

PRINCE EDWARD ISLAND LEGISLATIVE ASSEMBLY



Speaker: Hon. Carolyn I. Bertram

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Standing Committee on Agriculture, Environment, Energy and Forestry

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LOCATION: POPE ROOM, COLES BUILDING, CHARLOTTETOWN

SUBJECT: DEEP-WATER IRRIGATION WELLS

COMMITTEE:

Paula Biggar, MLA Tyne Valley-Linkletter
James Aylward, MLA Stratford-Kinlock
Bush Dumville, MLA West Royalty-Springvale
Colin LaVie, MLA Souris-Elmira
Pat Murphy, MLA Alberton-Roseville
Hal Perry, MLA Tignish-Palmer Road
Buck Watts, MLA Tracadie-Hillsborough Park

COMMITTEE MEMBERS ABSENT:

Kathleen Casey, MLA Charlottetown-Lewis Point

GUESTS:

Dr. Cathryn Ryan; PEI Aquaculture Alliance (Ann Worth); Bill Trainor; Rev. Karen MacRae; Citizens' Alliance of PEI (Chris Ortenburger, Cindy Richards)

STAFF:

Ryan Reddin, Research Officer and Committee Clerk

The Committee met at 1:00 p.m.

Chair (Biggar): Good afternoon, everyone. We are ready to proceed. Our technical people are already set up here and ready to go.

Members, you have before you the agenda for the afternoon. I just want to reiterate who is appearing before the committee, but first of all, could I have an adoption of the agenda?

An Hon. Member: So moved.

Chair: Okay.

For the members that are with us today and those that are in the gallery, just to remind everyone, please refrain from any participation in the committee meetings. It's the same as if we're in the Legislature. We have media with us who are accredited so there are no photos or recordings from the gallery as well.

We have with us this afternoon Dr. Cathy Ryan who is going to be our first presenter, and we do have a 30-minute allocation for that presentation of which you will be given notice. We have a lot of presenters on the agenda today so we want to make sure we don't have to rush anyone. The PEI Aquaculture Alliance will be in, Bill Trainor will appear, Rev. Karen MacRae will appear, and the Citizens' Alliance of PEI. Those are all scheduled for 15-minute actual presentations, and then of course, committee members will – if there are any questions afterwards.

Dr. Ryan, welcome to our committee. I know you have been to Prince Edward Island recently and done some presentations in the community, but we are pleased to have you with us here today. If you would like to, for the purposes of Hansard, just introduce yourself and then we'll go into your presentation, and then we'll take questions afterwards from committee members, if they so wish.

Dr. Cathy Ryan: Thank you very much for the opportunity to speak to you today.

Probably a lot of people are wondering what a faculty member from the University of

Calgary is doing in PEI talking about groundwater. I am a hydrogeologist by training. That means that I study groundwater. I'm really here, though, representing a team which has been working since 2012 – and we have one more year left in our project, which is funded by the Canadian Water Network – and is looking at nitrate in groundwater in fractured sedimentary bedrock. We're starting in PEI and then we will be moving on to New Brunswick and Nova Scotia.

I represent actually about seven or eight university researchers and a host of partners, many of whom are on the Island, and they're all listed here. I gave this presentation, as Paula mentioned, about a month ago with the Institute of Island Studies, and somebody asked me afterwards to point out that Cavendish Farms is a funder and not directing the research. We are university researchers doing what we do which is research in order to contribute to the scientific understanding of a problem. That's how I got to be here.

I have a brief summary here of PEI irrigation policy which I expect that you folks are more than familiar with.

We came here mostly to talk about – or to work on groundwater nitrate problem, but groundwater quality is intricately linked with quantity. So we have been looking at and thinking about groundwater quantity for some time and that's what's at issue here, and that's what I'm going to speak to in this presentation.

Just want to make one note before I move on. In 1995 the legislation said up to 50% of recharge might be pumped, and in 2010 the water extraction policy suggested that less than 35% of summer base flow – which is the lowest flow time of the year – is what should be pumped. I'm going to come back to those numbers a little bit shortly.

The first thing that I wondered about when I saw the news articles on deepwater or high capacity wells, deep groundwater, high capacity wells, the first thing I wondered was: What exactly do you mean by deep? I have these numbers here which show domestic wells and municipal wells. Domestic wells tend to be 20 to 50 metres deep and municipal wells, which are high

capacity wells, tend to be 75 to 100 metres deep. That's what I think is deep, 75 to 100 metres.

What I'm going to get at towards the end of this presentation is: What's the meaning of deep? You can have a deep well that's pumping shallow groundwater, so we need to talk about how wells can be constructed in order to be sure that you're capturing deep water.

The wells, whether they're deep or shallow right now, the way I understand it, is that they're – well, they're shallow by many other jurisdictions' definitions. In Alberta a deep well would be 300 metres. They're typically only cased to bedrock and they're cased to bedrock because the sediments will fall into the well and cause it to collapse or collapse into the well. They're not cased through bedrock because the bedrock's competent enough to stay open and it's cheaper not to case the well.

The thing that I'm going to get at here by the end of this presentation is that in order to capture deep bedrock you need to case through the shallow bedrock, which is fractured and provides a lot of water, but if you pump from the shallow bedrock, you'll be pumping from your streams and rivers here. So this casing depth is important.

Your aquifer is remarkably productive and the water is remarkably, typically, very high quality naturally, compared to, for example, Alberta.

We're talking about some sandstone rocks which are in PEI, Nova Scotia and New Brunswick. It's all one rock type here, it's all one aquifer. It's really highly fractured: a lot of what we call bedding plane so the beds are flat lying, most of the fractures are horizontal, but it's also vertically fractured. Groundwater that falls on your Island goes down through the sandy, silty till and into the bedrock and then travels through the bedrock, eventually discharging to the ocean around you naturally.

I'm really thrilled to be working here on PEI because every hydrogeologist, I want to tell you, we all see this map of Canada, and we all see that PEI is 100% groundwater dependent, so that's a special place in a hydrogeologist's world, as in many different

types of world. So that means that this groundwater question is really important and I'm sure that that's why it gets so much attention here.

Here are some pictures of your fractured bedrock which I'm sure you've all seen. Not only is it permeable because water travels through the fractures, but actually the sandstone matrix itself is pretty permeable. It's as permeable as some of these so-called aquifers that Albertans have to make due with in terms of domestic well water supply. The fractures are really permeable, but the matrix of the sandstone is also permeable. Not only that, it rains a lot here, so you get 1,100 mm of rain a year. You are 100% groundwater dependant but you're also very fortunate because you have a good aquifer and you have lots of rain.

These are some really key numbers. This is what we call a water budget. This is how much water falls onto the ground, what happens to that 1,100 mm of rain a year, and where does it ultimately end up? So, 100% of precipitation lands on the Island and of that, 60 to 70% of it is what we call overland flow, so that's called SR here – 60 to 70% of it pretty much goes straight into the ocean. Maybe it has a very short groundwater residence time, but it goes into the ocean quickly. Twenty-five to 30% of it is evaporated by the sun or transpired by plants. That leaves that Q groundwater, the discharge of groundwater, down to the lower right there: 5 to 12% of it goes into the ocean naturally.

If you want to pump more groundwater, then you've got to take it from one of those compartments. I forgot to mention that the Q abstracted or the amount of water that's pumped compared to the amount of water that's rained every year, is 1 to 3%. So 1 to 3% of what rains every year is pumped out into domestic, municipal and industrial water wells. If you want to take more than 1 to 3% you've either got to take it right from the rivers, which is a 60 to 70%, or you've got to take it from that 5 to 12%, which is what naturally discharges into the ocean.

