternatives, Using Integrated Lake Basin Management Principles.</p>	<p>NA</p>	<p>Rock and Marsh Creek, two watersheds in eastern Pennsylvania, USA (headwaters to the Potomac River)</p>	<p>Primary Case Study with a lengthy list of criteria and 5 predetermined steps moving through the process to the result. A total of 11 different groups or organizational representatives were used totally 53 individuals. Both successes and challenges were identified.</p>	<p>Integrated Land Base Management (ILBM) is a comprehensive approach, which considers scientific, socio-economic, and governance issues through gradual, consistent, and holistic improvements using 6 governance pillars: policy directions, institutional responsibilities, stakeholder participation, scientific and traditional knowledge, technology, and funding prospects and constraints</p>	<p>Development and improvement of the governance pillars through collective stakeholder actions. This is a collaborative and potentially adaptive management framework whereby multi-representative stakeholders facilitate learning and contribute to a more comprehensive, interactive decision-making process. Problem: most environmental degradation and over-exploitation can be attributed to governance failures of some type.</p>	<p>N</p>
<p>57) Slocombe, D. (1993).</p> <p>Implementing Ecosystem-</p>	<p>NA</p>	<p>Examples in Waterton and Glacier National Park Biosphere</p>	<p>Secondary Review/synthesis of theory and practice that facilitate implementing</p>	<p>Ecosystems-based Management (EBM) i.e. managed in whole ecological or landscape units based on integrative biological, physical, and/or</p>	<p>Lack of implementation testament to the political difficulties of changing arbitrary existing management units, such as regions and municipalities, and the conceptual and practical</p>	<p>N</p>

<p>Based Management.</p>		<p>Reserves, Alberta and Montana, the Australian Alps, and Yellowstone National Park</p>	<p>EBM. Examples reported reflect three common origins: protected systems, cooperative management, and management responses to complex demands and pressures.</p>	<p>socioeconomic assessments. Ecosystem: refers to a distinct and coherent ecological community of organisms and physical environment with which ecologists interact. Protection of structure and function of ecological services and integrity. EBM is both participatory and consultative.</p>	<p>difficulties in bridging traditional disciplinary and professional boundaries. In protecting the environment, economic development is achieved through modified planning, management, policy, and decision making activities. Currently not considered in regional and urban land use planning. Practical obstacles: defining the management unit, developing understanding, and management frameworks.</p>	
<p>58) Smith, D., Prepas, E., Putz, G., Burke, J., Meyer, W., & Whitson, I. (2003). The Forest Watershed and Riparian Disturbance Study: A Multi-Discipline Initiative to Evaluate and Manage Watershed Disturbance on the Boreal Plain of Canada.</p>	<p>1998-2001 and data collected for at least 2 years before a scheduled harvest .</p>	<p>16 streams in the Swan Hills, Alberta and Duck Mountains, Manitoba are being analyzed to extend approach to the eastern portion of the Boreal Plain and Boreal Shield.</p>	<p>Primary Two comparison approaches: treatment versus reference stream and before versus disturbance of impacts of varying patterns and intensities of fire and logging.</p>	<p>There is a need for ecologically-based management decisions in the forest industry. Forest Watershed and Riparian Disturbance (FORWARD) initiative integrates aquatic and soil science, hydrology, and forestry into models that link water quality, water quantity, and disturbance indicators with management of watersheds. Initiated with the recognition of the need to integrate data from watershed ecosystem analysis into landscape so that impacts of natural and human disturbance are used meaningfully in scale and outside of the study watersheds.</p>	<p>The yielding transferable technology will be used in forest product industry and the FORWARD study will: 1) collect appropriate ecological data 2) predict effects of watershed disturbance 3) link 1 and 2 into decision making tools of a detailed forest management plan (DFMP) 4) apply into practices into planning and management watershed landscapes against a baseline understanding. Purpose is to integrate the current distinct/fragmented academic, industrial, and regulatory disciplines. Note: Canada's Boreal Forest extends southeast from northeastern BC through northcentral Alberta and Sask. To southwestern Manitoba and comprises 77% of forested land in Canada.</p>	<p>N</p>
<p>59) Truitt, A. M., Granek, E. F., Duveneck, M. J., Goldsmith, K. A., Jordan, M. P., & Yazzie, K. C. (2015). What is Novel About Novel Ecosystems: Managing Change in an Ever-Changing World.</p>	<p>NA</p>	<p>Multi-scale</p>	<p>Secondary Conceptual framework aimed to identify where impacted ecosystems can/ought to have management efforts restore/conservate structure and function of ecological services</p>	<p>Managing 'novel' or 'emerging' ecosystems using three approaches: managing against, tolerating, and managing for these systems. Novel, emerging, or no- analog are adjectives used to define ecosystems with ecological function or species assemblages that, according to available historical evidence, have not existed previously. Hobbs et al (2006) used to describe: 1) recent or future anthropogenic changes characterized by</p>	<p>Framework will allow managers to make thoughtful decision about which strategy is working and to facilitate decision-making when it is time to modify the management approach. The terminology describing the resulting anthropogenic ecosystems is inconsistent and inadequate for effective cross-sectoral management. Equally challenging is the development of a common set of metrics to quantify ecosystem changes and functional impacts resulting from those changes. Neutral, unambiguous, and consistent terminology to develop a framework to classify,</p>	<p>N</p>

