

TRANSBOUNDARY GROUNDWATER GOVERNANCE:
AN ANNOTATED BIBLIOGRAPHY

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I. INTRODUCTION

Over the past several decades, increasing economic integration and the pressures of globalization have brought transboundary issues to the forefront of political debate in Canada and around the world. Some of the most high-profile debates have focused on environmental issues such as acid rain and fresh water management. Transcending local jurisdictions and transgressing boundaries, environmental issues often challenge governance structures based on nation-states and inviolable borders. In response, a range of transboundary governance initiatives have been put into place, with varying degrees of success.

Within this debate, groundwater governance has been an overlooked issue, in part because this is a resource “invisible” to the public eye. This “invisibility” tends to obscure the importance of groundwater. In Canada, 30.3% of its residents rely on groundwater for drinking water. In the United States, over 50 billion gallons of groundwater are used per day just to support the agricultural economy alone.

Groundwater resources in both Canada and the United States are under threat by both over-consumption and contamination. In part, the declining health of groundwater resources in some areas is due to poor governance³. With respect to transboundary groundwater resources, this is exacerbated by the difficulty of ensuring the ability of all stakeholders to articulate their interests, and the difficulty of effectively coordinating management. Lack of information on groundwater resources, and limited sharing of this information between stakeholders, are other important factors.

Given this background, this annotated bibliography has **two purposes**:

- To provide accessible information on transboundary groundwater governance mechanisms and stakeholders between Canada and the United States
- To provide specific information on transboundary groundwater governance of groundwater resources shared between the state of Washington and the province of British Columbia

The regional case study was included as a counterpart to the more general case set of references because of the high degree of variation in groundwater resources and use practices across Canada and the US. A correspondingly diverse set of institutional mechanisms exists at the local level; the BC-Washington case study provides insight into these regional dynamics.

The **structure** of the report brings together the general issues pertinent to Canada and the United States together with the regional BC-Washington case study. The second section of the report provides background on the roles of key stakeholders at the national and regional level. The third and fourth sections of the report provide an annotated bibliography of key documents relevant to transboundary water governance issues between Canada and the United States and between British Columbia and Washington. The final section provides a technical (non-annotated) bibliography of the governance of the Abbotsford-Sumas Aquifer in BC and Washington.

³ We define governance as the process by which stakeholders articulate their interests, their input is absorbed, decisions are taken and implemented, and decision-makers are held accountable. This is the definition used by the Ottawa-based Institute on Governance. For more information, see <http://www.iog.ca/>.

II. TRANSBOUNDARY GROUNDWATER GOVERNANCE: THE STAKEHOLDERS

Transboundary groundwater governance between Canada and the United States is enacted by a variety of governmental and non-governmental actors. This section briefly describes the background and role of two of the most important transboundary stakeholders: the Commission for Environmental Cooperation and the International Joint Commission. Three stakeholders important in the Washington-British Columbia region are then described: the Environmental Cooperation Council; the Abbotsford-Sumas Aquifer International Task Force; and the Fraser Basin Council.

The Commission for Environmental Cooperation (CEC) is an international organization created by Canada, Mexico and the United States under the North American Agreement on Environmental Cooperation (NAAEC). The CEC was established to address regional environmental concerns, help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law. The Agreement complements the environmental provisions of the North American Free Trade Agreement (NAFTA). The obligations of the participants include promotion of environmental goals, periodic publication of reports, scientific research, assessment of environmental effects and promotion of environmental goals. The CEC will become involved in dispute resolution if necessary, but its primary role is prevention rather than intervention.

