

## A political ecology of source water protection

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**Abstract:** Across Canada, and elsewhere, the concept of source water protection (SWP) has gained prominence in the drinking water resources literature. The logic behind SWP is that it is easier, cheaper, and safer to protect a drinking water source from contamination than it is to repair the water source after contamination. However, the literature also suggests that various capacity-related factors operate to constrain SWP implementation on the ground. This article reports the results of applying Robbins' (2004) dominant narratives of political ecology to help explain conditions operating to constrain SWP at the local water purveyor level. The results are based on case study research from the Okanagan Valley, British Columbia. Data was derived from semi-structured key informant interviews and document review. Results reveal that the dominant narratives of political ecology provide a useful means of explaining factors constraining SWP. This article answers the call for a 'First World' political ecology while contributing a politically-inspired perspective to water resource management in Canada.

### Introduction

Since the tragic events of May 2000 in Walkerton, Ontario, global interest in source water protection and the multi-barrier approach from academics, water industry, and government has been meteoric. Across Canada, the emergence of source water protection has re-configured the provincial regulatory landscape respecting safe drinking water. Source water protection (SWP) is broadly defined as watershed management for the protection of drinking water supplies and is operationalized through watershed management programs with the specific goal of protecting drinking water supplies (National Research Council 2000; Harrigan-Farrelly 2002; Gullick 2003). Within the water resources literature the concept of

source water protection is integrated within a broader water management strategy known as the ‘multi-barrier approach [that] directs attention both to water supply systems and to source water areas’ (de Loë and Kreutzwiser 2005, 242). The multi-barrier approach involves a number of stages, or barriers, based on the concept of system “redundancies” to safeguard the delivery of public water supplies. SWP is widely regarded as the key first barrier in the multi-barrier approach followed by the water treatment barrier, the distribution system barrier, and the monitoring barrier (O’Connor 2002; Hruday et al. 2003; Government of Canada 2004).

It is widely accepted in this literature that SWP is not only a logical imperative but also an economic necessity. It is deemed logical because it aims to reduce the human health risk of water borne contamination at the source (Hruday et al. 2003; Davies and Mazumder 2003). SWP is deemed an economic necessity because it is many times less expensive to protect a water source from contamination than it is to remediate after contamination (Job 1996; Leccese 1998; National Research Council 2000; Gullick 2003). However, there are indications in the literature that a host of institutional and organizational factors currently constrain the implementation of SWP on the ground (Government of BC 1998/1999:5; de Loë et al. 2002; Davies and Mazumder 2003; de Loë and Kreutzwiser 2005; Peckenham et al. 2005). Some of these constraints include lack of jurisdictional (political) control, shortages of technical and expert knowledge, and absence of financial capacity at the local, water purveyor level. The level of constraint facing local water operators in Canada with respect to source water protection implementation has initiated research focusing on capacity limitations (Timmer et al. 2007). While this literature has been helpful in identifying the relevance of capacity enhancement to undertake source protection it has provided little to explain causation of capacity deficiency at the local level. This research was motivated by the prospect of what political ecology might offer as an explanatory tool to understand the political conditions that operate to constrain local implementation of source water protection. This article reports the result of employing a political ecological perspective to help identify factors that may operate to constrain SWP.

## **Political Ecology**

Political ecology is defined as “the analytic focus on factors that shape relations of power among human groups and that influence relations between these and diverse aspects of their environments” (Paulson et al. 2003). The political ecological perspective has been employed more commonly in ‘Third World’ research to help provide fresh insight into, and

explanation for, environmental degradation resulting from uneven power relations operating between different actors (Jackson 1992; Bryant 1997; Crifasi 2002; Ivey et al. 2006). Political ecology offers an alternative to the more popular accounts of the environmental crisis traditionally nested in inappropriate technology, overpopulation, or poor land use management. Instead, political ecology focuses on relations of power between and among various actors. Applied research in political ecology has typically centred on local scale, peasant land management issues in the Third World. Calls have recently gone out for a broadening of political ecology to include First World research (McCarthy 2002; Robbins 2002; Schroeder et al. 2006). Within this call are concerns for thematic continuity between Third World and First World research themes (Schroeder et al. 2006). Methodologically, McCarthy (2002) has argued for a continued presence of ‘extended fieldwork using intensive case studies and ethnographic techniques’ in First World political ecology as a means of ‘discovering the Third World within’.

