Troy David Ouellette

Full Steam Ahead: Water Systems Esthetics

A Monograph Presented at The Art Gallery of Windsor
at the Water Symposium in 2016

Within the ancient western European context, it was well understood by philosophers, mathematicians and engineers that the movement of water could drive mechanical systems and act as a conduit for waste and purification purposes. Some of the first major waterworks grew out of water management for drinking and outflow. Significant advances came through power generation, made possible by transferring water energy into specific mechanical movements. In the Roman Empire, organic water systems were harnessed on a massive scale to serve civic needs through systematic use in architectural projects. This came about mainly through waterwheel and noria technologies, first pioneered by Hellenistic engineers as early as the 3rd century BC, to draw water up to canals for irrigation. Modern plumbing grew from many of these efforts, stemming from the Roman penchant for controlling and using water for domestic and public purposes in baths and fountains.[1]

Since the advent of electricity, water movement has been harnessed to great effect to generate electricity from waterfalls, currents, waves and tides. The ancient designs of noria became modernized during the medieval period transforming into flour mills, and its modern manifestation morphed into the turbines we see today and became the means to convey massive amounts of energy to the electrical grid. Niagara Falls is an example of how water energy has been harnessed and distributed to power many of our technological requirements. The first company to realize the immense potential for generating electrical energy from Niagara Falls was the Niagara Falls Hydraulic Power & Manufacturing Company, an American firm based in Niagara

[1] Had the Romans more widely used water wheel technology in their aqueducts it would have revolutionized many of their wide scale working processes like dyeing, wine-making, olive pressing or other forms of liquid extraction. Ancient engineers and civil workers understood the unique ability of water to change its state transforming itself at varying scales and certainly one could postulate that the processes of deposition and sublimation were directly observed in Roman and pre- Roman societies especially in colder regions across the globe.

Falls, New York, that started operations as early as 1882. Initially, they built their operation up from previous efforts to construct a canal for hydraulic mill power.

Schoellkopf mills along the canal in 1900[2]

Because electricity was so widely available in domestic appliances after the Second World War, the availability of mass-manufactured components meant that artists could now see this as material to work with. By the mid-1950s, artists were already taping into these technologies, which would fuel a new way to make art, especially those with a growing connection to electronic technology, automation and hardware/software-driven applications. We see this in the pivitol art exhibition entitled *This is Tomorrow* which came to fruition in August 1956, as well as other examples like Gutai artist Atsuko Tanaka who started working with domestic electronics in 1955. Her creation, Work Bell, produced in 1955, consisted of a string of electric bells laid out around

[2] This image is available from the United States Library of Congress's Prints and Photographs division under the digital ID cph.3g06887.

the border of a gallery; the piece included a button for visitors to press, which consequently set off a chain of shrieking rings.[3]

By the 1960s, video artists were working with the fluid nature of image-making processes. The pioneering Japanese video artist Shigeko Kubota once commented that: “in video’s reality, infinite variation becomes possible…freedom to dissolve, reconstruct, mutate all forms, shape colour, location, speed, scale…liquid reality.”[4] Her video sculptures of shifting images flow as does water in an endless cascade – especially in her works that reference alternate landscapes like *Three Mountains* (1976–79), *Niagara Falls I–III* (1985–87), and *Rock Video Cherry Blossom* (1986). By extension, conceptual artists adopting Systems Esthetics fostered relationships between the technological and cultural disciplines. Environmental artists now had a way to connect what they were doing with another discipline that embraced notions of complexity, and they were amongst the first groups to recognize that the complexity of natural systems necessitated the use of sensory technologies.

