

PRINCE EDWARD ISLAND LEGISLATIVE ASSEMBLY



Speaker: Hon. Francis (Buck) Watts

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Standing Committee on
Agriculture and Fisheries

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SUBJECT: BRIEFINGS ON SOIL ORGANIC MATTER, BEE POLLINATION & PESTICIDES' IMPACT ON BEES

COMMITTEE:

Hal Perry, MLA Tignish-Palmer Road [Chair]
Dr. Peter Bevan-Baker, Leader of the Third Party
Hon. Richard Brown, Minister of Communities, Land and Environment (replaces Chris Palmer)
Hon. Sonny Gallant, Minister of Workforce and Advanced Learning
Colin LaVie, MLA Souris-Elmira
Alan McIsaac, MLA Vernon River-Stratford
Bradley Trivers, MLA Rustico-Emerald

COMMITTEE MEMBERS ABSENT:

Hon. Paula Biggar, Minister of Transportation, Infrastructure and Energy
Hon. Chris Palmer, Minister of Economic Development and Tourism

MEMBERS IN ATTENDANCE:

Darlene Compton, MLA Belfast-Murray River

GUESTS:

Department of Agriculture and Fisheries (John Jamieson, Sebastian Ibarra Jimenez, Cameron Menzies, Kyra Stiles, Barry Thompson)

STAFF:

Ryan Reddin, Clerk Assistant (Research and Committees)

Edited by Hansard

The Committee met at 10:00 a.m.

Chair: Good morning, ladies and gentlemen, and welcome to the Standing Committee on Agriculture and Fisheries, Friday, March 2nd, 2018.

I'd like to call this meeting to order and welcome our committee members back here again today. We also have a substitution today: Richard Brown will be sitting in for Chris Palmer. I'd also like to welcome, sitting in on this committee, Darlene Compton. Welcome.

Mr. R. Brown: The government sent (Indistinct) the best (Indistinct) MLA.

Chair: Thank you.

So, line two on our agenda is the adoption of the agenda. Everyone had an opportunity to read it. It was circulated yesterday.

Mr. R. Brown: (Indistinct)

Chair: Thank you, Mr. Brown.

Number three, briefing on the study of changes in the soil organic matter over 18 years in Prince Edward Island. This was a study done by the provincial Department of Agriculture and Fisheries, and today, at our committee's request, we will have a briefing on this. I'll actually ask our presenters to introduce themselves and their positions, please.

John Jamieson: I'm John Jamieson; I'm the Deputy Minister of Agriculture and Fisheries.

Kyra Stiles: My name is Kyra Stiles and I am working within the Sustainable Agriculture section as the Agri-Environmental Development Coordinator.

Barry Thompson: I'm Barry Thompson; I manage the Sustainable Agriculture section of the Department of Agriculture and Fisheries.

Chair: Great. Thank you, and welcome.

What we'll do is we'll hold questions until after the presentation, and then I will open the floor to any questions that any of our

standing committee members may have, and those who are sitting in on today's session, too.

So with that said, you may begin.

John Jamieson: Thank you.

So, Mr. Chair, thanks again for inviting us here today. This is quite an interesting project and piece of work that I think you'll find maybe a little concerning; but also, we have some plans at the end that we'll discuss.

First couple of slides I'm actually going to speak to, and the first one I want to talk to you about the goals of the Department of Agriculture and Fisheries. One of the things that we've done in the last couple of years, is we've whittled our strategic plan into a one-pager that talks about our goals and our values, which I'll talk about in a minute, and our two – what I call ditches, HR and dollars. So we try to hire the best people available and make the best use of dollars that we have.

But if you look at the goals of the department – and pretty well everything we do circles back to this, and it's also related to the mandate letter that the Premier provided us – so we support sustained development, which is a development of agriculture, fisheries and aquaculture.

We spend a lot of time and effort on environmental stewardship, which is a little bit about what we'll talk about today. We also support local food, and some initiatives that we have around there around supporting and promoting local food, and also the new program that we introduced a while back on community food security and food education is doing quite well.

We are also tasked with developing a food cluster that'll promote food security, food sales and safety on Prince Edward Island. We work on innovation, sales and exports. Public trust is a new piece that's been added to our mandate, and it's also a requirement that the federal government has for us under our new Canadian Agriculture Partnership program. Then we also develop a human capital strategy for our industries.

We look at our values, and I think this is the key piece of what we do and strive for in a department. Our core values are respect, integrity, accountability and excellence; but above that, we try to maintain a workforce and workplace that is diverse. In fact, for traditional industries, 50% of our staff are male and 50% are female, exactly, which is kind of neat. We also have a number of other groups that are represented in our department.

Very inclusive; we support lifelong learning. We're innovative. Last year we won – Barry, in fact, won the innovation in government award, and we plan to win it again this year. We base our decisions on evidence, and we're very professional.

One of the things that we've done is we've changed the way we hire in our department. We had a lot of new hires and in the past we would sit someone down and ask them a bunch of questions about what do you know about this, what do you know about this, what do you know about this. We've changed that process that we hire on potential now.

When you start to hire on potential – we know the workplace is going to change over the next few years – and when you hire on potential you tend to end up with the people who are maybe a little younger, and I think you'll see that in the group we have here today, Barry and I being the exception for sure.

But we have a very professional, very adaptive workforce, and if we want to move – when we go back to our goals earlier – if we want to move to strive to do that, then we have to think about potential and how we hire. That's something that we've done, and as a result of that we've suddenly become the youngest department in government.

Just a few things around our values, and now I'll turn it over to our counterparts to talk about the meat of the presentation.

Barry Thompson: Okay, I guess I'll start off first and then we'll lead into Kyra. We'll kind of tag team this thing a bit. I guess being one of the senior ones, John, I can speak first here in that sense.

When we look at this project that we have; this soil quality monitoring project, the project started in 1998. I want to give you a little bit of a background to that to give you a feel for where this project is and maybe help you with some of our discussion and questions a little later on.

