

Notes on a Water Quality and Pollution History of the Ottawa River

For over a century and a half, concerns about water quality and the condition of aquatic life along the Ottawa River have arisen among residents of this historic waterway's neighboring communities. Although successive generations and all levels of government have debated the state of the river, expressing doubts about its future and even occasionally fears for their own health and safety, no sustained arrangements were ever devised to safeguard the Ottawa from contamination and neglect. A look back at the experience and observations of earlier generations of river residents offers some context in which to appreciate the nature of the challenge now being assumed by the Ottawa Riverkeeper.

The Early Alterations

Aboriginal and fur trade use of the Ottawa involved little impact on stream flow and water quality, but not long after Philemon Wright ran his first square timber raft downstream to transport the white pine resources of the valley in route to the British export market in 1806, transformative changes began to occur.

Early alterations to the Ottawa's flow and channel included canals such as those opened in the 1830s alongside the Carillon Rapids, Chute à Blondeau and Long Sault (Haxton, 6) and diversion dams such as the Chaudiere to power grist and saw mills following the arrival of the water-turbine in the 1840s. In addition, chutes or log slides were constructed to facilitate annual timber drives at Chats Falls (1835), Portage du Fort (1839), Calumet Falls (1843) and Rapides des Joachims (1844).

The Sawdust Menace

Slabs, bark, sawdust, and what were referred to as grindings (parts of slabs which have been crushed into pieces before being thrown in) obstructed nineteenth-century Ontario waterways and interfered with stream flow. Severe accumulations along the Ottawa following Confederation in 1867 inspired Richard Cartwright, MP for Lennox, to introduce legislation to prohibit lumber mills from disposing of sawdust, edgings and other sawmill refuse in navigable streams or rivers.

The situation cried out for action. As Cartwright graphically explained conditions were at their worst near the nation's capital. Here, the annual manufacture of lumber reached roughly 10,000,000 cubic feet. This level of production resulted in 2,000,000 cubic feet -the equivalent of 20,000 cords - of rubbish each and every year, by far the greatest part of which was dispatched directly to the river. Disposed of in this way, the lumber mill waste was "sufficient to block up the river for four miles, to a width of 200 feet, and a depth of one foot." Surely, Cartwright pleaded, rejecting the assumption that the leftovers were really waste, some means must be found "of turning this enormous mass of fuel to some use in a cold country like ours."¹

Ottawa lumbermen immediately reminded legislators of the size and significance of their industry, protesting the devastating impact of the proposed legislation, and arguing strongly that annual spring freshets removed saw dust, thereby eliminating any injury or adverse effects on

navigation.

In 1871, three federally-appointed commissioners were invited to investigate the situation. After break-up and at suitable intervals thereafter they embarked upon a series of interviews and on-site inspections across the country. Dr. E. Van Cortland, the city of Ottawa's health officer cited the threefold impact of lumber mill refuse on spawning grounds, on navigation and on public health as reasons for remedial action. This was a rare early attempt to consolidate a range of community concerns over industrial interference with water quality. But mill owners resisted vigorously, threatening loss of employment if they were forced to abandon water-power technology in favour of steam.

Lumberman H.F. Bronson, presented engineering studies and numerous affidavits debunking the threat of lumber industry waste to navigation on the Ottawa. The expert opinions of Professor Greene and of the engineer W.J McAlpine were particularly notable for elaborate technical explanation offered to support the proposition that the velocity of the current and the specific gravity of pine sawdust were such that there was "no reason to anticipate the formation of permanent or troublesome bars, or accumulation of saw-dust" in channels of the Ottawa.²

The commissioners acknowledged that Greene's analysis was indisputable, "so far as his theoretic calculations and experiments extend."³ But contrary opinions from equally distinguished sources asserted the injurious impact of sawdust on navigation and indicated a need for prohibitions.

