Presentation to the PEI Environmental Advisory Council – Nov. 9, 2015.
(with some added text)

PEI Sierra Club (Atlantic Chapter of Sierra Club Canada Foundation)
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Discussion of a Water Act for PEI : An Important Step in Making the Transition to Sustainable Agriculture

Introductions and Background on Sierra Club PEI

We, Tony Reddin and Lilly Hickox, are presenting this on behalf of Prince Edward Island volunteers with the Atlantic Chapter of Sierra Club Canada. Sierra Club is one of the oldest and most influential grassroots environmental organizations in North America, and has been active in Canada since 1963 and on PEI since 2001, with our stated mission to 'empower people to protect, restore and enjoy a healthy and safe planet'. Our major national campaigns fall under the program areas of Health and Environment, Protecting Biodiversity, Atmosphere and Energy, and Transition to a Sustainable Economy.
Our present projects on PEI include Sierra Buddies, an environmental education mentoring program for young people, 'Wild Child' Nature Immersion For Young Children, and the Annual Family Earth Expo, held very successfully in April for 5 years now. We also developed and delivered a water resource education program called "PEI Water Wizards" : http://www.sierraclub.ca/en/node/2131 .

Tony Reddin- I have been involved for many years as a volunteer with Sierra Club and the Council of Canadians on environmental issues, including considerations of water use, conservation and policy. My personal involvement with PEI agriculture includes involvement with programs at the PEI Farm Centre, ACORN and the PEI Food Security Network, attempts to start the PEI Farmworks Investment Cooperative, and many years in the past working on a mixed dairy farm in New Dominion and on other farms. I live in Bonshaw.

Lilly Hickox- I am a resident of Stratford, a student at CRHS, and a member of Envirothon and other environmental clubs.

First, we thank you for holding these hearings to consider and get public input for the proposed Water Act.

We encourage you to **include young people** as much as possible in this public input process (Sierra Club includes the Sierra Youth Coalition and other programs for young people.).

Because issues around water use, including present and future farming practices, have such an impact on the ability of future generations to have a sustainable food system, it is critical that young people from all sectors of PEI society be included in these discussions. We encourage your committee to investigate ways to reach and engage young people, for example through programs in schools, clubs and post-secondary courses; and including community and social media initiatives.

These hearings have served to open an important public debate about the state of agriculture on PEI and we would like to see that debate continued and opened up further. Agriculture is vital to PEI, and a very important part of making the 'Transition to a Sustainable Economy', one of our Sierra Club goals.

Our Island farmlands can easily supply our people with healthy crops and food, with enough to continue exporting to other provinces and markets. Our history shows that our Island agriculture in the past has produced food sustainably and protected our good soil and water. That record has been tarnished in the decades beginning with the post-war introduction of industrial farming methods based on large inputs of fossil fuels. Today there is some progress being made in moving back to sustainable agriculture; for example there are a number of very successful organic farmers and good initiatives toward diversifying crops. There are many present factors that we think call for a more radical transformation of PEI's agriculture, and setting a multi-year plan to make the transition to a sustainable food system on PEI.

Island Prosperity: A Focus for Change, a comprehensive 2008 report outlining the provincial government's five-year economic strategy, observes that "the factors that helped PEI to succeed in the past – supply push, mass production for mass markets, growth through higher volumes, efficiency – reflect a traditional approach which is increasingly obsolete." [1] We agree with this conclusion and many of the recommendations for diversifying PEI agriculture.

The Water Act, High Capacity Wells and Agriculture Directions

To begin, please give full consideration to all the reasons in favour of extending the 'deep or high capacity wells' moratorium, as given in many strong presentations you have heard (and many letters printed in the public media). We agree with others that the PEI government should:
- follow the Precautionary Principle and keep the moratorium in place, plus extend it to include uses outside agriculture,

- examine the adequacy and effects of the present provincial policy and regulations on currently-active high capacity water wells.

There is also a need to determine the health hazard posed by radon gas or other contaminants that may be brought to the surface from deep water wells.