In 1998 we were in a situation and I could speak to this. I think I referred to the fact that I'm the last guy standing because I think I'm the last one left from this original group, but what we were talking about in that day was like we had the assumption, or we felt that soils were changing. We had no way to monitor that. We didn't have any kind of real, sort of, I guess measurables, if you would say, other than maybe the soil and feed testing lab at the time. But that really wasn't representative because that was for individuals that were bringing samples in so how would we know what was happening across the entire province.

Between the department of agriculture of the day and Agriculture and Agri-Food Canada, we got together. Some scientists and ourselves decided what better way that we could go across this Island and maybe monitor over a long period of time to see what's happening with change and that. What came out of that was basically a project that looks at the entire Island. It's sampled over a three-year period in cycles, and we'll speak to that for a second, and really we had about 800 samples that were taken. That slide that's up there says 800 samples that were taken, but it's 232 GPS points. I'll explain that in a second by a map because I think it's a lot easier to see it when we get to a map.

But of the original 800 sample points, we're down now to about the 600 range. Why? Urban sprawl. It's funny how many cemeteries pop up in interesting spots to take away our sample sites; highways alone. Those types of things have changed over time, so therefore it's removed some of our sample points. Now we're at the point in our cycles where this year coming up, we have reviewed sort of where those sites were, where we're missing some samples and looked at sort of a statistical method that we can put those samples back in; get our numbers back up so we can keep our statistical analysis in good shape.

How the sample grid works is that it's a four-by-four kilometre grid across the Island. That four-by-four kilometre grid is very convenient because the national forest inventory in the day, and still does, use a four-by-four kilometre grid. Why the national forest inventory? Well, because what it was – it gave us consistency with the rest of the country. It also was a grid that was being used here on the 10-year anniversary whenever they have that forest inventory that's done. So they sampled the forest sites at that time, so what better opportunity for us to sample the agricultural sites? It gives us a good grid across the Island. You might say that every 10 years you have a complete cycle of what's going on on the Island; forest and agriculture.

We sampled the one-third of the sites, is what I say, but with that many sites we decided that over a three-year period we would sample the entire Island of 800 samples. Why the three years? Well, three-year rotation. What better way to do it than one sample every year from the three cycles? Over the three years we've got the whole thing covered. That's the rotation. At the same time, we're looking at what do we do with those sites when we're at those sites? Well, let's identify the crop that was growing there as well. Every year, all sites, not just a third of them, we identify the actual crops that are there. The benefit of that is it starts to give us a bit of a history and an idea of what's being grown there, and we can always look at sort of rotational type of balances and that kind of stuff as we go.

That kind of brings us to why we're here today and there is a paper that came out just recently, that both Kyra and I are cited as being part of the authors and thus, I think the interest to that point. What I want to do is – what we'll show you here is a quick example of the Island obviously, and that's how those sample points run.

The shaded areas are actually the forested areas so those would be the ones that are done every 10 years. The other ones are the ones that we work on a one-third basis. So if I was to move that forward again, what we're looking at – and that's hard to see there, actually, but there are the five blue dots that are circled there. What happens is that – remember I said the 232 GPS sites –

the GPS site is the central point on that, and we take another sample in each cardinal direction; north, south, east, west at 100 metres out and therefore, that gives us the extra sites. Thus, the 800 and 232 sites so it gives us a good representation of what's happening there. If there was to be forest in any one of those other areas on the outliers, obviously the site wouldn't be taken so we leave that to the forest folks to do that. That's how that was all set up in sampling.

What's gone on since 1998? A lot has gone on since 1998. The Island has changed quite a bit when it comes to the industry itself. One of the things is the actual potato acreages. Potato acreages now from – and we use 1996 to 2016, that's the Stats Canada range – but speaking sort of what's gone on in the Island here, around the Island; we've ran anywhere from up to, I think, as high as 116,000 acres of potatoes in that time and now we've dropped back down. We're running around, I'm going to say, the 80,000 to 85,000 acres range and that type of stuff. You saw quite a change in the potato acreage over that time.

Another thing that's really significant here that's changed and has had an impact from what we can see on organic matters is the livestock industry. The livestock industry has taken quite a decline in the time and in actual fact, it was probably in around that 2005 to 2008 range where you really saw the hit on the livestock industry, especially in the western end of the province where a lot of those farms would have had potatoes and livestock at the same time. The livestock disappeared. What's the consequence of that livestock disappearing? Well, obviously when the livestock disappears there's no more manure; that organic input is now essentially gone or limited.

The other piece to it is the forages that are grown. We don't need the feed to feed the livestock. There's not as much forage being grown. Guys are looking for other pieces in the rotation, something else that is profitable. We saw that. What's interesting here is that – and you don't get it from this particular paper and you won't see as much in our presentation – is that we've drilled down a little bit and although these organic matter ranges that Kyra will speak to – we made them a little tighter and when you saw those declines, you actually saw a dip in the

organic matter within the next couple of years. It levels out when we get into more of a general mapping, but you can really see the impact on that kind of stuff.

Another thing that happened, and that would be more around 2009-2010; in that range, soy beans. Soy beans went from, back in the 1998 areas, around 3000-4000 acres, 5000 acres, and it's bumped itself up to I think around 50,000 acres now. Soy beans in the rotation with potatoes, lack of forage; all of a sudden you're starting to see that. When you actually look at the province across the board, the western end saw the livestock impact a little bit more than the rest. The central part, what you want to call the potato belt, the Kensington area, when the soy beans came in you saw that being the dip area. Like I say, when you're drilling down you get a lot more information but we can speak to that when we get into some of our discussions. Those are some of the things that happened.

One of the things that's kind of interesting and really doesn't impact on this study at this point, it will as we go forward probably, is that in western PEI there's a lot of forest land that's cleared. Our original grid didn't pick that up, but as we go forward in starting new sites, we'll continue to add agricultural sites and that'll have some impact when we get into that.

