

Ways but not a Will: Addressing Nitrate Contamination on Prince Edward Island

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As the only Canadian province entirely dependent on groundwater, and the province with the largest percentage of land under agricultural cultivation, nitrate contamination of drinking water is a critically important issue for Prince Edward Island. Although there are clear links between nitrate contamination and human, environmental, and aquatic health, the province has taken minimal action on the issue. This article explores the current hindrances to progressive and effective public policy, and suggestions for how the province can move forward.

Introduction

Prince Edward Island is the only province in Canada that is entirely dependent on groundwater; it also has the largest percentage of land under agricultural cultivation. This combination of conditions has meant that Islanders are at an elevated risk for nitrate contamination in their drinking water from agricultural runoff. In addition, nitrate contamination threatens not only human health, but environmental and aquatic ecosystems—threatening the entire province's wellbeing. This article explores the potential impacts of nitrate contamination, the current legislation in place to address issues of water quality and quantity, potential hindrances to effective public policy, and how the province can move forward. These explorations engender the conclusion that change on the issue of nitrate contamination will be difficult to bring about, but is imperative. Change can be achieved through subsidies, primary and secondary educational reform, and a shift, through government support and regulation, to all-organic agriculture; with all-organic agriculture, the Island could effectively re-brand its farm products as unique within the market – while protecting the lives of all Islanders, the environment, and aquaculture ecosystems against the threats of nitrate contamination.

The Hazards of Nitrate Contamination

Nitrate contamination is an issue with potentially serious consequences for the health of humans, wildlife, and fisheries, shellfish, and aquaculture. As it has been stated: “Nitrates in drinking water can be a health hazard when present at relatively high concentrations (over 10 ppm). At much lower concentrations, nitrate interacts with other pollutants such as trace mixtures of pesticides to produce health impacts,” (Novaczek, 2008). This combination has been found in rural wells and surface waters on Prince Edward Island. Therefore, it is important to examine the specific hazards of such contamination.

Research has shown that mixtures of nitrates and other pollutants contribute to: immune, endocrine, and nervous systems conditions (Guillete and Edwards, 2005); various cancers (Pearce and McLean, 2005); childhood diabetes (Kostraba et al., 1992); thyroid dysfunction (Eskiocak et al., 2005); attention deficit disorder (Porter et al., 1999); and birth defects and reproductive problems (Manassaram et al., 2007). In addition, these impacts are most seriously evidenced in children, the elderly, and those with pre-existing immune, endocrine, and/or nervous system conditions. Beyond human health, it is also important to consider wildlife health and the impact of nitrates on fisheries and aquaculture. It is important to note that, while 10 ppm is considered dangerous to human health, a concentration of only 2.9 ppm is considered hazardous to wildlife health. Humans also have the capacity to drill deeper wells in order to reach less contaminated water, while wildlife are entirely dependent on surface water, which is more likely to be contaminated, and at higher concentrations. In addition, it is important to consider the impact on fisheries and aquaculture – Prince Edward Island’s third largest industry. Nitrate pollution can have both direct and indirect impacts on marine ecosystems; it has the potential to further collapse the lobster, scallop, and herring fisheries in the Northumberland Strait (GTA Consultants, 2006).

Current Regulations and Legislation

As the only province that relies entirely on groundwater, Prince Edward Island uses both individual wells and municipal supply systems. There is no provincial water conservation plan in place, but it is important to note the legislation that does impact water quality

and quantity in the province. The central pieces of water legislation are the Water and Sewerage Act (2003), Environmental Protection Act (1988), Water Wells Act (2004), and the PEI Fisheries Act (2009), while the Farm Practices Act (1998), Right to Farm and the Pesticide Control Act (2009), and the Planning Act (2009) also impact water quality issues. There are also groundwater and surface water monitoring programs in place, including: the Pesticide Research and Monitoring Program, PEI Groundwater Pesticide Monitoring, Public Water Data, Stream Flow Monitoring, Monitoring the Groundwater Table on PEI, Canada/Prince Edward Island Water Quality Agreement, Bacterial Sampling for Environment Canada, PEI Estuary Survey, Targeted Monitoring, Other Water Quality Monitoring Activities (The Living Water Policy Project).

In particular, the Drinking Water Strategy, put in place in 2001, “uses a multibarrier approach to protecting drinking water, focusing on source protection, system design, and operation for municipalities,” (The Living Water Policy Project). All municipalities in the province require the disinfection of drinking water, testing for 50 contaminants, including nitrates, but it is not mandatory that they report these to municipal residents, and more than seventy per cent of provincial land falls outside municipalities. Since 2004, well-field protection plans have been mandatory for homeowners who live within municipal borders, but there is no provincial equivalent for unincorporated areas (The Living Water Policy Project). No legislation is in place to ensure water quality of private wells or mitigate nitrate contamination.