### **Dominant Narratives**

Robbins (2004) identified four general narratives, or theses, that dominate the political ecology field as indicated in Table 1. These varied and distinct narratives are an indication of the evolving breadth of political ecology. The first political ecology thesis, the land degradation and marginalization thesis, borrows from political economy to explain land degradation in terms of exclusion, marginalization and exploitation, where one person’s accumulation is another person’s degradation (Robbins 2004).

*Table 1: Dominant narratives in political ecology (Robbins 2004).*

Thesis	What is explained?	Relevance
1. Degradation and marginalization	Environmental change: why and how?	Land degradation, long blamed on marginal people, is put in its larger political and economic context
2. Environmental conflict	Environmental access: who and why?	Environmental conflicts are shown to be part of larger gendered, classed, and raced struggles
3. Conservation and control	Conservation failures and political/economic exclusion: why and how?	Usually viewed as benign, efforts at environmental conservation are shown to have pernicious effects, and sometimes fail as a result
4. Environmental identity and social movement	Social upheaval: who, where, and how?	Political and social struggles are shown to be linked to basic issues of livelihood and environmental protection

Where local, traditional production systems become usurped by state intervention or regional and global market shifts, rules of resource access and control undergo change. Such conditions may lead to exploitation of the land in a quest to produce surplus capital for outside interests. Such exploitation, as the thesis goes, leads to local poverty and, cyclically, continued exploitation and land degradation. More recent (and more politically-related) assertions of this thesis hold that “modernist development efforts aimed at improving local production systems such as state enclosure (parks, protected areas) of traditional collective lands and imposition of new or foreign institutions (World Heritage designation) actually operate to decrease local unit production, sustainability, and equity of resource distribution” (Robbins 2004 14). The land degradation and marginalization thesis avoids consideration of potential benefits arising from new opportunities for local production systems.

The second thesis, the environmental conflict thesis, is concerned with conflicts that evolve between resource user groups that result from increasing resource pressures caused through land (or water) enclosures or appropriation by state authorities, private firms, or social elites (Robbins 2004).

An aspect of this thesis is that it is multi-dimensional. For example, environmental conflicts may surface when local groups secure local control of collective resources at the expense of others, including those from outside the local community. This perspective challenges the dominant view of private capital gaining control over local resources. Another dimension includes resource conflicts between local communities resulting from changes in state conservation or resource development policy.

The third thesis, conservation and control thesis, argues that the struggle over local command and control of resources by regional, national or global authorities erroneously characterize local and benign production practices as unsustainable. Subsequently, these same state authorities organize to preserve the environment under the mantra of ‘conservation’. The control and management of these areas by the state, according to this thesis, removes opportunities for local production practices creating conflict over resource access leading to local poverty and the possibility for environmental degradation through over-harvesting on an imposed limited land base.

The fourth and final thesis from political ecology, the environmental identity and social movement thesis, suggests that changes in environmental management regimes and environmental conditions create opportunities for local, and often disparate, groups to band together politically. As a result, powerful national and even global political and

economic forces become themselves the target of coordinated local opposition.

This research pays close attention to these four theses by testing their applicability to the results from this case study research. If one or more of the dominant narratives are applicable to case study results then it can be shown that political ecology is a useful explanatory tool in water resources research.

## **Research Problem**

In spite of its broad support in the water resources literature, the practice of SWP has been slow to develop (de Loë and Kreutzwiser 2005; Peckenham et al. 2005; Ivey et al. 2006). To date, the water resources literature has focused on capacity-related deficiencies, particularly at the local level, to identify factors constraining SWP implementation. These capacity-related deficiencies centre primarily on technical, financial, jurisdictional, and social components of water management at the local level. While the capacity literature has contributed to a better understanding of factors facilitating and constraining SWP, the capacity literature is limited as an explanatory device. For example, while the identification of jurisdictional capacity limitations may be helpful to initiate policy (re)direction, it provides little to explain why local areas may lack jurisdictional capacity within their watershed. The possible explanations may be tied to provincial priorities of resource extraction over watershed protection, state sponsored land designation such as park or intensive development, or private versus public land ownership within a watershed. This research sets out to determine the role of political ecology as an explanatory tool to identify conditions that constrain SWP at the local level.