Those are the types of things that are going on. Climate change is obviously a bit of an impact on this type of stuff. I think we'll probably get some discussion on that as we get going. The other thing when it comes to our rotational changes you'll see, is whether it be our disease or our pest pressures and that. Some of our rotations are changing around that in the sense that you'd have mustard, as an example, in a rotation which can act as a natural fumigator or that towards our wireworm.

All of those things are having impacts and it's one of those things where there's no one big change. It's been a lot of little changes over a long period of time that you're starting to pick up on, so the little things make a difference. The actual maps that you see up there, those are just trends on what's going on between the livestock industry and actually the cropping and that as well.

Before we get down to it and before I hand it over to Kyra to get into a little more detail about the project and show you some of the mapping products and that type of stuff, I just want to touch on our soils here in PEI. My background and education comes mainly from the soil physics and soil chemistry side of things, so when you start talking soil physics, it's awful but I kind of get right into the thing around structures and all that kind of stuff.

Our soils here in PEI really are podzols, more podzol based. Yeah, we have some glycols and (Indistinct) and that kind of stuff, but what I'm speaking about is podzols. We all know that red soil, the bright red soil. The bright red soil is that fairly well drained soils, sandy loam in nature, have high iron and aluminums. That's what we have. What's wrong with that? Nothing is really wrong with it. It's a very fertile soil, but the other side to it is that it's highly erodible. We've all seen the erosion and we all see that happening out there. The sandy loams, the structures aren't really that strong in our soils so they're highly erodible.

The other piece to these soils is that the organic matters originally in those podzols are starting maybe, maybe they're in around four or something like that. If I wanted to compare that to, say, Western Canada, Western Canada's tends to be more the chernozem type of series of soils. When I say that, those are those black ones. You can actually see organic matters in those. Grassland soils, they actually have a fair amount of clay and more silts in it so it's a heavier soil. It stands up better to a reduction of organic matter and that too. It won't break down as much. They're still fertile soils, just a different make up. Ours comes from, obviously, the sandstone bedrocks and that kind of stuff. That's where we derive all of our soils from.

When you start getting into that, that has a play on organic matter and our tendency to drop and that kind of stuff around our management practices.

The final little note there I have before we'll pass it over is around our soils and their sandy loams. When you get into sandy loam soils or loamy sands, that type of thing, you talk to soils people or different soil scientists

– they’ll be the first ones to point out to you that when it comes to organic matter, our management practices, we can decline a percentage of organic matter. So, from a four to a three, a three to a two, a full percentage point, we can do that in a three-five year period. We can kill the stuff real quick. Turn it around though, try and bring that back up a full percentage point, now you’re looking at something about 20-25 years.

Now another example we use and I didn’t put it up here because I just want to cite as an example to give you a feel for that, is that if you were to have only manure as a something to apply and that, you’d be looking at something around 40 tons per acre per year of manure on a 20-year period to try and bring that back up. Think about that. That’s 40 truckloads, those dump truck loads, of manure a year on an acre. That’s the impact you’re having. That’s the challenge we have as growers and as agriculture, to try and keep our organic where it is, or try to have an influence on a positive fashion.

That’s sort of – I set the stage for you (Indistinct) and now I’m going to let Kyra take over and she can do her piece.

Kyra Stiles: Good morning. I’m going to talk a little bit more about the data analysis and the results.

From the study, all of our data points, we use a regression kriging method to estimate soil organic matter trends across PEI. This is just a method that you use your data points to relate to other data points to create an estimation of what the other points will be within the same area.

From that interpolation we created geospatial maps and you’ll be able to see the trends across the PEI landscape from those maps. They’re going to follow in the following slides. But before we get to them I’d like to explain that for demonstrative purposes we divided the maps into different categories and classes of soil organic matter. There are four different categories which include: organic matter levels below 2% within the 2 to 3% range, the 3 to 4% range and any percentages above 4%.

Each map is divided up into individual cycles. Barry explained that we cover the Island completely over the span of three years. We would sample the same points in the first year – let’s say we started in the year 1998 – we’d go back to those same samples in the year 2001. By the time we go from 1998 to 2000; that would be a full cycle which would be cycle one. Cycle two would begin from 2001 to 2003.

The first map here – I’m going to go through them fairly quickly at the start and then we’ll go back and look at it again. I even see that the colours are distinguishing a different category of classes. A navy blue would be less than two, a beige-white is the 2 to 3%, the yellowish-orange is a 3.1 to 4, and the red would be soil organic matter levels above 4%. This would be the first cycle; we’ll continue on to cycle two, cycle three, cycle four, cycle five and cycle six, which ends in 2015. I’ll go through that one more time.

What might be useful here is if you look specifically at a certain area or a county and just kind of focus on that and see how it changes over the span of the 15 years.

As you can see, on average, our organic matter levels are declining in a trend since the beginning of the study. It’s important to note that not all of the points that we sampled have declined; some of them have changed in a positive trend and have increased, and some of them have remained fairly stable and are unchanged over the span of the study.

Using that same regression method that I mentioned, we created a graph below that shows an estimation of what the ranges would be for all of the agricultural land on PEI. If you look at the individual lines they’re divided up into the same category of classes as the maps. We have on the X axis the cycles.

So, you can see that land acreage generally ranges – the 2 to 3% range is increasing over the time, whereas the soil organic matter classes that are 3 to 4% and above, 4% have been declining. The levels that are less than 2% remain fairly stable and quite low.

There’s another way that we can look at the data – there’s several ways we can look at it

– but one of the ways that we’ve chosen here is looking specifically at the sample groups. I mentioned that we’re sampling the same samples every three years. If we went by 1998, all the samples that we collected that year could be listed as sample group one. The first year that those samples were collected would be on the X axis sample year one. The second year that they were collected would be the year 2001. Now the samples that began in the years 1999, which would be sample group two, their first sample year would be 1999, and their second sample year would be 2002.

The reason we divide them up by sample group is that when you put all the organic matter levels together in an average, it’s harder to see distinguishing trends. So if we follow the same points over time, we’re able to see how those points are changing throughout the cycles.

