

Changing Perspectives — Changing Paradigms: Taking the “Soft Path” to Water Sustainability in the Okanagan Basin

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“Only a broad and representative group of people with interests in a given river basin can determine what the optimum use of that river looks like.”

(Postel and Richter, 2003: 182)

Abstract: Access to fresh water is vital to Canada’s long-term prosperity. Water is the foundation of our economy and communities, and is essential for all forms of life. Yet despite its critical importance, water is undervalued and often wasted. Perceived as an abundant and virtually limitless resource, the myth of abundance is entrenched even in water-stressed areas such as the Okanagan, where drinking water supplies are at risk, conflicts among water users are common, economic opportunities are threatened, and aquatic ecosystem health and fisheries are declining. Population growth, coupled with the uncertain (yet increasingly evident) impacts of climate change, will only increase these challenges in the future. Water conservation and demand management are critical components in a lasting long-term and sustainable approach to water management. Demand management offers a genuine win-win solution as communities reap both environmental and economic dividends from reducing water use. To demonstrate that conservation is the next best source of “new” water in regions where supply is limited, this paper outlines opportunities to move toward more sustainable water management. A comprehensive and long-term approach to water demand management, referred to as the “soft path,” requires active participation by water users and effective strategic planning to create the appropriate mix and timing of conservation measures for the region. Lasting solutions require changes in attitudes and opinions about water and must draw on innovative tools and best practices from other jurisdictions to create a basin-wide and comprehensive “made in the Okanagan” approach to sustainable water management.

Résumé : L'accès à l'eau douce est essentiel à la prospérité à long terme du Canada. L'est constitue le fondement de notre économie et de nos collectivités et elle est essentielle à toute forme de vie. Pourtant, en dépit de son importance cruciale, l'est est sous-évaluée et souvent gaspillée. L'eau est perçue comme une ressource abondante et presque illimitée. Le mythe de l'abondance est bien ancré, et ce, même dans les

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régions soumises à des stress hydriques comme l'Okanagan, où les réserves d'eau potable sont menacées, où les conflits entre les utilisateurs d'eau sont courants, où des menaces pèsent sur les perspectives économiques et où la santé de l'écosystème aquatique et les pêches sont en déclin. La croissance de la population, ajoutée aux impacts incertains (et pourtant de plus en plus évidents) du changement climatique, ne feront qu'accroître ces défis dans les années à venir. La conservation de l'eau et la gestion de la demande sont des composants critiques d'une approche durable et à long terme de la gestion de l'eau. La gestion de la demande offre une véritable solution gagnante car elle permet aux collectivités de retirer des avantages à la fois environnementaux et économiques de la réduction de l'utilisation de leur eau. Dans le but de démontrer que la conservation est la deuxième meilleure source d'eau « nouvelle » dans les régions où les réserves sont limitées, la présente communication décrit diverses façons de se tourner vers des mesures qui favorisent une gestion de l'eau plus durable. Une approche globale et à long terme de la gestion de la demande d'eau, qu'on qualifie de « voie douce », appelle une participation active de la part des utilisateurs d'eau ainsi qu'une planification stratégique efficace qui permettront d'en arriver à un calendrier et à une combinaison appropriés des mesures de conservation pour la région. Les solutions durables exigent des changements d'attitudes et d'opinions par rapport à l'eau et doivent reposer sur des outils innovateurs et sur des pratiques exemplaires s'inspirant d'autres sphères de compétences. C'est ainsi que sera créée une approche globale et à l'échelle du bassin (« produit de la région de l'Okanagan ») de la gestion durable de l'eau.

Introduction and Context

“Water will become Canada’s foremost ecological crisis early in this century.”

(Schindler, 2001)

Access to fresh water is vital to Canada's long-term prosperity. Yet despite its critical importance, water is undervalued and often perceived as a virtually limitless resource. This myth of abundance is firmly entrenched throughout Canada, even in water-stressed areas such as the Okanagan Basin in British Columbia, where drinking water supplies are at risk, conflicts among water users are common, economic opportunities are threatened, and aquatic ecosystem health and fisheries are declining.

Growing population, increasing pollution, urbanization and misconceptions about regional water abundance and climate variability put stress on water supplies. All of these factors challenge decision-makers and local leaders to embrace innovative approaches to water management to realize a sustainable future for the region.