				new species combinations that have the potential to change ecosystem function 2) ecosystems resulting from either deliberate or inadvertent human actions that do not require maintenance to persist.	describe, and manage ecosystems can facilitate decision-making.	
60) Van Nijnatten, D. (1996). Environmental Governance in an Era of Participatory Decision Making: Canadian and American Approaches.	NA	Canada and USA	Primary Comparative analysis of state fragmentation	Environmental governance, which ensures that the natural environment is taken into account when economic activities are undertaken. Multi-stakeholder consultation (MSC) process in Canada allows a forum for environmental priority setting by forming overarching relationships, which transcend the institutional divisions of the state – between levels of government, between government agencies, and between divisions within these agencies – and which forge links between government and societal interests. Humans must take a comprehensive and longer-term perspectives on their interactions with the natural environment.	The need to overcome fragmentation yet, doing so requires a state/province which can coordinate its various policy making appendages so as to ensure that they function as one body. This is an illusion given in reality, the state is fragmented by the division and sub-division of policy making authority among various institutions, as well as the increased interactions of these component parts with societal actors. Each state operates according to a unique decision-making dynamic is inextricably connected to a different segment of society, which is not conducive to holistic decision making as they result in irrational and incoherent compromises. Questions the market economy and its bias toward consumption patterns, which are seen as the root of environmental degradation. Seeks a balance between the economy and ecology such that economic activities are not carried out at the risk of the environment. But how?	N
61) Vigano, J. (2007). Watershed Governance: A Canadian Perspective.	NA	Okanagan Basin, BC	Primary Phenomenological Study using both survey and interview methodology. 9 people responded to the survey and all play a role in watershed planning and management. 5 people were interviewed.	Ecological Governance (water-centric approach) i.e. the consideration of ecosystem processes up and down the watershed. Supports governance at a watershed scale as appropriate, which “is environmentally sound and respects jurisdictional boundaries.”	Watershed governance takes ecological governance one step further and implies that existing political boundaries are either replaced by basin boundaries...thus governance falls within the confines of the basin or a new governance mechanism is created within the confines of the basin boundaries.	Y