International Joint Commission

The International Joint Commission was created in 1909 as part of the International Boundary Waters Treaty to review applications for transboundary water use, to investigate water pollution issues involving Canada and the United States, and to deflect and mitigate potential transboundary water conflicts. The IJC was created because Canada and the United States recognized that each country is affected by the other's actions in water systems along the border and they wanted a neutral party to intervene when necessary. The IJC is comprised of a six-member advisory board that reports to, and advises, the federal governments on issues of transboundary concern at the request of the parties involved. Although the IJC was created specifically for the Great Lakes region, and has historically focused on surface water systems (rivers and lakes), the IJC has become involved in other transboundary cases. For example, the IJC established the International Air Quality Advisory Board in 1966 to monitor and provide advice on air pollution problems along the Canada-U.S. borderland. The IJC has also become increasingly involved in issues of groundwater. Although groundwater is protected under Article IV of the Boundary Waters Treaty, which generally prohibits either country from polluting waters that flow across the boundary to the injury of others (both health and property), it was not until the late 1980's that the IJC became explicitly involved in groundwater pollution with the 1988 Flathead River Mine. The IJC was given jurisdiction over other sources of transboundary pollution when the 1978 Great Lakes Water Quality Agreement was amended in 1987. Annex 16 of that Amendment focuses specifically on groundwater, which requires both parties to: "identify existing and potential sources of contaminated groundwater, develop standard approaches in sampling and analysis, controlling the sources of contamination where problems are identified and report progress to the International Joint Commission biennially" (U.S. EPA 1987). In accordance with its expanded mandate on

groundwater, the IJC has prepared a number of reports and papers on groundwater contamination along the Canada-U.S. border.

Environmental Cooperation Council

The Environmental Cooperation Council (ECC) was established as a result of the 1992 Environmental Cooperation Agreement (ECA) between the Province of British Columbia and State of Washington. Then British Columbia Premier Mike Harcourt and then Washington Governor Booth Gardner spearheaded this initiative, prioritizing bioregional approaches and transboundary governance to manage shared natural resources. The role of the ECC is to ensure coordinated action and information sharing on environmental matters of mutual concern and interest for British Columbia and Washington. The ECC provides a forum where officials can bring initiatives forward, as well as provides a process for formally established task forces, work groups, and committees.

The ECC currently has five task forces, each corresponding to the transboundary issues that the ECA identified as needing immediate prioritization. These five issues include: Georgia Basin / Puget Sound water quality, Columbia River/ Lake Roosevelt water quality, flooding of the Nooksack River in Northwestern Washington, regional air quality, and groundwater management in the area of Abbotsford, B.C. and Sumas, WA. Subsequently, the ECC developed a task force for each of these issues. The three “emerging” issues (issues that have potential for further emphasis) include: solid, hazardous, and biomedical waste management; water resource management; and wetland protection.

Abbotsford-Sumas Aquifer International Task Force

The Abbotsford - Sumas Aquifer International Task Force is one of five task forces created by the ECC to coordinate cross-border environmental governance activities. The Abbotsford - Sumas Aquifer International Task Force (ASAITF) was developed as a subcommittee of the ECC because the polluted aquifer was prioritized as a key transboundary concern for both countries. The ASAITF is charged with monitoring the aquifer and developing recommendations for shared management and pollution reduction. The Task Force reports its findings bi-annually during the regularly scheduled ECC meetings.

The mission of the ASAITF is to coordinate efforts directed towards protecting the aquifer across the common border between Canada and the United States. These efforts include establishing managerial approaches, developing aquifer management strategies, and facilitating coordinated mechanisms to educate and involve the public in protecting the aquifer's water quality and water resource values.

Abbotsford-Sumas Aquifer Stakeholder Group (City / County)

The Abbotsford-Sumas Aquifer Stakeholders Group acts as a type of stewardship board or management forum for all stakeholders interested and/or invested in the Abbotsford-Sumas Aquifer. The Stakeholders Group acts as body to disseminate information from government research agencies, to co-ordinate public awareness programs, to monitor stakeholder initiatives, to explore funding, to develop partnerships, to liaise with U.S. counterparts and to regularly report on all these matters to Council. The Stakeholders Group is an all-volunteer association and is open

to the public. The city of Abbotsford provides a meeting space (and representation) for their bi-monthly meetings.

Fraser Basin Council (local nongovernmental agency)

The Fraser Basin Council was established in 1997 to facilitate shared decision-making within the watershed. The council was developed in order to address the decline in environmental quality associated with industrial pollution and increasing population growth in the region. The council is a new body involving many governmental and nongovernmental interests. The basin council received support from then Mayor of Vancouver - Gordon Campbell, and then Mayor of Vancouver, John Backhouse, who challenged each other to "clean up their parts of the (Fraser) River." The public challenge acknowledged the need for collaboration to clean up the river basin and work between jurisdictions. The Fraser Basin Council is organized into five regions including Upper Fraser; Cariboo-Chilcotin; Thompson; Fraser Valley; Greater Vancouver, Squamish, Pemberton. Each region works at coordinating their efforts to best achieve the Goals specified in the Charter for Sustainability. The Fraser Valley region is the main contact for activities associated with the Abbotsford-Sumas aquifer.

