

Executive Summary

At a Watershed



**Ecological Governance and Sustainable
Water Management in Canada**



Urban
Water
Demand
Management

**At a Watershed:
Ecological Governance and Sustainable Water Management in Canada**

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Urban Water Demand Management Project (UWDM) is an initiative that began in January 2003 at the POLIS Project on Ecological Governance at the University of Victoria. The UWDM Project seeks to understand the structure and dynamics of urban water use, and to provide mechanisms to reorient Canadian water management from supply to demand-side approaches. Web site: www.waterdsm.org



Environmental Law Clinic (ELC) is operated by the non-profit Environmental Law Centre Society, in collaboration with the University of Victoria's Faculty of Law. Staffed primarily by law students who get course credit for their work, the ELC is Canada's only hands-on academic program in public interest environmental law. The ELC provides legal representation and legal assistance to community/conservation groups and First Nations; produces citizen handbooks and other public legal education materials; and advocates on a wide range of environmental law reform issues. Web site: www.elc.uvic.ca

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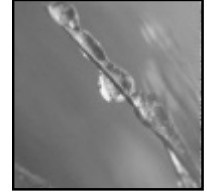
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BUILDING ON CANADA'S STRENGTHS

Executive Summary



Critical to life in all its diversity, water is the lifeblood of society and a foundation of civilization. In addition to drinking water, freshwater ecosystems provide other fundamental “ecosystem services” such as irrigation water, habitat for wildlife, reserves for biodiversity, flood control and drought mitigation, mechanisms for environmental purification, and sites for recreation. All these functions are essential to the ongoing health and development of society.

As cities grow and environmental problems escalate, managing human demand for fresh water presents an immediate challenge. In Canada’s cities, scarcity of supply, wasteful use, pollution, climate change and other factors combine to increase the stress on aquatic ecosystems and water supply systems. The habits of a profligate past are colliding with ecological and economic limits—the need for innovative water management is acute.

Water is *the* strategic resource of the 21st century. As we write this report, Canada stands “at a watershed” in freshwater management. Attitudes, institutions and policies are changing, but an outdated supply-oriented paradigm still dominates. This paradigm treats fresh water as a virtually limitless resource; forecast demands are met by endlessly seeking additional sources of supply. A new approach is needed.

Demand management: The new water paradigm

Demand-side management uses less water to meet the same human benefits, through conservation and a dramatic increase in water use efficiency. Demand-side practices include conservation pricing, smart technologies, public education, and regulation that forces innovation by promoting efficiency, conservation and recycling.

Comprehensive demand management programs integrate diverse activities such as consumer behaviour, water provision, waste disposal, energy use, and land use to redirect social development onto a new “soft path.” This path focuses on meeting underlying human *needs*, for example, for sanitation and agriculture, instead of supplying more water. It requires water planners to satisfy demands for water-based *services*, rather than

simply delivering more water as the *product*.

A “soft path” for water moves away from “forecasting” the future by simply extrapolating from the past. Instead it relies on “backcasting”—a planning approach based on a future scenario that integrates human needs within ecological limits. After determining what water might be available (ecologically), planners then work *backwards* to find feasible paths to meet long-term social and economic needs. To reach a sustainable future, the soft path relies on policies and programs that change behavior and promote greater water productivity. At the core of this process are structural changes that embed conservation, complemented by technologies and practices that increase efficiency.

Water in Canada

The myth of abundance is firmly entrenched. This myth impedes Canada’s ability to change water use habits. Water prices in Canada are the lowest in the industrialized world, which encourages our pattern of excessive use and waste. Lack of consumer awareness and conservation incentives, a dearth of effective policies and innovative regulations, and limited strategic planning all reinforce the supply-side paradigm. Profligate water use not only causes environmental damage, but also inflicts huge and unnecessary infrastructure costs on already overburdened municipalities and taxpayers.

Structurally, myriad public agencies share authority in “a bewilderingly complex administrative galaxy” that fails to address the underlying problems. From coast to coast, Canada’s water management is in need of sober reform. The ultimate solutions are local in nature, yet those solutions are unlikely to be widely implemented unless situated within a broad national strategy.

Ecological governance to address water scarcity

At a Watershed focuses on the enabling environment that ensures holistic water management is institutionally embedded. Ultimately, the goal is “ecological governance,” where natural ecosystem processes are carefully considered at all levels of decision making, up and down the watershed. All three pillars of governance—government, business and civil society—must participate to fully incorporate sustainability into the very nature of our government, our industry and our civil society.