Now, I'd like to show you a cross section and talk a little bit about how deep you could pump groundwater from. That red line there which goes from New Brunswick out to the Magdalen Islands, I'm going to

pretend that I can cut the earth vertically and show you what it looks like along that slice. Here's the red line, it goes 250 kilometres from – I think I said Nova Scotia before but I meant New Brunswick, if I did. From New Brunswick on the right to the Magdalen Islands on the left-hand side there. You can see the depth or the elevation on the vertical axis. The sea is about 150 to 175 metres deep between the Magdalen Islands and PEI, and then PEI's got a maximum elevation that's escaping my mind right now, but it's less than 50 metres on this and that's the depth of the deepest Charlottetown well at the time that I made this cross-section. It looks to me like it's about 80 or 100 metres deep.

Then there's a relationship between the height of land and the depth below land that we expect freshwater to be present and that's about a one to 40. For every metre of elevation above ground, you get 40 metres of depth of groundwater. You've got probably more than 500 metres of freshwater sitting under your Island. If you want to talk about deepwater extraction, you could drill a lot deeper than the average so-called deep well now. If you want to take water that's not going to the rivers or the creeks, then you might want to think about drilling a little bit more deeply than we are now.

You can see that the freshwater lens – that dash line underneath PEI – goes up and down because the Island is so sliced up. That's an estuary in the middle there and there's not much freshwater under an estuary.

You might not want to believe this relationship, one to 40, that's more than a century old, so here's some more historic information. This is a Canadian geological survey borehole looking for oil and gas drilled in 1910 and these are the notes that they made about the borehole. They've got water encountered in the well: on the left-hand side is the depth it was encountered, on the right-hand side are their notes, and where the water's salty I've highlighted it in pink, and where it's a little bit brackish or a little bit saline it's orange, and where it's fresh it's blue. This is right on the very southeast tip of the Island, so it's right on the ocean where you wouldn't expect a very deep freshwater lens based on the elevation

of land. You can see that already at 1,500 metres, or still, pardon me, at 1,500 metres or 500 metres below ground surface, they have freshwater there. So there is freshwater to be had at depth.

A couple of other pieces of hydrogeology work that have been extremely helpful in our work here, our work that was in particular done by Rory Francis who worked for a while for the province here and still works here, and he did a master's in hydrogeology based on the Island as well. These are probably two of the best technical documents for physical groundwater flow on the Island. Interestingly enough, the second one is the groundwater surface water interaction in the Winter River which is the watershed that Charlottetown's water is supplied from.

I want to show you some graphs from these and bring home my message about casing deeper high capacity wells. This is the kind of information that we hydrogeologists collect. I'm sure it's not that interesting to you. In fact, we're just out coring bedrock in western PEI today, which is part of the reason that I'm a little bit late getting here.

On the left-hand side we have depth below land surface and these are research boreholes that they put in down to 50 metres. There's a bunch of different parameters on each one of the graphs and I just want to hone in on a couple of the more interesting ones.

We're going down to about 50 metres here on the vertical axis and then the fracture frequency is recorded every two metres, so the more fractures, the more permeable. We have it for sub-vertical fractures in the middle column and then we have an estimated hydrolic conductivity or permeability. Basically the far line, the solid line on the right-hand side that's going down in jigs and jags, that's the hydrolic conductivity that they estimate by testing. You can see that it ranges from 10^{-5} metres per second on a – you'll just have to believe me that that is an extremely high hydrolic conductivity. We get that in eastern slopes of the mountains' river aquifers. That's about as high as I've ever measured is 10^{-3} metres per second, and then in some places it's as low as 10^{-7} , so that's four orders of magnitude less. Those are typical hydrolic

conductivities. But basically you have high hydrolic conductivity and it tends to get a little bit less as you go deeper.

If you were to make a deeper well and case-off the upper part of the aquifer, which is what I would suggest that you consider doing for irrigation, you'll see that you'll lose the most permeable part of the formation. So you're going to have to drill a bigger diameter well or a deeper well to get the same amount of water, and it's going to cost you more, but you'll take less shallow groundwater which is going more directly towards the streams and you'll impact the streams and the rivers less.

Now I'm going to show you another cross-section. We love cross-sections in my field. This is the cross-section that goes through the Winter River watershed, so this is the work that Rory Francis and others did in the late 1980s. It goes from A to B, and A is at the tip of the watershed which is just a little bit west and north of Charlottetown Airport. It goes right through Brackley well field, and you'll see that the Winter River goes back and forth across the cross section or the red line a couple of times and will end up there in the estuary.

Here's what it would look like if we were able to look at the earth sideways. We're down to 300 metres there. You can see the low lands where the rivers are crossing through there and you can see the little dipsy doodles that suggests that the rivers in the low lands – and here's their research boreholes here. The solid lines that go from the top left to the bottom right are flow lines.

Water in the very highest part of the watershed goes down the deepest and has the longest residence time and the longest flow path before it discharges out near Winter Bay, whereas water, let's say, between B-34 and HP-32, water there has a really short residence time. Water always infiltrates in the water table and then flows towards the nearest discharge zone. That's what we call a local flow zone.

If you put a well into one of those local flow zones, into one of those short arrows, and you pump it hard, then you'll be taking water that's on its way to the river. If you put a deeper well into one of those longer areas with one of those longer arrows and

you pump it hard, then it will be a long time before the river flow is affected at the end of that arrow.

I want to bring back those numbers from that second or third slide. First, they'd said up to 50% of discharge and now they're saying less than 35% of the lowest flow in the year. That's actually a huge improvement on what's happened, or been happening, because already in 1989 pumping for Charlottetown water supply was reducing the Winter River by 54 to 70%.

It's a different era now in terms of groundwater pumping affecting surface water. We didn't think about it so much in the 1970s, 1980s, and maybe into the 1990s, but we think about it a lot, and not just in this jurisdiction, in lots of jurisdictions. In my view, less than 35% of summer flow would be an improvement on what's already happening.

You might say: How could Charlottetown be allowed to pump that much? But the truth is that they were pumping that much before this was really recognized in the groundwater surface water field. It doesn't mean that we can't do something about it now. You'll note at the bottom there groundwater protection zones are strongly recommended already in the late 1980s.

I think this is my last cross-section that I'm going to subject you to. Now this is across the river, cross-wise to the river flow going from A to B, so from one end of the watershed to the other. I just want to illustrate what using deeper and shallower wells might do to the impacts on, in this case, the Winter River flow.

There's the cross-section up top – sorry, the location of the cross-section up top – and the cross-section itself on the bottom. You can see that the height of land from one side of the watershed goes down towards the Winter River and then back up on the other side. There are three different water tables here for three different times of year. The highest water table is right after the winter snow thaws and infiltrates and then it goes down, down, down, until the next spring. The groundwater's flowing towards the river.

Now I just want to show you what they had have here in terms of different pumping. These are all pumping. This is all when they're pumping Brackley well to supply Charlottetown and these are all water levels at different times of the year. In fact if they weren't pumping at all, the water level might be quite a bit higher and the stream flow would probably be higher, and there might be a spring or two on this side which has dried up since they pumped. Now they pump, and the harder you pump the harder the water level goes down on either side, and this is actually in all directions, so we call this a cone of depression. If you pump it a little bit you might dry up the stream; if you pump it a little bit more you might start – sorry, let me start again. If you pump it a little bit you might dry up this spring; if you pump it a little bit more then you might start affecting the stream flow and causing what would be river water to go into the well here; and if you pump it a lot, then you'll eventually dry up the stream.

As soon as you pump it such that you start taking some of the stream flow here, then we call it groundwater under the influence of surface water. Lots of provinces have legislation on groundwater under the direct influence of surface water. I think that that's something that PEI might want to start considering. This is groundwater whose source is located nearby enough to surface water to actually pump the surface water directly. Doesn't have to be pumping surface water directly, I just want to make this point one more time. Doesn't have to be pumping water directly from the stream to be affecting the stream. If it's pumping groundwater that in the absence of pumping would have made it into the stream, then it can still affect the stream flow.