The commissioners travelled by steamer from Lachine to the Carillon Rapids and up the Ottawa past the Grenville Rapids and Hawkesbury to the capital where they reconnoitred numerous bays and around the river mouths of various incoming streams. Captain McNaughton piloted the inquiry to several locations where he thought obstructions associated with mill waste might be found. Below Pine Tree Island, just opposite the home of the Gilmour family, then prominent lumbermen, McNaughton approached a shoal which upon inspection extended some 250 yards. "On the south side, this deposit of slabs, edgings, etc. in some parts united by sawdust, *extends wholly across the river*, until it reaches near the shore at the foot of the hill."⁴ On attempting to approach the lock beneath Colonel By's Rideau Canal the commissioners found the bay thoroughly blocked up with logs, square timber and other debris.⁵

In response to mill owners' apprehension about cost and the impossibility of disposing of sawdust waste other than by sweeping it into rivers, the inquiry specifically identified examples of mills where the problem had been satisfactorily resolved - generally by means of small furnaces. No doubt the commissioners attached some significance in this regard to their examination of the Gilmour steam mills at the mouth of the Trent River. This facility, they recorded, had "all the modern improvements" including elaborate arrangements conveying the waste to the furnaces. The Chaudiere site, where several mills were clustered closely together along the Ottawa river near the capital was the only location where the commissioners acknowledged the possibility of significant difficulty. Even here they expected it could be overcome.

In the end, perhaps by way of compromise between two prominent industries, the investigators endorsed an immediate prohibition against the deposit of sawmill waste other than sawdust. If Parliament, based upon further evidence, eventually determined that the injurious effects of pure

sawdust on navigation supported a more comprehensive prohibition, the commissioners assumed such action could then be taken.

Legislation enacted in 1873 prohibited the discharge of mill waste, including sawdust, into navigable waterways. The statute provided for exemptions, although the onus lay on the lumbermen to satisfy the Governor-in-Council that the "public interest would not be unjustly affected."⁶

J.R. Booth, already a prominent Ottawa lumberman whose successful commercial ventures in the white pine trade would eventually earn him recognition as a "lumber king," declined to alter his Chaudire mill to ensure compliance. He preferred instead to pay a twenty dollar penalty when, in 1875, he became the first subject of successful prosecution under the new act.⁷ Facing the prospect of further prosecutions, and perhaps ultimately injunction proceedings, Booth and other mill operators seemed to acknowledge that the era of dumping slabs and other heavy waste materials into the river was at an end. Almost all of the Ottawa Valley mill owners completed renovations (not including the removal of sawdust and grindings) by the end of the decade and obtained exemptions from the act by order in council 23 June 1880.⁸

Exempt from prosecution under the federal statute, the lumbermen were by no means immunized from private claims that might be initiated against them. In one court case, the judge described the lumbermen as "wrongdoers who from their mills allow sawdust, blocks, chips, bark and other refuse to fall into the River Ottawa." Water pollution and the obstruction of navigation were inevitable consequences of sawdust accumulations. Not only was water fouled and rendered offensive both to taste and smell, but the persistent depositions of sawdust "produce from the gas generated underneath the surface frequent explosions which are disagreeable and sometimes dangerous."⁹ Sawdust dumping on the Ottawa River contributed to accidents and took its first recorded victim in 1897. John Kemp, a farmer from the Montebello area was thrown from his boat into the chilly late fall waters by a methane explosion. Kemp succeeded in catching hold of the boat, only to be dislodged by a second "sawdust explosion" and lost forever.¹⁰

At the provincial level, institutions with responsibility in the domain of public health took up the sawdust question. In the early 1880s, officials solicited information from municipal authorities on several related issues, including the possibility that adverse health impacts might be associated with the presence of sawdust or disposal practices. Presumably to assess whether anyone else had actively taken up the challenge, municipalities were also asked to describe measures undertaken locally by the Fishery Inspector to prevent the pollution of streams, rivers, or lakes, and to report on any indications of compliance.¹¹

