

# NO SUCH THING AS NEW WATER

*Louise Hollingsworth*

Way back when I worked for a conservation authority, among other things, I taught outdoor education. With my limited education budget, the impressionable 6 to 10 year olds were a priority. Systems were my favourite topic, as an understanding of the interrelationship of all things, helps reach the goal of a conservation educator – that of growing a better land steward.

In the hydrological cycle program I ran, one of my first questions of the class was “Where does water come from?” They had a hard time coming up with an answer. Answers would start with “the tap” and end up with “God.”

timated. Ask a group of adults today “where does water come from?” and see the variety of answers you receive.

## **Understanding the Cycle**

In the past, water management has focused on water to drink, grow food and support industries. Providing water to the “environment” has been viewed as a luxury. In these days of diminishing fresh water supplies and growing populations, the need to remind people that there is no such thing as new water becomes more important – and I often feel like I am out at the conservation authority, once again trying to communicate that same basic message.

The original system for recycling water is the hydrological cycle ... water moves around the world, changes forms, is used by plants and animals, but never really disappears. It “travels” through a large, continuous cycle.

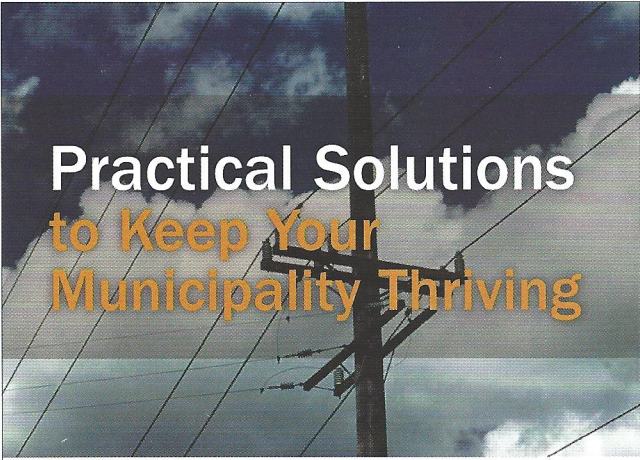
Today, so many years later, I find the same lack of understanding – but this time when working with groups much older. At a recent public consultation program, one gentleman was surprised to learn the large tower on the edge of town was a water tower. “Oh, that’s what that is” was his comment to our surprise. The lack of general knowledge about natural and manmade infrastructure that supports our human systems should not be underes-



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Water vapor condenses to form clouds, which result in precipitation when the conditions are suitable. Precipitation falls to the surface and infiltrates the soil or flows to the ocean as runoff. Surface water (eg. lakes, streams, oceans, etc.), evaporates, returning moisture to the atmosphere, while plants return water to the atmosphere by transpiration. Erosion and nutrient cycling are natural processes, which are dependant on the hydrologic cycle. Soil generation and landscape development are, in part, products of weathering and the movement of sediment through the hydrologic cy-



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cle. Nutrients are naturally added and removed from the land as water cycles through it. As water flows through the land, it exchanges heat energy with the surrounding environment. The natural processes of erosion, sediment and nutrient transport, all rely upon the hydrological cycle.

The 20th century has witnessed unprecedented rises in human populations, from 2.8 billion in 1955 to 5.3 billion in 1990. That number is expected to reach between 7.9 and 9.1 billion by 2025.<sup>1</sup>

Consequently, human demands for water, for domestic, industrial and agricultural purposes, is also increasing rapidly.

Even more than population densities rising, global warming will cause hydrologic changes that will impact our watersheds and our freshwater resources.<sup>2</sup> As the climate warms, changes in the nature of global precipitation, evaporation, snowpack, streamflow and other factors will affect freshwater supply and quality. We are seeing longer periods of drought alternating with spells of heavy rainfall and runoff. Greater runoff variability makes it more difficult to maintain optimal reservoir levels, which reduces the reliability of water storage.