Most provinces – not all, I'd say about six or seven of 10 – have legislation or guidelines to help people who would like to pump groundwater understand if they are pumping groundwater under the direct influence of surface water. Usually that is because they want to make sure that the groundwater that's under the influence of surface water is disinfected, but increasingly, it's because we don't want to affect surface water flows.

I ask you now: If you were to drill another well to help supply Charlottetown here, which of those three possible locations

would you get the most water from? It would either be B or A where you're tapping the very shallow groundwater. And which one would affect the surface water the most? Well, A the most, B the second most and C, which is the deepest, the least, but not if it was cased in the shallow part of the section, in the shallow part of the aquifer, because it would just take the water from the shallow part of the aquifer.

This is where casing comes in. This is just a schematic from the Ontario ministry of agriculture here. Well drillers all put down casing initially, they have to do that by legislation. Part of the reason they have to put down the casing is in order to put down a seal of clay in order to prevent water, which often has pathogens in it from livestock and family pets and whatnot, in order to prevent it from running straight down into the well casing. In PEI they also put down a casing to get through the soft surficial sediments and they case it just into bedrock and then they drill through the bedrock and put the pump in an open hole in bedrock.

What I'm advocating now is if you were to put this casing down deeper and case off the shallow bedrock, then you'd have a different story. Here's for A and B what they do now. They put casing into the bedrock and then have an open hole. I'm suggesting that if you were to case down through the shallow aquifer then you wouldn't be taking water from the shallow aquifer and you wouldn't be affecting the river quite so immediately.

That's not to say – and here's an important distinction – that's not to say that pumping from a deep screen here won't affect stream flow. It just won't do it as quickly or as much, so it might intercept – instead of water that's going through to the stream, what it might do is intercept water that would have discharged naturally to the ocean. That would be, then, water that doesn't affect your streams and rivers so much.

The problem with this is that you have to do monitoring. First of all, you have to understand the aquifer, you have to drill deeper wells, you have to case off wells – both of which are more expensive – and then you have to deal with monitoring and enforcement which I don't think anybody

really likes. It's a necessary evil, and I just put this slide in for a little bit of humour. There's a lot of monitoring and enforcement that's happening slowly and surely on PEI. Really what we'd like to have is collaboration amongst all the parties for a common goal.

In conclusion, PEI has really a lot of groundwater. It's very fortunate. The issue is that it needs to be managed appropriately, in this case in order to prevent streams and rivers from being strongly affected.

The challenge is to avoid pumping groundwater under the direct influence of streams and rivers and to avoid interfering with other wells. I think that means deeper wells with the upper bedrock cased off so that you don't take shallow groundwater from the shallow part of the aquifer, and they'll be more expensive to drill and to instrument and they'll take a little bit more time and energy. But I think that you can pump more water for irrigation at a little bit more of expense, but it's going to take some communication and cooperation between all parties.

Chair: Dr. Ryan, before you shut your display off –

Dr. Cathy Ryan: Can I just do one acknowledgement slide?

Chair: Yeah, I just want to make sure you don't shut your slides off because I need you to go back to something.

Dr. Cathy Ryan: I promise you.

I just want to make the point that I'm representing a team here and that we've all learned a lot from the very healthy and active hydrogeologic community that you have on the Island, and we're grateful to them. And that we are funded by the Canadian Water Network and we're really pleased to be here working on such an interesting and, I have to say, welcoming place.

Chair: Great.

Dr. Cathy Ryan: Thank you.

Chair: If you could go back to that slide from 1910, I think it was mentioned perhaps

that it was metres and I think it's feet, actually. Yeah, that's registered as feet. Just for the Hansard, I think inadvertently you might have said metres.

Dr. Cathy Ryan: I beg your pardon.

Chair: I just wanted to make sure for the Hansard that the figures that were being quoted were in feet not metres, because someone may go back and look at the Hansard and say: Well, she said –

Dr. Cathy Ryan: Yeah.

Chair: So I just wanted to –

Dr. Cathy Ryan: Yes, the deepest freshwater is 1,500 feet, which is about 500 metres.

Chair: Okay. Thank you.

Dr. Cathy Ryan: Great.

Chair: Committee members, does anyone have any questions for Dr. Ryan or comments?

Mr. Aylward: Well presented.

Dr. Cathy Ryan: Well, thank you.

Chair: Colin LaVie.

Mr. LaVie: Thank you for your presentation.

I was out at UPEI when you were there and there were lots of questions. Actually, I had some questions myself so, great presentation and nice seeing you again.

Dr. Cathy Ryan: Thank you for putting up with it twice.

Mr. LaVie: Yeah.

Chair: I just would like, also, to thank you for your patience. We had a lot of back and forth communication, and the PEI weather wasn't that great at the time when we had hoped to have you in earlier, but I think you probably are enjoying the weather a little bit more at this time.

Dr. Cathy Ryan: Well, I've been out since 8:00 a.m. in the field this morning in the rain.

Chair: Yes.

Dr. Cathy Ryan: But at least it's not below zero.

Mr. Aylward: (Indistinct)

Chair: Go ahead.

Mr. Aylward: Thank you, Chair.

Dr. Ryan I'd like to just, what everyone has said, thank you very much for your presentation.

Here on Prince Edward Island the biggest impact we've seen so far with high capacity wells has been coming from the city of Charlottetown and the municipal water supply or domestic water supply from the Winter River Watershed.

Are you saying, then, what we've experienced the last number of years, where the river has essentially run dry, if they were using deeper wells – and quite often there's, I think, a little bit of confusion when people are talking about deep water wells and high capacity wells and what one is and what the other is. But if your research is telling us that if that well field, if the wells were drilled deeper and cased down deeper as well, that we would not see that river running dry in the summertime?

Dr. Cathy Ryan: I think that would alleviate the situation quite a lot. Now you'd want to think about how deep you're going to case the wells, right? It's different – so what is a deep water well, what is a deep casing?

Mr. Aylward: I guess the way I look at it in my mind, and I'm certainly not an expert in the field such as you, but if I've got a vessel with water, any kind of vessel with water, and I put a straw in it and I go down six inches and start drawing water, the level's going to go down. If I take an 18 inch straw and put it down further and start drawing water, the level is still going to go down. I'm just trying to understand the correlation between that.

Dr. Cathy Ryan: Yeah, let's talk about a 55-gallon drum, it's filled with sand –

Mr. Aylward: Right.

Dr. Cathy Ryan: – it's got holes in the side of it and you're always pouring some water in the top and some of it's coming out the side and most of it's at the bottom. But you got bigger holes and more of them in the shallow part. If you put that straw down into the shallow part and pump it, then you're going to have less flow in the shallower holes of which there are more, right? Now it's not a straw, now it's a steel pipe, and the pipe's got what we called screen or slots in it the whole way down. If you put it down the whole way to the bottom of the 55-gallon drum and you just take water out of the top of the pipe, then most of the water will come from the shallow part if it's more permeable.

Okay, I've got to change it up. You've got a 55-gallon drum. It's got sand at the bottom. It's got gravel at the top. You've got a pipe right down which has got screens the whole way up. You're just pumping from the open screen. It's got holes the whole way down. If you pump from it, most of the water's going to come out of the gravel because it's the least resistance to flow. The most water will come out of there, even if you screen it to the bottom of the 55-gallon drum.

Now if you put solid pipe over top of it to the sand and then you pump, it will come from the sand, and part of the pumping in the deeper sand will decrease the amount of flow coming out of the holes in the bottom, and part of it will come from the top, so it'll bring the level down a little bit. But I think what we need to do is decrease the amount of flow coming out the bottom into the ocean, in this case.

I want to be careful here, because lots of the ocean ecosystem, which is important to PEI as well, relies on that fresh groundwater discharge as well. We've got 5 to 12% of what is recharge on the Island coming out naturally through the bottom of the barrel, and we pump 1 to 3%. Let's say we pump 2 to 4%. So we take 1% out of what's coming out into the ocean, and that's not so much. If we were to take 3%, then we might have a not very – well, we'll have a significant impact on the ocean ecosystem.