You can see that when you’re comparing these sample group classes, the declining trend began a bit more significantly in the first sample years, the decrease in intensity in the fifth, sixth, seventh sample years. It’s important to note here that we haven’t yet done the seventh sampling year for the sample group three; we’ll be collecting those this year in 2018.

This is an interesting way to look at the results because some long-term studies have shown that in intensive agriculture systems you can see an initial decline in soil organic matter originally, but at some point they establish an equilibrium over time. We’re not sure if this is happening within our province, but it’s something that we’re going to keep in consideration for future data analysis, because as this project continues we’ll be able to see a longer term effect.

Barry Thompson: Speak to the later part of the term, the last cycle, how we can analyze it from there forward.

Kyra Stiles: Yes, so it’s possible that the later sample years may be fluctuating closer to an equilibrium point.

Barry Thompson: Yeah.

Kyra Stiles: It’ll be interesting to see this year’s results based on the decline in the

sample year six for group three, but group ones and two have been fairly consistent within the last sample years.

Looking at these solar organic matter levels, a lot of questions may arise and there’s some considerations that we need to keep in mind of what factors may be influencing the soil organic matter levels.

Initially, PEI is a primary industry of agriculture and some of that includes different crops that include intensive soil management and that’s dependent on what type of tillage is used and what type of crop rotations are used. We’ve seen a switch from what might be considered a traditional crop rotation from the beginning of the study, like for example, the potato grade under seeded to hay to a year of hay. Those crop rotations in some areas have changed and they’ve been influenced by increases of other cereals, oil seeds, brassicas, which means that sometimes forages have been taken out of the rotation, or, if forages are left within the rotation, they’re in the rotation for a shorter period of time.

We’ve also seen, as mentioned, a decrease in livestock numbers, which means that organic inputs in manures are decreasing. So, soil organic matter is largely a function of carbon inputs and carbon outputs. A decrease in your inputs like manure is going into a system, may lead to a net deficit of carbon for that year, unless we look at changing our outputs from the carbon.

Barry’s already mentioned a bit about the nature of PEI soils and their sandy loam texture, mixed with some undulating topography on PEI. Soils are more stressed and more prone to erodibility. We’re seeing changes in climate. Our precipitation events are much more unpredictable than they used to be. So, getting frequent smaller rainfall throughout the season, in some seasons have changed to very infrequent participation events that are very intensive. Particularly, this is important if you have a drought season and you get a large intensive precipitation event that can lead to a flush of microbial activity, meaning that you can get some mineralization of soil organic matter.

Finally, one of the factors to consider is that soil organic matter changes are very incremental over time. A positive influence,

like one particular beneficial management practice on a farm may take numerous years to see a change in organic matter; however, if you do numerous beneficial management practices on a farm, you may see changes slightly quicker given that each one adds up to make a benefit on your soil organic matter.

Which kind of leads into what is the province doing, or our department, about influencing positive change on soil organic matter levels? Within our section, the sustainable agriculture section, we work with a PEI – we work with a program that's for producers called the PEI Agriculture Stewardship Program. This funding has historically been called Growing Forward 1 and 2, and it's funding from the federal agency of agriculture.

As of April 1st 2018, the new name for it will be Canadian Agriculture Partnership. The Agriculture Stewardship Program gives financial incentives to growers to help implement some of these best management practices on their farm. Some of the strategies include significant financial investment from the producer.

This could include the construction of soil conservation structures. So a grower can come to the department and speak with one of our soil and water engineers and make a plan to create a soil conservation structure within their field. That could be a waterway, a terrace, a farmable berm; and the engineer would create that plan, and the program would also help cost-share the price of constructing this soil conservation structure.

Other parts of the program include promotion of residue management strategies. So if a producer wanted to use conservation tillage on their farm, we would pay a certain amount for including that practice on your land, and that would mean that the use of a conservation tillage implement would give extra residue on the soil surface of your field, so that it'd be less prone to erosion.

We also encourage the use of fall cover crops. So any fields that you see this time of year that have the green – mostly brown now – plants on top, is likely a winter wheat or a fall rye that was planted following the main crop to help with erosion and nutrient

loss over the winter months. That's also covered within this program.

And finally, we help encourage soil health promoting strategies and nutrient management practices. We cover nutrient management plans, and we'll be adding some more soil health strategies within the Canadian Agriculture Partnership in April.

We also work very collaboratively with Agriculture and Agri-Food Canada research scientists, particularly with Dr. Judith Nyiraneza, who helped write this paper with us, but there's numerous research scientists that we've been working on projects related to soils and crop management, and some new scientists that will be doing some work on the effect of soil management practices on soil health and on soil microbial communities.

We also provide education and awareness to industry and farmer groups on soil organic matter and quality in projects like this, and fact sheets are developed and reports developed from this.

Finally, I'd like to mention that we do some work with soil health more recently within our department, and we're looking at developing some soil health testing parameters with the PEI Analytical lab. What this does is it's going to provide a new slew of soil tests that are available to the producer to sample, not only the nutrient analysis of a field, which would be the kind of soil chemical aspect of it, but we'd be looking at soil biology, soil physics, and you'd be able to put all those tests together to get an all-encompassing approach of what your management practices are doing on your farm to contribute to the soil health in total.

Right now it's in a developmental stage, but we're hoping that some of these tests will be able to be offered to producers later on this year, or early 2019.

John Jamieson: If I could just add one other item on this list: A thing we're working on now is a perennial crop program, to help encourage producers to put in high value crops that essentially don't see a plow. We talk about how that intensive tillage is impacting on soil organic matter. We expect under the next program, starting

April 1, we will have something around that, and it also helps with diversity in agriculture: high-value crops that don't see a plow, so there's kind of a win-win-win there, and that's something that we're developing some parameters around as we speak.

Kyra Stiles: Those are all the slides we have.

Thank you.

Chair: Thank you very much.

The floor is now open for questions. I am compiling a list. First on the list I have Brad Trivers.

Mr. Trivers: Thank you, Chair, and thank you for your presentation.

I have a whole ton of questions. I was writing them down as we went through the slides. I want to start off with, when you mentioned in slides 2 and 4 and 16 and 17 near the end, you're talking about how we can influence positive change.