## **Methodology**

### **Semi-structured interviews:**

Semi-structured interviews using an interview guide were conducted with a range of participants from both inside and outside the Okanagan Valley, British Columbia. This research will report responses from the local interviewees including water managers, consultants, and elected officials. In total, approximately 50 interviews were conducted between August 2004 and July 2005.

**Document review:**

Document review helped corroborate interview material as well as provided an additional source of quantitative data. Documents reviewed for this study included professional reports, purveyor newsletters, government documents, internal and external reports produced by water associations and water purveyors, and correspondence specifically related to the individual case study areas. The documents represent a wide range of local, regional, and provincial scale material. In total, 45 documents ranging from single page newsletters to multi-page documents were utilized.

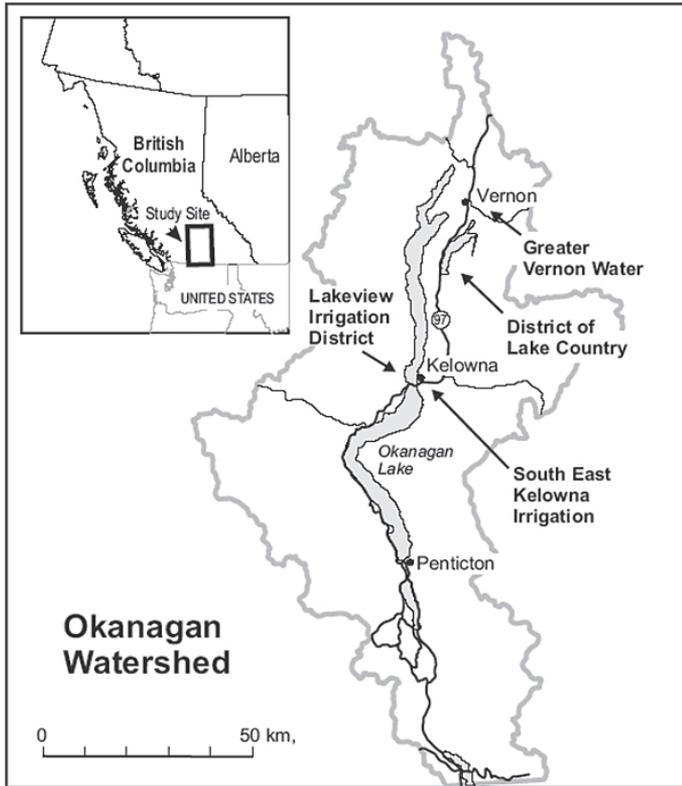
**Case Study Areas:**

The four case study areas in this research are all located in the Okanagan Valley of BC (see Figure 1). The Okanagan Valley offers a rich water resource landscape in one of the most important basins in the Southern Interior (Cohen and Kulkarni 2001). The Okanagan Valley is roughly 160 km in length, averages 50 km in width, and encompasses approximately 8200 km<sup>2</sup> of land surrounding Okanagan Lake and Okanagan River. Located in the rain-shadow of the Coast (BC) and Cascade (US) Mountain Ranges the Okanagan Valley has a dry continental climate. The semi-arid region receives approximately 30 cm of precipitation per year; of this 85 percent is lost annually to evaporation and evapotranspiration (Cohen and Kulkarni 2001).

The Okanagan Valley is divided politically into 3 regional districts, 11 municipalities, 40 improvement districts, and the Okanagan Nation Alliance comprising seven Indian Band Reserves (Cohen et al. 2004). For the purposes of this study, specific case study research was conducted within the Regional District of North Okanagan and the Regional District of Central Okanagan. It is important to note that in all four case studies the municipal or irrigation district boundaries do not coincide with the respective boundaries of the water supply watersheds.

The main potable water source for the Okanagan is the mountain valley tributary streams. These sources generally supply adequate quantity, are gravity fed, and require minimal treatment or filtration. Within the North Okanagan Regional District approximately 70 percent of potable water supplies originate in mountain source areas. The percentage for the Regional District of Central Okanagan is lower at 40 percent, owing mainly to Okanagan Lake supply (valley bottom) to the Kelowna City.