That making sense?

Mr. Aylward: Somewhat, yeah. In my mind I'm still considering – I mean, gravity, right? Regardless of where you're taking the water, the water is still going to go down because of the laws of gravity.

Dr. Cathy Ryan: Yeah, but it goes down and it goes across, right? What's the distance from the highest part of the Island to the ocean? Anywhere from – well, let's say 40 kilometers. There's 40 kilometers of flow that happens horizontally before it discharges to the ocean. That's the deepest flow. The shallowest ones are shorter local flow systems.

Mr. Aylward: Thank you.

Chair: I think Colin had a question again, or a comment?

Mr. LaVie: Thanks, Chair.

We have lots of water today. What about five, 10, 15, 20 years' time?

Dr. Cathy Ryan: In terms of climate change?

Mr. LaVie: Yes.

Dr. Cathy Ryan: Yes. That is not my area of expertise, but I can say what we all know, and that is that everyone says that climate change is here and it's happening. The projections for PEI, I think, are for less water. You've got lots of water today. We all have to be cognizant of how much water we have and how much we use and the future.

I can compare the city of Charlottetown to the city of Calgary where we are not allowed to take any more water from our rivers and we don't have good aquifers, and so that has caused Calgarians to actually use – I think we now use 30% less water per capita than we did a decade or two ago. The whole solution isn't pumping more water, that's for sure.

Mr. LaVie: We got to be cautious about this.

Dr. Cathy Ryan: I think everyone on this earth has to be cautious about this. Some people more than others. One hundred per

cent groundwater dependent, that puts you in the cautious zone, I think.

Mr. LaVie: Yes.

Chair: Thank you very much.

Dr. Cathy Ryan: My pleasure.

Chair: If you want to leave any materials with the committee, we'd be happy to have it as part of our record, as well, for reference.

Dr. Cathy Ryan: Okay.

Chair: Thank you.

Dr. Cathy Ryan: Thanks again for the opportunity.

Chair: The next one up is the PEI Aquaculture Alliance. If Ann Worth would come forward, and Ann, if you need a presentation set up on computer –

Ann Worth: (Indistinct).

Chair: No? Okay.

You can sit at the end, if you wish, wherever you're comfortable.

Ann Worth: Sure.

Chair: Ann, welcome to our committee. I think you have about a 15-minute presentation, as I understand, and that will give us some time for questions as well. For the Hansard, again, you're familiar with introducing yourself, I guess, for that purpose.

Ann Worth: It's a rainy day out there, but that's following two days of sun, so we'll not complain.

Mr. LaVie: We need the rain.

Ann Worth: I'll provide just a little overview orally. Perhaps what we'll do is I'll work my way through. I have here for circulation copies of the oral presentation, and then maybe we can have some Q&A to follow?

Chair: Yes.

Ann Worth: Great.

My name is Ann Worth and I serve as the executive director of the PEI Aquaculture Alliance.

I'd like to begin today by thanking the committee members for their willingness to receive a presentation from the PEI Aquaculture Alliance, and we wish to recognize the committee for their proactive, consultative approach to engaging the PEI cultured shellfish and finfish industries in future program and policy development related to the environment and the protection of our water in this very special place that we live, Prince Edward Island.

I'll begin with a brief introduction of our organization for those that are unfamiliar. The PEI Aquaculture Alliance was established in January 1998 as an umbrella organization representing the PEI Cultured Mussel Growers Association, the Island Oyster Growers Group, and the PEI Finfish Association. The Alliance is a not-for-profit organization and represents the collective of almost 200 members, which includes those mussel, oyster and finfish growers, processors, supporting organizations and supplier companies.

We exist for many reasons but we focus dominantly on our efforts to grow and produce excellent products that we sell around the world. We participate in industry-driven research and development in our sector, and we try and respond to issues that are timely that impact our industry. We promote a cooperative spirit of those engaged in our sector with the goal of attempting to improve the economics of our industry. And of course, we grow opportunities for our companies to be successful internationally. Of course, many of you are familiar with our famous PEI mussels or oysters.

The net result of this 16-year endeavor as an industry association is we've evolved to be an effective global competitor and supplier of pristine, high quality shellfish and finfish products to multiple countries around the world. In tangible terms and economic output, we're talking about 238 million in indirect, direct and induced economic spinoffs to the PEI economy, and we employ thousands of people, many located in rural

small communities in the province from tip to tip.

Why are we successful in aquaculture in this province? One of the primary reasons is the cool, pristine waters of PEI's bays and estuaries which provide optimal growing conditions for farmed blue mussels and PEI oysters. We are equally fortunate to have an abundant supply of high-quality groundwater that allows for dynamic rainbow trout and Atlantic salmon nursery production units and an Atlantic halibut facility to thrive.

I would add that another key factor for our success is the innovative and environmentally conscious members of our industry that are committed to cultivating safe products and insuring a sustainable environment. The foundation of our success is in our ability to produce from a sustained, cared for resource, our precious water. Growing, and indeed aquaculture farming, is built on the foundation of a clean, cool and pure growing environment.

The aquaculture industry is, by definition in this province, an environmentally friendly industry with sustainable practices being a cornerstone of the industry's development from its inception. The industry recognizes the interdependence between a vibrant sustainable shellfish industry and the health of our marine environment. The industry believes and demonstrates that shellfish and finfish aquaculture can be undertaken in harmony with the environment and that the sustainable use of the marine environment is a shared responsibility requiring a climate of cooperating amongst all resource users and regulatory authorities.

We are a model of sustainable aquaculture and we are regularly visited by aquaculture jurisdictions from around the world that look at our best practices and our growing environment. We are privileged to use water for farming seafood and we take this responsibility very seriously. The provincial government shares in this mandate as they have a responsibility in the protection of public health, in safety of consumers, and are responsible for the stewardship of our environment and natural resources. This includes responsibility for the quality of our air, water, land, and natural habitat.

Over the course of the past few months we have had internal discussions with our membership about water resources. We sought to become better informed on the province's water extraction policy through receiving a direct presentation on the policy by the provincial department of environment. It provided us with an opportunity to ask questions and to better understand the current state of water in the province. We heard that PEI has an abundant groundwater recharge, and in fact, source of groundwater.

We, however, like perhaps some of you, don't profess to be water experts. We grow in it, we feel it's precious, but we wouldn't pretend to be experts. What we do, however, is desire to raise some important questions as this committee considers the best way forward in terms of future policy decisions, questions that perhaps some of you may already be posing: Is there enough independent peer-reviewed science focused on our water resource and unique geography? Independent science that provides a comprehensive analysis of potential impacts of incremental high capacity wells in our view is invaluable to consider within a comprehensive consultation process.

Other questions: Are there gaps or enhancement efforts needed in our existing long-term water monitoring efforts?

We need to be rock solid in our view that there will be no detrimental impacts from incremental deep-water wells for agriculture use. We understand that the province undertake good department work in this particular area. We understand the province's knowledgeable people that care about the long-term stewardship of our water. We work with these people every day in the field. However, it remains a nagging thought that can't be overlooked: Have we satisfied all of the important questions and are there realistically any gaps in our monitoring, data collection and process?

Another important question is: Will irrigation modify or change the current fundamental impact of runoff into waterways?

The estuaries have a unique intersection with the land. We know that groundwater

recharge and runoff cannot be measured directly but are calculated for measurements of total stream flow and groundwater elevations. This isn't a science or exact. This is a delicate ecosystem to balance and we haven't always found the successful balance between these two. Over the years we have observed significant increases in the densities and presence of nitrate-driven algae growth in PEI estuaries.

Macroalgae are a significant detriment to shellfish production, and algae death and decomposition results in production of anaerobic conditions, or anoxia, as we are better refer to it as, or a lack of oxygen, as some of us might know it.