<p>62) Wang, G. (2016). Integrated Watershed Management: Evolution, Development and Emerging Trends.</p>	<p>NA</p>	<p>Focus: Canada's Fraser River Basin</p>	<p>Primary Case Studies comparing three watersheds: Poyang Lake Basin (China), Rhine River Basin (Europe), and the Fraser River Basin (Canada).</p>	<p>Fraser River Action Plan (FRAP) was implemented in 1991 with a Fraser Basin Management Board (FBMB) and the Fraser Basin Council (FBC) establishment in 1997. Integrated and Adaptive Watershed Management. This lead to the Charter for Sustainability that outlined 12 guiding principles for economic, social, and ecological sustainability. The Fraser Salmon Management Council (FSMC) was also established to increase FN involvement in decisions using cultural and spiritual contexts.</p>	<p>Numerous issues still impeding successful management outcomes, many of which can be remedied through holistic management approaches, incorporation of science and technology, and cross-jurisdictional coordination. The management plan requires the active involvement of all interested parties in developing the best approach to achieve its objectives. Focuses on 5 strategies: integrated management; local knowledge; cross-jurisdictional cooperation and information sharing; advanced data collection and analysis; and the consideration of both ecological and socio-economic concerns.</p>	<p>Y</p>
---	-----------	---	---	---	--	----------

Table 6. Sources Reviewed and Summarized. Note: Final column involves First Nation consultation i.e. Y/N

References

- Affolderbach, J. (2011). Environmental bargains: Power struggles and decision making over British Columbia's and Tasmania's old-growth forests. *Economic Geography*, 87(2), 181-206. doi:10.1111/j.1944-8287.2011.01107.x
- Allan, A. (2008). Integrating watershed management – Connecting people to their land and water. *Mountain Research and Development*, 28(3/4), 337-338. Retrieved from: <http://www.jstor.org.ezproxy.royalroads.ca/stable/25578216>
- Anderson, T., Cowichan Basin Water Management Plan Manager, CVRD Development Services, Presentation to Showcasing Innovation in the Cowichan Basin *Partnerships and Collaboration - Moving from Concept to Reality*, September 2007. Retrieved from: <http://waterbucket.ca/gi/2007/10/26/local-governments-in-the-cowichan-basin-showcase-green-infrastructure-innovation/>
- Armitage, D., Bene, A., Charles, A., Johnson, D., & Allison, E. (2012). The interplay of well-being and resilience in applying a social-ecological perspective. *Ecology and Society*, 17(4), 15.
- Armitage, D., De Loë, R., & Plummer, R. (2012). Environmental governance and its implications for conservation practice. *Conservation Letters*, 5(4), 245-255. doi:10.1111/j.1755-263X.2012.00238.x
- Baba Dioum. (1968). Retrieved from: http://www.searchquotes.com/quotes/author/Baba_Dioum/
- Baird, J., Plummer, R., & Bodin, O. (2016). Collaborative governance for climate change adaptation in Canada: experimenting with adaptive co-management. *Regional Environmental Change*, 16(3), 747-758. doi:10.1007/s10113-015-0790-5

Bakker, K., & Cook, C. (2011). Water governance in Canada: Innovation and fragmentation. *International Journal of Water Resources Development*, 27(2), 275-289.

doi:10.1080/07900627.2011.564969

Bakker, K., & Morinville, C. (2013). The governance dimensions of water security: a review. *Philosophical Transactions of the Royal Society: A Mathematical, Physical and Engineering Sciences*, 371(2002). doi: 10.1098/rsta.2013.0116

B.C. Registry. (n.d.). Societies. Retrieved from:

<http://www2.gov.bc.ca/gov/content/employment-business/business/not-for-profit-organizations/societies>

Benson, D., Jordan, A., Cook, H., & Smith, L. (2013). Collaborative environmental governance: Are watershed partnerships swimming or are they sinking?. *Land Use Policy*, 30(1), 748-757.