One of the things you referred to quite a bit was crop rotations, and you also talked about fall cover crops and soil and health nutrient management; but the term that was used on one of the slides was "encouragement" to follow those practices, and as well, in a previous presentation – we were talking about drones – we were told that farmers are encouraged to follow the crop rotation act.

I understand we have to work closely with our farmers, and we have to make sure that they can put into practice some of these positive changes; but it's mostly farmers that come to me, and they complain because they know some of these practices aren't being followed, like crop rotation, and this idea of encouraging instead of enforcing is one that – honestly, a lot of people come to me and it doesn't sit well with them, because we have that legislation in place for a purpose.

So I was wondering if you can comment on whether we have the data – for example, through satellite imagery, and again, in our previous presentation we heard that the federal government has satellite imagery that would allow us to, multiple times a

year, look at the Island and understand how different crops are changing and whether in fact the crop rotation act is being followed, as well as things like whether there's been fall plowing, whether there are fall cover crops, whether you have the information and whether you think we need to, perhaps, given the negative results of this report, be a little more aggressive in actually enforcing some of our acts instead of just encouraging people to comply with them.

Unidentified Voices: Do you want to start? (Indistinct) Do you want to speak to –

John Jamieson: Well, I can start. There's a couple of things. Farmers do have to follow the crop rotation act, and in fact, the enforcement of it falls under the department of Justice; but also within the department of environment is an agri-environmental unit that has officers that work with farmers on those types of activities.

I believe there's a fly-over a couple of times a year, and there has been charges, so there is enforcement of the act. We encourage from our end, but the enforcement is within another department. You wouldn't necessarily want to have the department of agriculture doing the enforcement on that act. It is encouraged by our group, but it is enforced by justice and by environment.

Barry Thompson: If I could add to that for a second: so with that enforcement piece, individuals are identified to the AEOs as we refer to them, the environmental individuals. They'll speak to them, and then those names of those individuals are identified to us in our soil and water engineer group, and then we make contact with those individuals. We speak to them. We work with them to try and bring things in line with the crop rotation act, with the soil losses that are tolerable within the province.

I know there's the enforcement piece, and when we say we encourage, we're actually one-on-one with those individuals when we know they're out there. So that's how we're working with them. I guess I can speak to the fact that 90% of the individuals we speak to are involved in our programs. So we are making positive steps. We're going in that direction.

Mr. Trivers: Yes, and I think all farmers want to comply.

Unidentified Voice: Exactly.

Mr. Trivers: They want to do things right, and I think sometimes identifying whether or not doing things incorrectly is really something that they need and then they want. I guess I'll put it more pointedly, then: Do you have the data to do a comprehensive review of land usage on PEI, maybe in the spring and the fall, two to three times a year, so that you can give the information to the enforcement arm so that they can go and they can engage the people, or you can go and proactively engage the people so they don't get into a situation where they are breaking the rules?

Barry Thompson: We do not have a set of data that I could look at that on a, over three times to a season – that's an incredible amount of data and a lot of time required to put that together. That has not been our focus at this point, to get that.

John Jamieson: But I think the point of the presentation, too, is not necessarily that people are not following a three-year rotation, it's the fact that that three-year rotation has changed. So we're seeing the influence of soybeans, and we're seeing an influence of less manure as much as someone not following – am I correct there?

Barry Thompson: And if you look at the – and Kyra touched on it near the end – is that one of the slides showed that the last two sets of sampling seemed to have – they're not dropping – they seem to be planing out a little bit. We're hoping that this next year shows us that. It's way too early for us to say we're having that positive effect, but I think if we're to take the first two cycles off of our study, we may not be saying exactly the same words, we may be saying that practices that our individual farmers are doing are starting to have some effect. But we can't confirm that. Because I can't sit here – and I don't have the data to confirm that at this time – but it starts to show a trend to us that perhaps something is coming around with all our practices.

Mr. Trivers: I'm getting some mixed messages based on our previous presentation because they definitely said that they

believed that a satellite imagery was available to multiple times a year, go out and actually over the three, five, six-year period, find out if indeed crop rotations were being done properly. I'm hearing from you now that the data is not available, or that it's not a priority of the department.

Barry Thompson: We don't have that data in place; that data is done by the federal government. It's a satellite pass over; every 17 days it passes over the Island so that data can be purchased and put into place and analyzed. I guess my statements here that we don't have it, we don't physically have that data in our system to do that. That data is available; I'm not contradicting that. It's a matter of getting that data, analyzing that data and looking at those rotations or whatever your purpose is for the data.

Mr. Trivers: I believe it was in slide three you talked about evidence-informed decisions and I'm curious of that choice of wording as opposed to evidence-based versus evidence-informed.

Also, I was wondering, again you referenced later on that you worked with agriculture and Agriculture Food Canada scientists; I was wondering if you feel like you have enough evidence being provided to you by scientists and if you think that we might need more scientists that are based on Prince Edward Island to give you that data you need, or if you feel like you're getting all the information you need.

One reason I bring that up is because it's been brought to me that at UPEI, one of the concerns brought to me was that some of the faculty are not being replaced and so the number of scientists on the Island are less. I'm asking about three questions in one there, I realize; hopefully you can comment on that.

Barry Thompson: I know that you have your evidence-informed, evidence-based. Right now in Prince Edward Island it's extremely – if I was a scientist in soils – it'd be an extremely exciting period of time. In the last five years Agriculture and Agri-Food Canada have been staffing up and they've been staffing up right here. All the soils guys are coming this way; this is the soils area. We're doing good, if you want to say that from our point of view. In fact, I'm

kind of disappointed I'm in the twilight of my career. Because if it was early on I'd be just jumping; these folks should be jumping next to me. We're going in that direction so I think we're in great shape that way.