The Okanagan has experienced rapid expansion in agriculture and other resource activities as well as significant population growth since the mid-1900s. The combination of these activities has placed enormous pressure on water resources, a condition that, in part, initiated the Canada-British Columbia Okanagan Basin Agreement (March 1974) and, more



**Figure 1:** Okanagan Basin case study areas.

recently, has generated debate over water governance throughout the valley (Cohen and Kulkarni 2001; Cohen et al. 2004; Okanagan Partnership 2004). Drinking water quality has long been a concern in the Okanagan, most notably the 1996 *Cryptosporidium* outbreak in Kelowna with over 10,000 confirmed epidemiological cases. Additionally, the Okanagan Valley has not escaped BC's long history of enteric illnesses and aesthetic quality concerns (Government of BC 1998/1999; Parfitt 2000; Phippen 2001; Government of BC 2001).

The criteria for case study selection included non-metropolitan surface water suppliers drawing from mountain surface water sources. As well, the case study areas all operate under identical regulatory framework and occupy similar bio-geoclimatic regions. An effort was made to include a range of public water purveyors, including irrigation districts (South East

Kelowna and Lakeview), a district municipality (Lake Country), and an amalgamated regional water authority (Greater Vernon Water).

## Results

A broad range of factors was reported as constraints to SWP. Factors identified as constraining SWP are reported in Table 2. Values reported in Table 2 reflect the percentage of interviewee responses identifying a specific constraining factor. The right-hand columns in Table 2 provide the aggregate percent total for each constraining factor across all case studies.

Lack of purveyor authority within the watershed (53%) was the most frequently cited constraint to SWP. Other leading constraints reported by interviewees included the lack of single agency responsibility (47%), conflicting mandate of provincial government (44%), and the lack of funding and experience (43%). As a contribution to the capacity-building literature these results identify lack of jurisdictional, financial and human capacity as main factors constraining local SWP. In these examples, capacity limitations provide a valuable contribution to our understanding of factors constraining SWP. However, it is argued that the capacity literature alone

**Table 2:** Factors constraining SWP (values in percent).

Factors Constraining SWP	LID	SEK	DLC	GV	Total
Purveyors lack authority (lack shared jurisdiction)	15	17	12	9	53
No one agency responsible for watershed authority	10		22	15	47
Conflicting mandate of provincial government	15	12	5	12	44
Lack of funding, experience to do SWP	10	12	15	6	43
Lack provincial staff to do enforcement	8	12	5	6	31
Lack of public education on SWP	8	12	10		30
Multi-use nature of watershed	2	12			14
Lack prov. land use communication to purveyors		7		6	13
General lack of knowledge on how to do SWP		7		6	13
Increased development pressure			10		10
Lack local staff		7			7
Rapid population growth in Okanagan Valley	6				6
Drinking water Officers lack watershed experience				3	3

LID = Lakeview Irrigation District; SEK = South East Kelowna Irrigation District; DLC = District of Lake Country; GV = Greater Vernon Water

can not describe the full range of reported constraints to SWP listed in Table 2. More importantly, the capacity literature alone can not explain the political causes contributing to lack of capacity.

The dominant narratives identified by Robbins (2004) may offer an explanatory tool to help understand broader political conditions constraining SWP. Table 3 links those factors constraining SWP reported in Table 2 to a dominant narrative from political ecology. Factors linked to capacity and external factors have also been identified in Table 3 and are not discussed further in this article.

**Table 3:** Factors constraining SWP linked to a dominant narrative.

Factors Constraining SWP	Dominant Narrative			
	1	2	3	4
Purveyors lack authority (lack shared jurisdiction)	✓			
No one agency responsible for watershed authority	✓			
Conflicting mandate of provincial government		✓		
Lack of funding, experience to do SWP	Capacity-related			
Lack provincial staff to do enforcement	Capacity-related			
Lack of public education on SWP	Capacity-related			
Multi-use nature of watershed		✓		
Lack prov. land use communication to purveyors			✓	
General lack of knowledge on how to do SWP	Capacity-related			
Increased development pressure	External factor			
Lack local staff	Capacity-related			
Rapid population growth in Okanagan Valley	External factor			
Drinking water Officers lack watershed experience	Capacity-related			

## Discussion

Factors constraining SWP that have been linked to a dominant narrative are listed in Table 4. The following provides a discussion of these constraining factors in relation to the dominant narrative to which they associate.