The Provincial Board of Health, like its counterparts, would in time exert an extraordinary influence over matters such as these. In their first encounter with the Ottawa Valley lumber trade, however, public health officials were out-manoeuvred. Booth, the lumber king, and his industry associates had not been idle. Threatened with possible court orders against their operations, owners of the Ottawa River lumber mills sought legislative protection for their industry. In 1885 Premier Mowat's provincial government took steps to immunize the owners or operators of saw mills who threw sawdust and refuse into the Ottawa River from actions for injunctions when the Lieutenant Governor determined that the public interest so required. The courts retained their traditional jurisdiction subject to the instruction that in an action for an injunction against the owner or occupier of an Ottawa River mill site, arising from the dumping of sawdust or other mill waste,

they "shall take into consideration the importance of the lumber trade to the locality wherein such injury, damage or interference takes place, and the benefit and advantage, direct and consequential, which such trade confers on the locality and on the inhabitants thereof, and shall weigh the same against the private injury, damage or interference complained of." The Ontario legislature clearly wished to deter the courts from impeding the advancement of a major resource industry then entering its most productive era.¹²

Despite provincial legislation to discourage injunctions against lumber mills for dumping mill waste in the waterways, the Canadian sawdust controversy persisted at the national level. The occasional explosion resulting from accumulations of methane made lumber waste difficult to ignore and stimulated public criticism. Moreover, the harmful effects of sawdust on marine and aquatic life became more fully appreciated. In 1889 a federal Fisheries official explained that the effects of the sawdust scourge on water were more ruinous than the impact of sawdust when spread upon the land. Floatability allowed the "blasting influences" of the sawdust scourge to spread downstream, even in some instances to vulnerable estuaries, small inlets and bays, either coastal or inland. Here it "kills the sources which give life and food for the smaller races of insects and other marine animals" while "settling here and there in its course down the streams, it forms a compact mass of pollution all along the bottoms and margins of the rivers and inlets, filling up the crevices on the gravel beds, and among stones, where aquatic life is invariably produced and fed." Sawdust eventually became "a fixed, imperishable foreign matter," adhering to the beds of lakes and streams where it "forms a long, continuous mantle of death..",¹³ These consequences, in all but name, were ecological. Yet it remained to be seen how concerns of this nature might be addressed.

Ottawa's constitutional responsibility for navigation appeared in the late nineteenth century somewhat more robust than its ostensible authority in relation to fisheries, and so, in 1886, the sawmill provision was rewritten with reference to the firmer constitutional foundations: "No owner or tenant of any sawmill, or any workman therein or other person, shall throw or cause to be thrown, or suffer or permit to be thrown, any sawdust, edgings, slabs, bark or rubbish of any description whatsoever, into any river, stream or other water any part of which is navigable, or which flows into any navigable water..."¹⁴ With a flourish, that final phrase - any navigable water - asserted the sweeping extent of federal concern. But the possibility of exemptions had been preserved.

There was little evidence of support for vigorous enforcement against the lumber mills from the higher reaches of government. Prime Minister John A. Macdonald may simply have reflected contemporary understanding of both forestry and the fishery when he remarked that each should take its turn: when all the trees were cut along the river, it could then be restocked with fish.¹⁵ It was not until 1894 that legislation to eliminate discretionary exemptions was finally approved by Parliament.¹⁶

The announcement that exemptions would expire in May 1895 unless extended by act of Parliament was certainly not welcomed by the trade. Hiram Robinson of the Hawksbury Lumber Company protested the anticipated impact on the fortunes of his firm. The Hawksbury saw-mills, he explained, were located on the Longue Sault rapids about sixty miles below Ottawa. The facilities, where some eight hundred men were employed, extended across one branch of the river from 700 to 800 feet from end to end, and had a capacity during their four months of annual operations ranging between 50 and 60 million feet. It was practically impossible to save sawdust

and smaller refuse, Robinson insisted, owing to the very low head of fall and some back water, during the running season, as a result of which "the wheels and machinery are very much submerged." Apart from this, he sought to assure officials that the Hawksbury company addressed the waste issue responsibly and that after passing through the rapids, the larger pieces of refuse were retrieved by farmers and the poor who prized them greatly.