Developing Sustainability

By definition, sustainability respects biophysical limits. However, while *sustainable development* merely imposes constraints on traditional economic development, *developing sustainability* seeks to liberate new processes for social and economic transformation.

Developing water sustainability requires a shift that embeds ecosystem integrity in the fundamental basis of all planning. This approach limits the expansion of supply-oriented infrastructure, addresses cumulative effects at the watershed, and unleashes the full potential of conservation-oriented innovation. The best source of “new” water is not actually new water at all. It is better use of the water we already withdraw.

Key Concepts

To develop sustainability, four key concepts must guide water planning and management:

1. Prevention and Precaution

To maintain ecosystem integrity, prevention of harm is better than subsequent compensation or remediation. A precautionary approach is the best hedge against an uncertain future.

2. Ecosystem-based management

Ecosystem-based management adapts economic, political and social processes to fit within the ecosystem, instead of the reverse. Rather than managing a watershed as an adjunct to human needs, ecosystem integrity sets the context for management decisions.

3. Matching authority to jurisdiction

Watershed governance recognizes that local people and institutions are best situated to monitor environmental feedback and respond with tailored solutions. However, local powers must also be “nested” within higher level institutions that hold them accountable, co-

ordinate with other local institutions, and participate in broader collective actions.

4. Adaptive management

Plans and policies should be continually modified to respond to ecological, economic and social feedback through an ongoing process of informed “trial and error.” Decisions that are provisional and reversible can create and apply critical knowledge to refine decision making in an uncertain world.

Part II: Key Components of a national water strategy

Working together, federal and provincial governments can promote the tools and institutions to allow all local interests—suppliers, businesses, consumers and local governments—to take effective action in developing water sustainability. Real world experiences in many jurisdictions can provide signposts for Canadian authorities along the path to a sustainable water future.

The attached table summarizes these opportunities, experiences and best practices from around the globe (with reference to additional details in the full report).

Allocating water in the 21st Century

Ecosystem-based management starts at the source to protect ecological function and ecosystems. Only after ecological needs are met can water then be accessed for human activities. Once the ecological limit of an aquifer, river basin or watershed is reached, future water demands must be met through increased water “productivity.” This liberates the full potential of demand management.

Enabling local water planning and conservation

Senior governments can uniquely address the institutional inertia of the supply-side paradigm that now prevents the long-term planning and decision making needed to implement DSM. They can ensure local governments have a sustainability strategy based on long-term water conservation planning and an integrated approach to water management.

Patterns of supply and demand, ground and storm water use, energy and land use decisions can all be shaped and transformed. Specific tools and practices to foster such transformation include funding, guidelines, data and information, building and sharing technical knowledge, increasing staff resources, providing incentives for innovative management and ensuring widespread public education.

Facilitating urban water demand management

Demand management programs can reduce infrastructure costs and ecological impacts. However, water conservation does not just happen. Success requires coordinated efforts from all stakeholders and an environment where demand management is the primary focus of water managers.

Senior governments can facilitate a demand-oriented focus through the creation of model bylaws and standardized Best Management Practices (BMPs). They can act as a central clearinghouse of information and undertake research, pilot projects and educational programs. They can also move forward specific DSM opportunities such as product labelling, social marketing, conservation-based pricing and reuse and recycling technologies.

Thinking like a watershed

Sustainable water management requires managers, in effect, to “think like a watershed”—to consider the complex interaction of human activities and natural processes in planning and decision-making. Ecological governance is only possible where management focus shifts away from manipulating the watershed and toward managing human activities within the watershed.

Demand management is a foundational tool for watershed managers. When applied not only within the urban sector but in all sectors—including power generation, industry, manufacturing and agriculture—up and down the watershed a broader social process of ecological governance begins to take root.

Learning from other places

The strength of this report lies in the rich mosaic of experiences and examples from around the world where theory and concept inform practice. For example, experiences in *Australia* and *South Africa* reveal opportunities to integrate ecological considerations into water allocation systems and demonstrate how watershed-based management institutions can protect ecosystems. In these jurisdictions, nature is recognized as a legitimate “user” of water.

In *California* and some other parts of the United States, urban water management and innovation go hand in hand. Conservation planning, increasing water efficiency and improving water reuse and recycling are

fundamental aspects of water management. Dedicated government divisions for water efficiency, specific conservation laws and codes, targets and reporting requirements, and processes linking infrastructure funding to best practices ensure continual innovation and improvement.