Berkes, F. (2012). Implementing ecosystem-based management: Evolution or revolution? *Fish and Fisheries*, 13(4), 465-476. doi:10.1111/j.1467-2979.2011.00452.x

Booth, A. L., & Muir, B. R. (2013). "How far do you have to walk to find peace again?": A case study of first nations' operational values for a community forest in northeast British Columbia, Canada. *Natural Resources Forum*, 37(3), 153-166. doi:10.1111/1477-8947.12005

Brandes, O. M. (2005). At a watershed: Ecological governance and sustainable water management in Canada. *Journal of Environmental Law and Practice*, 16(1), 79-97.

Bridges, A. (2016). The role of institutions in sustainable urban governance. *Natural Resources Forum*, 40(4), 169-179. doi:10.1111/1477-8947.12116

Buckminster Fuller. (n.d.). Retrieved from:

https://www.goodreads.com/author/quotes/11515303.R_Buckminster_Fuller

Bunch, M. J., Parkes, M., Zubrycki, K., Venema, H., Hallstrom, L., Neudorffer, C., ... Morrison, K. (2014). Watershed management and public health: An exploration of the intersection of two fields as reported in the literature from 2000 to 2010. *Environmental Management*, 54(2), 240-254. doi:10.1007/s00267-014-0301-3

Cohen, A. (2012). Rescaling environmental governance: Watersheds as boundary objects at the intersection of science, neoliberalism, and participation. *Environment and Planning A*, 44(9), 2207-2224. doi:10.1068/a44265

Cohen, S., & Neale, T., eds. *Participatory Integrated Assessment of Water Management and Climate Change in the Okanagan Basin, British Columbia*. (Vancouver: Environment Canada and University of British Columbia). 2006. Retrieved from:
<http://www.worldcat.org/title/participatory-integrated-assessment-of-water-management-and-climate-change-in-the-okanagan-basin-british-columbia-final-report/oclc/420977146>

Conservation Ontario. *The Importance of Watershed Management in Protecting Ontario's Drinking Water Supplies*, Submission to the Walkerton Inquiry 2001. Retrieved from:
<http://conservationontario.ca/library?view=document&id=168%3Athe-importance-of-watershed-management-in-protecting-ontario-s-drinking-water-supplies&catid=53%3Aintegrated-watershed-management&font-size=larger>

Cook, C. (2014). Governing jurisdictional fragmentation: Tracing patterns of water governance in Ontario, Canada. *Geoforum*, 56(2), 192-200. doi:10.1016/j.geoforum.2014.07.012

Cowichan Valley Regional District. (2007, Dec.). *South Cowichan OCP Background Study: Cobble Hill-Shawnigan Lake Community Profile*. pp. 1-99. Retrieved from:

<http://www.cvrld.bc.ca/DocumentView.aspx?DID=1925>

Cowichan Valley Regional District. (n.d.). Electoral Area B. Retrieved from:

<http://www.cvrld.bc.ca/286/Area-B>

Cowichan Valley Regional District. (n.d.). Electoral Areas and Municipalities. Retrieved from:

<http://www.cvrld.bc.ca/284/Electoral-Areas-Municipalities>

Cowichan Valley Regional District: Shawnigan Village Plan- Schedule A, Appendix B, Official Community Plan, No. 3510 (2011). Retrieved from:

[http://www.merged%20Shawnigan%20Village%20Plan_201407141611373012\(1\).pdf](http://www.merged%20Shawnigan%20Village%20Plan_201407141611373012(1).pdf)

Dale, A. (2001). *At the Edge: Sustainable Development in the 21st Century*. Vancouver: UBC Press.

Davidson, S. & De Loë, R. (2014). Watershed governance: Transcending boundaries. *Water Alternatives*, 7(2), 367-387.

Davidson, S., & De Loë, R. (2016). The changing role of ENGOs in water governance: Institutional entrepreneurs? *Environmental Management*, 57(1), 62-78.

doi:10.1007/s00267-015-0588-8

Day, J., & Cantwell, M. (1998). Citizen initiated river basin planning: The salmon watershed example [Salmon river watershed round table]. *Environments*, 25(2/3), 80-80.