Managing water demand is an effective way of dealing with the current challenges and represents a shift from the traditional supply-side approach to water management. Conservation and demand management are critical to achieving a long-term and sustainable approach—offering a genuine win-win solution, as communities reap both environmental and economic dividends from reducing water use. Moving away from a focus on supply-side options and toward a comprehensive, integrated and long-term approach to demand management begins the shift to sustainable water management—sometimes referred to as the “soft path” for water.

This paper investigates the potential of positioning water conservation and demand management at the forefront of a “soft path” approach to water management in the Okanagan Basin. The Okanagan Basin may be considered Canada's “canary in a coalmine” from a water management perspective. With similar emerging water-related challenges facing other jurisdictions in Canada, the lessons learned and opportunities for action explored in the region can inform water management across the country.

Purpose and Overview

The purpose of this paper goes beyond simply revisiting the balance between supply and demand management approaches. Instead, it seeks to recast this balance within a “soft path” approach. To achieve this, the discussion explores how to move the “soft path” approach from

concept to implementation in the Okanagan. This research draws on the continuing dialogue about ecosystem health and current water planning practices, and allows the development of an understanding of water availability and management approaches in the Okanagan Basin. This foundation provides the basis to explore the potential for a comprehensive and long-term approach to water management—referred to here as the “soft path” for water—as a viable response to the various water challenges facing the region.

This first section introduces the topic and outlines the water management context in the Okanagan Basin. The following subsections provide the necessary background information for a detailed discussion of the potential, and the challenges, of moving toward sustainable water management. This first section concludes by providing an overview of the soft path for water and the specifics of what such an approach might look like in the Okanagan Basin, including specific attention to water conservation measures that represent the building blocks for a sustainable water future.

The second section—Being Innovative—moves the discussion towards implementation. Existing innovative water management initiatives and efforts in the basin are introduced. This section describes some of the barriers to a water conservation paradigm. Understanding the interaction among different barriers is a necessary first step to move beyond isolated strategies and begin tackling barriers simultaneously and strategically.

Finally, the third section—Creating Change—explains the importance of social solutions that focus on managing people, not watersheds. Although this section acknowledges the significant challenge of changing perspectives and attitudes, it begins the dialogue to initiate such changes. The discussion then moves to questions of governance, emphasizing that “good” governance is more than just government and requires action by all stakeholders. The section concludes with a list of key factors that will enable and embed water demand management and the soft path in a basin-wide and integrated “made in the Okanagan” approach. Some of the critical factors identified for such an approach include the need for a shared vision for the basin; the importance of knowledge about current and future supply limits; adaptive institutions to promote long-term planning, create solutions and lead

innovation; and the critical importance of relentless education to create a lasting water ethic.

Water in the Okanagan – A Changing Reality

The Okanagan Basin lies in the rainshadow of British Columbia’s Coast Mountains and receives an annual average of only 300 mm of precipitation in the valley’s bottom (Mason *et al.*, 2005). In dry regions like the Okanagan, even small changes in climate can put significant stress on water supplies. Since much of the region is arid or semi-arid, any changes in timing or reductions of supply will have significant impacts throughout the basin.

Agriculture is an important component of the regional economy and is highly dependant on a reliable supply of irrigation water. Climate change is “expected to impact both the demand for and availability of water for irrigation purposes” (Cohen *et al.*, 2004). A significant concern is the changing availability of water for irrigation, adding to concern that water supply is quickly becoming the limiting factor to growth in the region.

Climate change impact studies in the region suggest that earlier runoff, lower precipitation with warmer, wetter winters and longer, hotter and drier summers will be the norm (Dickenson, 2005; Cohen *et al.*, 2004; Barnett *et al.*, 2004; Cohen and Miller, 2001). The UBC watershed model for Okanagan streams specifically shows “that a characteristic response to climate change scenarios is earlier peak flows” (Cohen *et al.*, 2004). This changing availability means that, beyond the basic amount required to keep the aquatic system functioning, water may not be available for much of the growing season. This may force early dependence on stored water and stress the supply system, as occurred during the drought in 2003. Some observers even suggest that droughts such as the one in 2003 may become the norm.

Demand is also impacted by climate change. Neilsen *et al.* (2005) indicate a 20 to 40 percent increase in daily water demand for agriculture by 2080. Climate change models have projected that while demand for water in the Okanagan Basin will probably increase by 30 percent by 2050, summer precipitation by that time could be as much as 35 percent less than the average between 1961-1990 (Cohen *et al.*, 2004).