What happened in the 1970s, 1980s, that's when the soils were strong here and all our soil science was going strong here. We took a little bit of a lull. Now Ag-Canada is recognizing that. The nice part about our relationship with Ag-Canada is that we have the connect to the grower; call us the extension if you would and listening to the grower, but we're able to put that connection between the grower with us doing the extension piece and information transfer and the scientist. The scientists are reacting directly to what our growers are saying right now. We have watershed groups that had inputted to what research is being done. Currently at our Harrington Farm and actually across the province, because the scientists are no longer just working at Harrington, they've taken it out to the farm. Because there's always been that criticism, small plots – everything is magical at Harrington. Well, it isn't, but now they've taken it to the farms. I think we're in great shape to be honest with you.

Mr. Trivers: One last question and I'll let you move on.

You had mentioned at the very end the perennial crop program, which sounds very promising, especially when it comes to diversification of crops on the Island so you're not depending on one industry with all your revenue. I was curious; can you give some example of the type of crops that they're thinking of in a perennial crop program?

John Jamieson: Some crops that are perennials are apples, high-bush blueberries, crops like that, cherries. Again, you're getting in to high value. I'm not sure if asparagus counts as a – I'm not sure. I think so, asparagus, crops like that. Again, you're getting in to fairly high value and you're not seeing that tillage. Those are things that we want to encourage and we will be under our new program once it's developed.

Chair: Peter Bevan-Baker.

Dr. Peter Bevan-Baker: Thank you, Chair, and thank you for your presentation.

I don't think at any point during our discussion so far we've actually established the importance of soil organic matter, so could you – you talked about it in terms that it's something very precious that we need to maintain and preserve, but yet we – could you just give us an overview as to why soil organic matter is important and why we should be protecting?

Kyra Stiles: Soil organic matter is extremely useful in retaining our soil structure. A higher soil organic matter generally means that your soil aggregates are going to be held together better and that they are less prone to erodibility. They hold water better; they have a greater water holding capacity and they also hold nutrients better.

Soil organic matter also influences microbial communities, so microbial communities are generally higher within higher organic matter soils.

Barry Thompson: I think you'd notice it a lot in the summer actually when you get into these drier summers we have and that kind of thing. I think what you'll notice is that crops aren't under stressed as easily or as quickly when you have you have your higher organic matter levels. The other thing is around the structural piece, is traffic ability and that type of stuff. You're not compacting that soil so much. Obviously the benefits of not having the practice order are unbelievable when it comes to crop growth. That's another little side piece too.

Kyra Stiles: They're definitely more resistant to environmental stressors and they also hold air space and are better – when you have a higher air space within the soil you're actually creating a system that is much more a healthier eco-system. You'll allow for all the processes that normally happen that are natural to continue on. They're also better with water drainage. I referred to the intensive precipitation events, so not only can – it seems kind of intuitive but not only are they better at holding water during periods of drought, they're better at getting water to flow through the system in periods of high intensity. Not usually as much of an issue on PEI because we have

well drained soils, but it is an influence of organic matter.

Dr. Peter Bevan-Baker: That's a wonderful answer and it's clearly the presence of organic matter in our soils is important in all kinds of ways, critical, which is why this particular study is of such concern to myself and many other Islanders and farmers, everybody.

There's an interesting synchronicity here in when the study started in 1998, that's exactly the same time the act came in, the crop rotation act. We have in exact parallel, a time when a new piece of legislation was brought in, specifically to retain our soil organic matter and the results of that program. John, you talked earlier about one of the values of the department is evidence-based decision-making. The evidence here would suggest that the agricultural crop rotation act is not working, so what are we going to do about that?

John Jamieson: I don't know if you can make the complete correlation between the crop rotation act and reduction in organic matter. I think there's been other parallel items affect the loss of livestock and we've seen a significant loss of beef animals in Prince Edward Island during that same period from 1998 to the present, in particular, after BSE in 2003. Then the other change when Cavendish Farms started to use their – put their biodigester in and they didn't have the cull potatoes available to cattle producers.

Then we've also seen the loss of the hog industry. I worked in the hog industry back in the 2000s, late 1990s, and at that time we had 400 hog farms on Prince Edward Island; now we have less than a dozen. There's all kinds of correlations that we can put in place from 1998 on. Not only in the crop rotation act and the fact that we've seen changes in rotations as well.

I think we may need to – some of the work we're doing around the stewardship program – and I know under the new Canadian Agriculture Partnership Program, 50% of our funding has to be on three particular items, one of them being environmental stewardship, which is the biggest component of that program.

Also, to move toward diversity and move toward things like perennial crops will help. I think if we can work toward – I don't know what – we've supported the beef plant over that period of time, over a long period of time as well. I think you would have seen a great drop in livestock numbers had that not been there. I think there are a number of things that we can do on top of looking at the crop rotation act, and I know we've talked about doing a review with that. It doesn't fall under our department, but we would certainly encourage and participate in that.

Chair: Peter Bevan-Baker.

Dr. Bevan-Baker: Thank you.

John, I appreciate the fact that many other things are happening at the same time and whether or not the introduction of ACRA at the same time that the study started, whether they're causal or – I get that and I absolutely appreciate that the loss of livestock on Prince Edward Island has had a – and the statistics are starkly clear – has had a profound impact on the availability of organic matter, and the other crops that we're putting in our rotations, particularly soybeans and corn.

I've a particular question on that; those are not considered to be row crops. They're not regulated crops. Is that potentially a part of the problem here? That we are putting in crops which are not regulated, considering them a part of a three-year rotation but we might actually be exacerbating the problem?

John Jamieson: Correct me if I'm wrong, Barry.

I think the only regulated crops are carrots and potatoes?

Dr. Bevan-Baker: Potatoes?

Barry Thompson: Yeah, the row crops (Indistinct)

John Jamieson: I do, I agree. I think we may need to have a look at that because soybeans – they do not put a lot back into the soil. Corn certainly doesn't. I think, perhaps, it's a time to review and I know we've talked about this.

Even when I was with the federation of agriculture working with the department and doing a review of the crop rotation act with this data, I think that's probably well overdue.

Chair: Peter Bevan-Baker.

Dr. Bevan-Baker: Thank you.