The collection of real-time data helped to delineate the sets of relations between materials and organisms. During the late 1960s, the explosion in software development became a defining moment in creating parameters essential to carry out experiments, whether social, cultural, or biological. The 1968 exhibition entitled Software signalled a break with Bauhaus-influenced instruction, which made up the core courses taught within art institutions. First postulated by artist/writer Jack Burnham, Systems Esthetics was well-positioned to take advantage of new advances. He stated, "The priorities of the present age revolve around the

---

[3] Edward M. Gomez, Atsuko Tanaka: Painting the Body Electric pp. 80–83, 2005

[4] *Painting with video*. Aesthetica Magazine. (n.d.). Retrieved October 17, 2022, from https://aestheticamagazine.com/painting-with-video/

problem of organization. A systems viewpoint is focused on creating stable, ongoing relationships between organic and non-organic systems, be these neighbourhoods, industrial complexes, farms, transportation systems, information centers, or any of the other matrixes of human activity. All living situations must be treated in the context of a system's hierarchy of values."[5] Even in this earlier text, the emphasis on human intervention is evident. Still, at the same time that Systems Esthetics was taking shape, environmental art was intensifying - artists were responding to the disasters caused by human interference with "natural" systems. The dematerialization (that is to say, deemphasizing the object in favour of an idea, for example, in artist Hans Haacke's Condensation Cube) is also mirrored in themes that are disassociated with anthropocentric concerns in favour of non-human entities. The earliest manifestations of environmental practice culminated in interventionist performance, durational projects involving remediation, or examinations of natural systems and elements. Water has played one of the most important roles in environmental art, magnified by the catastrophic media memes that permeated commercial broadcasting related to the pollution of streams, rivers, lakes and oceans as industry and transcontinental trade became more pervasive. Water pollution was probably the most discussed topic during the 1970s because water dispersed and mixed with oil spills, nuclear events or toxic chemical disasters like the love canal in New York State. In this latter case, the disposal of 22,000 barrels of toxic waste stored after World War Two made its way into the water system of the Niagara Falls community in the late 1970s. It is evident that

[5] Jack Burnham, Great Western Salt Works: Essays on the Meaning of Post-Formalist Art. New York: George Braziller, 1974, p. 16

these earlier lessons have not been taken seriously enough, even with such a tragic event, which ruined the lives of at least 800 Americans—Flint, Michigan and Standing Rock are but two recent examples of populations dealing with water rights, safety and security as a public good and an assertion of sacred space. I see this as a move to deal with a problem that is simply out of control, whereby the forces that seek to see it solely as a resource are extracting and/or modifying it at an increasing rate. Systems for water management have also come under the purview of the legal profession as new laws may be enacted to see natural watersheds and aquifers as having private rights.[6] Even as this is happening, the chemical composition of drinking water is forever in question, as wastewater contaminated with pharmaceuticals is now found everywhere human populations congregate.[7] The intensification of medicines meant to cure or alleviate pain alters our drinking water into a soup of our creation.

Artist Buster Simpson's 1983 *Purge* Series exemplifies these disturbing trends in the dilution of chemicals in our waterways. In this work, Simpson casts large limestone disks to neutralize the pH levels in the Hudson River and Lake Placid, respectively, changing their chemical makeup. In this instance, Simpson used the topes of conceptualism within the convention of happenings to become an agent in the continual balancing act between environmental devastation and the desire for remediation. This small gesture might seem futile in terms of its

[6] Megan, Mcardle. "How Property Rights Could Help Save the Environment." The Atlantic. May 29, 2012. Accessed November 17, 2016. http://www.theatlantic.com/business/archive/2012/05/how-property-rights-could-help-save-the- environment/257756/.

[7] http://www.cbc.ca/news/health/drinking-water-contaminated-by-excreted-drugs-a-growing-concern-1.2772289

scale. Yet, it echoes through a history of environmental work amplified by the writers and researchers looking for solutions to current problems, no matter how absurd.

Before Simpson's interventions, Helen Mayer and Newton Harrison proposed radical political approaches. In 1976 they suggested that populations bordering the Great Lakes Watershed of the United States and Canada succeed from each country and unite to form a "dictatorship of the Ecology." In this particular instance, the work comprised diagrammatic drawings with stark geometrical boundaries that took the form of official planning processes. This type of urban renewal and urban planning parallels other large-scale objectives like the collaborative installations proposed by the Fellows at the Center for Advanced Visual Studies culminating in the Charles River Project. This planning and implementation process took place from 1971-1974. Although it was never fully realized, it became part of the larger project for revitalizing urban environments where artists aided in shaping the local ecological footprint. These proposals became part of the tradition of modern urban design that resulted from the hurried pace of urbanization in the nineteenth and twentieth centuries to test various approaches to problems that faced sprawling and economically depressed neighbourhoods. Often these economic differences that featured poor working-class districts were within walking distance from affluent communities. Water was and has always been crucial for vibrant urban prosperity. Plagues and disease were and are often connected to poor water quality, especially in communities that continue to have an inadequate infrastructure. We have seen how cities have disposed of human waste in water in various ways, where sewage is mixed into rivers and streams to be diluted or somehow "purified" by organisms and watersheds in the rural hinterlands. An example is the recent Montreal sewage dumps into the St. Lawrence River, as