Opponents of the moratorium have also made presentations, and paid for media advertising messages that would downplay and disregard the past and present negative effects of industrial agriculture and the french fry potato industry on PEI's natural resources of soil, water and air.

These messages cannot be given credibility, when one considers the record of industrial agriculture on PEI:
- unacceptable nitrate levels in PEI's groundwater and in surface water, which are often above what is recommended for human health, and for health of aquatic organisms;
- unacceptable levels of pesticides in the air over PEI every summer;
- fish kills, shellfish closures and regular anoxic events;
- depletion of soil organic matter, erosion, siltation and other degradation of soils and watercourses;
- increased farm debt and hardship for farm families;
- severe reduction in the number of farms and of people involved in farming;
- incidents of non-compliance with crop rotation guidelines and regulations; and
- dependence of the potato industry on a fast food industry that has little connection to healthy food.

In spite of many good farmers working to improve the land, big corporations are in control of many of our large farms, dictating inputs and crop choices. Industrial potato producers are expert at growing industrial potatoes and the corporations are expert at processing and marketing the products. That french fry industry may or may not continue on PEI in the future, depending on decisions made by those corporations, which as we know are obliged to follow their primary mandate of maximizing profits.
Perhaps they will someday develop markets for organic healthy potato products...meanwhile how much damage are we prepared to allow before the corporations pack up their plants and move away?

It is unfortunate to see ongoing support of the french fry potato industry given such high priority and funding by the PEI government. This industry may make lots of money for some individuals and corporations, but it is costing our Island dearly, not only in resource depletion but also in human and ecological health. (It would be worthwhile to research how much of the gross revenues from industrial potato sales go to pay the high costs of imported inputs such as fossil fuels.) In spite of the dependence of many jobs on this insecure industry, many Islanders are increasingly concerned about the costs, are speaking out and are organizing education about alternatives.

The request to drop the moratorium and provide large quantities of water to supply the french fry industry is just another episode in the demands of industrial agri-business to dominate PEI agriculture.

In spite of many Land Use Commissions and Round-tables raising concern about unsustainable land use policies, the response of the PEI government has so far lacked a long-term vision, and shown a reluctance to show the leadership needed to make the major changes needed in PEI's food system.

Our Island's land, soil and water need protection and restoration. We could have agriculture across PEI that would accomplish this and still give farmers a good living. There needs to be more support for diversifying, innovation, and encouraging new and young farmers. PEI need long-term planning for agriculture that will drastically reduce the present high dependence on fossil fuels, and the chemical fertilizers and pesticides that are made from petroleum.

This brings us to details of the main points we wish to make:

The PEI Water Act can be a major step in the transition away from industrial agriculture to sustainable agriculture

- **Challenging the status quo- 'The Leap'**
    - **Energy and Climate Change**
    - **Soil Organic Matter**
    - **GMOs**
- **Nitrates on PEI and Effects on Human Health**
- **Water Protection**

We ask that your Council include in its recommendations that the PEI government initiate a transition away from industrial agriculture, to sustainable agriculture based on the principles of organic farming.

This would mean setting policy, goals and time-lines to such actions as:
- evaluating present programs of the PEI Department of Agriculture for usefulness in Sustainable Agriculture,
- increasing programs to support organic farming,
- increasing organic acreage,
- protecting organic farms from pesticide drift of adjoining farms,
- making PEI a GMO-free zone,
- supporting local production of food now imported to PEI, and
- supporting farmers as they make the transition to organic methods.

The ideal of truly Sustainable Agriculture can be defined as farming an area so that it produces healthy food indefinitely while:
- restoring and preserving natural resources so that future generations can meet their needs,
- maintaining and improving the quality of the land (for example, soil organic matter),
- withdrawing no resources from the world that cannot be replenished (for example, fossil fuels), and
- protecting public health, protecting the social and economic conditions of farmers, their employees and human communities, and protecting animal welfare. [2]

Important transitional farming practices include soil and water conservation programs, longer crop rotations, selection of better crop varieties and cover crops, integrated pest management, and using alternative fertilizers.