III. ANNOTATED BIBLIOGRAPHY: TRANSBOUNDARY WATER GOVERNANCE

(1971). "The Work of the International Joint Commission." External Affairs 23(6): 208-217.

This paper reviews the work of the Canadian-American International Joint Commission from 1894 through 1971. This paper serves as a good introduction to the history of the IJC and helps familiarize the reader with issues surrounding bi-national governance of water in Canada and the United States

Barberis, J. (1991). "The development of international law of transboundary groundwater." Natural Resources Journal 31(1): 167-186.

Regimes are being developed for the maintenance and protection of shared aquifers. The generally accepted customary rules applicable to other shared resources are being applied in this context as well. These principles include the obligation not to cause appreciable harm, the duty of equitable and reasonable use, the obligation of prior notification, and the duty to negotiate. There are multiple examples of the successful application of these principles to shared aquifers.

Burton, L. (2000). American Indian Water Rights and the Limits of Law. Lawrence, University Press of Kansas Press.

This book analyzes the history of American Indian water rights by highlighting the conflict within the Interior Department (between the Bureau of Reclamation and the Bureau of Indian Affairs) that ensued following the 1908 Supreme Court decision in *Winters v. United States*. Although Burton's analysis focuses on American Indian water rights, it can be valuable to the transboundary water debate, as it discusses similar issues involving 'sovereign' territory, water use, and policy.

Davies, J. M. and A. Mazumder (2003). "Health and environmental policy issues in Canada: The role of watershed management in sustaining clean drinking water quality at surface sources." Journal of Environmental Management 68(3): 273-286.

This paper explores the importance of science in linking the relationship between healthy watersheds and clean and safe drinking water. The paper draws on examples from Canadian aboriginal water systems, British Columbian water policy and US EPA policies.

Day, J., K. Boudreau, et al. (1996). "Emerging institutions for bilateral management of the Columbia River Basin." American Review of Canadian Studies 26(2): 217-232.

The authors critique the International Joint Commission's effectiveness in managing bi-national resources. Drawing on the Columbia River Basin example, the authors contend that after many years of serving the region well, the system is now showing signs of strain. This paper is helpful for transboundary resource scholars as it highlights the difficulty of balancing the dual role of resource management at both a national and bilateral level, with pressures and expectations from both countries influencing decision-making.

De Loe, R., S. DiGiantomaso, et al. (2002). "Local capacity for groundwater protection in Ontario." Environmental Management **29**(2): 217-233.

Cost of insufficient municipal governance can be tragically high, as seen in the seven deaths due to E.coli in the community of Walkerton, Ontario in 2000. In a comparative context, the United States has been more successful than Canada, in providing resources to support regional water municipalities. This paper analyzes the factors that shape local capacity for groundwater protection and recommends avenues for capacity building.

Dinar, A. and Xepapadeas (1998). "Regulating water quantity and quality in irrigated agriculture." Journal of Environmental Management **54**(4): 273-289.

This paper is useful because it shows how a theoretical model, formulated by the authors in an earlier paper, can be applied to an empirical case. The authors draw on a case of a non-point-source polluted aquifer contaminated by several agricultural producers and the consequential intervention of regulatory agency. Through the use of the model, the authors suggest that investing in monitoring technology would be the most effective means of intervention.

Draper, S. E. (1997). "International duties and obligations for transboundary water sharing." Journal of Water Resources Planning and Management **123**(6): 344-349.

The need for effective water sharing agreements between sovereign states is increasing as people and industries compete for use of that finite resource. To prevent conflict the affected parties must enter into effective and efficient water sharing agreements for equitable sharing of the water. States entering into the transboundary water sharing agreement are obligated to perform four duties: 1) The duty to cooperate and negotiate in good faith; 2) the duty to prevent unreasonable harm; 3) the duty to equitable utilization; and 4) the duty to exchange data and information.