Robinson explained that since his mill was essentially in a rapid of several miles length, there were no steamers or barges in the channel. Consequently, "no damage has been done to Navigation or to settlers, or people in any way." He added that if the *Fisheries Act* were to be enforced against the Hawkesbury operation, he would be compelled to close down the five existing mills for the reason that it was "quite impossible with the peculiarities of the place to erect new water mills, to catch the saw-dust and etc. "Robinson estimated the cost of replacing the installed works with steam powered facilities at between 375,000 and 425,000 dollars, not including the loss of the value of the current mills and the costs associated with shutting down for whatever period of construction might be required.

In 1899 prosecutions were launched to encourage compliance, but over a three year period J.R. Booth managed somehow to obtain further indulgences, ostensibly to complete conversion of his lumber mill and to develop a pulp plant where the sawdust would be utilized as fuel. On September 11, 1901 the prosecutorial arm of the department of justice finally secured a conviction and another twenty dollar fine. Ultimately the Prime Minister of the day, Sir Wilfrid Laurier, became personally involved in the Booth file. Laurier was instrumental in securing Booth's firm commitment to cease dumping sawdust at the end of the 1902 season in exchange for relief from further prosecutions and the threat of injunction proceedings.¹⁷

Pulp and Paper Pollution

Booth was not alone in anticipating the Ottawa forest industry's shift from lumber to pulp and paper production utilizing spruce rather than the declining supplies of pine. The opening of E.B. Eddy's pulp mill in Hull in 1889 ushered in a new era in water quality, for both chemical residues from the pulping process and associated paper making, as well as suspended wood fibres imposed severe demands on the river. Eddy discontinued its Hull pulping operations in 1972, but other twentieth-century operations along the watershed included, along with Booth's venture, facilities owned by the McLaren interests in Thurso and Masson, and the Canadian International Pulp and Paper Company plant in Gatineau and elsewhere.

A snapshot for 1959-1960 indicates that 120 million feet of wood, seventy per cent consisting of spruce and balsam, was cut on the Quebec side of the watershed. The Ottawa River itself and the Gatineau River contributed 24 million cubic feet and 14 million cubic feet respectively. The consequences of newsprint production from one mill alone resulted in annual discharges to the Ottawa of 7,000 tons of fibres and 20,000 tons of bark. On a daily basis one million gallons of sulphite liquor were being introduced to the waterway.¹⁸ A decade later, in 1971, high concentrations of suspended solids and related sludge deposition were reported downstream from the Kipawa mill of the Canadian International Paper Company in Temiscaming, the Hull mill of the E.B. Eddy Company, and the Canadian International Paper Company mill at Gatineau. The Masson mill of the James MacLaren Company, the Thurso mill of the Thurso Pulp and Paper

Company, the Hawkesbury mill of the Canadian International Paper Company, and the Consolidated Bathurst Company mill at Pontiac were responsible for lesser impacts.¹⁹

The pulp and paper industry was regarded by this time as the primary source of pressure on water quality in the Ottawa. Overall this sector was responsible for discharging approximately 190 tons per day of suspended solids. Additional discharges of organic wastes substantially reduced oxygen levels in the river with a five day biochemical oxygen demand of over 1 million pounds of oxygen per day. That was then equivalent to the burden of the raw wastes of the metropolitan areas of Toronto, Montreal and Ottawa combine. Other industrial wastewater discharges contributed to pollution loads, as did the ever-expanding flow of municipal sewage which had, for decades, constituted a major, though largely disregarded source of contamination.²⁰

The Sewage Crisis

In the nation's capital, a singularly unhealthy set of circumstances threatened water quality for years after the introduction of a piped municipal supply and sewerage during the 1870s. Yet even after bacteriological discoveries beginning in the same decade, recognition of the linkage between health and contaminated water supplies was slow in coming.²¹ By 1913, a consultant's report recommended that Ottawa should disregard the river and draw its water from Thirty-one mile Lake, Pemichangaw Lake, and Long Lake in Quebec's Gatineau Hills. Provincial and federal statutes were enacted to facilitate the project, and one municipal council eagerly passed a by-law to fund the new water-works. Irate ratepayers succeeded in having that by-law quashed²² and a virtually identical successor which the city claimed it had been compelled to enact by order of the province's Chief Officer of Health met the same fate.