### Recycling the Water

Drought stricken areas like Queensland, Australia are making global news with their approach to recycled water. "I think in the end, because of the drought, all of Australia is going to end up drinking recycled purified water," Peter Beattie, Premier of the tropical state of Queensland was quoted saying in local news articles in January of this year.<sup>3</sup>

When Northern Georgia's water scarcity peaked in 2003, following five years of drought and increased water demands that produced a four-metre drop in the Lake Lanier reservoir,<sup>4</sup> it became a dire situation. The crisis aggravated water disputes between adjoining states Alabama and Florida. "The stakes in these Southern water disputes are huge," says Aaron Wolf, a water policy specialist at Oregon State University. "The water war between Georgia and Florida and Alabama is, in nearly every way, similar to the bitter water conflicts that were waged in the arid Western states, and even in the dry Middle East between countries like Jordan and Israel." Circumstances such as in Georgia made it necessary to consider water recycling programs.<sup>5</sup>

- 1 Michael Acreman, Freshwater Management Adviser to the IUCN, Institute of Hydrology, United Kingdom; From Water and Population Dynamics: Case Studies and Policy Implications: Report of a Workshop, October 1996, Montreal, Canada, edited by Alex de Sherbinin and Victoria Dompka with Lars Bromley, Foreword by Malin Falkenmark <[www.aaas.org/international/ehp/waterpop/acreman.htm](http://www.aaas.org/international/ehp/waterpop/acreman.htm)>.
- 2 Water – Vulnerable to Climate Change, The Green Lane, Environment Canada <[www.ec.gc.ca/water/en/info/pubs/FS/e\\_FSA9.htm](http://www.ec.gc.ca/water/en/info/pubs/FS/e_FSA9.htm)>.
- 3 "Beattie defends recycled water decision," Monday, 29 January 2007, ABC Online <[www.abc.net.au/water/stories/s1835571.htm](http://www.abc.net.au/water/stories/s1835571.htm)>.
- 4 "A Growing Trend? Growth, Regulations, and Drought Drive MBRs," <[www.zenon.com/newsroom/articles/2006/04/mbr\\_for\\_water\\_re-use.shtml](http://www.zenon.com/newsroom/articles/2006/04/mbr_for_water_re-use.shtml)>.
- 5 *ITT Industries Guidebook to Global Water Issues*, Atlanta and Southeast, 2007, Charles Seabrook, Environmental Reporter, Atlanta Constitution.

The practice, which is used all over the world, does not have public support here in Canada. Alternatives typically considered include new well sourcing and new water intake sites on one of the Great Lakes. It is time to add a new option to our list of alternatives, and begin to seriously consider recycling water and keeping our water resources within our watershed, as an option for municipal water supply.

Many cities using water from rivers are using water that contains effluent discharged from upstream sewage treatment plants.<sup>6</sup> It is said that water in London, England has been drunk five times before it arrives at the tap. With the population densities being what they are along the Thames, one can easily imagine that reality. How is this so much different than direct recycling from a treatment facility? It is the way of the future. By 2011, Singapore promises to supply a third of its water needs by recycling water.<sup>7</sup>

Still, more attention needs to be given to the role of natural recycling and ecosystems in managing the hydrological cycle and their potential as alternatives to major engineering works. Well-managed headwater grasslands and forests reduce runoff during wet periods, increase infiltration to the soil and aquifers and reduce erosion, sustaining flows during drought periods and reducing

runoff during floods. Conserving wetlands, in particular, ensures adequate supplies of water; and helps maintain fisheries, arable and pasture land, fuel wood and medicines, as well as habitats for wildlife.

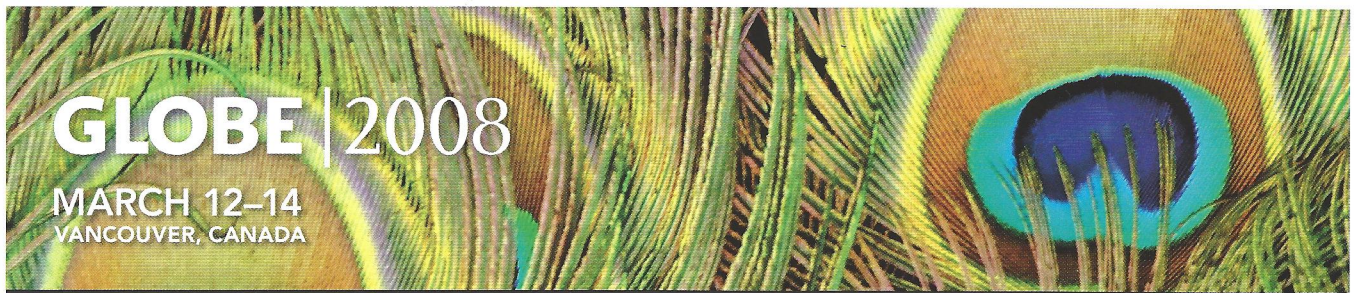
### Broad-Based Approach is Needed

A broad-based approach to water management, with greater emphasis on integrated regional planning and conservation of critical habitats is needed. Our environment contains a set of physical, chemical and biological components, including water, oxygen, plants, animals, soils and minerals. Superimposed on this natural environment is the effect of human beings. There is no place on earth unaffected by human beings, who have had large-scale impacts on the earth's environment ever since agriculture began thousands of years ago.