It is also important to note that no water monitoring programs for drinking water or water resources exist, at either the territorial or provincial levels, for the First Nations communities on Prince Edward Island (The Living Water Policy Project). As the First Nations communities are located on Federal Reserve land, they are under Federal jurisdiction; they are not protected by any provincial legislation on water quality. As it has been summarized: “First Nations rights to water are not yet explicitly and legally acknowledged in any provincial or federal legislation. The 1987 Federal Water Policy (Environment Canada, 1987) acknowledges Native interests in water but this has not generally been reflected in provincial allocation decisions,” (The Living Water Policy

Project).

Hindrances to Effective Public Policy

Despite the clear scientific data on the impact of nitrate groundwater contamination, there are a number of factors unique to Prince Edward Island that hinder the public policy process from implementing an effective strategy for protecting Island water sources. Therefore, these factors are explored to understand how cultural, socio-economic, and political structures can impinge on the ability of governments, or of citizens, to enact change. It is only through fully understanding these hindrances, that they – and the issue of nitrate contamination – can be effectively addressed and overcome; without examining the conditions that shape the policy process on Prince Edward Island, the failure or success of governments to meet challenges cannot be understood – or learned from.

Cognitive Dissonance: Cultural-Industrial Disparity

Arguably more than any other province in Canada, the culture of Prince Edward Island is shaped by its traditional way of life – and chief amongst this traditionalism is an adherence to the image of the family farm. This adherence, though, has come to be marked by cognitive dissonance, a dissonance that must be addressed and overcome if Islanders are to effectively address the health and environmental threats of nitrate contamination, but first it must be understood. First summarized by David Milne in 1982, PEI's political culture can be understood as “the myth of the garden.” At the core of this myth, he argues, is Islanders' view of themselves as “an independent agricultural people protected from the world in an unspoiled pastoral setting,” (Milne, 1982). This image colours not only Islanders' self-image, but how potential changes to the “Island way of life” are understood, evaluated, and considered. Yet, change to the Island way of life has been continuous since the Second World War.

The agriculture industry of Prince Edward Island has undergone a drastic transformation and decline over the past eighty years. In 1931, 1.2 million of the Island's 1.4 million acres (McClellan, 1982) were cultivated on 12,865 farms (Statistics Canada, 2006), and the farm population of 55,478 accounted for sixty-three percent of Islanders (Department

of the Provincial Treasury, 2010). By 2006, the number of acres under cultivation had declined nearly fifty-percent, to 619,885, and the number of farms had dropped to 1,700, with a population of 5,295 – only 3.9 percent of the provincial total (Department of the Provincial Treasury, 2010). The family farm has been replaced with commercial farming operations; the self-sustaining, varied 100-acre farm has been replaced with mono-crop operations, namely potatoes. With transformation from family farms to commercialized operations, came subsequent changes in how crops were planted, grown, and harvested. The changes in equipment and practices brought about by increased farm sizes brought with them increased environmental impacts. More land-intensive equipment is now employed on the majority of operations in order to keep up with their growing farm sizes (Bukowski, 1996). As growing practices have intensified, and farmers have switched from mixed crops to mono-crops, namely potatoes, under machine-based operations, the sediment runoff into Island waterways has dramatically increased.

Along with more intensive mechanical operations, there has been a dramatic increase in the use of nitrate rich fertilizers. Used particularly on agricultural land in potato rotation (Benison et al., 2006), nitrates seep into, and move through, the soil during summer months when applications “exceed the absorptive capacity of the crop. Its impact is doubled by the land-intensive practices of potato farming which rob soil of its natural richness. As Novaczek has summarized: “In winter, nitrate may be mobilized from organic matter in soils. Recent research indicates that the common practice of fall ploughing greatly exacerbates the liberation of nitrate from soil organic matter. This practice therefore robs the soil of nutrients that would otherwise be available for growing crops the falling season, pollutes groundwater and increases demand for chemical fertilizers,” (Novaczek, 2008). As the soil is robbed of its nutrients during the fall ploughing season, most commercial farms now apply nitrate rich fertilizers at the beginning of the growing season, before the potato plants begin to grow; if rains are heavy before nutrients are absorbed by the plants, up to eighty per cent of the nitrogen can be leached into the soil, and subsequently the groundwater sources. Additionally, as fertilizers are re-applied throughout the growing season, what plants do not absorb can be moved into ground and surface water sources (Novaczek, 2008).