local sewers and treatment plants become outdated and can scarcely keep up with changing climatic conditions and increasingly frequent storms.[8] Water purification is something that comes up time and again in works by environmental artists that feature a systems approach. In his work Rhinewater Purification Plant (1972), artist Hans Haacke used contaminated Rhine river water in conjunction with a purification system that involved goldfish in a large fish tank.[9] Viewers became observers of a real-time event that grew out of grey water purification technologies. The subsequent filtered surplus water was used to water the Museum Haus Lange gardens in Krefeld, Germany. In their ground-breaking 1998 text, Land and Environmental Art editors Kastner and Walls describe the piece by stipulating that,

> "Haacke obtained polluted Rhine water from a Krefeld sewage plant. The water was pumped into an elevated acrylic basin from large glass bottles in the gallery in which the water was stored. Chemicals were injected into the water to cause the pollutants to settle. The sedimentation process continued in a second acrylic container. From there, the partially purified water flowed through a charcoal and a sand filter and eventually dropped into a large basin with goldfish. A hose carried the overflow out to the garden, where it seeped into the ground and joined the ground water level. This work, which resembled a laboratory experiment, called into question a specific environmental problem - water pollution in Krefeld, where the Rhine was used as the repository of raw industrial and household sewage. The goldfish tank was set in front of a view of wooded landscape behind the museum,

[8] Antarctica Journal. (2022, May 8). *Montreal to dump 2 billion gallons of raw sewage into its drinking water*. Antarctica Journal. Retrieved October 17, 2022, from https://www.antarcticajournal.com/montreal-to-dump-2-billion-gallons-of-raw-sewage-into-its-drinking-water/

[9] These projects that involve what Burnham would refer to as real-time systems become significant in that the future of monitoring the behaviour of organisms and material interactions may dovetail with newer philosophical movements such as speculative realism or actor-network theories and although the latter failed to acknowledge first nations discourse regarding the reading of natural systems and information it has come to represent renewed interest the complex interactions of animism.

establishing a dialogue between two ecosystems, one life-supporting, one on the verge of collapse."[10]

In contrast to this functional grey water system work by Haacke, media arts practitioners use water in a much more contemplative and aesthetic way. Their projects often examine everything from macro/micro distinctions to the ephemeral nature of changing states water becomes more elemental and poetic.[11] An example of this is Bill Viola's "He Weeps for You" from 1976, where he magnified a water droplet emerging from a small copper faucet and projected it onto a large screen. Each droplet contained an image of the viewer and the surrounding room.[12] Viola draws our attention to the surface tension of water as we wait for the drop to take shape and fall. Besides mercury, water has the highest surface tension of all liquids due to the hydrogen bonding within water molecules, and it is this that holds the image for the viewer.

Similarly, Murray Favro's artwork Synthetic Lake represents the repetitive mechanical movements of water in terms of wave action with a projection of a Lake Erie littoral space on a canvas sheet. As Favro remarks, "My Synthetic Lake is a large machine that imitates wave movements. A movie projection simulates the breaking of waves on a gallery floor. It is in a movie in actual space; the screen is the water surface stretched out over a wave-imitating machine about 30ft x 20ft and slightly off the floor as it goes back from you. And for me, this piece transforms the movie media to be viewed as an object and not a regular movie with a beginning

[10] Kastner and Walls, (eds). 1998. Land and Environmental Art. London: Phaidon Press Ltd, p.141)

[11] Running parallel to Haacke's *Rhinewater Purification Plant* is Avital Geva's much larger Ecological Greenhouse work. Founded in 1977 it developed grey water technologies to create social space.