In 2008, the commission on nitrates and groundwater said that we need to – their sort of primary recommendation was that we need to enforce the three-year crop rotation and I quote: With no exceptions.

I know that there are farmers who comply exactly with ACRA, but there are so many exemptions out there that often that three-year rotation is not in actuality a three-year rotation. What is the department's feeling on that recommendation – and that's not the only time that recommendation has come forward – of absolutely, without exception, applying the three-year crop rotation?

John Jamieson: I think, Barry, you know the management plans better than I do.

Barry Thompson: With the three-year crop rotation and the act in itself, it's related to soil loss. Soil loss over the rotation, which is three tons per acre per year allowable average over the (Indistinct) nine tons per acre over the three-year period, is how it would work. That was the basis for how that three-year crop rotation came into it, because a three-year crop rotation of the day – potatoes, grain under-seeded to hay for a year – met a certain number value of soil loss, calculated out.

Therefore, rotations that met that same number or better would fit under the rotation act. How we work it is that we would have the typical rotation being that one in three of potatoes, then any other series of rotations that an individual wanted to put through it, we have what we refer as the revised universal soil loss equation, is the equation that we use to determine those calculations. So with all the factors of climate, the type of cropping it is and all that fit into that equation, should that number come up equal or better then that particular rotation would fit.

That's the basis and that's how those numbers are determined, and that's how individuals having management plans, and that's what we refer to as a management plan. The person (Indistinct) actually files with our department to have their rotation reviewed, to look at, and that's how they get to the point where they're able to grow those crops.

One thing that I'd like to mention, if I could, is just the three-year rotation in itself. The three-year rotation that was designed for the universal soil loss equation was one that had management practices around it; key management practices around the two other (Indistinct). The potatoes are grown for a certain length of time. There may have been – and I use it as an example – there may have been cover there that fall before they went to grain and those types of factors were all factored into that equation in the day.

Where I'm coming to with this is that there are individuals with a three-year rotation that are not meeting the same numbers either. You can have poor three-year rotations, and you can have very good two-year rotations that meet the same numbers. Face value, it seems very clear. But as you know, there's always all those little complexities and things within, so that's how we got to where we are and we were instructed to kind of work along that way to meet those soil erosion numbers.

The three-year rotation was about soil loss. It wasn't necessarily about the building of organic matter. It wasn't necessarily about retaining nutrient and that. It was all designed around soil loss with the type of topography we had and the amount going.

Now having said that, soil loss does contribute to a drop in organic matter because you're losing all that top soil with the better organic matters in it. I'm not sure whether I've covered your questions there or not, but that's just thoughts.

Dr. Bevan-Baker: I appreciate the nuanced answer, Barry.

On the maps that we're shown – this wasn't on my list of questions originally, but I was interested to see that some areas have actually improved, that there's higher organic matter in some parts of the Island.

Are there consistent features in the places or particular farming practices are being done that are responsible, perhaps, for that increase in soil organic matter?

Kyra Stiles: Within our project, we go back to that field and we identify what was the main crop that was grown. What we don't identify are the intricacies of the crop rotation. We don't know what different management practices that producer is doing. As we see a change over time, we would know what crops were grown, but we won't know whether or not they've applied a certain amount of manure or they've used residue tillage implements.

It is a disadvantage to the project, but it is a good opportunity for us to look at the sites that are increasing and to probably talk with those producers and get an idea of what is working for them on their farm in order to help establish future beneficial management practices.

Barry Thompson: We've always had that question because you know yourself, if you are a grower and you looked at that and you think you're doing the best you can do and you see you've declined, the grower is always very quick to say: Mine has remained the same, mine has gone up. So, it's working with that grower.

What are those little things? Because as I said before, it's not necessarily the big thing. It's all those little things that are adding up in there so it's that communication back and forth. Actually, we have watershed groups that are working right now with growers in that area. Like, we have an East Prince growers group that is a group of growers that are working together and bringing all that knowledge as one group to say: What can we do? They're working amongst one another to work out all those little management techniques and monitoring it themselves. So, there's a whole effort going on out there to either counteract what we're saying –

John Jamieson: Just to pick up on what Barry said, for example, the East Prince agri-environmental group is – I met with them earlier this week and it's a group of mostly young farmers, or generational farmers, and soil health is one of their key activities and they're working with the

Kensington North Watersheds; a variety of researchers, including our folks, on again, trying to identify those practices that are leading to better soil health.

We've actually provided some funding to some growers in the Barclay Brook area of O'Leary to try to replicate that activity that the East Prince group has – and we've provided some funding to them over the years too. I think that's a model that should be replicated across the Island because then you have peer education. You're connected to researchers, and farmers are identifying practices that: Hey, guess what? This worked on my farm. This didn't work on my farm. They go in. They shut the door. They are open to basically present what works, and I think that's a really good model as well.

As Barry said, just having a three-year rotation in itself doesn't guarantee that you're going to have good soil health. It depends on what's in that rotation and how you're managing that operation.

Chair: Peter Bevan-Baker.

Dr. Bevan-Baker: Thank you, Chair.

I take it from that that you don't actually know why these areas are improving. There weren't that many of them, so it strikes me that that would be a really critical piece of information that would be good to know.

We talk about soil organic matter as if it's one thing, but of course you've got large particle organic matter; your small particle; you've got micro-organisms, you talked about that a little bit, Kyra. There was no – you didn't take into account your pesticide use in your study here. We just looked at the results, but of course with pesticide use comes killing of micro-organisms and that can have a profound impact on the organic matter in soils if we include micro-organisms.

I know in the Cornell study that you were involved with, other factors, other metrics are measured and I'm wondering whether if you were to – if this study continues, and I hope it does. I mean, we have this wonderful baseline of data from which to build. Is that something that you would look at? Rather than looking at soil organic matter as one

thing, break it down into its various elements and look at that? Is that something you might do, Kyra?

Kyra Stiles: I can speak a bit on what some of the soil health tests are that we're developing. As you know, organic matter is divided into different types of fractions. So we have a very stable fraction that is basically unchanging. It's recalcitrant; and so over thousands of years or hundreds of years, it's not going to change that much.