Yet, despite these both physically and nutrient intensive practices, Islanders continue to view themselves, primarily, as family farmers – as farmers whose practices are in harmony, rather than in constant threat to, the Island’s natural environment. If this cognitive dissonance remains, between the self-image and reality of the province’s largest industry, it unlikely environmental groups or governments will find significant support for changing agricultural practices to mitigate environmental impacts; if there is little cognizant recognition of how practices have already changed, few will recognize the need to return to practices they still view themselves as employing.

An Economic Paradox

As agriculture holds an unparalleled place in the Island’s culture, but has been in rapid decline since the Second World War, there is a strong sentiment amongst the provincial population that the industry should be protected from further financial burdens. Therefore, despite the fact that agriculture is the biggest contributor to nitrate contamination, political leaders are reticent to be seen as financial impinging on the industry. This is further complicated by two economic conditions that largely define Prince Edward Island: the economic hegemony of McCain Food Limited and the province’s financial dependency on Ottawa.

Beyond their individual financial difficulties, the majority of Island farmers have come to be economically dependent on McCain Food Limited, and their demands for potato production; in an increasingly risky and unstable global, many producers have found relative stability in selling their crops directly to McCain’s. This, though, enables McCain’s to have significant influence over the agricultural industry on Prince Edward Island. Processing accounts for approximately sixty percent of the PEI potato crop each year, and this done almost exclusively by McCain’s, although Cavendish Farms does buy some amount of potatoes for processing. In addition to process, McCain’s and Cavendish purchase potatoes to package and ship whole to markets throughout North American and overseas. Although land ownership laws prevent McCain’s from directly owning more than 3,000 acres from land, they effectively own tens of thousands of more acres as “family” owned farms sell directly, and only, to McCain’s (Department of Agriculture).

As potatoes continuously account for a greater percentage of acres under cultivation, the scope of McCain's influence, and the vulnerability of farmers, continue to rise.

One example of this hegemonic influence – and its adverse impact on Island groundwater – is the overwhelming shift to Russet Burbank potatoes amongst farmers, in response to pressure from McCain's. In the 1990s, using industrial studies on aesthetic preferences of French-fries, which have shown a strong preference for long, thin fries, McCain began to demand that its suppliers grow Russet Burbank potatoes, over other varieties, in order to produce such fries. Russet Burbank potatoes, though, have a longer growing season than other varieties commonly grown on the Island. This longer growing season has shortened the time for a ground-cover to grow after potatoes are harvested in the fall – leaving more land exposed in the Fall and Spring, increasing sediment runoff and increasing nitrate levels in Island waterways. In addition, larger potatoes require greater nutrient levels, adding pressure for farmers to increase their use of nitrate-rich fertilizers on their fields; compounding the nitrate contamination levels that resulted from a change in crops (McDonald, 2000). In addition to having significant sway over the practices of Island farmers, McCain's hegemony extends to having significant economic leverage and lobbying power with the government; agriculture is the province's largest industry, and McCain's is the biggest player. Therefore, governments are limited in their ability, or their willingness, to challenge the wishes of McCain's when addressing the environmental impacts of potato production.

Beyond the influence of McCain's on the agricultural industry's finances, Island governments are limited by a second economic factor: their own dependency on Ottawa. As a "have-not" province, Prince Edward Island is heavily dependent on transfer payments. Currently, forty-four per cent of the provincial budget is directly funded by Ottawa. With such dependency, Prince Edward Island is not, economically, in a place to easily absorb the cost of mitigating the financial hardship of farmers in transitioning to more environmentally sustainable practices. Yet, despite the short-term economic hardships of Prince Edward Island, and its dependency on Ottawa, the current provincial budget paints a grim future if the issue of nitrate contamination is not addressed. As

discussed above, nitrate contamination is linked to a significant number of human, and environmental, health issues; currently, more than a third of the provincial budget – \$476 of \$1,360 million – goes directly to Health PEI (Department of the Provincial Treasury). If health complications continue to rise from the impact of nitrates in the Island’s drinking water, the portion of the provincial budget that must be spent on health expenditures can be expected to rise significantly. Therefore, due to the economic hegemony of McCain’s and its financial limitations, Prince Edward Island remains locked within a financial paradox.