### Dominant Narrative 1: Degradation and marginalization thesis

#### Lack of water purveyor authority:

Lack of water purveyor authority in the watershed was cited most frequently as a factor constraining SWP. For example, the District Manager for Lakeview Irrigation District (19 October 2004 interview) voiced frustration in not having any jurisdiction within the watershed:

**Table 4:** Dominant narrative.

Factors Constraining SWP	Narrative 1	Narrative 2	Narrative 3
Purveyors lack authority (lack shared jurisdiction)	✓		
No one agency responsible for watershed authority	✓		
Conflicting mandate of provincial government		✓	
Multi-use nature of watershed		✓	
Lack prov. land use communication to purveyors			✓

‘We’ve been charged with the responsibility of providing safe drinking water with no means of enforcement. We have our hands tied. The province is allowing multiple uses up into our watershed, including forestry, cattle range, and now intensive (motorized) recreation. We have no jurisdiction, no enforcement, and no compensation coming back to us for watershed damages’.

An elected official from South East Kelowna Irrigation District (31 May 2005 interview) expressed concern regarding the lack of purveyor authority respecting industrial and recreation watershed activities:

‘We (South East Kelowna Irrigation District) have no enabling legislation to enforce bylaws or enforce control over activities within our watershed’.

While lack of local water purveyor jurisdiction within a watershed was frequently noted, in no interview was there the suggestion that watersheds be closed-access areas for the exclusive use of the local water purveyor. In the words of the General Manager of Infrastructure Services at the Regional District of North Okanagan (11 August 2004 interview):

‘We simply can’t do what they do in Vancouver and put a big fence around and close off the watershed, we don’t have that luxury’.

In another interview, the Senior Planner for the Regional District of Central Okanagan (10 August 2004 interview) noted:

‘If we manage watersheds for a single use we lose tourism, outdoor recreation, forestry, mining, it could be damaging to your local economy’.

Lack of water purveyor authority in the watershed was consistently identified by the purveyors as a factor constraining SWP. This reported factor represents a form of water purveyor marginalization. Powers to

make decisions in the watershed are held exclusively by provincial agencies (e.g. forestry, mines) to the exclusion of local water purveyors. Interviewees reported that this arrangement not only constrained SWP implementation at the local level but also contributed to watershed degradation. While water purveyors were not expecting, nor asking, for exclusive control over watershed decision-making, they were asking for a larger voice on matters concerning the watershed. This response is taken here as a sign of water purveyor marginalization by provincial government agencies and their respective watershed management structures. SWP is constrained in this case because of the marginalization of local water purveyors as a result of provincial agencies unwilling to share jurisdictional powers.

### **No single agency responsible for water:**

Several reports to the BC Government reference the lack of a single agency responsible for water as a factor constraining SWP. For example, one of the Auditor General's final recommendations is that the Province "[d]esignate within Government a lead agency for drinking water interests, to coordinate government policy and action on drinking-water sources" (Government of BC 1998/99). The call for a lead agency was repeated once more in 2002 in the Final Report of the Drinking Water Review Panel (DWRP) commissioned by the newly elected BC Liberal Legislature. In DWRP's Final Report it is stated that the province should "[c]reate a single lead Drinking Water Protection Agency reporting to the Minister of Health Planning, to integrate the skills, resources and authority of all provincial ministries with responsibility for drinking water protection" (DWRP 2002 8). A private engineering consultant in Vernon, BC stated:

[t]here is no leader, this is the heart of the problem, it is the core of the problem, absolutely. It was recommended at least three years ago after Walkerton and also by the BC Drinking Water Review Panel (Final Report, Feb. 2002). It said we should have one water ministry, and guess what, it hasn't been done. If we had one water ministry ... we'd have better coordination, fewer barriers ... and absolutely this would help source protection".

The Senior Engineer for the District of Lake Country (31 May 2005 interview) expressed frustration in not having a single agency structure responsible over water:

'If you ever phoned (the BC Government) to find out who is in charge of your watershed you'd get the switchboard from hell. I think it is authority that is the key word we are looking for, who has the authority

in the watershed to deal with drinking water issues? In my opinion they are not there.'

Local water purveyors reported that the partition of responsibility for water management in BC was a constraint to SWP. This partitioning of responsibility is taken here to be a form of marginalization wherein local water purveyors are not only isolated from watershed decision-making but also unable to efficiently communicate their concerns to a single agency. Under this condition, local water operators remain frustrated in their efforts to undertake SWP. In the absence of a single water agency structure, local purveyors are unable to effectively communicate their concerns to provincial agencies, and therefore remain marginalized.