This 21st century is bringing many changes to our economy and job markets, to our energy supply and technologies, to our food system, to our weather and climate, and of most concern because everything else depends on it, to our natural environment.

Challenging the status quo

Islanders need to look at our food system on PEI from new perspectives, with sustainability foremost in our minds, as we investigate and decide how to best solve this challenge of making the transition away from our present unsustainable agriculture model.

That should include looking at what is being done to build a sustainable economy in jurisdictions elsewhere. An excellent overview of this can be found

in a recent book by Chris Turner: 'The Leap - how to survive and thrive in the sustainable economy'. Many examples are given of successful initiatives around the world where individuals, communities, businesses and governments have jumped to creative solutions by changing their outlook away from the status quo; and by doing this in spite of the powerful vested interests, especially in the corporate world, that spend vast amounts of effort and money to keep that status quo, which has provided secure profits for many years. We highly recommend this book- some excerpts are online [3].

'Surviving and thriving with a future sustainable economy' will require consideration of many factors, including especially energy, climate, soil and water.

Energy

We are passionate about the need to change our energy consumption on PEI and in Canada to get off the fossil fuel addiction that drains our economy and destroys our environment. Farming, with its present dependence on big machinery and chemical inputs, presents one of the biggest challenges for this on PEI, but with innovation and good long-term planning using many solutions, we can make this choice.
Besides encouraging farming sectors that use much less fuel, PEI could be a world leader in this field of energy conservation by developing modern efficient farming methods and technology that make use of renewable fuels.

This is a topic worthy of much more research; for now we include references to articles about using methane from manure management for fuel and electricity:
http://suscon.org/cowpower/index.php ,
and a study done in Vermont on manure methane capture:
http://www.sciencedaily.com/releases/2011/10/111013111130.htm

There could also be future benefits from this for PEI in terms of carbon credits for increasing organic matter, ie, carbon, in soils (see below).

Reducing PEI's Contribution to Greenhouse Gases and Climate Change

Besides the problems associated with high consumption of fossil fuels, industrial agriculture makes a major contribution to greenhouse gases through the use of synthetic nitrogen fertilizers:
“...The impact of 1 pound of N2O on warming the atmosphere is over 300 times that of 1 pound of carbon dioxide...Nitrous oxide is emitted when people add nitrogen to the soil through the use of synthetic fertilizers. Agricultural soil

management is the largest source of N2O emissions in the United States, accounting for about 69% of total U.S. N2O emissions in 2011...[which were 5% of all ghg's from human activities] 8% higher in 2011 than in 1990." (source http://epa.gov/climatechange/ghgemissions/gases/n2o.html)

Soil Organic Matter

On the positive side, a transition away from industrial agriculture will provide the benefit of increased soil organic matter (SOM), which can give crops protection from drought, provide substantial storage of greenhouse gases (carbon) from the atmosphere, and lessen fuel requirements:
(to quote an article from 'Soils.org')
"...Carbon can potentially be sequestered in any soil, but humanity has the greatest potential control over sequestration in intensively managed systems such as agricultural and agroforestry soils. Soil management techniques such as no-till systems often result in lower CO2 emissions from the soil and greater carbon sequestration in the soil as compared to management systems based on intensive tillage (Fig. 5) (Post et al., 2004; Lokupitiya and Paustian, 2006; Steinback and Alvarez, 2006; Hobbs and Govaerts, 2010), as do changes such as using cover crops, crop rotations instead of monocropping, and reducing or eliminating fallow periods (Post et al., 2004; Álvaro-Fuentes and Paustian, 2011). The use of reduced or no-till systems has the added benefit of using less fuel for working the soil, which reduces CO2 emissions by agricultural machinery (Schneider and Smith, 2009; Hobbs and Govaerts, 2010; Wagner-Riddle and Weersink, 2011); fuel savings of around 32.7 L ha−1 (3.5 gallons per acre)..."
(source: https://www.soils.org/publications/sh/articles/53/4/12)

We are also including an excerpt from the book 'Natural Capitalism', about the importance of rich levels of soil life, which are usually destroyed by industrial farming methods [4A].