[12] Edward A. Shanken, Art and Electronic Media, New York, NY: Phaidon Press, 2014. pg. 107.

and end."[13] This pivotal work makes visible the potential in wave energy by foregrounding the energy consumption correlative. Hidden underneath, the frequent mechanical movements of sprockets and bike chains undulate the canvas melding kinetic sculpture with film projection, all the while referencing more traditional forms of art-making, namely painting on canvas. Indeed it also has an affinity with systems aesthetics in that there are patterns that now and again misalign in a more complex dance of control and chaos. The best-laid plans often go awry. This early work, 1972-1974, was made when the great lakes were becoming polluted, and environmental art was coming into its own due to human pressures from the comforts of capitalism as waste became the other of consumption. It is an exciting proposition that environmental art combined with a system theory liberated systems esthetics from the technocratic and militaristic tendencies that were part of its broader historical legacy.

[13] Caroline Langill, "Shifting Polarities : Interview with Murray Favro". Accessed November 22, 2016. http://www.fondation-langlois.org/html/e/page.php?NumPage=1956.

The Cloud, Stormy Weather and Systems Esthetics

Fujiko Nakaya, *Fog* or *Low Hanging Stratus Cloud* at Expo '70 Osaka World's Fair, Pepsi Pavilion. EAT Archives, Getty Library and Archives, Los Angeles, California.

Conceptual art often foregrounds its particulate environment and has drawn inspiration from new advances in meteorological and sensory technologies. We can think of the work that grew from the 1960s to the early 1980s as a catalyst for what was to come made manifest by artists such as Hans Haacke's Condensation Cube from 1965, which responded to the white box of the gallery environment—changing its appearance with the ebb and flow of differences in humidity

and temperature, water droplets condensed inside a Plexiglas cube, referencing the conditional nature of its making. Because Condensation Cube is such an iconic work, it simultaneously becomes an exercise in the limits of measurement, emphasizing the parameters of an objective closed system - taking on the guise of an experiment. Five years after Haacke's work, Fujiko Nakaya's large-scale project exhibited at the Pepsi Pavilion at the 1970 Osaka World's Fair became a formative and iconic marker for artists attracted to immersive environmental projects. As a member of Experiments in Art and Technology or E.A.T., she created an immense vapour cloud surrounding a geodesic dome to express atmospheric phenomena. In my 2014 dissertation, I emphasized its importance in its break with modernist structure and stability, "The structure at Expo consisted of a Buckminster Fuller-style PVC dome covered with piping and pressure nozzles. Nakaya's was the first physical articulation of a cloud, significantly predating Architects Diller + Scofidio's widely renowned 2002 Blur Building. Her 'constructed' atmosphere also juxtaposed modernist ideas of geometric measure, efficiency, pattern- seeing and form-finding with the outside atmosphere and the futurism of the Expo itself. Yet her work moved beyond the structural stability of modernism because its formlessness signalled notions of unpredictability."[14]

Born in Sapporo in 1933, Nakaya built her entire career on the analysis and utilization of water as vapour. These works of complexity contravene any attempts at framing something within a defined and predictable system echoed in the philosopher Hubert Damisch's text A Theory of