In the *European Union*, integration at the watershed level is an important part of a “nested” planning approach promoted through the EU Water Directive. For many European countries the watershed is viewed as the starting point for sustainable water management. For example, *France* has created a water parliament system where government has modified its water management role from central controller to facilitator of local decisions in the context of river basins and watersheds. A management authority for the basin develops policies and plans that address basin-wide problems. These provide guidance to the management bodies of smaller, nested watersheds, which develop detailed action plans tailored to local conditions.

Similar efforts to integrate water resource management at the watershed level are occurring in *Washington State* where growing recognition of a need to shift away from centrally-driven efforts towards more collaborative watershed-based approaches is creating a dynamic adaptive management framework.

Future directions

A future different from the past is possible for Canada. Financial, technological, legal and social tools are available to grapple with water issues before they reach crisis proportions. But the long-term solution requires a fundamental shift to watershed governance—an institutional shift towards ecologically-based water allocation, innovation in planning, managing water use with a “soft path” approach, and ecosystem-based management at the watershed scale.

The challenge now is to ensure that these new approaches, resources and institutional arrangements are implemented across the country. Senior government must provide the leadership to make this happen, taking steps to ensure water agencies at all levels of government have the ability and the incentives to implement comprehensive solutions and programs. The opportunity is here, and the time for action is now.

Key elements of a national water strategy for Canada

| | Practice (BMP) | Purpose(s) | Key enabling requirement(s) |
|---|--|--|---|
| Ecosystem-based water allocations Chapter 5 | Water allocations that ensure watershed health | Allocate water to sustain ecosystem integrity | Provincial action on fundamental reform of water licensing and allocation systems |
| | Adaptive withdrawal permitting | Avoid future over-allocation of water sources by allowing permitted withdrawals to be adjusted over time in response to water availability | Change water licenses and entitlements; and demand detailed hydrological and human water use monitoring |
| | Market-based instruments for water sustainability | Provide incentives (financial rewards) for desired behaviour or impose fees on undesirable behaviour to reduce water use and provide potential revenue to subsidize conservation and restoration | Pricing - attention to distributive effects (i.e. political economy of water) Trading - property rights with clear ecological water allocations and significant government regulation Liability - public access to legal system |
| Innovative Urban Water Management Chapter 6 and 7 | Long-term conservation planning | Overcome short-term decision making that increases long-term impacts/costs | Water conservation planning guidelines and incentives that require their use (conditional funding, legislation) |
| | Environmental management systems | Embed planning in an adaptive management framework, ensuring regular assessment of business practices and consequential environmental impacts | Overcome upfront costs for management process (e.g. plan, do, check, act) and ensure availability of detailed information |
| | Utility Full-Cost Accounting | May eliminate perverse subsidies by promoting a truer value of water to end users, ensuring long-term financial stability for the utility | Local political will or provincial legislation as in Ontario. Citizen/end-user education |
| | Developing conservation capacity | Develop professionals that create and run effective long-term DSM programs | Sufficient financial resources and recognition that DSM professionals are critical to any water supply team |
| | Best practices clearing-house | Disseminate information and opportunities to improve water management and promote innovation | Create one central and credible resource in collaboration with key stakeholders |
| | Promote market in DSM planning/implementation | Ensure ongoing innovation and continual integration of conservation technologies | Commitment by local government to link development with conservation incentives |
| | Labelling | Allow purchasers to identify and select the most water-efficient products to meet their needs, facilitating a market for conservation technologies | Credible oversight and enforcement of standards |
| Key DSM measures Chapter 7 | Social Marketing | Promote behavioural change at community level | Specific training and direct public contact and involvement |
| | Conservation-based pricing | Provide incentives to reduce water use and signal the value of water | Universal metering and public and political buy-in |
| | Reuse and recycling | Cascade water use to reduce wastewater and water use | Dual plumbing, enabling regulation, pilot projects, national guidelines for reused water and health regulations |
| Watershed Governance Chapter 8 | Water parliaments | Ensure holistic planning and decision making at the watershed scale by bodies aware of local needs and circumstances | Collaboration by key stakeholders and senior governments; sufficient resources and delegated decision-making authority |