In 1914, following the election of a new city council, Ottawa ratepayers formally expressed their continued preference for water drawn from the Ottawa River - an industrial thoroughfare for the lumber trade of the nineteenth century²³ - and filtered locally, over the more costly scheme to deliver uncontaminated water from Quebec. But when the actual plans for the less costly pumping, filtration and chlorination of river water were presented to the PBH for approval, that body unanimously rejected the scheme.

The PBH observed that the Ottawa river was "beyond any question, a polluted source of supply at all points in the vicinity of the city of Ottawa." Accordingly, the board concluded that it would not be consistent with its duty to the citizens of Ottawa or to visitors to the national capital to "countenance the use of water which, after mechanical filtration, constantly requires chlorination, when a pure and adequate supply, requiring no treatment whatever, may be readily procured."

This particular skirmish between the city and provincial officials over the condition of the Ottawa River was not an isolated incident, a one time only regulatory clash between local politicians concerned with the practical realities of municipal finance and a remote provincial agency intent on imposing abstract and artificially high standards. The need to address drinking water quality in the nation's capital had been pressing for half a decade, and particularly acute since the deaths in 1911 and 1912 of 174 people in successive typhoid epidemics. With the outbreaks of disease attributed to pollution from the untreated sewage of the community of Hintonberg flowing down Cave Creek to Nepean Bay where it entered the city's faulty supply pipe, the situation was

urgent. Eventually, however, a reassessment of the city's water volume requirements for fire fighting purposes conclusively removed the Gatineau lakes plan from contention.²⁴

Meanwhile, against this unfolding local backdrop, the distinguished francophone Senator Napoleon Belcourt campaigned for national action. As an Ottawa resident, Belcourt was thoroughly familiar with the national capital's dilatory approach to water supply and with typhoid outbreaks accompanying the delay. Belcourt first called for amendment of Canada's Navigable Waters Protection Act in the interests of public health as early as 1910. The successful earlier ban on sawdust, he suggested, might usefully be supplemented by a further prohibition. He called on parliament to declare that "our noble rivers shall no longer be made the receptacles of the raw sewage of the country."²⁵

In 1911, perhaps with renewed determination in light of the major typhoid outbreak, Senator Belcourt re-introduced legislative measures. The Belcourt proposal was in essence a prohibition against contaminating navigable water in Canada, subject to exemptions authorized by regulation or specifically permitted. Directed at surface waters generally, the proposed protections were wider in scope than most provincial efforts to safeguard sources of water supply.

Belcourt's advocacy of anti-pollution measures was vigorous and wide ranging. To demonstrate the severity of the underlying public health crisis he quoted newspaper reports from a number of Canadian communities; he cited devastating typhoid statistics from Chicago when the Lake Michigan city had been polluting its own water supply; and he recounted at some length a local family's tragic experience with the water of the Ottawa River. With one of their twelve children already dead and five more hospitalized with typhoid, the Gravelle's of nearby Deschenes, Quebec, illustrated the Senator's point that water quality was the most important public issue of the day.