Duda, A. M. (1993). "Addressing nonpoint sources of water pollution must become an international priority." Water Science and Technology **28**(3-5): 1-11.

This review examines the effects, causes and sources of surface and groundwater pollution. Examples are given from across the globe illustrating extensive economic, environmental, and human health damage from these diffuse sources. Agricultural sources were found to cause the most widespread water quality problems worldwide. The authors argue that progress in controlling nonpoint source pollution can be made, and institutional and cultural barriers to pollution abatement can be overcome, by including interventions as integral parts of sustainable economic development initiatives.

Emel, J. (1992). "Ideology, property, and groundwater resources: An exploration of relations." Political Geography **11**(1): 37-54.

Drawing on empirical studies of southwestern United States, the authors examine the historical and divergent ideologies of property to illustrate their continuing and contradictory presence in contemporary groundwater management systems. The authors argue that ideological contradictions regarding private property in

groundwater may help explain spatial and temporal differences in resource-use systems.

Emel, J. and R. Roberts (1995). "Institutional form and its effect on environmental change: The case of groundwater in the Southern High Plains." Annals of the Association of American Geographers **85**(4): 686-695.

Emel and Roberts posit the effectiveness of various forums of regulatory institutions in furthering environmental goals. Drawing on an empirical study of southwestern United States, they compare the effects of three institutional forms - 1) community-organized regime; 2) a centralized-state regime; and 3) an unrestricted private-property regime - on groundwater for agriculture.

Feitelson, E. and M. Haddad (1998). "Identification of joint management structures for shared aquifers. A cooperative Palestinian-Israeli effort." World Bank Technical Paper **415**: 1-28.

In this study, the authors provide an approach for building joint management institutions over time for groundwater, and present some of the lessons that may be gleaned from their collaborative experience. Although the paper's focus is limited to the Israeli-Palestinian situation, the conclusions reached in this study can be applicable to other transboundary settings.

Hamlin, C. (2000). "'Waters' or 'Water'?: Master narratives in water history and their implication for contemporary water policy." Water Policy **2**: 313-325.

Hamlin argues that the concept of 'water' has been simplified and essentialized. He suggests that policy makers need to become more cognizant of the diverse types of water, divergent needs to maintain water quality, as well as the multiple uses of water as a resource.

Jockel, J. T. and A. M. Schwartz (1984). "The Changing Environmental Role of the Canada-United States International Joint Commission." Environmental Review **8**(4): 236-251.

Jockel and Schwartz outline the changing role of the International Joint Commission since its inception in 1909. Prior to the formation of the IJC, the countries mainly resolved transboundary water issues in an ad hoc manner. However, even with the institutionalization of the joint commission, their powers remain limited. The authors conclude that the IJC has successfully developed new strategies for remaining a useful commission, in particular its burgeoning role as a watchdog.

Kanji, M. (1996). "North American Environmentalism and Political Integration." The American Review of Canadian Studies **Summer**: 193-204.

Kanji shows (through empirical evidence based on polling surveys) that people who indicate a concern for the environment are more supportive of the idea of "doing away with political borders". Although the motivation for environmentalism varies between individuals, Kanji does find that environmental concern is a predictor for participation in conventional forms of activism. This is relevant to the case of BC / WA

transboundary governance because it shows that the people involved (or supportive of) transboundary environmental governance are a self-selected group of individuals not necessarily representative of the general populace.

Kidd, J. (2002). Groundwater: A North American Resource: Discussion paper for the Expert Workshop on Freshwater in North America (21 January 2002). Program on Water Issues. Toronto, Munk Centre for International Studies Trinity College, University of Toronto.

This document was developed to spur discussion and focus the debate on groundwater in the North American context. The Commission for Environmental Cooperation has recently prioritized groundwater because it is the least well understood component of North America's freshwater system and a number of agencies have called for governments to increase their understanding of the resource.

Kliot, N., D. Shmueli, et al. (2001). "Institutions for management of transboundary water resources: their nature, characteristics and shortcomings." Water Policy 3(3): 229-255.

This paper examines the evolution, structure and characteristics of the management systems of 12 transboundary river basins. Many of the legal principles investigated for the shared river basins are transferable to shared groundwater management. In particular, the principle of equitable use of transboundary water resources and the obligation not to cause harm in the management of transboundary water resources are pertinent.