Political Complications

Cognitive dissonance and reticence to financially burden already struggling farmers is compounded by the politics of Prince Edward Island. As discussed above, agriculture lies at the core of the Island’s culture, so too does it lie at the centre of its political culture. But in political sphere, as opposed to the wider Island population, this special place of agricultural – and the reticence to burden farmers, even when the environment and human health are at stake – has been bolstered by two historical trends. Although one, the over-representation of rural areas, changed in the mid-1990s, the other, the over-representation of farmers in the Legislative Assembly, remains a key feature of the provincial political sphere. In addition, the lack of political will to act on nitrate contamination can be understood by examining the absence of third parties and the fact that agriculture falls under both federal and provincial jurisdictions. Finally, the issue is political complicated by the fact that its falls under a significant number of provincial ministries. All of these factors have all been at play in the Island’s history of ineffectual commissions on land use issues, and its currently struggle to address the issue of nitrate contamination.

Historically, agricultural interests and rural identity were bolstered in provincial politics by the Legislative Assembly’s antiquated electoral-system that distributed ridings by county, rather than by population (Elections PEI). This ensured the manifestation of agricultural identity and interests in provincial politics, despite the socio-economic transformation of the industry and the province’s rural areas. The legacy of rural over-representation

remains in provincial politics, despite the redrawing of ridings based on population in 1996 under a Supreme Court mandate (Shott, 2011). In addition, despite the decline in the number of farmers on Prince Edward Island, a similar decline in the number of farmers in the Legislative Assembly has not occurred. In 2007, eight of the twenty-seven members of the Assembly were farmers, a much higher percentage than the 3.9 per cent of the total provincial population. As it has been noted about the representation of farmers in Canadian legislatures, “their decrease in proportion over the past number of years has been less than the decrease in the number of farmers in the population. ‘Provinces with heavy reliance on agriculture retain a strong critical mass of farmers in the legislature,’” (Docherty, 2010). Therefore, for a large number of MLAs, the protection of agriculture interests is not just a political issue, but a personal one as well, bolstering the industry’s place in provincial politics.

In addition, the dominance of agricultural interests, and the subsequent reticence to progressively act on environmental or health issues has been bolstered by the absence of third parties; they have never gained a foothold in Prince Edward Island. In the history of its Legislative Assembly, only two members have been elected from outside the Liberal and Progressive Conservative (PC) parties. Therefore, an infusion of new ideas, in this case on to agriculture, and its environmental and health implications, from third parties has not occurred in Island politics; PEI has remained limited by the ideas of its two dominant parties. This continued dominance of the Liberals and PCs is a result of the traditional nature of the Island’s culture; historically, it has been considered heresy to renounce one’s inherited political allegiance (MacKinnon, 2010).

In addition to these cultural aspects of the Island’s political sphere, the issue of nitrate contamination is further complicated in its public policy process by the fact that while groundwater is a provincial and municipal issue, responsibility for agriculture falls at both the federal and provincial levels. The impact of nitrate contamination is spread across multiple ministries at the provincial, as discussed below, but multi-level governance further complicates its main source. As it has been summarized by Wayne Easter, Federal Opposition Critic for Agriculture: “No level of government actually takes

responsibility [for agriculture]. One sluffs it off, one blames the other and the other blames the other and so, that's part of the reason – there is nobody in charge of the kitchen here,” (Easter, 2010). On an issue politically risky for provincial governments to address, multi-level governance allows them to shift significant portions of the blame to the federal government. With mixed responsibility in the public policy process, though, does not come the ability of either to truly hold the other accountable for agricultural practices and their environmental impacts; blame is passed back and forth, while the problem continues to grow. Without effective accountability measures for agricultural practices in place it can be expected that the blame passing will continue.

The ability to shift blame under mixed responsibility also occurs at the provincial level. The issue of water quality itself is divided under three ministries: Environment, Energy, and Forestry; Communities, Cultural Affairs, and Labour, which administers funding for water and sewer infrastructure; and Fisheries, Aquaculture, and Rural Development. Yet, as discussed above, the ability to act on issues of water quality is often mitigated by the priority given to The Ministry of Agriculture. In addition, it is the Ministry of Health and Wellness that deals with the human health impacts of groundwater contamination. Therefore, the issue itself is spread thin across ministries, defusing accountability for the issue, but also hindering the ability to enact effective public policy on the issue of nitrate contamination.

Commissions and Other Jurisdictions: Potential, but Failure, to Learn

It is important to note a historical trend in the Island's political sphere: the mismatch between innovative commissions the lack of political will to act on groundwater contamination. For all of the aforementioned reasons, the lack of political will is clearly evidenced by the history of land use planning commission on Prince Edward Islands. As a submission to the latest report on the issue summarized:

Over the past 40 years the public purse has paid for a series of commissions and deliberative processes to consider land use practices and more recently, forest policy and watershed management. Many excellent recommendations have been made, but only a few of these have been fully enacted ... This trend of using public commissions and consultations to forestall action has led to

considerable cynicisms and apathy on the part of stakeholders ... Clearly, there is much to be done that has already been clearly outlined in previous studies. The answers have been obvious for decades, but the political will to act has faltered," (Novaczek, 2008).