Higher temperatures will also increase residential water demands. A case study in the city of Penticton demonstrates that a nine percent increase is possible by 2050 from climate change alone (the lowest change among the climate scenarios) (Cohen *et al.*, 2004). Increasing water demand induced by climate change exacerbates the already increasing demand associated with regional population and economic growth. Many water supply systems in the Okanagan may not be able to meet future projected demands based on their current supply capacity (Cohen *et al.*, 2004: 2).

In the Okanagan Basin, both supply and demand management approaches are employed to deal with water challenges. The balance between them varies with geography, public attitudes, financial resources, and economic and political choices. In the past, the focus has been to find the appropriate balance between water supply expanding strategies and appropriate demand management techniques to extend existing supplies while new supplies are found. But with demand expected to increase while supply declines, regional water challenges may intensify. The dual challenges of both water supply limitations and demand increases in the region may only be addressed by considering conservation as the best source of “new” water for the Okanagan.

Meeting Water Needs Through Demand Management

Managing water demands to meet water needs is part of a broad spectrum of water management approaches (see Table 1). At one end of this spectrum is a supply-side paradigm that seeks to increase capacity through large infrastructure such as additional pumps and new and larger reservoirs. At the other end of the spectrum is a truly long-term and comprehensive approach to planning and water resource development and use—a “soft path” for water. In the middle of the spectrum is demand-side management (DSM), an approach that focuses on efficiency and includes education, water-efficient technologies, watering restrictions, regulatory regimes that promote reuse and recycling, and volume-based conservation pricing.

Demand-side management refers to the planning and implementation of programs that influence the amount, composition, or timing of demand for a commodity or service. In general, when the issue is scarcity, the demand management solution is to reduce

use rather than to automatically supply more of the service or resource being sought. In the context of population growth and urbanization, water demand management increases per capita water-use efficiency; and in the context of agricultural production, it entails “more crop per drop” to stabilize or reduce total water use. Brooks and Peters (1988: 3) specifically define water demand management as “any measure that reduces average or peak withdrawals from surface or groundwater sources without increasing the extent to which wastewater is degraded.”

Conceptually, supply and demand management strategies are separated by their fundamentally different views of water as a resource. Supply-side management views fresh water as virtually limitless, with resources being developed according to human needs. Demand management, on the other hand, accepts the finite nature of water resources and focuses on improving efficiency—doing more of the same with less water.

Ultimately, by increasing water-use efficiency, demand management measures and programs mitigate the pressures of excessive water use on municipal and regional finances, infrastructure, and the aquatic ecosystems on which these systems rely (Brandes and Ferguson, 2004).

At its core, a water demand management approach recognizes that developing new water sources may be costly while influencing consumer demand is often much more cost-effective. Brooks (2003: 9) suggests that “in almost every sector, cost-effective savings of 20 to 50 percent of water use are readily available.” This is particularly true when environmental and full economic costs of water services are taken into account. For example, a recent study in California demonstrates that total commercial, industrial, residential and institutional water use could be cost-effectively cut by as much as 30 percent using similar prices and existing off-the-shelf technologies. This study goes on to conclude that these improvements can be achieved more quickly and cleanly than any new supply project under consideration (Gleick *et al.*, 2003).

Going Beyond Efficiency Towards the “Soft Path” for Water

As demand management programs become more comprehensive and long-term, they begin to fall into a more holistic approach to water management—often

Table 1. A spectrum of water management.