Kramsch, O. and V. Mamadouh (2003). "Crossing Borders of Political Governance and Democracy." Journal of Borderlands Studies 18(1): 39-50.

Kramsch and Mamadouh offer an alternative to nation-state or capitalistic interpretations of border analysis. They suggest that focusing on "scale" and "democratic politics" *from* the border, rather than from the State or economic center, can offer new insights into cross-border governance. Many scholars have noted that supra-national institutions lack the political structure to effectively and reliably engage in cross-border cooperation, and that minor networks with bottom-up approaches are often more adept at border-governance. The British Columbia - Washington border is an excellent example where both supranational and informal networks are involved in transboundary management of a shared water source - looking at the processes through scale and democratic processes, allows for a deeper analysis of the processes - both the factors that limit and perpetuate cooperative governance.

Leach, W. D. and N. W. Pelkey (2001). "Making Watershed Partnerships Work: A Reivew of the Empirical Literature." Journal of Water Resources Planning and Management 127(378-385).

This article offers practical suggestions for designing successful watershed partnerships. Drawing on empirical studies, they note 'best practices' for management and dispute resolution.

Lemarquand, D. (1993). "The International Joint Commission and Changing Canada-United States Boundary Relations." Natural Resources Journal 33(1): 59-91.

Lemarquand provides a succinct history of the changing roles of the IJC since its creation in 1909. He concludes that the IJC's much needed reform should focus on what it already does well. That is, expand its role as a third party advisor (fact finder and technical mediator), as well as a neutral mediator and program evaluator.

Mumme, S. P. (1984). "Regional Power in National Diplomacy: The Case of the U.S. Section of the International Boundary and Water Commission." Publius 14(4): 115-135.

The author analyzes the U.S. section of the International Boundary and Water Commission that was established in 1945 for the bilateral management of water resources between Mexico and the U.S. The author considers the unusual authority of the commission as a result of the narrow field of jurisdiction and the technical and apolitical image of the organization. Other North American organizations can benefit from this analysis, which reveals how an agency that is formally subject to policies of the US State Department, can operate at a bilateral level with minimal State Department interference.

Munton, D. (1980-81). "Dependence and Interdependence in Transboundary Environmental Relations." International Journal [Canada] 36(1): 139-184.

This paper, which is based on confidential interviews, speeches, and Canadian and U.S. documents, discusses the processes by which Canada and the United States typically deal with transboundary environmental management. Drawing from the Great Lakes examples, the authors show that the confrontation is usually made through verbal interaction, using a fact-finding commission. They also find that despite the utilization of a fact-finding commission to suggest neutral solutions, the governments base their decisions on political and economic considerations rather than environmental considerations.

Newman, D. (2003). "On Borders and Power: A Theoretical Framework." Journal of Borderlands Studies 18(1): 13-26.

Newman sets an agenda for border research by expanding traditional notions of borders (as nation-state territories) to include social aspects of border-creation. With this broadened view of borders, Newman suggests an expanded need for border research to include topics such as: transboundary institutional governance at various scales; borders as sites of exclusion and "othering"; frontiers as hybrid-spaces blending national identities; and the power-relations of elite decision-makers who open and close borders.

Paule, A. (1996). "Underground Water: A Fugitive at the Border." Pace Environmental Law Review. 13: 1129 - 1170.

Paule discusses the threats to groundwater along the U.S.-Mexico borderland and the corresponding need for binding nation-state groundwater agreements. Paule cites NAFTA as a reason for concern for increased pressure on water sources, as well as the increased industrial and population pressures along the borderlands. Although

demographics vary significantly between the North American borderlands, parallels can be made the Canada-US border - specifically, the need for binding arbitration and clear communication between parties.

Perrez, F. X. (1996). "The Relationship between "Permanent Sovereignty" and the Obligation not to Cause Transboundary Environmental Damage." Environmental Law 26: 1187 - 1212.

Perez argues that state sovereignty and obligations to international environment issues are not mutually exclusive. In fact, Perez shows that transboundary environmental responsibility is inherent in national sovereignty. His argument rests on interpretations of various international principles including: *sic utere tuo ut alienum non laedas* (use your own property so as not to injure that of another) from the 1917 Trail Smelter Arbitration, Principle 21 From the 1972 *Stockholm Convention*, and Principle 2 from the Rio Convention. This paper is useful for transboundary cases along the BC/WA border, because it reaffirms the fact that strong nation-state identities (as they fluctuate over time) is not mutually exclusive to cross-border cooperation.