## **Dominant Narrative 2: Environmental Conflict**

### **Conflicting mandate of provincial government:**

The third most commonly cited constraint to SWP was the apparent conflicting mandate of the provincial government (43 percent). Provincial Acts and regulations were commonly cited as operating at cross-purposes. This constraint extends the notion of agency fragmentation to policy fragmentation and illustrates the problem facing SWP where contradictory Acts and regulation are in place. Several interviewees identified the contradiction between the legal requirement of the purveyor to provide 'safe drinking water' under the BC Drinking Water Protection Act and the absence of any watershed authority among water purveyors. For many, this was interpreted as the hand of government forcing water treatment upon the local purveyor. Emphasis on treatment, something for which the purveyors do have authority draws attention away from watershed management and SWP. This situation was a significant source of frustration to the local water purveyors, many of whom could ill afford expensive water treatment facilities.

One key land use activity seen to be posing a threat to water quality was urban growth including the deregulation of septic field installation approval by provincial health authorities. A new sewage system regulation took effect May 31, 2005 with the intent of shifting responsibility from provincial health authorities to private industry. This 'results-based approach' is intended to enhance industry effectiveness and accountability. The new sewerage system regulation applies to site assessments, installations, and maintenance of onsite wastewater systems, from septic systems for single family homes to complex systems for multi-residential, industrial and commercial applications (Government of BC, 2005). However, others feel such deregulation of provincial health authority may

compromise public safety. In the words of a water resource consultant based in Vernon, BC (2 June 2005 interview):

‘Septic regulations are changing, no longer inspected or meet specifications. It will be left to the discretion of recognized practitioners. The Ministry of Health is no longer going to be involved. So at the same time as trying to add protection for drinking water they are making it easier for people to build lousy septic tanks around the lakes that people drink out of.’

In a second example, the same water resource consultant pointed to the contradiction between the new ‘results-based’ Forest and Range Practices Act (FRPA) (Government of BC 2002) and the new BC Drinking Water Protection Act (DWPA) (Government of BC 2001).

‘The DWPA is a strong regulatory instrument ... on the other hand there is the new FRPA that is a very flexible, results-based instrument. As a result the forestry companies can cut right up to streams, they can do basically whatever they want now. The theory goes if the result was fine then the practice was fine. But there are problems; some of the impacts will not happen until well after the activity, there will not be any monitoring, so no chance of following-up, damage will be done. That legislation is conflicting with the DWPA. So they are at cross purposes. The wording in the new FRPA says protect streams, as long as protecting streams does not get in the way of forest harvesting and timber supply. It is protection when it is convenient.’

Noted above is evidence provided by interviewees of the conflicting mandate of the provincial government respecting SWP. This conflicting mandate is taken here as an example of Robbins’ (2004) environmental conflict thesis wherein access to environmental resources are bundled and controlled within a provincial regulatory system favouring resource development over drinking water source protection. Privileging access to certain resources over others (e.g. wood fibre over drinking water) through legal regulation created environmental conflict, thus constraining the practice of SWP by local water purveyors.

### **Multi-use nature of watersheds:**

Watersheds in Crown areas of British Columbia are provincially owned and therefore designated as multi-use areas. The multi-uses of these areas were a regular concern among water purveyors. Allowing multiple users on Crown-owned land, in the view of many purveyors, allows for unmanaged land use activities and the potential for negative watershed

impacts regarding water quality. For example, the Water Quality Technologist at the District of Lake Country held the opinion that the management focus of provincial agencies prioritizes resource extraction over water quality protection. This, stated the Water Quality Technologist, was a main constraint to SWP:

'If we would have had any say in the land resource management planning, we were told loud and clear, that these were multi-use watersheds, there was no way that they were going to eliminate range, no way that forestry was going to be kept out of those areas. We would never have the chance to say we do not want anybody to be in there, that this is a community watershed; they are huge basins, and sub-basins. But sometimes they (provincial government) look at it as though they are managing it, but they are managing it for the land base but not (for) the water.'

In addition, the Water Quality Technologist highlighted the contradiction of the provincial government regarding resource extraction and water quality:

'I don't think the political will is there to ensure drinking water quality. Everybody is still very much looking after themselves, from range to forestry to whatever; they are all looking after their product and their market as directed by government. There are people in industry that are dedicated to water quality, but they have to look out for their industry too.'

The conflict emerging from multiple-use activities within a community watershed was common place in many interviews. This constraining factor to SWP fits within the environmental conflict thesis and shows that conflicts are part of jurisdictional struggles over resource access and control. In a resource rich province such as BC, SWP competes with other crown-land users resulting in conflict. These industrial watershed users pre-exist SWP planning and initiatives. Under such conditions, SWP will be difficult to operationalize at the local level.