Shellfish, including oysters and mussels, are effectively smothered by algae. In the case of the collection of mussel seed, green algae adhere or set on the crop and the heavy growth results in the stripping or loss of seed. The end result of algae is undoubtedly a significant challenge that has resulted in shellfish mortality many times.

Aquaculturists have endured significant crop and financial losses as a result in the hundreds of thousands of dollars, in fact, from year to year. Clearly this impact example is not a desired nor acceptable impact between land and water. To be clear, aquaculturists are very concerned about nitrates as we observe the state of some of our estuaries.

Other significant threats to our bays and estuaries include siltation – namely, the degradation of the water growing environment where nutrients and water disappear and give way to silt. Any potential for any impacts on nitrate loading will need some significant analysis. Can we say with clarity today that we've conducted comprehensive analysis in this area? We have to think clearly and comprehensively about any and all potential impacts of decisions that may adjust in any way our relationship between land and water.

We need to know more about global warming and the impacts of climate change. With the evidence of global warming and resulting change directly impacting us, we see some disturbing changes unfolding in our own environment. We see an increase in frequency of significant storm events

causing damage to crops and gear and degradation of the shore lines. Have any external inputs in our climate change been consulted with or on with experts in this field?

As the previous speaker said, she wasn't a climate change expert, and folks, I don't pretend to be either, but I think there are people that have expertise in that field, and I think we need to be looking further out, five, 10, 15, 20 years, and trying to anticipate and plan what climate change could bring.

Another important question points to regulation. Strong effective regulation is a tool in our toolbox that protects our bays and estuaries. Protecting our bays and estuaries, for the record, isn't optional or voluntary, it's critical and essential. We need to ensure we have the right legislation, regulation and policies in place that are effectively working to ensure the protection of our water resource.

As you entertain the potential of lifting a moratorium on deep water wells for agriculture it begs the question: Should there be a comprehensive regulatory review conducted that looks at the complete picture, versus a single stand-alone policy change?

The approach to regulatory change needs to be carefully considered, and in our view government should be revisiting legislation, regulation and policies on an ongoing basis to ensure present day realities are being accounted for and that it's effective and relevant.

This commitment to review provides government with comprehensive input from all stakeholders that legislation, policy and regulation seek to serve. It's important for regulations to be constantly monitored to ensure they are achieving their intended outcomes. Effective regulation that protects our precious water resources is what we are all collectively after.

What can happen when we fail to achieve this, when error or disregard occurs, when negative impacts from land use happen? We all lose big and lose big in the short and long term. This is highly important work for government, for industry and, in fact, the general public. Revisiting relevant regulation and legislation to ensure it is the

very best it can be is essential moving forward and the very least that we can do.

We do have a world-class reputation. Prince Edward Island has a stellar reputation as a supplier of world-class quality seafood and aquaculture products. In fact, Prince Edward Island represents 70% of the mussel production in Canada, a very impressive fact. We couldn't do that without great water. Our brand success is built in part on our pristine environment. For a brand to be effective it has to be built on truth. Our care of our environment is, and will be, PEI's truth. The far-reaching implication of great environmental stewardship work is a lot like compound interest: the benefits accumulate and grow at an accelerated pace.

We need to work more collaboratively with agriculture, with watershed groups, commercial and recreational boating organizations, and others, regarding their roles as users, identifiers, reporters, managers and stewards of the water. This is an important undertaking that we need to put more resources and effort in to facilitate.

We recommend a commitment to conduct a comprehensive regulatory review of legislation around water, and if it doesn't exist in a comprehensive manner, then we need to develop it. We are living in a dynamic, changing climate. Important work needs to be spearheaded that anticipates and plans for potential future impacts. We would like to see provincial government play a lead role in facilitating the development of a land and sea task force that focuses on the delicate environmental relationship between land and sea. We would be willing participants in such an effort and see various aspects of water management/environmental stewardship being central to the group's mission.

With the aim of enhancing and strengthening environmental assessment and land management, we see strategic partnering on environmental activities that bring together agriculture and aquaculture to explore and further develop best practices, pro-active policies and incremental programming that encourages cooperation amongst sectors.

We recommend the formation of this land and sea multi-sector task force that would

identify key activities that further enhance our collective care and performance around environmental sustainability. This formalization, we believe, will bring enhanced cooperation and aligned resources with future efforts.

We recommend governments be diligent about revisiting environmental policy and regulation with frequency. Its close connectivity to our water resource is undeniable. It's important for policy and regulations to be regularly reviewed to ensure we are achieving desired and intended outcomes. Effective regulation that protects our precious water resources is what we are all collectively after. It's foundational and it impacts all of us. Water is life, it sustains us. It's precious and it's everybody's business to ensure we manage our water resources sustainably for future generations. We are caretakers and carry this responsibility with integrity. Nothing evokes more passion or discussion than our water resource. Today is not a day to weigh in on the past but rather a day to consider what is right for our future. Let's do just that.

I'd like to thank the committee again for this opportunity to share some thoughts on behalf of the aquaculture industry. Our collective effectiveness will have lasting implications for generations to come. We wish you well in your important tasks ahead and look forward to any questions you may have.

Thank you.

Chair: Thank you, Ann.

Does anyone have any questions or comments they would like to put forward? Thank you for bringing those folders for us, Ann, and also for putting forward some recommendations for our consideration when we do our report for the fall sitting.

If there's no questions from the members – oh, James Aylward.

Mr. Aylward: Just a comment. Ann, again, thank you very much for coming in today. It was great to see you here and I look forward to reading through your information as well.

Your recommendation with regards to the land and sea task force, that's I think

something that – well myself, right off the get-go, I think is a wonderful idea because we quite often focus on the land or the sea and we forget how integral they are together. That's a great idea, thank you.

Ann Worth: Thank you.

Chair: Buck Watts.

Mr. Watts: Yeah, thank you, Madam Chair.

I, too, would like to thank you, Ann, for your presentation. Of course having been involved with the aquaculture business for a number of years I feel close to it and your presentation was well thought out, well documented, and a lot of good ideas, and thank you very much for that.

Ann Worth: Thanks, Buck.

Chair: Great, thanks Ann.

Ann Worth: Thank you.

Chair: Is Mr. Bill Trainor in the gallery? You can come forward, Mr. Trainor.

What I'll get you to do, Mr. Trainor, is introduce yourself. If you're presenting as an individual or on behalf of a group you can also share that. I think you have about a 15 minute presentation or less, whichever you prefer.

Bill Trainor: My name is Bill Trainor and I'm presenting as individual.

First of all, I'd like to say that I talk in a very monotone voice and my family accuses me of mumbling, so if you do not hear what I'm saying just stop me and I'll speak up.

I'd like to thank you for the opportunity to share my thoughts today.

I asked for an opportunity to appear before this committee around my concerns on water and land use. I applaud this committee's decision to follow through on a recommendation that was made to them in establishing of a water act. Also, our government's recent decision that no further consideration will be given to lifting the moratorium on high capacity wells for agriculture irrigation until the water act and regulations are in place.

Having said that, the situation still leaves me with a concern about where the issue of deep water wells will go in the future in relation to agriculture and in particular potato production on this Island.

I should tell you a little bit about me for you to fully understand where I am coming from on this important issue for all Islanders. This includes all farmers, big and small, some who are in the circumstances who are unable to speak for themselves. I have lived in the community of Emerald all my life, with the exception of a seven-year stretch where I resided in Alberta, Annapolis Valley and Charlottetown. I grew up on a mixed farm with potatoes being the bigger source of the family income, and although livestock was secondary, it was felt to be necessary for the proper nurturing of the soil.

Starting with my great-grandfather there have been five generations of farmers in my family. Although my career was not spent in farming I never lost my love for the land and always took holidays around harvest, and to a lesser degree planting season, to help out the family at home.

I have seen in my lifetime crop rotations decrease to a standard three-year rotation, less today on some farms. Proper crop rotation, then, was not in question, it just was. Our soil and water were meant to be conserved. We looked on our soil, woods and streams much like they do in Europe today, where respecting nature provides the necessary balance to protect the soil, water and wildlife crucial to controlling the insect population.