Scheuer, M. F. (1980). "Calming Troubled Waters: The Organization, Procedures and Operation of the International Joint Commission." Inland Seas 36(1): 4-11.

This paper describes the history and institutional framework of the IJC from 1911-1980. Scheuer highlights the longstanding record of the IJC - deciding on more than 100 cases - and the versatility of the commission - concerning itself with issues beyond water.

Schlender, G. (2002). *Trans Boundary Water: Feasibility of Conducting Negotiations with other States and Canada on Water Bodies Shared with Washington*, Department of Ecology, Water Resources Program: 40.

This report deals with the feasibility of conducting negotiations with other states and Canada on water bodies shared with Washington. The report describes the agreements that have been signed between Washington state and Canada, as well as interstate agreements between Washington and Idaho, and Washington and Oregon. The transnational agreements include: Lake Roosevelt-Columbia River Treaty and Tributary Systems, Abbotsford-Sumas Aquifer agreement, the International Osoyoos Lake Board of Control. The interstate agreements include: Pullman-Moscow Aquifer, and Regulation of water rights between Washington and Oregon in the Walla Walla Basin of Washington.

Schwartz, A. M. (2000). "The Canada-U.S. Environmental Relationship at the Turn of the Century." American Review of Canadian Studies 30(2): 207-226.

This paper serves as an excellent overview of the ongoing bilateral relationship between Canada and the United States in environmental management. The authors draw upon several 20th century examples to highlight the major successes and challenges of the environmental relationship between the two countries.

Schwartz, A. M. and J. T. Jockel (1983). "Increasing Power of IJC." International Perspectives [Canada] **Nov-Dec**: 3-7.

This paper highlights the changing role of the International Joint Commission from its original role as nonpartisan fact finder of technical matters to its new role as a permanent watchdog. The added responsibilities of the IJC materialized with the passage of the 1972 and 1978 Great Lakes Water Quality Agreement. The new role of the commission has found opportunity to criticize the United States for its failure to adhere to its previously agreed upon obligations.

Singh, J. and P. Ganster (2003). "Transboundary Environmental Cooperation: A Conversation on Issues in Research and Methodologies." Journal of Borderlands Studies **18**(1): 51-60.

Singh and Ganster discuss the practicalities of transboundary environmental cooperation. They note that shared environmental projects across borders rarely translate into wider shared regional identities. They also find that bioregional identities spanning political borders are often a political project of imagined realities (such as the creation of the Cascadia identity) and often benefit elites.

Singleton, S. (2002). "Collaborative environmental planning in the American West: The good, the bad and the ugly." Environmental Politics **11**(3): 54-75.

This article seeks to test the claims made for collaborative, place-based natural resource management by looking at three cases of watershed planning in the Pacific Northwest. The conclusion is that the success of such efforts is impressive in some areas, while in others is limited by the collaborative movement's difficulty in confronting, or developing institutions to resolve core conflicts over equity, the distributive effects of natural resource planning, and competing visions of nature and the goals of watershed planning.

Uitto, J. I. (2004). "Multi-country cooperation around shared waters: Role of monitoring and evaluation." Global Environmental Change **14**: 5-14.

Uitto argues that in order to minimize the risk of conflict between two or more countries sharing a common water resource, the development of effective international governance systems is required. This paper specifically focuses on monitoring and evaluation in order to ensure that the implementation of action-plans is agreeable to all parties.

Van-Veen, D., R. Kreutzwiser, et al. (2003). "Selecting appropriate dispute resolution techniques: A rural water management example." Applied Geography **23**(2-3): 89-113.

This paper explores general dispute resolution principles as they apply to groundwater in southern Ontario. The authors set guidelines for selecting the most effective dispute resolution technique that could prove useful in the transboundary context.

IV. ANNOTATED BIBLIOGRAPHY: REGIONAL TRANSBOUNDARY WATER GOVERNANCE BETWEEN BRITISH COLUMBIA AND WASHINGTON

Agnew, B. (1992). Overview of Washington State and perspective on cross-border issues. Round Table on Environment and Economy. B. C. Victoria.