Characteristic	Supply-Side Approach	Demand-Management (DSM)	Soft Path for Water
Philosophy	Water resources are viewed as virtually limitless; the primary constraint is capacity to access new sources or store larger volumes of water.	Water resources are viewed as finite, to be used efficiently. Conservation is key and economic cost-benefit analysis guides development choices between increased supply and managed demand.	Water resource are viewed as finite and driven by ecological processes. The focus is on a fundamental re-evaluation of the way we meet the services that water currently provides.
Basic Approach	<p>Reactive.</p> <p>Currently, the status quo approach, developing resources driven by exogenous human needs and wants.</p>	<p>Short-term and temporary.</p> <p>Generally used as a secondary approach, complementing and deferring supply-side options often until future supplies are secured.</p> <p>When used in a comprehensive, integrated and long-term fashion, DSM represents an incremental step towards a broader “soft path” approach.</p>	<p>Proactive.</p> <p>Long-term, based on making attitudinal changes (which are not seen as outside the process—not “exogenous”) and on fostering new patterns of resource use.</p>
Fundamental Question	How can we meet the future projected needs for water given current trends in water use and population growth?	How can we reduce needs for water to conserve the resource, save money and reduce environmental impacts?	How can we deliver the services currently provided by water in new ways that recognize the need for long-term systemic changes to achieve social sustainability?
Primary Focus	Built infrastructure	Efficiency	Conservation
Tools and Primary Disciplines	<p>Large scale, centralized, expensive engineering solutions.</p> <p>Examples include dams, reservoirs, treatment plants, pumping stations and distribution systems.</p>	<p>Innovative engineering and market-based solutions focused on any measure that increases the efficiency and/or timing of water use.</p> <p>Examples include low-flow technologies, drip irrigation, conservation-based pricing, education and policies and incentives to reduce use.</p>	<p>Encompasses the full suite of social sciences and generally relies on decentralized distribution coupled with management strategies aimed at ultra efficient ways of meeting end-use demand. The focus is on measures to deliver the services provided by the resource taking full environmental and social costs into account, and identifying new options to provide services associated with water use.</p> <p>Examples include drought resistant native landscaping, grey water reuse, ultra-low flow technologies, and dry sanitation. In addition, the soft path encourages new forms of urban development (“smart growth”) and industrial innovation (e.g., new products, changes in agricultural practices and food preferences) that are inherently more sustainable.</p>
Planning Process	Planners model future growth, extrapolate from current consumption, plan for an increase in capacity to meet anticipated future needs, then locate and develop a new source of supply to meet that need.	Planners model growth and account for a comprehensive efficiency and conservation program to maximize use of existing infrastructure. Increasing capacity would be a final option as part of a least-cost approach.	Planners model future growth, describe a desired sustainable future state (or scenario) and then “backcast” to devise a feasible and desirable path to that future. Sustainability built into the economic, political and socio-cultural choices made along the way.

Source: (Brandes *et al.*, 2005: 7).

called the “soft path.” For water demand management as it is currently practiced, the primary focus is efficiency. The soft path has a broader perspective: conservation not just to save water, but water conservation within the ecological context and with a view to sustainability. It goes beyond efficiency and seeks to make lasting changes to habits and practices. This more robust view of water conservation depends on changing the very nature of our perspectives on water and changing the water governance institutions.

The soft path approach accepts that water conservation does not just happen. It requires institutions to creatively manage and accelerate the adoption of more sustainable practices. Similar to a demand management approach, the soft path strives for sustainability and equity in water management by using demand management (or water conservation) measures to increase water productivity, rather than seeking additional supplies. The soft path also ensures that stakeholders are engaged in decision-making and explicitly recognizes ecosystems as legitimate users of fresh water (Wolff and Gleick, 2002; Brooks, 2003; 2005). Moving from demand management along the spectrum towards the soft path requires a comprehensive, basin-wide and integrated framework. While demand management represents incremental change that buys time, the soft path is the fundamental change that ensures we begin living within the local water budget and ecological realities.

The soft path fundamentally challenges the way water is perceived and how it is used—shifting the focus to services provided by water rather than water as the resource or a commodity itself (Gleick, 2002; Brandes and Brooks, 2005; Brooks, 2005). This approach ensures that human needs for water are met in the most ecologically sustainable way. Demand for water is not generally for water itself—except for drinking, food preparation, and washing, which often account for less than one-third of total domestic water use. Rather, water demand is mainly for services such as sanitation and irrigation. Focusing on water services allows water managers to consider many more options to satisfy demands, reducing the pressure to increase water supplies.

A key feature of soft path planning is the recognition that many existing water needs can be met with far less water, and often with water of a lower quality than is currently used. High-efficiency toilets, for example, reduce the amount of water used

for personal hygiene; however, there is significant potential to further increase water productivity by using reclaimed wastewater to flush toilets or by using dry sanitation systems that completely eliminate water use. The soft path for water moves beyond the technical and micro-economic efficiencies of demand management, into the social, political and cultural realm that result in long-term institutional and structural changes that embed water conservation (Brooks, 2003: 11).

This change requires planning, incentives and time to allow for the adoption of new attitudes, processes and technologies. Clear objectives and targets (based on understanding water availability beyond *in situ* needs) are also necessary to enable adaptive management over time as conditions and expectations change.