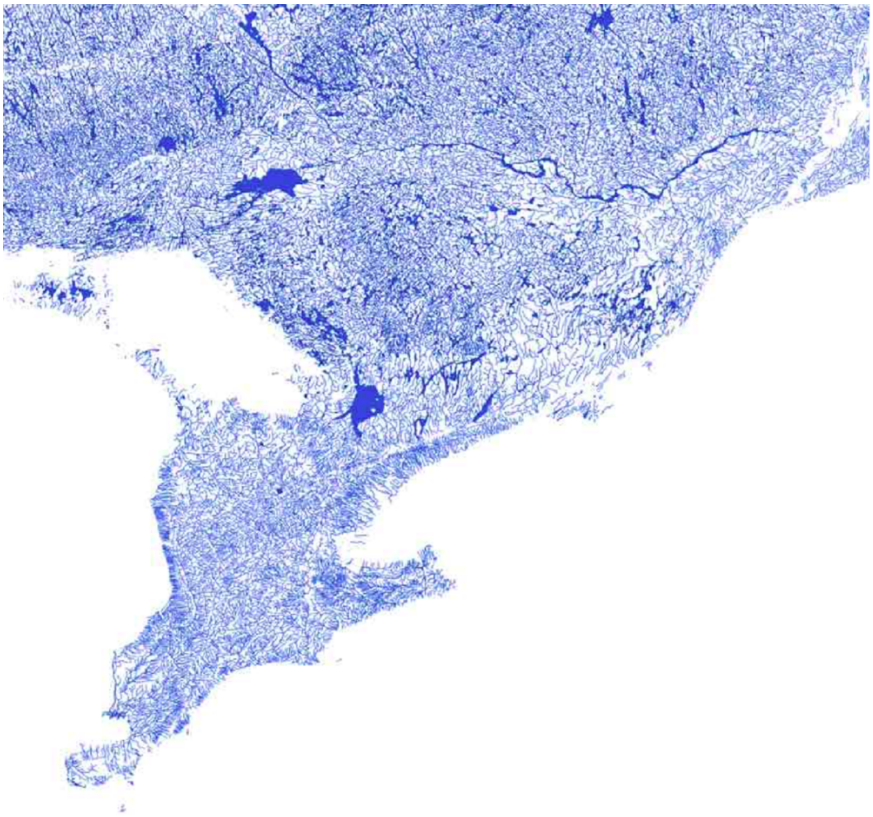
[14] Troy David Ouellette. “Conditions Variable: Assemblage Theory and Systems Theory in Creative Practice” Dissertation. York University, 2014. Pg. 137

/Cloud/ Toward a History of Painting, which chronicles the depictions of clouds within the western artistic tradition of painting. The cloud, with all its amorphous and ever-changing qualities, has come to symbolize our current predicament of run-away entropic catastrophic flooding events. Simultaneously it has shown us the incredibly complex nature of particulate environments as clouds mix with high and low-pressure zones and upward currents or are moved with the force of the jet stream.

Today water has gone from these mechanized uses to the treatment, purifying and irrigation processes. It has become one of the most politicized materials on the planet. It continues to plague environmentalists and scientists at odds with the corporate urges to commodify it or use it for industrial purposes like fracking and mining. Desertification, climate change, and rising sea levels have all made water a contentious issue for municipalities and regions worldwide. This is, for the most part, uncontested amongst climatologists, meteorologists and even popular belief.

As a sign of hope, all of this points to how we can manage, monitor and predict events using data and sensory technology. As these technologies adapt to new economic and environmental realities, artists have critiqued and utilized these working methods in conceptual and media art practice. The potential to monitor the use and adjust intakes and outflows of water is sure to be more pervasive in the future. Water, moisture and humidity sensing technologies have allowed us to monitor its composition, quality, and evaporation rates. Its changing dynamic in terms of weather, soil moisture, topographical changes in water courses, ocean currents, marine transgression and water stratification can now more readily be tested and recorded with a fair amount of accuracy. With more advanced mapping, wireless and sensory technologies, it

may be possible to connect a vast network of monitoring systems and electrical distribution nodes to a much larger electrical grid. Water flows and currents can generate power in far-flung areas. One of the ways I imagine a sensory apparatus to fulfill this energy requirement would be to construct of a vast network of replaceable sensors and monitoring stations to accommodate ever-changing technologies and create wireless feedback to be processed as information over long periods. Some components of these monitoring systems may even more effectively be serviced using drone technologies to fly new or replacement components from various stations around southern Ontario.



Depiction of Southern Ontario water systems. Lakes and rivers in Canada - CanVec – Hydro Features, Natural Resources Canada. Licensed under the Open Government License

In a recent survey of Canada mapped only by rivers, streams and lakes, the potential to visualize environmental degradation and to locate water systems throughout the country for water monitoring through sensory technologies has been increased exponentially.[15] The Government of Canada Water Office also allows public access to real-time hydromantic data sets across the country. One can see at glance water levels, discharge amounts and other data related to the region. In my view, this data set, combined with other innovative sensory technologies and satellite imagery, allows for increased intervention to ensure our water systems and the organisms in them stay healthy.[16]

[15] See: http://imgur.com/a/ryWfd

[16] See: http://wateroffice.ec.gc.ca/index_e.html