This document presents an overview of Washington State government and perspective on cross-border issues. It looks at the following points: state government; economy and labour; population/growth impacts; environment; regional planning and local governments; native tribes; cross-border issues - environmental and natural resources; transportation; and the Cascadia Corridor Commission.

Alper, D. K. (1996). "The Idea of Cascadia: Emergent Transborder Regionalisms in the Pacific Northwest-Western Canada." Journal of Borderlands Studies 10(2): 1-22.

This paper assesses the idea of Cascadia as a regional identity linked between the ecological region of the Pacific Northwest and western Canada, as well as investigates the nascent transnational organizations created to problem solve in the bi-national area.

Alper, D. K. (1997). "Transboundary environmental relations in British Columbia and the Pacific Northwest." American Review of Canadian Studies 27(3): 359-383.

Alper shows that sub-national political units - provinces, states, cities, and municipalities - have become key actors in bi-national and global activities in British Columbia and Washington. He also shows that despite the increasingly 'transnational' character of the region, transnational environmental groups are unable to surpass the limitations of sovereign jurisdictions due to both litigation and monetary considerations.

Alper, D. K. and R. L. Monahan (1986). "Regional Transboundary Negotiations Leading to the Skagit River Treaty: Analysis and Future Application." Canadian Public Policy [Canada] 12(1): 163-174.

Alper and Monahan examine the negotiation process of the Skagit River treaty - involving the building of a dam in Washington and the flooding of British Columbia territory. Lessons from this negotiation process could prove useful for other bi-national transboundary resource issues. In particular, the lessons applicable for groundwater governance includes: regional transboundary issues should be dealt with at the lowest scale possible (local / regional); impartial fact-finders should act on behalf of both parties; effective communication between parties are paramount; and during negotiations parties should aim for benefits that go beyond specific issue of contention.

Day, J. C. (2004). "The role of collaboration in environmental management: An evaluation of land and resource planning in British Columbia." Journal of Environmental Planning and Management 47(1): 59-82.

Recent literature on land-use planning proposes the use of innovative collaborative planning (CP) models to resolve planning disputes. This paper uses a participant survey

based on 25 evaluative criteria to evaluate an application of CP to land-use planning in British Columbia, Canada. The results show that CP is an effective means of resolving environmental conflict and produces significant additional benefits such as improved stakeholder relations, skills, and knowledge. The case study evaluation also identifies the keys to successful CP management including factors related to process design and external circumstances.

Day, J. C., T. I. Gunton, et al. (2003). "Toward environmental sustainability in British Columbia: The role of collaborative planning." Environments 31(2): 21-38.

This paper describes the shift in rural British Columbia in the 1990's to prioritize ecological, social and economic sustainability. The authors analyze the corresponding institutional changes and the adoption of collaborative planning - or shared decision making - as the basis for conflict resolution. The authors highlight several lessons learned during this shift that could prove helpful to those interested in best practices for environmental managers.

De Loe, R., L. Moraru, et al. (2001). "Demand side management of water in Ontario municipalities: Status, progress, and opportunities." Journal of the American Water Resources Association. 37(1): 57-72.

The authors evaluate "demand side management" of water resources in Ontario municipalities. This style of management is aimed at improving the efficiency of water use, deferring costs associated with constructing new water treatment plants, and minimizing the environmental impacts associated with supplying water. The authors find, however, that the demand style management needs to demonstrate the real cost savings to consumers, as well as develop specific goals and objectives for its programs.

Dorcey, A. (1987). "The myth of interagency cooperation in water resources management." Canadian Water Resources Journal 12(2): 17-26.

Dorcey argues that the myth of interagency cooperation needs to broaden its scope in order to more effectively address the challenges facing Canadian water resource management. Specifically, Dorcey contends that cooperation between private organizations and other interested parties need to be recognized, as well as a focus on conflict resolution.

Litke, S. and J. C. Day (1998). "Building local capacity for stewardship and sustainability: the role of community-based watershed assessment in Chilliwack, British Columbia." Environments 25(2-3): 91-109.