“[The soft path] will require institutional changes, new management tools and skills, and a greater reliance on actions by many individual water users rather than a few engineers. Yet when compared with the growing cost to society of continuing down the hard path, it is evident that a new way of thinking about our scarce water resources is long overdue.”

(Gleick, 2002: 373)

The Soft Path in the Okanagan

A comprehensive and integrated planning process that promotes a suite of locally appropriate measures to reduce water demand in the face of climate change impacts, is the central focus of what Cohen *et al.* (2004) call an “adaptation portfolio.” Such an adaptation portfolio should also include improved planning for droughts and severe floods, improved water quality protection, and better monitoring. All of these are considered “no regret” options that provide benefits regardless of the specific climate change impacts (Dolan *et al.*, 2000; Cohen and Miller, 2001; Schindler, 2001; Environment Canada, 2004; Natural Resources Canada, 2004).

Collectively, these adaptation strategies are the best way to reduce local vulnerability and also meet a wide range of environmental, social and economic objectives within the region. In particular, changes in climate and the emergence of new socially-driven pressures, such as urban and tourism growth and the recognition of the need for proper ecosystem function, intensify the need to manage demand as a hedge against future uncertainties.

For regions such as the Okanagan that face increasing demands and water supply limits, traveling down the old supply-oriented “hard” path is no longer a sustainable option. The soft path offers a new approach that works within existing infrastructure and can build on some of the local success around innovative water management. For the Okanagan, the soft path would:

- focus on the underlying services that water provides and not necessarily the volume of water *per se*;
- view water conservation as the best “new supply” of water in the basin;
- match the quality of the water supply to the quality required by end users;
- maintain ecosystem health before allocating water for other social and economic human needs; and
- turn the current planning practices around, and instead “backcast” from a shared vision and a desired future state.

By achieving consensus on a desired future condition (e.g., a level of water extraction and use that ensures sufficient water remains available to sustain the ecosystem), a basin-wide effort to promote the full suite of innovative solutions and conservation measures is possible—and a fundamental shift in perspectives may be realized.

Water Conservation Measures – The Building Blocks of a Sustainable Water Future

A wide variety of measures exist to reduce water use. Options range from simple technologies such as drip irrigation and low-flow fixtures and appliances, to alternative sources such as cisterns, rainbarrels, and reuse-recycling technologies. Other measures include education, regulation (watering restrictions, land-use ordinances and mandated best practices) and economic incentives (full-cost accounting, conservation-based pricing, rebates for conservation technologies, and subsidies for less water-intensive crops). Collectively, water conservation measures—the means for achieving

reductions in water use—are critical drivers to the soft path approach. Specifically, the soft path recognizes the synergistic nature of conservation measures and seeks to reduce water use by employing multiple initiatives and a comprehensive approach.

Table 2 provides a general list of such measures that are applicable both to the urban and agricultural sector.

Water reuse-recycling and metering with conservation-based pricing incentives stand out as promising opportunities to reduce water use and promote water sustainability. These options are key components for water management in regions of scarcity and limited supply.

Conservation-based pricing and technological innovation for water reuse and recycling are synergistic. As prices reflect a “truer” cost of the resource, recycling and reuse options become more economically feasible, spurring innovation and technological advances. These advances in turn reduce costs, leading potentially to further opportunities for cost-effective alternatives. Reuse and recycling and conservation-based pricing are equally relevant across sectors—agricultural, industrial and municipal water.

Collectively, water conservation, efficiency, education, pricing, and recycling and reuse represent significant opportunities to manage water demand and reduce water use. Postel (1997: 191) believes this “last oasis” is “large enough to get us through many of the shortages on the horizon, buying time to develop a new relationship with water systems and to bring consumption and population growth down to sustainable levels.”

Being Innovative – Promoting and Learning from the Early DSM Adopters

As we peer into the twenty-first century, water conservation is looking far more like an imperative than an option.

(Vickers, 2001: xv)

Projecting how much water can be saved and made available to meet future water needs is simple enough, and ample evidence and experiences throughout the Okanagan Basin exist to support the increasing use of demand management and water conservation measures. In the basin, measures range from cutting-

Table 2. Water demand management measures.