Watershed management is the management of land and other resources on a watershed basis. Unique to the concept

6 "Is Recyclable Water Waste Water?" Jay Fairweather, H2O Team Leader, <[www.schools.nsw.edu.au/events/statecompetitions/webawards/winners2006/secondary/14/recyclewater.htm](http://www.schools.nsw.edu.au/events/statecompetitions/webawards/winners2006/secondary/14/recyclewater.htm)>.

7 "Singapore Says Water Recycled from Sewage Will Meet a Third of Its Needs by 2011," March 16, 2007, Associated Press, <[www.enn.com/energy.html?id=1484](http://www.enn.com/energy.html?id=1484)>.



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of watershed management is recognition of the relationship between land use, soil loss and productivity, water quantity and quality, wildlife populations and habitat, social factors, and economic factors. Up-stream and down-stream land areas and entities are linked on a watershed through the hydrological cycle.

The value of the original system – the hydrological cycle – lies with its integration of the various elements of the watershed. As shifts in precipitation patterns occur, created by a changing global climate, the implications for floods or drought and considerations of managing water resources require integrated, creative watershed approaches.

The watershed management approach aims to integrate all the important physical, chemical and biological components and processes, which interact with social, economic and institutional factors.

In northern Nigeria, large dams were constructed on the Hadejia River to feed intensive irrigation, which led to a reduction in the Hadejia-Nguru wetlands downstream.<sup>8</sup> When it was demonstrated that the economic value of water when used for intensive irrigation was many times less than its value for supporting fisheries, agriculture and fuel wood in the wetlands downstream,

the Nigerian government began to explore the potential for releasing water from the dams to restore the wetlands. A wider view of economic valuation thus provided a sound basis for water management decision making.

Water management has traditionally been focused on providing enough for people to drink, grow their food and support their industries. Providing water to the “environment” is often viewed as a luxury that only rich countries can afford. As the world’s population rises and the earth warms, there will be increasing demand to ensure that direct supply of water to humans is given top priority. However, people cannot live by water alone. We require the services of the environment’s life support system, which itself needs water to function. Sound water management should focus on maintaining watershed ecosystems, and not operate as a conflict against nature to supply water for people.

After all, there is no such thing as new water, and what comes around goes around. MW

8 *Supra*, note 1.

## New Superheated Steam Machine for Pesticide Restricted Municipalities

In a time of increasing environmental concern, many Canadian municipalities are either banning or restricting the use of pesticides, while many others are voluntarily reducing or eliminating pesticide use altogether ... but leaving municipal workers and commercial gardeners few viable weed control alternatives, except huge increases in labour costs. Essentially, their “power tool,” herbicides, have been taken away. Over 130 Canadian municipalities and many other organizations have pesticide bans or restrictions, affecting over 40% of the Canadian population, a situation mirrored in much of the developed world. Pesticide restrictions are increasing, but no one had provided a cost effective alternative.

A small Victoria, BC based company, Green Steam Inc., has been working on this problem and now their technology is available. It is a highly portable, six pound steamgun system that generates and applies 350°C (660°F) superheated steam on demand, producing immediate weed knockdown. The expanding steam penetrates pavement cracks, scalding and dislodging small weeds and the organic buildup that provides an environment for them. The steam's moisture and blast effect further increase heat transfer and speed of operation, resulting in a very cost effective, portable tool for urban sidewalks and hard surfaces.

The system also consists of a small pumper push cart that holds a 10 gal water supply and a standard 20 lb propane tank, with a rechargeable battery and electric pump. This resolves portability issues as it requires only one operator and no support vehicle. The operator simply walks the steamer along his weed control “route”. Water requirements are very modest, 3 to 5 gallons of water/hour (a teaspoon of water produces over a gallon of steam) and it uses clean burning propane, at a rate of 15 to 20 pounds (about \$15) per day. To get more information on this system visit the website at [www.greensteamtech.com](http://www.greensteamtech.com), where videos show the product at work on Victoria streets.



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