As a child and youth I swam in the Dunk River, fished there as well with my dad. Skated in winter months on a number of ponds, and with at least one on every farm you didn't have to walk far. Today a child couldn't swim in the Dunk in our community as the water depth is not there. As far as fishing, you could fish for days without a bite. For skating on those natural ponds fed by springs, they are hard to find.

In our community, where there used to be a woodlot on most farms, there isn't anymore, and the natural treed hedges are few as they have been cut and bulldozed out as well to make for bigger fields more conducive to the large machinery that is required in

industrial potato farming today. I might add, this practice is still going on.

Our natural soil conservation methods, I believe, were more effective than berms and grasslands they are promoting today. A lot of those grasslands were wet areas we left and worked around, and the hedgerows along fences we left.

In working the soil we were very cognizant of not overworking it. Instead we cultivated the grass and weeds away from our plants, versus killing all weeds and grass with chemicals that contaminate our soil and water, kill organic matter and, in turn, our soil's ability to hold water.

Now some farmers are using a new machine they call a sub-soiler that works the land depth to at least 18 inches, loosening up the brick clay bottom. This practice, I believe, as well as others I have talked to, will further reduce the soil's ability to hold water and in turn the chemicals and pesticides will reach our water table that much quicker.

The Irvings' presentation to the committee pointed out they have plants in other growing regions where farmers are enjoying higher yields and more consistent quality with irrigation. In comparison, we are a much smaller land base to the areas they are talking about, with a shorter growing season, lower soil depth that doesn't hold the water as well.

This is a much bigger issue than water. Money talks, as we know, but these types of threats by a processor to pull out further squeezes our farmers to become even more industrialized in their farming practices. PEI soils can't sustain this in the long haul, and by that I mean just our children and their children's generation.

There have been numerous articles written in our local papers on the issue of deep water wells including some science, some fact, and some opinion. It is quite evident the majority are against lifting the moratorium, including the majority of the presenters to this committee, and for good reason.

Mr. Irving has said he is at a crossroads without the deep water wells moratorium being lifted in terms of his ability to

maintain his level of business here with the quality and quantity of potatoes that are grown here. I would say we as Islanders are at a crossroads as well in terms of deciding how far we go with this way of farming on our small Island.

I have lived in the centre of one of the biggest potato growing areas on PEI for 60 years and, as I have pointed out, I have seen firsthand the deterioration of our land, river and forest.

We have to ask the following questions:

1: How much further do we go with the industrial model of agriculture? Deep water wells will add to that and reduce our number of farmers.

2: Can we afford the health costs associated with growing the perfect potato with the chemicals and pesticides getting into our water table along with the nutrients and organic matter being depleted in our soils?

3: The negative impact this can have on our tourism and fishing industry in the future.

4: When our soil is completely contaminated and robbed of organic matter and its ability to grow potatoes, how long will the processors be here and what will the economic impact be then if we just look at the short-term profitability of this industry?

It's our children and grandchildren left to deal with all of this. No, not an immediate problem for us here today sitting around this table, but what does it say about us if we allow this to happen? It doesn't say much either about us in support of our future farmers. We have a major responsibility to them and we should take it seriously. Our land and water for them is more important than the short-term goal of a better, more profitable french fry.

I'd like to leave you with my thoughts on a few recommendations:

we need to enforce the regulations I understand that are already in place on crop rotation and look at these further in terms of reestablishing and strengthening the organic matter in the soils that is not up to par – and I'm not saying here that there isn't good

farmers out there that keep their soils up to par, but there are problem areas in that;

we need to explore other types of farming as well that will put more organic matter back in our soil;

support the rejuvenation of our livestock industry;

put in place a no tree cutting zone for clearing purposes in high industrial potato growing areas;

increase programs to support organic farming;

do not lift the moratorium on deep water wells for the irrigation of agriculture products.

I would like to end my presentation today with a couple of quotes. The first quote is from an ancient First Nations proverb. It states that: We do not inherit the earth from our ancestors, we borrow it from our children. The second quote is from Gandhi: Earth provides enough to satisfy everyone's need but not for everyone's greed.

Thank you.

Chair: Thank you, Bill, for your presentation, your concern and your recommendations to the committee. That's very well thought out.

Is there anyone who would like to say anything?

Bill, if you would like to either give us a copy of that, we would be pleased to have it as part of our materials. Thank you again for taking the time to come and see us.

Bill Trainor: (Indistinct).

Chair: We have Reverend Karen MacRae next on our agenda, if you would like to come forward.

Do you have a verbal or overhead presentation or –

Rev. Karen MacRae: I have overhead.

Chair: Okay.

Rev. Karen MacRae: And they're doing some –

Chair: Okay. We'll just take a brief –

Research Officer and Committee Clerk: Yeah, take a recess.

Chair: We're just going to take a brief recess while they set up the presentation.

Rev. Karen MacRae: Sounds good.

Chair: So you don't have to rush.

[Recess]

Chair: Gentlemen and committee members.

Reverend MacRae, welcome to our committee. If you would like to, again, for the Hansard record your name, what your role is here, is it yourself or on behalf of another group. I think it's about 15 minutes your presentation?

Rev. Karen MacRae: About that, yes.

Chair: Thank you.

Rev. Karen MacRae: I don't have a lot of the scientific background that many people have, but I have a phys ed, computer science and theological background, and I've lived in many of the provinces, and several of them more than once, and my home province is Prince Edward Island.

From my phys ed degree I've been very involved in camping with camping of various age groups. I have also visited countless farms for various reasons because as a minister I have spent 20 years in the rural areas as well as 30 years of growing up in rural areas. It's really where I enjoy being the most – wrong way.

The water, regardless of where it is or what kind it is, is important. This water is Wood Islands and that's a freshwater stream flowing out into the ocean. Regardless of where we are we always have the sunsets, and the sunsets around water are extremely important, and people love them.

I am a proud Canadian and I believe that we need to be taking advice and help from our various neighbours but also various other

places. We are 100% groundwater dependent and we need to believe in the possibilities of continuing with the future and, yes, we want potatoes. The theme, believe in possibilities, is Heather Moyses' motto for living. She is a representative not only of potatoes but also of this Island and the people and the wonder and the expectation that we have of being together. To be a top rate athlete you have to get proper nutrition, and this is a nutritional fact that exists for potatoes.

Forty-five percent of what we need in a day we can get, vitamin C, from the potatoes. We need iron to keep our blood flowing well. We need the fibre to keep other stuff flowing well, so it's all important.

Islanders have been growing potatoes for over 200 years and it's part of who we are. Even though Heather Moyses is known as a great Olympian, Island potatoes I think are known more than that. It's part of who we are, it's in our nature. Irrigation, it's part of our economy. Having sorted potatoes – I have sorted various vegetables outside in the field which is part of why I put that ahead of the storage, but we are proud Islanders, proud of our beauty, our people and our produce.

I like the fact that we're also talking about the fishing industry. That's part of the produce that we make here. We celebrate, and the Potato Blossom Festival has been going on for nearly 50 years, and it's a reminder of we celebrate what we have and who we are.

The PEI Women's Institute is something that I'm part of. They discuss what's important for family and home. One of the things that was discussed was: Is this wise to have deep water wells? I started to review my many years of history in considering: Is that the way we need to go? This was a picture of a deep water well that I was quite impressed with, but I also saw the waste of the water on the surface and it made me wonder. It also made me wonder that the crops that are really up close to can't grow or don't grow as well because their feet are too wet.

We had a speaker here, Janice Shelly. Shirley?

Chair: Sherry.

Rev. Karen MacRae: That's the word, I knew you would get it right. It's right in my notes but I'm not looking at my (Indistinct). Who said: environment is not on one side of the fence and agriculture on the other.