Higher organic matter in soils also lessens the leaching of nitrates into the water supply and improves the water-holding capacity of the soil.

GMOs

Making PEI a GMO-free farming zone must be considered a very important step in the transition to Sustainable Agriculture; by protecting organic crops from GMO contamination and preventing pest resistance, for example, the 'super-weeds' resistant to glyphosate. Municipalities in B.C. are leading this movement in Canada (http://www.cban.ca/Resources/Topics/GE-Free-Zones) and 19 European countries have now banned GMO crops [4B].

Nitrates on PEI and Effects on Human Health

Prince Edward Islanders are 100% dependent on ground water for their source of drinking water, therefore the quality of the water source must be prioritized for the health of Islanders.

Unfortunately, in recent years and from one generation to the next, we have seen a rising level of nitrates in our drinking water supply. In multiple regions of the province, the level of concentration of nitrates has been found to be above the Canadian Health guidelines of 10mg/L (measured as nitrate-nitrogen NO3-N) [5]. Water with concentrations above this level is unfit for drinking and has been proven to cause negative health effects including: methemoglobinemia, cancer, Non-Hodgkin's lymphoma, birth defects, thyroid gland dysfunction and possibly type one diabetes [6] [7].

Epidemiological studies conducted in Slovakia, Spain, and Hungary, assessing the relationship between nitrates in drinking water and cancer found positive correlations between stomach cancer incidence or mortality, and drinking water nitrate concentrations near or above 10mg/L [6]. Although infants are most susceptible to certain nitrate-causing afflictions, such as methemoglobiemia (blue baby syndrome) and acute nitrate poisoning, adults are also impacted when exposed to high concentrations in drinking water.

A Slovakian study found that the incidence of Non-Hodgkin's lymphoma, and colorectal cancer were significantly elevated among men and women exposed to public water supplies with nitrate levels of 4.5-11.3 mg/L [6]. With colorectal cancer being the third most common cancer in Island men and women, and the second leading cause of cancer death [8], one can't help but wonder if the high nitrate levels and high colorectal cancer levels are related.

In 2007, a series of free clinics across the province for testing nitrates drinking water revealed that 6% of private wells exceeded the 10mg/L guideline, and an alarming 11% tested between 8-10mg/L (near the maximum levels of Canada's Health Guidelines on nitrate levels in drinking water) [7]. A total of 2,511 water samples were tested for nitrates at the clinics across the Island [7].

From the ten year period between 2000 and 2009, the average nitrate concentration in drinking water in Prince Edward Island was 16.6mg/L. In comparison with other provinces' averages, PEI's levels were extremely high. Ontario had 0.35mg/L, Yukon had 0.6mg/L, Newfoundland and Labrador had 1.8

mg/L, and Manitoba had 2.5 mg/L [6]. When nitrate levels are above what is deemed to be safe, people are being put at risk. What impact do the guidelines on nitrates in drinking water have on protecting Canadians' health and safety, if they are not being followed?

To combat this threat, the Water Act needs to include a clear strategy designed to reduce nitrates in drinking water and needs to establish enforceable drinking water standards.

Water Protection

Coming back to the main topic today, we repeat the need to protect our water on PEI from unacceptable nitrate and pesticide levels, fish kills, shellfish closures, regular anoxic events, erosion and siltation into watercourses.

As well, some watersheds on PEI are already suffering from over-extraction of water.

Adding high capacity wells on PEI could change the concentration of pollutants in groundwater, could lower water levels in nearby wells, and could cause salt water intrusion into aquifers near the coast.

People who live in the large areas of PEI that are unincorporated now have no recourse or warning if a high-capacity well were to be drilled.

And we definitely don't want high capacity wells to supply water for fracking, nor for a 'bottled water' plant.