Day, J. C., & Litke, S. (1998). Building local capacity for stewardship and sustainability: The role of community-based watershed management in Chilliwack, British Columbia.

Environments, 25(2/3), 91.

- De Loë, R. (2000). Moving down the food chain: The increasing importance of local-level water management. *Integrated Water Resources Management*, 272, 13-17.
- Devine-Wright, P. (2013). Think global, act local? The relevance of place attachments and place identities in a climate changed world. *Global Environmental Change*, 23(1), 61-69.
- Dubé, M. G., Duinker, P., Greig, L., Carver, M., Servos, M., McMaster, M., ... Munkittrick, K. R. (2013). A framework for assessing cumulative effects in watersheds: An introduction to Canadian case studies. *Integrated Environmental Assessment and Management*, 9(3), 363-369. doi:10.1002/ieam.1418
- Egunyu, F., Reed, M. G., & Sinclair, J. A. (2016). Learning through new approaches to forest governance: Evidence from Harrop-Procter community forest, Canada. *Environmental Management*, 57(4), 784-797. doi:10.1007/s00267-015-0652-4
- Erickson, A. (2015). Efficient and resilient governance of social-ecological systems. *Ambio: A Journal of The Human Environment*, 44(5), 343-352. doi:10.1007/s13280-014-0607-7
- Flotemersch, J. E., Leibowitz, S. G., Hill, R. A., Stoddard, J. L., Thoms, M. C., & Tharme, R. E. (2016). A watershed integrity definition and assessment approach to support strategic management of watersheds. *River Research and Applications*, 32(7), 1654-1671. doi:10.1002/rra.2978
- Fraser, B. (2017, November 26). Personal interview.
- Fraser, B., Musselwhite, K., Musselwhite, B., & Musselwhite, C. (2017). *Saving Water: Stewardship of the Shawnigan Community Watershed*. Mill Bay: Cowichan Press.

Furlong, K., & Bakker, K. (2011). Governance and sustainability at a municipal scale: The challenge of water conservation. *Canadian Public Policy*, 37(2), 219-237.

doi:10.3138/cpp.37.2.219

Furness, E., Harshaw, H., & Nelson, H. (2015). Community forestry in British Columbia: Policy progression and public participation. *Forest Policy and Economics*. 58, 85-91.

doi.org/10.1016/j.forpol.2014.12.005G

Furness, E., & Nelson, H. (2016). Are human values and community participation key to climate adaptation? The case of community forest organizations in British Columbia. *Climatic Change: An Interdisciplinary, International Journal Devoted to The Description, Causes and Implications of Climatic Change*, 135(2), 243-259. doi:10.1007/s10584-015-1564-2

N

Government of Canada: Fisheries and Oceans. (n.d.). Retrieved from: <http://www.dfo-mpo.gc.ca/index-eng.htm>

Grumbine, R. (1994). What is ecosystem management? *Conservation Biology*, 8(1), 27-38.

Retrieved from: <http://www.jstor.org.ezproxy.royalroads.ca/stable/2386718>

Hammond, H. (1997). What is ecoforestry? *Global Biodiversity*, 7(2), 3-7.

Hammond, H., & Hammond, S. (2004). *The power of community: Applying ecosystem-based conservation planning across Canada*. J. Heywood (Ed.). Trail, BC: Silva Forest Foundation.

Hammond, H. (2015). *Ecosystem-Based Conservation Plan for Shawnigan Lake*. Retrieved from: www.community.netidea.com/silvafor/ShawniganMaps/Shawnigan_EBCP.pdf

Hammond, H. (2015, October 29). Personal Letter to SBS.