The church is not for or against agriculture. We are for the betterment of everybody. I'm speaking on behalf of myself having talked to thousands of farmers over the years, and I agree that in order to have good farms we've got to work together and look after the land which God has given to us and asked us to look after it.

Then I thought of a place called Ministers Island where Sir William Van Horne, the pioneer in the construction of the railway, had his summer. There is no groundwater on Ministers Island. They collect it all. He took the idea of turning tankers upside down and collecting them and that became how he got drinking water, looked after the crops, the gardens and his fruits and vegetables which he received daily from Ministers Island in Montreal that came on the train. He believes in the importance of looking after our land.

Another place that I had been was Bermuda where there's water, water everywhere but not a drop to drink. They don't have groundwater either. Another island that has the problem. Their solution was: we collect it off our roofs. We don't have snow, but we do have water coming, and that's why Bermuda is known for their wonderful white roofs because they are getting their water from their roof. Every person in the community is expected to take 80% of the water collected that comes down and be stored in cisterns in the basement. Imagine what this place would look like if we took all the flat roofs and collected the water instead of pouring it into storm sewers.

This is St. George, New Brunswick. St. George, New Brunswick has high water flowing there and low water flowing there. When I was there they said: You've got to understand, that's not where we get our water. We don't get our water from this, that's where we get our power. Sometimes the power of the water is expressing itself substantially. That's the flood of 2010. Where do they get their water? They get it from artesian wells and store it in a tank. It

makes sense to me to store the water that we have that's coming down from the air.

I grew up part of my life in Ebenezer. When we arrived at this old farmhouse our well was approximately 10 feet, which is approximately three metres, give or take a little bit. That was supposed to last us, but of course we had to dig a well. The next one comes in at 40 feet, which is approximately 10 metres, or thereabouts – 15 metres, someone, (Indistinct) better answer, somebody (Indistinct)? No, okay. That was supposed to last us forever.

Chair: Twelve.

Rev. Karen MacRae: Pardon?

Chair: Twelve.

Rev. Karen MacRae: We go to twelve, good. That didn't work. We had to get rid of that well and dig deeper. The next well comes in at just under 300 feet, but I know that there are several in that area that are over 300 feet, which is approximately a hundred meters. Our first person who was talking, Dr. Cathy Ryan, was saying that that was a deep well. We have it on our farms already. That is not an unusual reality.

Pierre Elliott Trudeau is known for his love of water. He was our 15th prime minister and he told us that the state has no business in the bedrooms of the people, and yet we are looking at legislation which is going to invade our kitchens, and not only that but the privacy of our bathrooms, to teach us how to conserve water.

This is part of Charlottetown's calling everybody who lives in Charlottetown to be water friendly and reduce our consumption. They're telling us to reduce our consumption, change – and (Indistinct) being asked to pay for this – to change how I take a shower. I have no problem with that. I agree with it. But I'm just saying that that's part of what's taking place in our residential areas. Not only that, but we are told to get low flow toilets. I am totally convinced that if we don't pay attention we're going to end up with the ultimate low flow toilet. I remember those days, and at 30 below I didn't enjoy those days, and I have no interest in going back there, but if we don't watch out we could end up there.

Piping water is not something that's new. The watershed for Charlottetown, it's piped for 22 kilometers, which is a fair chunk of this Island.

This is a picture of Glenfinnan Marsh. When I was living in Ontario there was a lot of marshland when I went there first and they gradually drained them off. While I was in Ontario also they were taking the water where they considered the ultimate, the Great Lakes, a continual complete supply of freshwater. Now they're aware of the fact that the freshwater in the Great Lakes is dropping, and they have to be aware of that and change some things that we're doing.

Stewart MacRae has gone back to organic farming and is aware that we have got to stop digging deeper wells and go back to an organic way of doing things. I watched some of the organic farmers, the Mennonites, in Ontario, and some of their policies and the way they were doing it I thought was pretty good. But part of organic farming is we've got to get the water supply, and if we drain too much off we've got a problem with nitrate. This is a picture of nitrate in the Wheatley River prior to the conservation of the Wheatley River watershed because they're saying: We've got to hold on to the nitrate or we're ruining our streams, we're ruining our fisheries. I agree.

If we choose to do drainage, and these are some possibilities of drainage – this was fairly common in Ontario because they have those wonderful flat fields and it was quite parallel and it was quite wonderful, but in some of the areas where it wasn't quite so flat, they were doing herringbone. Some of the other areas actually had it draining into a stream that flowed out. Now, our streams flow out into salt water. We have no chance of using it again, but we also have to be aware of all that freshwater nitrate going out into the salt water and affecting the shellfish. How many times has the North River and other parts been shut down due to raw sewage entering our streams and being unable to get produce out of those?

This to me is more like what it would look like for drainage fields in PEI. I know there are drainage fields in PEI. What we need to consider is holding on to that water that we're draining off. I asked many people and they say: We have never considered holding

onto the water that we're draining off. I'm thinking if we hold onto it, we put that nitrate back up on the field where it came from. We put that fertilizer back up onto the field where it came from.

Cisterns. These are underwater, underground cisterns that could be used to hold (Indistinct) from a given field. In Ontario I lived in a house that had a cistern, and I said: Why aren't we using the cistern? They said: It was inconvenient to get in and clean it out every year, but you're right, we still have the equipment inside the house to purify the water and we could have been using a cistern instead of digging another well.

This is the tower in London. Now can you imagine instead of going through wells if Irving put their sign on the top and promoted that they were working more and collecting the water? I think that that would be good publicity for all concerned, or maybe for organic farmers, or maybe for somebody else who would sponsor the preservation and holding onto the water that is being sent away.

This is a picture of a potato field. I took it as a reminder that they're going into an estuary. If we don't hold onto our water the estuary disappears. Brookfield Gardens has chosen to hold onto the water that they are draining off their fields, and during the summer, this is their pond that they shoot back up on – here we have a look at also a publication. Shows the residences. I understand why you've entered our bathrooms and kitchens, calling us to reduce that amount, but we also have to watch out that we don't increase agriculture as we reduce our water supply.

Potatoes are essential for PEI life. Agriculture is essential for us. Believe in the possibilities that our Island will continue to have enough water. I agree with the concept of a complete water policy that to me includes both fresh and salt. Believe in the possibilities that we have win-win-win for PEI gold for everybody.

Thank you very much.

Chair: Thank you, Reverend MacRae.

Any questions or comments? I want to certainly thank you for your extensive presentation, and we'd be happy to have that as well.

Rev. Karen MacRae: You have the –

Chair: We have it, I'm sure, on data.

Rev. Karen MacRae: You might not have everything I said, but then again, this probably does.

Chair: It's good. Okay. Nothing else at the moment, but we will certainly appreciate everything that you have taken to put before us.

We have another presentation. We'll just let you –

Rev. Karen MacRae: Going to go back over here.

Chair: Yeah, no.

The Citizens' Alliance of PEI. Are they here this afternoon?

Oh, hi. Do you have any overheads to prepare?

Unidentified Voice: We do.

Chair: Okay. We'll just again take a quick –

Unidentified Voice: Can I steal this chair?

Chair: Yes, you can sit in it, but you can't steal it.

Unidentified Voice: No, this is true.

Chair: We'll let you get set up there.

Unidentified Voices: (Indistinct).

Chair: Whenever you get ready, if you want to introduce yourself for the Hansard. Just anyone that's in the gallery today, if they want to ever go back and look at any of the presentations, they're all on Hansard under our committee, and so they're all there for review at the Assembly website.

I'll let you introduce yourselves and whenever you're ready, about 15 minutes do you have? Okay?

Chris Ortenburger: Hi, I'm Chris Ortenburger and this is Cindy Richards, and we're from the Citizens' Alliance of Prince Edward Island. We want to thank you for accepting our request to speak before the committee.