Ottawa River communities, like the vast majority of their North American counterparts chose to rely on the chemical treatment of water supplies - chiefly by means of chlorination - rather than sewage treatment to ensure the quality of municipal water. The strategy, extremely successful from the perspective of advances in public health, did nothing to encourage attention to environmental conditions. The Green's Creek sewage treatment facility for the city of Ottawa was not in operation until 1963, then offering only primary treatment. By the time of a comprehensive survey of the entire watershed later in the decade, a few communities on the Ontario side, (not including the nation's capital,) had introduced secondary treatment. Most communities on the Quebec side, including Hull, Gatineau and Pointe Gatineau, provided no sewage treatment at all.²⁶

At the start of the new millennium, Ontario's Environment Commissioner reported that while Lake Ontario was the recipient of 38% of the total provincial discharge from sewage treatment plants in 1998, the Ottawa River was the second largest recipient with 9% of total municipal STP discharges. On a national basis, Ottawa-Carleton's STP was second only to Toronto's Ashbridge' 5 Bay facility as a source of ammonia releases to water. (ECO)

Other Factors Affecting Water Quality

Hydro-electric Power Production

Some hydro dams such as Chats Falls and the Bryson generating station date from the 1920s. A further flurry of construction got underway at mid-century following a 1943 agreement between Ontario and Quebec to allocate undeveloped water power sites along the river. This wave of activity included generating stations at Des Joachims (begun in 1946 and completed in 1950), Chenaux (begun in 1948 and operational in 1951), La Cave where the Otto Holden Dam was built between 1948 and 1952. The Carillon generating station began a few years later in 1959 and came into operation in 1964. Facilities of this nature, if they do not contribute directly to increased pollution loads on the river, may, because of their impact on current, the deposition of suspended materials, and so on alter the river's restorative capacity and the quality of shoreline habitat.

Agriculture, Residential and Recreational Activity

Land-based activity such as agriculture has significant potential to undermine water quality as a consequence of the use of chemical pesticides and fertilizers, or as a result of the run-off of organic materials from livestock operations conducted in or near riparian zones.

The location and operation of our golf courses, residential sub-divisions and other activities which proliferate along the Ottawa or tributary waterways also pose threats and challenges, both from the perspective of water quality within the river and to the birds and other wildlife that would otherwise frequent the banks and wetlands of an historic and cherished river.

Remedial Initiatives

Official inquiries into the condition of the Ottawa River and deliberations over suitable responses to degradation go back over fifty years to at least the time of a comprehensive survey conducted under the auspices of an inquiry into the state of Canada's industrial water resources. The matter was equally of some interest at the time of the formation of the National Capital Commission in the 1950s.

By 1961, however, the Chair of Quebec's Water Purification Board demonstrated considerable apprehension about the fate of the river. "Are we going to let the water deteriorate to a point where the Ottawa River cannot be approached safely?" asked Guy Prevost.²⁷ Pursuant to a joint announcement by the Premiers of Quebec and Ontario in August 1967, officials of the Ontario Water Resources Commission and the Quebec Water Board collaborated in a study of control strategies for water quality in the Ottawa. The findings underlined the severity of existing impacts: "The severe pollution pressures that result from the discharge of inadequately treated municipal and industrial wastes presently threaten to destroy the water quality of the Ottawa River if permitted to continue."²⁸

Since that era, of course, significant improvements have been made in a variety of settings with both provinces and many riverine communities moving to address particular aspects of their own responsibility for the river. Federally, the Canada Water Act introduced at least the potential for river comprehensive water quality management on a basin-wide level. The results however have largely been confined to reporting conditions rather than to remedying sources of deterioration and threat.

One participant at a hopeful conference organized in 1970 offered a frank assessment of the obstacles that confronted anyone who set out to safeguard the Ottawa River from the many perils that beset it then, and now.

"Costs, jurisdictional problems and division of power are not the only reasons for persistent pollution problems. Indeed, I might suggest they are but secondary considerations - the byproducts of our social attitudes. In this whole question of pollution we are dealing with a cultural phenomenon. We have the technology and the wealth to at least make a good start on beating pollution. But we have no collective commitment. Getting to the moon was mainly a matter of social commitment first, systems management second, and technology and dollars last. Cleaning up the earth is obviously a tougher nut to crack, not because we can't really afford it, but because we are faced with the greatest problem of all, cultural transference. Changing people's attitudes. Transforming their value systems without benefit of appeal to their sense of material gain." ²⁹

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