- Holden, M. (2011). Public participation and local sustainability: Questioning a common agenda in urban governance. *International Journal of Urban and Regional Research*, 35(2), 312-329. doi:10.1111/j.1468-2427.2010.00957.x N
- Howlett, M. (2007). Analyzing multi-Actor, multi-round public policy decision-making processes in government: Findings from five Canadian cases. *Canadian Journal of Political Science*, 40(3), 659.
- Ireland, L. (2013). Developing a Sustainable Perspective [PowerPoint]. *ENVP500 Developing an Environmentally Sustainable Perspective*. Royal Roads University.
- Jaung, W., Putzel, L., Bull, G. Q., Kozak, R., & Elliott, C. (2016). Forest stewardship council certification for forest ecosystem services: An analysis of stakeholder adaptability. *Forest Policy and Economics*, 70, 91-98. doi:10.1016/j.forpol.2016.06.004
- Johnson, L., & Castleden, H. (2011). Greening the campus without grass: Using visual methods to understand and integrate student perspectives in campus landscape development and water sustainability planning. *Area*, 43(3), 353-361. doi:10.1111/j.1475-4762.2011.01001.x
- Kanie, N., Betsill, M. M., Zondervan, R., Biermann, F., & Young, O. R. (2012). A charter moment: Restructuring governance for sustainability. *Public Administration and Development*, 32(3), 292-304. doi:10.1002/pad.1625
- Keenan, R. J. (2015). Climate change impacts and adaptation in forest management: A review. *Annals of Forest Science: Official Journal of The Institut National De La Recherche Agronomique (INRA)*, 72(2), 145-167. doi:10.1007/s13595-014-0446-5

- Krott, M., Bader, A., Schusser, C., Devkota, R., Maryudi, A., Giessen, L., & Aurenhammer, H. (2014). Actor-centred power: The driving force in decentralized community based forest governance. *Forest Policy and Economics*, 49, 34-42.
- Lerner, S. (1993). Environmental stewardship: Studies in active earthkeeping // review. *Earthkeeper*, 4(1), 41-41.
- Levesque, M. (2012). Mapping a way forward: Interest group selection and roles performed in engagement processes. *Canadian Public Administration*, 55(4), 531-552.
doi:10.1111/j.1754-7121.2012.00224.x
- Lin, H., & Ueta, K. (2012). Lake watershed management: Services, monitoring, funding and governance. *Lakes & Reservoirs: Research & Management*, 17(3), 207-223.
doi:10.1111/lre.12003
- McDonough, W., & Braungart, M. (2002). *Cradle to cradle : Remaking the way we make things* (1st ed. ed.). New York: North Point Press.
- Morin A, 2009 *Strengthening Integrated Water Resource Management in Canada*. Policy Research Initiative, Government of Canada, Ottawa, ON.
- Morris, T. & Brandes, O. (2013). The State of the water movement in British Columbia: A waterscape scan & needs assessment of B.C. watershed-based groups. POLIS Project on Ecological Governance. University of Victoria. Retrieved from:
<http://dspace.library.uvic.ca:8443/handle/1828/7954>
- Newig, J., & Fritsch, O. (2009). Environmental governance: Participatory, multi-level - and effective? *Environmental Policy and Governance*, 19(3), 197.

- Noble, B. (2014). Toward cumulative effects assessment and management in the Athabasca watershed, Alberta, Canada. *The Canadian Geographer / Le Géographe Canadien*, 58(3), 315-328. doi:10.1111/cag.12063
- Nowlan, L., Bakker, K., British Columbia., University of British Columbia., Fraser Basin Council (B.C.), & Canada. (2007). *Delegating water governance: Issues and challenges in the BC context*. Vancouver: BC Water Governance Project.
- O'Boyle, R., Sinclair, M., Keizer, P., Lee, K., Ricard, D., & Yeats, P. (2005). Indicators for ecosystem-based management on the scotian shelf: Bridging the gap between theory and practice. *ICES Journal of Marine Science*, 62(3), 598-605.
doi:10.1016/j.icesjms.2005.01.011. Retrieved from:
<http://icesjms.oxfordjournals.org/content/62/3/598>
- Orr, D.W. (2007). Optimism and hope in a hotter time. *Conservation Biology*, 21 (6), 1392-1395.
- Parkes, M.W., & Horwitz, P. (2009). Water, ecology and health: Ecosystems as settings for promoting health and sustainability. *Health Promotion International*, 24(1), 94-102.
doi:10.1093/heapro/dan044
- Parto, S. (2000). Industrial ecology and regionalization of economic governance: An opportunity to 'localize' sustainability? *Business Strategy and The Environment*, 9(5), 339-350.
doi:10.1002/1099-0836(200009/10)9:5<339::AID-BSE257>3.0.CO;2-0
- Plummer, R., De Grosbois, D., De Loë, R., & Velaniškis, J. (2011). Probing the integration of land use and watershed planning in a shifting governance regime. *Water Resources Research*, 47(9). doi:10.1029/2010WR010
- Province of BC, Malahat Nation. (n.d.). Retrieved from:
<http://www2.gov.bc.ca/gov/content/environment/natural-resource->