### **Dominant Narrative 3: Conservation and Control**

#### **Lack of provincial land use communication to purveyors:**

Lack of provincial land use communication to the purveyors was regularly reported by case study interviewees. Lack of communication from the province to the local purveyor is being linked in this paper to the conservation and control thesis (Robbins 2004). The Okanagan Shuswap Land and Resource Management Plan (LRMP) will be used to provide the

example. The LRMP was a multi-year, provincially-driven land use plan for the Okanagan Shuswap, an area including the Okanagan Valley. One of the many land use designations that resulted from this process was the Resource Management Zone RMZ designation of 'Intensive Recreation (Motorcycle – Bear Creek)' over the entire LID watershed (BC Okanagan-Shuswap LRMP 2001 REC 4-10). This designation, and the process that enabled it, remains a controversy between LID and the adjacent Westbank Irrigation District (WID), their consultants, and the then provincial agency behind the process, the Ministry of Sustainable Resource Management (amalgamated 2005 into the new Ministry of Environment). For example, a water resource consulting engineer in Kelowna stated:

'The BC Government did a land use plan, an LRMP, there were two people there representing the water districts, and somehow this intense recreational area for motorcycles got approved in a community watershed, and without the knowledge of the irrigation district because they weren't at the table'.

In separate interviews the LID manager and the WID manager expressed grave concern over the LRMP process that legitimized dirt bike activity through the 'Bear Creek Motorcycle Recreation Zone' (RMZ) land use designation. For example, the WID manager summarized the process by stating:

'a couple of different BC Government agencies got together and allocated this huge motorized recreation zone, the RMZ without any consultation with Lakeview or Westbank, which is totally unacceptable'.

In this example it is shown that efforts toward a land use designation for a specific user group (bike club) created political and ecological exclusion (irrigation districts). Alienated and ignored, the local water purveyors were placed in a reactive position to a land use designation process that favoured one special interest user group (dirt bike enthusiasts) over public water purveyor and domestic water users. Here, the conservation and control thesis provides a lens through which a seemingly benign land use designation is shown to have negative effects on institutional relations and environmental quality.

## Conclusion

This research sought to identify factors constraining SWP at the local, water purveyor level. Expanding upon previous work in the capacity-building literature, this research adopted a political ecology approach to help identify explanatory causes for the slow uptake of SWP at the local, water purveyor level. The use of Robbins' (2004) dominant narratives of political ecology enabled a means of categorizing interviewee responses. In this research, three of the four dominant narratives offered explanation for the slow uptake of SWP in the Okanagan Basin. Lack of water purveyor authority as well as the lack of a single water agency structure in BC is seen as conditions that marginalize local water purveyors. Such marginalization disables the ability of SWP to effectively develop on the ground. Additionally, the conflicting mandate of the provincial government and the designation of multi-use watersheds are seen to contribute to environmental conflict, further reducing the potential for SWP to develop at the local level. Lastly, poor communication between provincial agencies and local water purveyors, caused in part by provincial control over resource use, is seen to be a factor constraining SWP practice at the local level. Therefore, the dominant narratives approach provides a useful analytic tool to explain conditions constraining SWP implementation at the local level.

Continued research into a 'first world political ecology' is warranted. To this end, there is an important place for a First World political ecology in the area of water resources management. SWP will particularly benefit from a political ecological perspective where power relations that serve to constrain SWP are revealed. Attention also needs to evaluate alternative, cooperative models of watershed management. While SWP is supported throughout the water management literature there is a need for more applied research that will assess new models of watershed planning to help operationalize SWP with greater emphasis on power-sharing and partnership arrangements between different levels of authority.

To help address the damaging effect of uneven relations of power a shift is necessary from the "management" of watersheds to the "planning" for watersheds. Watershed planning could emphasize power sharing between the land manager (Province) and the many users, including the water purveyors. The traditional "command and control" model of watershed management of Crown land by fragmented and overlapping provincial agencies has served to concentrate power within certain provincial resource ministries and related industries thereby negating opportunities for shared decision-making and true watershed collaboration with all stakeholders. Robbins' (2004) dominant narratives of political

ecology provide a useful means of understanding the broader conditions that may serve to constrain SWP.

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