General Categories	Specific Examples
Socio-political strategies	<ul style="list-style-type: none"> • Information and education • Social marketing • Water policy • Water use permits • Plumbing codes for new structures • Appliance standards • Regulations and by-laws: <ul style="list-style-type: none"> ◦ Watering restrictions ◦ Landscaping ordinances ◦ Turf limitation by-laws ◦ Once-through cooling system bans
Economic strategies	<ul style="list-style-type: none"> • Rebates for more efficient technologies (e.g., toilets, showers, faucets, appliances, drip irrigation) • Tax credits for reduced use • Full-cost recovery policies • High-consumption fines and penalties • Pricing structures: <ul style="list-style-type: none"> ◦ Seasonal rates ◦ Increasing block rates ◦ Marginal cost pricing ◦ Daily peak-hour rates ◦ Sewer and waste water charges
Technical strategies	<ul style="list-style-type: none"> • Metering • Landscape efficiency • Soil moisture sensors • Watering timers • Cisterns • Rain sensors • Efficient irrigation systems: <ul style="list-style-type: none"> ◦ Micro and drip irrigation ◦ Soaker hoses • Leak detection and repair • Water audits • Pressure reduction • System rehabilitation • Efficiency technology: <ul style="list-style-type: none"> ◦ Dual flush toilets ◦ Composting toilets ◦ Low-flow faucets ◦ Efficient appliances (dishwashers/washing machines) • Recycling and Reuse – ranging from cooling and process water, to grey water for toilets or irrigation, to treating and reclaiming wastewater for reuse

Source: Adapted from (Brandes and Ferguson, 2003: 40).

edge leak detection, low-flow and reuse and recycling technologies, agricultural best management practices, drip irrigation systems, governance restructuring, conservation-based pricing systems, incentives and economic instruments, education and information programs, and creative stakeholder partnerships.

Early DSM Adopters in the Okanagan

Many water utilities in the Okanagan Basin employ demand management (or DSM) techniques in the residential sector. Larger municipalities such as Kelowna and Vernon, employ a variety of demand management techniques, most commonly education programs, metering, watering restrictions and rebates for fixtures and toilets. The South East Kelowna Irrigation District's (SEKID) universal agricultural metering pilot project, which reduced annual allocated water allotments by 27 percent, is another major local success story (Pike, 2005). However, Shepherd (2005), in a 2002 survey, found that while most municipal utilities are using some DSM measures, only a few have established programs employing a suite of initiatives.

Innovative local solutions are proof that change is possible—and is already occurring. Table 3 provides a list of many of the more successful initiatives in the region.

Barriers and Challenges

Approaches to water management must evolve to more fully embrace a fundamental water conservation paradigm if the region is to deal with the uncertainties of climate change and remain prosperous in the face of rampant growth.

Although many options for managing demand are available to water providers and end users, broad implementation in the Okanagan Basin (as in most of Canada) has been limited and generally piecemeal (Brandes and Ferguson, 2004). While Kelowna, Vernon, and a few other communities have taken initial steps toward more comprehensive programs, a variety of barriers limit widespread adoption of a holistic and long-term approach to water conservation.

Some of the most significant and challenging impediments in the Okanagan include:

Root causes:

- a myth of water abundance – the notion that more water is always available undermines efforts to pursue greater conservation;
- resistance to changes in water pricing – viewed as another government tax;
- a belief that reducing water use compromises standards of living or leads to more development;
- fragmentation of responsibility – water crosses international borders and water management involves multiple levels of government. This raises the question of who should bear the cost of water efficiency; and
- public perceptions and political agendas – in the Okanagan, for example, agricultural users have a strong sense of historically entrenched ownership over water and they continue to expect low water rates.

Entrenching factors:

- insufficient data – little is known about total supply and use. For example, insufficient information about groundwater and surface water linkages and difficulty in monitoring quantities of water allocated in water licenses and the amount used;
- limited ability of managers to modify water rights (e.g., water licence transferability and conditions);
- disconnect between land use and water management – rapid population growth in the valley is challenging decision-makers to find ways to effectively integrate water management considerations into land use planning;
- perception that achieved efficiency will simply allow for further development in the region, without a change in the development agenda;

Table 3. Okanagan Basin demand management initiatives.