Yet the commissions have consistently sought to infuse Prince Edward Island with practical and critically important recommendations for change.

In particular, the 2008 Commission on Nitrates attempted to bring about important changes to how the problem of groundwater contamination can be addressed. It made recommendations on improving public education on protecting water quality, reducing nutrient loading from sewage treatment systems, supporting watershed-based water management planning, reducing nitrate contamination from cosmetic use of fertilizers, amending land-holding legislation, protecting and restoring wetlands which trap nutrients, matching nutrients with crop needs to reduce nitrogen levels, and identifying high nitrate areas (Commission on Nitrates in Groundwater, 2008).

Its recommendations tackled many of the key problems. The 43 recommendations included: developing a public education campaign, create a provincial-wide watershed planning initiative, institute a province-wide policy to eliminate cosmetic pesticides, restore natural wetlands, reduce the amount of commercial fertilizers applied to potato crops, increase the length of crop rotations – including a mandatory three-year rotation, facilitate collaboration between the departments of agriculture and the environment to development a nutrient management program, develop financial incentives to help farmers transition to more sustainable practices, prohibit fertilizer application before plants are able to fully absorb nutrients, and financially support organic farms.

Additionally, it recommended that the province identify high-nitrate areas and immediately put in place watershed management plans, jointly developed by the departments of agriculture and environment, containing five six key steps:

1. reduction in fertilizer inputs,
2. management of soil organic matter,
3. increased tree cover,
4. reduction in land under potato production,

5. strict controls over all subdivision development, and
6. the encouragement of wetland restoration (Commission on Nitrates in Groundwater, 2008).

In 2011, only one of these recommendations has been adopted. On 1 April 2010, the province implemented a partial ban on pesticides for commercial pesticide use on residential and commercial lawns, including parks, playgrounds, sports fields, speciality turf, or driveways, walkways or patios. Yet the legislation only banned substances include 2,4-D and mandated that the application of 2,4-D is still legal for commercial golf courses (Department of Energy, Environment, and Forestry). When addressing the other recommendations, Premier Robert Ghiz has urged Islanders to “be patient,” stating that a solution to the problem will likely twenty-five years (CBC, 2008). He has promised that the rest of the recommendations will be limited, noting that “there’s going to be some recommendations ... that won’t be as popular as others, but at the end of the day you have to take the politics out of it and say we have to make sure that this is a problem that is addressed,” but politics has arguably continued to mitigate further government action on the recommendations (CBC, 2008). Therefore, commissions have shown the ability to learn from other jurisdictions, but governments continue to be entrenched in – and limited by – the Island’s unique conditions.

As submissions to the Commission on Nitrates in Groundwater, and the Commission itself, showed: there is much to be learned from other jurisdictions – but it is the lack of political will that has held Prince Edward Island back. Lessons could be drawn from the Great Lakes and European watersheds (Muscutt et al., 1993); research from as close as New Brunswick could be used to replace chemical fertilizers with spring clover plough-down (Nass et al.); and the Island could look to its “local, pre-industrial farm practices, to the cultural values of the Island’s Aboriginal people, and to current organic agricultural practices” for inspiration (Novaczek, 2008).

Conclusion: Looking to the Future

Although the hindrances to change on Prince Edward Island is strong, a culture of resistance exists, and past commissions have failed to be effective, there are still

avenues through which change could be brought about. Chief amongst these is a province-wide, mandated change to organic agricultural practices. If fully supported in this change by government subsidies, farmers could successfully make this transition – particularly if it was coupled with a new, effective marketing strategy that could be engendered by an all-organic Island. In a complex, global market, Prince Edward Island has the opportunity to make itself distinct, to stand out, instead of struggling to function within dominant global practices.

Additionally, this mandated change could be bolstered and more effectively brought about through increased educational resources in agriculture – through the establishment of a partner branch of the Nova Scotia Agricultural College at the University of Prince Edward Island, and through primary and secondary educational resources in organic agriculture and its health benefits. By mandating the change, but fully subsidizing and supporting farmers throughout the transition, Island governments could mitigate future nitrate contamination – saving the human, wildlife, and aquaculture populations from detrimental health impacts of contaminated groundwater sources. Prince Edward Island is the only province entirely dependent on groundwater, but it has the opportunity to become the national – and possibly a global – leader on organic agricultural practices, which would foster healthy citizens and communities.

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