| Impact/implications | Governance principle | Leading example(s) |
|--|---|--|
| Water allocated for ecosystems and basic human needs first; the remainder allocated to maximize social and economic benefits | Ecosystem-based management | <ul style="list-style-type: none"> • South Africa National Water Act (Sec 5.3) • Australia, COAG reforms (Sec 5.3) |
| May challenge expected long-term specific volume requirements for fresh water | Adaptive management | <ul style="list-style-type: none"> • Time-limited withdrawal permits in the UK, South Africa and Florida (Sec 5.4.1) • A consumptive pool - Australia (Sec 5.4.2) |
| <p>Tax shifting and green taxes may impact costs and individual company/industry competitiveness</p> <p>Commodification of water resources and potential corporate influence requires careful government oversight</p> <p>Cost recovery facilitated by environmental bond requirements</p> | Ecological modernization; full-cost accounting and user pay | <ul style="list-style-type: none"> • Europe (Sec 5.6.1) • South Africa (Sec 5.6.1) • Australia (Sec 5.6.2) • Alberta (Sec 5.6.2) • California (Sec 5.6.2) • Sweden (Sec 5.6.3) • Columbia (Sec 5.6.3) |
| Senior government must provide support (finances and information) to assist in preparation of plans, and must enforce penalties if plans are not implemented | Matching principle and deliberative democracy | <ul style="list-style-type: none"> • EPA guidelines (Box 39) • California's Urban Water Management Planning Act (Box 40) |
| Requires industry or government action to develop specific EMS frameworks for water utilities and providers, and requires establishment of indicators | Adaptive management | <ul style="list-style-type: none"> • ISO 14001 (Box 41) • North East Water in the State of Victoria Australia (Sec 6.3.1) • Sydney Water Corp., Australia (Box 42) |
| Concern that privatization may result; requires strong public oversight | Subsidiarity and ecological modernization | <ul style="list-style-type: none"> • CRD Victoria (Box 45) • Ontario's Sustainable Water and Sewers Systems Act (Box 44) |
| Changing utility focus from water supplier to service provider | Ecological modernization | <ul style="list-style-type: none"> • California - dedicated government division for water efficiency (Box 40) • Some Canadian cities have hired full-time DSM staff (Sec 6.6) |
| Compliance with practices can be part of criteria for linking funds for infrastructure expansion or DSM programs | Ecological modernization and subsidiarity | <ul style="list-style-type: none"> • WaterWiser Clearinghouse Web (Sec 7.2.2) • California MOU Regarding Urban Water Conservation (Sec 7.2.1, Box 47) |
| May increase developer costs leading to focused resistance | Ecological modernization | <ul style="list-style-type: none"> • WASCOs (private entities contracted to plan and implement DSM program (Sec 6.2.3) • Arizona Active Management Areas requires developers to reduce water use before new building permits are given (Sec 6.4.1) |
| Can help local water providers select models/brands for rebate and giveaway programs | Deliberative democracy and ecological modernization | <ul style="list-style-type: none"> • WaterStar (Sec 7.3) • EcoLabel (Sec 7.3) • WELS (Australia) (Box 49) |
| Requires detailed planning, pilot projects and evaluation | Ecological modernization | <ul style="list-style-type: none"> • The Region of Durham, Ontario (Sec 7.1.5, Box 19) |
| May effect municipal water revenue predictability | Ecological modernization; full cost and user pay | <ul style="list-style-type: none"> • Irvine Ranch Water District (Box 50) • EU Water Framework Agreement (Sec 7.4) |
| Requires additional technologies and technical expertise | Ecological Modernization | <ul style="list-style-type: none"> • California Water Code (Sec 7.5.2) • Florida Reuse Coordinating C'ttee (Sec 7.5.2) • Vernon, BC (Sec 7.5) |
| Changing role of government from central control to facilitator of local decisions | Matching authority and subsidiary | <ul style="list-style-type: none"> • France's Water Parliaments (Box 56) • COAG and the Murray-Darling Basin Initiative, Australia (Box 58) • Washington State, US (Sec 8.2, Box 57) |

POLIS Project on Ecological Governance: An Organization for Transformative Solutions

Created in 2000, The POLIS Project on Ecological Governance, seeks to discover and implement solutions to pressing issues that can build healthy and sustainable communities. Among the many research centres investigating and promoting sustainability world-wide POLIS is unique in its focus on multidisciplinary research and action and in that its work strives to blend academic research with community engagement.

The concept of ecological governance is exciting in that it offers an alternative to extractive, linear and unsustainable systems that continue to level ancient forests, displace indigenous and local communities and clog and choke our global cities. Instead ecological governance asks how we might foster circular systems in which we reduce our demands on distant (and local) ecological systems.

Whether it be through investigating the shift from supply to demand management in our use of minerals or water, re-imagining new forms of urban 'smart growth' such as the eco-innovative university campus, or reforming local land tenures for indigenous and local community, revitalization or overhauling national environmental laws, the thrust of all of our research is guided and informed by the concept of ecological governance.

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