stewardship/consulting-with-first-nations/first-nations-negotiations/first-nations-a-z-listing/malahat-nation

Province of BC Ministries. (n.d.). Retrieved from:

<http://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries>

Resilience Alliance. (n.d.) Panarchy. Retrieved from: <https://www.resalliance.org/panarchy>

Riddell, D. (2005). Evolving approaches to conservation: Integral ecology and Canada's Great Bear Rainforest. *World Futures: The Journal of General Evolution*, 61(1-2), 63-78.

Rogers, P. & Hall, A. W. (2003). *Effective Water Governance* (Technical Committee, Global Water Partnership, Stockholm).

Saunders, B. A., Rast, W., & Lopes, V. (2014). Stakeholder evaluation of the feasibility of watershed management alternatives, using integrated lake basin management principles. *Lakes & Reservoirs: Research & Management*, 19(4), 255-268. doi:10.1111/lre.12075

Shawnigan Lake Historical Society (SLHS). (2017). About Shawnigan Lake. Retrieved from: <http://www.shawniganlakemuseum.com/>

Slocombe, D. (1993). Implementing ecosystem-based management. *Bioscience*, 43(9).

Smith, D., Prepas, E., Putz, G., Burke, J., Meyer, W., & Whitson, I. (2003). The forest watershed and riparian disturbance study: A multi-discipline initiative to evaluate and manage watershed disturbance on the boreal plain of Canada. *Journal of Environmental Engineering and Science*, 2, S1-S13.

Smith, L. (2017, November 29). Phone call to CVRD Corporate Services.

Statistics Canada. (2012, Feb.). Cowichan Valley Regional District Census Population 1986-2011. Retrieved from: www.cvrld.bc.ca/DocumentCenter/Home/View/8623

TimberWest. (2017). Retrieved from: <http://www.timberwest.com/>

Treloar, G. (2017). Retrieved from: <http://shawniganwater.weebly.com/ebcp.html>

Truitt, A. M., Granek, E. F., Duveneck, M. J., Goldsmith, K. A., Jordan, M. P., & Yazzie, K. C. (2015). What is novel about novel ecosystems: Managing change in an ever-changing world. *Environmental Management*, 55(6), 1217-1226. doi:10.1007/s00267-015-0465-5

Van Nijnatten, D. (1996). Environmental governance in an era of participatory decision making: Canadian and American approaches. *The American Review of Canadian Studies*, 26(3), 405-405.

Vigano, J. (2007). *Watershed governance: A Canadian perspective* (Order No. MR30209). Available from Dissertations & Theses @ Royal Roads University; ProQuest Dissertations & Theses Global. (304719098). Retrieved from: <http://ezproxy.royalroads.ca/login?url=http://search.proquest.com/docview/304719098?accountid=8056>

Wang, G. (2016). Integrated watershed management: Evolution, development and emerging trends. *Journal of Forestry Research*, 27(5), 967-994. doi:10.1007/s11676-016-0293-3