<p>Black Mountain Irrigation District: Watershed protection, collaboration with other utilities, public education</p>
<p>City of Kelowna: Residential and ICI metering, watering restrictions, demand management planning, water audits, benchmarking, voluntary in-home, low-flow fixture programs, leak detection, sector demand study, Green design/SmartGrowth, water supply upgrades, computer upgrades, watershed protection, residential technologies, programs, pilot programs, pricing review, water conservation applied to operations and maintenance, collaboration with other utilities, public education, education for elected officials</p>
<p>District of Lake Country: Advisory committee, watering restrictions, sector demand study, Green design/SmartGrowth, computer upgrades; public education, education for elected officials</p>
<p>District of Summerland: Watering restrictions, metering pilots, water supply upgrades, public education, education for elected officials</p>
<p>Greater Vernon Water: Residential and ICI metering, demand management planning, water reuse, water supply upgrades, computer upgrades, voluntary in-home low-flow fixture program, public education</p>
<p>Lakeview Irrigation District: Watering restrictions, sector demand study, computer upgrades, watershed protection, water conservation applied to operations and maintenance, public education</p>
<p>Rutland Waterworks District: Metering, pricing review, watering restrictions, water supply upgrades, computer upgrades, collaboration with other utilities, drought management planning, demand management planning, water conservation applied to operations and maintenance, public education, education for elected officials</p>
<p>South East Kelowna Irrigation District: Agricultural metering, collaboration with other utilities, sector demand study, water supply upgrades, computer upgrades, watershed protection, pilot programs, pricing review, drought management planning, demand management planning, water conservation applied to operations and maintenance, public education</p>
<p>Westbank Irrigation District: Watering restrictions, water supply upgrades, computer upgrades, pilot programs, xeriscaping, public education, drought management planning</p>

Source: (deVries, 2004).

- concern that DSM savings are unreliable and/or insubstantial;
- general preference for high-visibility projects;
- publicly subsidized infrastructure expansion without enforced DSM conditions, which promotes supply-side solutions; and
- lack of funding for DSM projects and insufficient resources to develop “good” DSM programs.

The evolution of water management in the region and the influence of root causes and entrenching factors maintain the unsustainable, supply-side focus of the current water management regime in the area. These barriers create a gridlock that limits the widespread adoption of demand management and impedes the shift toward a soft path approach.

Overcoming this gridlock is challenging, but possible—through an understanding of individual barriers and their inter-relationships, and with the active participation of all stakeholders. This requires moving beyond isolated strategies and tackling a number of barriers simultaneously and strategically.

Creating Change – A “Counter” Story for Water Sustainability

“The water crisis is essentially a crisis of governance.”
(United Nations World Water Development Report, 2003)

Finding the appropriate mix of water conservation measures best suited to the Okanagan is relatively simple. It involves planning, discussion, and some basic research, but it is a goal that can be accomplished. Many of the methods and technologies for water demand management have been around for centuries (Brooks, 2003: 43). The more significant challenge is changing attitudes and initiating fundamental change—creating the “counter” story to the myth of abundance in the Okanagan, and thus begin to change the water management paradigm itself.

Changing Perspective

To what extent is the region prepared to move beyond merely being more water efficient to fundamentally changing the way it views and manages water? A change in perspective about water is the starting point. People must understand that limits exist, and individuals in the region must respect the full range of economic, social and environmental benefits that water produces.

Changing behaviour can be challenging. Conventional education programs are focussed on information dissemination and sometimes lack a thorough understanding of the barriers limiting the desired behavioural change. Social marketing is an alternative. It differs from conventional approaches because more time and effort is invested up-front to understand barriers prior to program design and implementation (McKenzie-Mohr, 2004). Although such an approach is most appropriate at a local level, it is a place to start and is an important part of a basin-wide transformation.

The Region of Durham in Ontario has adopted this approach into its outdoor water efficiency program with notable success. The program started in 1997 with the region employing summer students in a community-based social marketing program to work with homeowners to reduce residential lawn watering. The result was a 32 percent reduction in peak water demand over a three-year period (Maas, 2003).

A new relationship with water is possible. A water ethic and an understanding of the benefits of water as a bundle of services liberate resource managers to seek innovative solutions to water management problems. A shared vision of balancing the water budget for the region ensures that the many disparate organizations, interests, and individuals can work in concert to create more sustainable behaviour and practices—the first step towards a lasting water ethic.

“Adopting such an ethic [water ethic] would represent a historical philosophical shift away from the strictly utilitarian, divide-and-conquer approach to water management and toward an integrated, holistic approach that views people and water as related parts of a greater whole. It would make us stop asking how we can further manipulate rivers, lakes, and streams to meet our insatiable demand, and instead to ask how we can best satisfy human needs while accommodating

the ecological requirement of healthy water systems.”