This paper explores the community watershed stewardship process emerging in British Columbia in which community-based organizations, citizens, government agencies, First Nations, and private industries are working cooperatively to build local capacity for sustainable management of water. The paper focuses on a stewardship initiative in Chilliwack, British Columbia, where partners work cooperatively to complete a community-based watershed assessment. This example provides an opportunity to evaluate successes, challenges, and opportunities for community-based watershed

assessment, and the ability for local stakeholders to participate in water governance projects.

Marshall, D. (1998). "Watershed management in British Columbia: the Fraser Basin experience." Environments 25(2-3): 64-79.

This paper describes the role of the B.C.-based Fraser Basin Council, a new body involving many governmental and nongovernmental interests, to facilitate shared decision-making within the Fraser River watershed. "This paper describes antecedent institutions to the Council and the new Council partnership for managing the largest salmon-producing river system in the world, a system whose health is continually threatened by a myriad of activities beyond its banks and those of its tributaries."

McDaniels, T., R. Gregory, et al. (1999). "Democratizing risk management: Successful public involvement in local water management decisions." Risk Analysis 19(3): 497-510.

This paper looks at local governance efforts to resolve several highly controversial water management issues associated with an electrical generation facility in British Columbia. This paper is useful as it outlines principles for public groups to participate in "successful" decision-making processes such as 'value-focused thinking' and 'adaptive management' practices.

McDaniels, T. L., L. J. Axelrod, et al. (1998). "Public perceptions regarding water quality and attitudes toward water conservation in the Lower Fraser Basin." Water Resources Research 34(5): 1299-1306.

This paper concerns public judgments regarding water quality, public attitudes about water conservation, and related issues in the Lower Fraser Basin of southwest British Columbia, Canada. A written survey was administered to 183 lay subjects in four communities within the Lower Fraser Basin. The results show that subjects generally perceive water quality in specific water bodies as worse than indicated in technical studies of those water bodies. Respondents also indicated a high willingness to engage in water conservation activities.

Sparke, M. (1998). "From geopolitics to geoeconomics: Transnational state effects in the borderlands." Geopolitics 3(2): 62-98.

Sparke outlines how an examination of localised strategies to create cross-border regions in the context of globalised economic interdependencies offers a research window onto processes currently challenging the nation-state from the ground up. As such, it is argued that the case studies offer a way of empirically evaluating the geoeconomic influence of discourses about 'the end of the nation-state' promoted by writers such as Ohmae.

Sparke, M. (2000). "Chunnel Visions: Unpacking the Anticipatory Geographies of the Anglo-European Borderland." Journal of Borderlands Studies XV(1): 187-219.

Sparke employs the notion of 'geographic imagination' to show how transnational projects (in this case, European cross-channel transportation between England,

France, and Belgium) serve to promote wider visions of socio-political-economic cooperation between border regions. Sparke's engagement with transnational governance, although placed in Europe, provides valuable insights into how Canada - U.S. transnational projects are embedded in larger projects and nation-state goals.

Sparke, M. (2000). "Excavating the Future in Cascadia: Geoeconomics and the Imagined Geographies of a Cross-Border Region." BC Studies: The British Columbian Quarterly 127: 5-44.

Sparke shows how the region known as 'Cascadia' was been promoted by neoliberal entrepreneurs on the basis of (false) geoeconomics premises. Despite the decade-long promotion of the bi-national region as a singular economic force, Sparke shows that 'Cascadia' is no closer to becoming linked economically or politically. This has not dissuaded promoters of 'Cascadia', however, as the project continues despite fledging results. Part of the success is the powerful metaphor based on images of a singular, beautiful bio-region.

Washington Department of Ecology (2004). Groundwater Assessment: Department of Ecology. Retrieved August 22, 2004, 2004, from <http://www.ecy.wa.gov/programs/eap/groundwater/>

This website provides a description of and contact information for groundwater studies in Washington State, as well as a comprehensive map showing completed studies and links to available on-line reports. It also provides links to general information on groundwater in Washington State and a compilation of sources and information regarding groundwater in Washington.

V. TECHNICAL BIBLIOGRAPHY: TRANSBOUNDARY WATER GOVERNANCE OF THE ABBOTSFORD-SUMAS AQUIFER IN BRITISH COLUMBIA AND WASHINGTON

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