

Industrial watershed management – A 21st century view of water stewardship



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We're at the cusp of a new industrial revolution – the era of the “industrial watershed” – and it is poised to change the water industry as well as industry in general.

For thousands of years, water supplies grew and consolidated, from communal wells to sprawling municipal water systems. We built massive infrastructure of reservoirs and canals, huge hydropower plants, and vast networks of drinking water and sewer pipes.

But in recent years, the benefits of decentralization are becoming clearer in many places. Sprawling cities – in both developed and developing nations – realize that they can augment their overstretched grids with decentralized micro-grids, servicing new neighborhoods with small, integrated water treatment plants. And as industrial facilities, from factories to factory farms, manage volumes of water that can be as large as those flowing in and out of full-sized cities, we have begun to recognize that they comprise their own ecosystems, complete with their own watersheds.

Those industrial watersheds have to be managed holistically. Every drop that gets pumped in, flushed out, or falls from the sky must be accounted for within the ecosystem. It must be measured, analyzed, treated, used, and released with the best possible outcomes in mind, and with an eye toward how each of those steps affects processes both upstream and downstream.

By recognizing industrial watersheds as smaller ecosystems within larger ecosystems, we can manage them better. It's a thought process that lends itself to organic design, where the water system reflects the systems of a great body: from the circulatory system of pumps and pipes, the immune system disinfecting the water and the kidneys filtering it, a nervous system of sensors, and at the center of it all, a brain that coordinates all the functions and keeps the system alive and aware of itself.

Optimizing the water that flows in and out of industrial ecosystems challenges us to innovate. Clearly, the technology in each of those systems can be as sophisticated as possible – certainly the more sophistication we build into the system, the more efficient we can become in making every drop count. And if we operate on the level of industrial watersheds instead of massive geographic ones, we can afford to innovate. We don't have to change the entire infrastructure serving a million people, but we can revolutionize how we manage one million gallons of water per day.

In a 2013 poll of industry leaders, the Pacific Institute and VOX Global found that 79 percent of companies reported that they faced current water challenges, and 86 percent expected to face water challenges within five years. Fifty-seven percent of the responses reported that water issues affected their bottom line; the same number also stated water would affect their growth in the next five years; and 80 percent expected water to impact where they will locate a facility in the next five years. Growth, supply, and siting – if those aren't strategic issues, I don't know what is.

In any industry, whether it's food processing, beverage production, pharmaceuticals, mining, oil and gas (from extraction to refining), or power generation, water is integral to the business. Viewing any of those businesses as a watershed helps us reflect on water at every stage of its cycle within the process. Ingredient water is used in finished goods. Service water transports products through the system – picture the flumes that float tomatoes through a cannery – or heats, cools, or cleans the production system. Then there's also process water that needs to be treated before it leaves the system.

Each gallon of water has a value and a cost. As we assess those values, we can determine appropriate costs. Then we can fine-tune the resources we put into securing the water, treating it to the level necessary for the job – after all, cooling water doesn't necessarily need to be treated to the same level of purity as ingredient water – and preparing it for its journey downstream, or even better, back into the system for another round.

Within our industrial watershed, there's also stormwater. On the plus side, rain can be harvested as a free source of water that can be applied to tasks like cooling, flushing toilets, or irrigating green space. On the other hand, stormwater can pose huge challenges as it sweeps up contaminants from industrial or agricultural sites and threatens to move them into receiving waters or overwhelm wastewater

systems that have combined sewer overflows. Here again, we see this water as part of an ecosystem, and ideally we address it onsite.

There is no greater challenge. Water is where technology meets life itself – on a global scale; on a human scale; on a microscopic scale; and on the scale of an industrial watershed. Innovators everywhere must begin to view water as their issue, their priority, and their cause. The enthusiastic and creative input of smart technology companies could propel the water industry to new heights and raise the standards for all those concerned.

While the world's best technology thinkers apply themselves to building the nerves and brains of the next generation of water systems, leaders of industry can adopt the industrial watershed mindset. A commitment to viewing industrial water holistically will yield better solutions. A commitment to considering water from the very start of an industrial project – from the siting, to the design, and the overall industrial engineering – will yield more effective and more efficient systems. And a commitment to viewing the industrial watershed in the context of the geographic watersheds surrounding it will remind us all why we need to take such dramatic steps to make every drop count.



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Author's Note

Jim Lauria is a water technology executive who has spent more than 20 years selling water treatment systems and process solutions for industrial, municipal, commercial, and irrigation applications. He has provided peer review for the World Health Organization's publication on drinking water treatment and has written for numerous trade journals including World Water. He can be contacted at jim@jimlauria.com .

The above is based on an excerpt from a chapter in Damned If We Don't, a book published by Water Anthology Press with contributions from more than 25 different authors looking to accelerate change around water.