(Postel, 1997: 185)

Governance – More than Just Government

Implementation of a basin-wide, comprehensive and integrated approach will require action by many different players, including all orders of government, the private sector, civil society, and individuals. The Okanagan Basin Water Board has a broad mandate for management of water resources in the Okanagan and is well situated to catalyze such an approach.

“Good” governance and leadership by publicly accountable authorities are critical to ensure desirable outcomes. Governance certainly refers to more than just government; it includes broader institutions, such as business and “civil society,” and a full range of players who can creatively manage and accelerate the adoption of more sustainable water practices. However, government still has a critical role—especially as a leader signalling the importance of our water resources (Brandes *et al.*, 2005).

Governance must be adaptive and inclusive if it is to be successful at creating sustainable water management solutions. Consensus exists among technical and scientific experts, resource managers and business leaders concerning the urgency of coordinated and collaborative action in the Okanagan Basin. Effective action will also involve enhanced communication, ongoing research, and professional, private, and public-sector commitments that involve leadership, innovation, and follow-through to implementation.

Fundamentally, good governance and the challenge of developing sustainability require the engagement and commitment of all members of society.

Getting from Here to There – A “Made in the Okanagan” Approach

Opportunities are available to create a sustainable water future for the Okanagan. Solutions exist; the challenge is making them happen. The following identifies some of the key factors that will enable water demand management and the soft path in a

basin-wide, comprehensive and integrated “made in the Okanagan” approach:

- achieve a shared vision – a shared vision for water sustainability must be created by people from all sectors with diverse backgrounds, skills and expertise from across the basin;
- endorse basin-wide thinking – a clear understanding that everything in the basin is connected and that decisions and actions have impacts throughout the watershed;
- create knowledge – about current and future supply limits; anticipated demands through population and economic growth; financial impacts of water shortages on social and economic well-being; ecological limits, and the implications of exceeding these limits on habitat and species. Knowledge is more than just data, but data are necessary for knowledge to evolve; currently, many data gaps exist. Important information is urgently needed on streamflow levels, groundwater resources, water use by various end users and the state and potential of various water conservation measures such as pricing, social marketing and reuse and recycling;
- choose appropriate options – allow for tailored programs to address specific local needs, starting with the appropriate suite of water conservation measures for the region;
- commit to standards and targets – a clear expression of sector-specific performance standards and targets for conservation coupled with information about proven and practical ways of achieving these goals will promote success in achieving the targets;
- ensure technical and financial support – technical support is needed to assist in moving to water-efficient practices and financial support is critical to help share the risk and overcome start-up deterrents of water-efficient capital and operating practices;

- promote early adopters – recognition of early and ongoing success embeds change and creates innovation;
- provide incentives – both “carrots” and “sticks” can promote appropriate choices, such as changing crops to low water options or switching “grass for cash”;
- embed performance planning and adaptive management – clearly define performance targets and commitments to achieve these; then monitor and report on these commitments and successes from the basin to the site level; and finally, adapt to changing conditions and make adjustments in response to experience. This allows for continual learning and new solutions for future problems; and
- educate, educate, educate – raise awareness and empower people to be part of the solution. Relentless education about the benefits and potential of conservation and demand management is where to start, but ultimately we must educate about the critical need for a region-wide water ethic. Specifically we must educate the end users, educate our leaders and educate our children.

Conclusion – Solving Social Dilemmas

In the Okanagan, long-term water sustainability in the face of a growing population and a changing climate is a social dilemma that will not be resolved with technical fixes. For the Okanagan to achieve a sustainable water future, it must begin by changing perspectives. The soft path for water addresses the underlying social foundation of water challenges, providing a framework to begin moving towards a path to sustainability.

Social solutions are achieved by focusing on the broad social and cultural contexts that shape attitudes and behaviours. These solutions must start from a paradigm that focuses not on managing watersheds, but managing people in watersheds. This new paradigm doesn't assume endless supply or the large-scale technologies necessary to harness it. Instead, it manages demand and uses innovation to ensure water

conservation, and it allows institutions to creatively manage and accelerate the adoption of more sustainable solutions.

In this region, as in much of Canada, a water crisis will be of our own making. Vulnerability is the result of profligate water use, increasing pollution and lack of preparation in the face of climate uncertainties. Avoiding a water crisis is possible, but requires both immediate action and a clear focus on reducing our water impacts through conservation and holistic water management.

If ecological sustainability requires changing the world one watershed at a time—for Canada, the Okanagan is likely the very place to start.

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