Recommendations:

We therefore ask you to recommend that the government of PEI:
1.- follow the Precautionary Principle and keep the 'high capacity wells moratorium' in place, plus extend it to include uses outside agriculture,
2.- examine the adequacy and effects of the present policy on currently-active high capacity water wells,
3.- determine the health hazard posed by radon gas and other contaminants brought to the surface from deep water wells,
4.- put in place programs to increase soil organic matter (SOM) and make other improvements to increase resistance to weather extremes,

5.- develop and act on a comprehensive 'water' policy, which will restore and protect our vulnerable PEI groundwater resource,
6.- plan and put in place a transition away from industrial agriculture to Sustainable Agriculture based on the principles of organic farming,
7.- include in the Water Act a clear strategy designed to reduce nitrates in drinking water, and
8.- establish enforceable drinking water standards.

In conclusion, we propose that your Council encourage Islanders to take on 'The Leap'[3] for agriculture by enlarging this public discussion beyond the issue of irrigation wells and a Water Act. We recommend that your Council do further research on, and promote Sustainable Agriculture. We encourage you to watch the inspiring short film 'Island Green' (which "...celebrates the work of all farmers, while asking a hopeful question: *what if PEI went all-organic?")* and other films about the transition to Sustainable Agriculture [9].

There will be strong resistance from those who benefit from the current dire state of agriculture on PEI- leadership is needed to set a new course.

Thank you for your time and attention.

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footnotes:
(1) http://peiafa.com/assets/Innovation-Road-Map-Feb2013.pdf
"..In 2001, there were 1,484 farms in PEI; by 2011, that number was reduced to 1,085.
In terms of farm revenue class, in 2001 over 50 percent of Island farms had gross revenues of less than $100,000; 33 percent had revenues of $100,000 to $500,000; and 15 percent had revenues of over $500,000 annually. By 2011, 45 percent of farms were in the gross revenue class of less than $100,000; and the mix shifted for the higher revenue classes: 28 percent had $100,000 to $500,000, and 27 percent had revenues of over $500,000..."

(2) http://www.sustainabletable.org/246/sustainable-agriculture-the-basics

(3) http://www.randomhouse.ca/books/204441/the-leap-by-chris-turner

(4A) excerpt from 'Natural Capitalism' by Hawken and Lovins:
(http://www.natcap.org/sitepages/pid44.php)
"...In the organic, ecosystem-based view, the complete eradication of pests is a tactical blunder, because a healthy system needs enough pests to provide enough food to support predators so they can hang around and keep the pests in balance. Some organic farmers also use biologically derived substances to cope with their pest problems. But the best-known of these compounds, the insect-specific family of natural Bacillus thuringiensis toxins, may become ineffective because agrichemical companies are putting Bt-making genes into common crops for universal use. This may appear to be a sound strategy, genes instead of pesticides, information instead of mass. But over time, and maybe sooner than expected, the prevalence of Bt in the ecosystem will select for insects resistant to it and make the compound useless or, worse, begin to affect nontarget species. By 1997, eight insect pests in the United States had become resistant to Bt, for the same reason that penicillin is now impotent against 90 percent of the staphylococcus infections and many of the other germs that it used to control. A coalition of organic farmers, consumers, and public-interest groups has sued the EPA to rescind all Bt-toxin transgenic crop registrations.

Monocultures' chemical dependence requires enormous amounts of fertilizers to make up for the free ecological services that the soil biota, other plants, and manure provide in natural systems. Healthy soil biota can provide about tenfold better uptake of nutrients, permitting the same or better crop yields with a tenth the application of soluble nutrients. …"

(4B) http://ecowatch.com/2015/10/05/european-union-ban-gmos/

(5) http://www.gov.pe.ca/photos/original/cle_bground.pdf

(6) http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/nitrate_nitrite/index-eng.php

(7) http://www.gov.pe.ca/photos/original/cofNitrates.pdf

(8) http://www.healthpei.ca/index.php3?number=1053748&lang=E

(9) https://www.nfb.ca/film/island_green
- + e.g., BBC Natural World: Farm for the Future (permaculture in Britain) http://www.youtube.com/watch?v=ixx1c3RSw_8 : “...explores ways of farming without using fossil fuel. With the help of pioneering farmers and growers, ... learns that it is actually nature that holds the key to farming in a low-energy future. “