We'd also like to thank you for your leadership on the issue of the moratorium on high capacity wells for agriculture purposes and for your encouragement of presenters, and for your clearly worded report that you presented to the Legislature on April 4th that detailed your activities and your recommendations. These actions are appreciated by Islanders, and it also reminds Islanders of the importance of these standing committees.

Cindy Richards: The Citizens' Alliance of PEI is a group of Islanders dedicated to advancing environmental rights and the democratic process. Of paramount importance to the Citizens' Alliance of PEI and Islanders is clean and high quality water for current and future generations.

We intend to present a number of presentations which will help facilitate the natural progression towards the protection of this, our most valuable resource.

Chris Ortenburger: And we (Indistinct) recommendations.

Most of us in the Citizens' Alliance are also involved in other work and in other community organizations. I'm in the Bonshaw Women's Institute. A few weeks ago at the PEI Women's Institute annual convention three resolutions unanimously passed that day. The first recommended that the PEI government write a comprehensive water policy; another, that the PEI government place a moratorium on hydraulic fracturing; and a third, that the PEI government keep the moratorium on high capacity wells for agricultural irrigation. While I'm not representing the women's institute here today, I'm honoured to be a member of that organization and to share with you their profound statements.

Like other groups which have passed resolutions or spoken to this committee or the many, many individuals who have written letters to the editor, the Citizens' Alliance of PEI recommends government

keep the moratorium on high capacity wells for agricultural irrigation.

Cindy Richards: We are pleased that Minister Sherry has acted upon the recommendations of this committee and many others who have announced the development of a water act to protect the supply and quality of ground and surface water in PEI. This act must be transparent which includes access to information, access to scientific findings and data, and a broad consensus on the final draft before it makes it way to the provincial Legislature.

A comprehensive and integrated policy requires the incorporation and combination of all aspects and elements that are presented. These elements are a complete picture of the risks, the values, the costs, the environmental impacts and must provide integrated analysis of systems that affect and are affected by water sources.

Scientists agree that climate change will seriously affect water resources around the world. Coastal areas will be particularly vulnerable and PEI will be no exception. The water act must support the capacity for adapting to climate change which means the need to be ready to manage water in the context of greater uncertainty about the future and increased risks of hazards and the emergence of new weather and hydrological conditions.

The executive summary of a report entitled *Mainstreaming Climate Change Adaptation in Canadian Water Resource Management* states: Effective adaptation will require a rethinking of how we design our policies and infrastructure. Community and ecosystem resilience to climate change requires water management to be adaptive, flexible and risk-based.

Based on this, the citizens' alliance recommends that with due diligence and transparency, the government develop a comprehensive integrated water policy for PEI. Climate change adaptation must be mainstreamed into all aspects of the water resource management.

Chris Ortenburger: A water act needs to have meaningful public consultation. Two recent consultation processes had effective components to engage the public.

The Carver commission on the *Lands Protection Act, PEI* hosted tip to tip public meetings, had an easy-to-find schedule of these meetings, gave generous time at each location, made recorded proceedings available for further review, and certainly had an enthused commissioner. The taskforce on land use policy made a public online survey and a website with lots of information. The Citizens' Alliance created a social media public service announcement to encourage Islanders to participate in the survey.

The discussions of the water act should incorporate these types of components and more to ensure that as much consultation is done as possible and then to ensure that the process validates Islanders' opinions. We look forward as the Citizens' Alliance to promoting public awareness and engagement along the way.

A water act would also need to have sound science to support it. We know that PEI is totally dependent on its groundwater. There is no plan B for a water source and Islanders get the significance of our water. We may have plentiful snowfall and rainfall, but that does not necessarily mean our aquifer is recharging Island-wide at a sustainable rate.

The science for a water act and its regulations need to be more comprehensive, we think, than the studies used to justify the 2013 water extraction policy. When details of those studies are looked at, even a casual observer can see that the studies were quite narrow either in time or in locations, and then the conclusions were applied to the whole Island which is a very diverse area.

Some well-respected Island biologists have pointed out to this commission that the policy is based on a misinterpretation of the recommendations of the Canadian Rivers Institute about not extracting groundwater when the local streams are at baseflow, not to 35% of baseflow, but baseflow at all.

So baseflow, swimming pools of water, dozens and dozens of wells, only 1% of 7% – none of these bits that you've heard and that the public has heard can be viewed in isolation. Water is tied to our land and our surrounding seas, our air, and it's entwined with the effects of climate change and human activities such as our agricultural

choices, and our agricultural choices are probably a whole other issue that you're probably going to need to consider.

Some studies are designed to answer a specific question and others are designed to help produce the reliable means and methods to answer other questions. The 'science,' in quotes, has been talked about often enough to this committee and it's hard to say we could frame the question to get one conclusive answer: Is there enough water? Would we maintain the quality? See, that's already two questions. A conclusion for many that have come here is that the current science is not sufficient in scope to justify the extraction policy that's there. Very good questions have been brought up which need investigation and consensus before a sustainable water act and its regulations should be inked. That would be the start of a sound scientific foundation.

As even Dr. Ryan said earlier today, it's not just about pumping more water. A water act's going to have to take more than that into account. Above all, the idea of the water act has to take into account the precautionary principle, and that's the idea that there is a duty to prevent harm when it's within our power to do so. It is undeniably the only way that we can deal with the issue of water.

The Canadian Environmental Law Association defines the precautionary principle as: If an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is not harmful, the burden of proof that it is not harmful falls on those taking action.

That proof must be agreed upon by scientific consensus. The economic benefit of the action should not compromise human rights to water.

With these things in mind the Citizens' Alliance recommends that the Government of Prince Edward Island establish a transparent and meaningful public consultation process that allows all Islanders to give their input and be heard regarding a sustainable water act. The policy needs to have scientific consensus as part of a strong foundation with an overarching precautionary principle.

Cindy Richards: Legislation and regulations are only as good as their enforcement. This is a direct quote from Environment Canada.

Ensuring effective compliance requires rules and regulations in order to create a well-functioning society and trust in government. It forms the basis for safeguarding health and safety, protecting the environment, securing stable state revenue and delivering other essential public goals. The challenge for governments is then to develop and apply enforcement strategies that achieve best possible outcomes by ensuring the highest possible levels of compliance.

At public hearings on the commission for the *Lands Protection Act, PEI* the PEI Potato Board stated their 75% compliance with the regulations. Although we recognize that the majority of producers are good stewards of soil and water, it must not be overlooked that 25% are in non-compliance. Furthermore, the number of fines that have been issued for these infractions are not indicative of consistent surveillance or enforcement.

Jim Young, the director of the department of environment, in the presentation to this committee, spoke of sporadic monitoring and said: Long-term monitoring has not been done on irrigation wells per se. It is important to realize that poor regulatory practices cause more cynicism in the public and fails to meet policy objectives and results in non-compliance. Therefore, the Citizens' Alliance recommends the government to establish a strong compliance strategy for the water policy with focus on public awareness, monitoring and enforcement.

Chris Ortenburger: To close, we would like to thank you again for this time and encourage you in your work as you write your recommendations to government, and ask you to hold government to this value about water that we all share. It's a quote from the taskforce on the land use policy from their report that they just issued last week: It is in the provincial interest to protect the quality and quantity of the Island's water and ensure it is healthy and sustainable for current and future generations.

Thank you.

Chair: Thank you, Chris. There is a lot of work to be done on this topic. The committee was glad to see that our recommendation was taken seriously and that there is work beginning to address some of those concerns. However we, I'm sure, will have more recommendations when our report comes back as well, so we'll be looking forward to that work to begin.

Anything from the committee? Okay.

We'll have your presentation, I'm sure, and thank you for taking the time to put that together and to be with us today.

Committee members, anything else? We're into new business.

We don't have anything else on the agenda today. If not, we'll ask for an adjournment.

Mr. Dumville: (Indistinct).

Chair: Yes, okay. Bush Dumville. Thank you for coming.

Thank you, everyone, for your undivided attention.

The Committee adjourned