We have another fraction that's very active and is a mixture of crop residues, living microorganisms, decomposing plant matter; and with some of these soil health tests, we're able to analyze the active fraction of organic matter a little bit closer than we would with just looking at total organic matter, which was part of this project.

So there's no plan specifically to tie that and pesticide use; however, there is a plan to incorporate the tests that are looking at the soil biology, like active carbon and soil respiration, and that will give us an idea of the more sensitive tests that are related to changes in organic carbon levels and organic matter levels over time.

Dr. Bevan-Baker: Okay.

Chair: Do you have more questions?

Dr. Bevan-Baker: I do, but if you want to move on, Chair, I (Indistinct) –

Chair: I'll put you back on the list.

Dr. Bevan-Baker: Yeah, sure.

Chair: Sonny Gallant.

Mr. Gallant: Thank you, Chair. Thank you very much for your presentation.

One of my questions Peter asked, it was the importance of the organic matter. You did allude to soils in other parts of the country but is there any other parts of the country that are having problems like we are with, or concerns like we are with the organic matter in their soils, that we could –

Kyra Stiles: So I'm aware of some areas in Ontario that are seeing issues as well. The prairies and western provinces have much

different soils and different management, so a lot of their grasslands are really high in organic matter. They're going through a change where they're incorporating a lot of no-till and residue tillage on their land.

Ontario is currently developing a soil health plan and strategy, and they just put out a large report that is looking at increasing their soil organic matter levels by 2030. So for sandy loam soils which would be similar to ours, their goal is to reach 3.5% by 2030.

We know that based off of a soil quality indicator tester or model that's being used by Agriculture Canada, they're looking at a period from 1981 to 2011 that showed that within a lot of eastern Canada and the Maritimes, the predicted organic carbon values are to decrease. So it includes all of the Maritime Provinces as well.

Mr. Gallant: I had another question. John, you've mentioned like fall foliage and manure are two keys for organic matter, but you also made mention to plowing; or did I understand that correctly? So by plowing up the field –

John Jamieson: Yeah, and –

Mr. Gallant: – it harms the organic matter?

John Jamieson: – I'll let the scientists talk about this, but essentially when you're breaking up the soil you're impacting on –

Barry Thompson: Organic (Indistinct)

John Jamieson: – soil organic matter.

Barry Thompson: Yeah.

John Jamieson: You're losing it every time you – so the more tillage you do, the more impact you have on soil organic matter.

Mr. Gallant: Okay.

John Jamieson: Am I incorrect in –

Kyra Stiles: No, it's correct. With each tillage event, you're basically incorporating oxygen into the system; and by doing that you're providing more air space and more of an opportunity for microbial communities to respire and break down any organic residues within the soil. So mixed with warmer

temperatures and moisture, which are also a factor in mineralization, you're kind of influencing the system that's conducive to microbial communities eating and mineralizing organic matter.

Mr. Gallant: Just one more question, Chair.

You talk about a fall crop, and then you drive by a field and there's a crop in it before the snow comes and you drive by another one and it was either plowed or left alone after the crop was taken off it, so it's red. Is that damaging that soil in that field? With the winter weather and the wind and – or is there a reason why some fields are plowed and some aren't? Or does it allude back to that, that you try to plow as less as you can?

Barry Thompson: You want that one?

Kyra Stiles: (Indistinct)

Barry Thompson: I'll start.

Kyra Stiles: (Indistinct)

Barry Thompson: I'll start. The practice of plowing the land sometimes is based on the management and the timing you have on your farm. That's your first principle. We have to figure out how much time we have to do things.

Mr. Gallant: Right.

Barry Thompson: The other piece would be the time in which we harvest the prior crop. So if we have a late season potato and you're harvesting in late October, obviously the establishment of a cover crop is going to be very limited because of the growing conditions themselves.

When it comes to the plowing practice itself, there's a lot of other factors can fit in here in the sense of the quality of the soil. If we're to plow early and completely invert the soil – which we like to do here, we like to make it look nice after we've plowed it – we're exposing that soil, then, to all kinds of elements, potential for soil erosion.

Every time you're breaking the soil, you're affecting the soil structure, so therefore, yes you are. If you're breaking it early enough and turning it over and exposing organic

matter to what Kyra referred to, some moisture conditions and heat and that kind of stuff, there's a whole mineralization process happening. So there is some impact to that.

The other side to that, though, when it comes to practices of plowing that we're looking at, and we're looking at it from a nutrient perspective as well, is that if you late fall plow – so late is always a subjective type of time, but if we were to say late in November, soil temperatures are such that the activity within the soil is slowed down. Everything's ready for a winter's nap, you might say, so there may not be as much breakdown of activity and that kind of stuff.

As always, there's not a straight answer for those things. It's always very complex, but there's different considerations you have to look at. I think in the ideal world, we'd love to have a crop removed early enough that you can establish a nice winter cereal cover, have it there all winter, and then whether you take it through to harvest or plow it in the spring, that'd be wonderful.

Mr. Gallant: Okay.

Barry Thompson: But for us to tell you what's going to happen, that's tough.

Mr. Gallant: One more question, Mr. Chair.

As we all know, we look outside today and yesterday, our winters are changing. Is that playing a factor in this or is that a tough question? You know, things aren't frozen as long as they used to be, the snow's not here like it used to be. Is that playing factors in this?

Kyra Stiles: I can comment on how it's influencing winter cover crops. We've seen a few falls recently that have been ideal for establishing winter cover crops because they've been warmer and they've been conducive to a good growing environment; however, but we don't have large amounts of snow covering those fields throughout the season. We're getting freeze-thaw cycles with lots of ice. It's more likely contributing to failure of that crop over the winter, so we're going to see large amounts of winter cereals that appeared lush and green and great in the fall which may not be doing so well come spring due to ice conditions.

Mr. Gallant: Thank you very much.

Chair: Okay, committee members. I still have one, two, three, four, five more members who would like to ask questions on my list, and we do have another set of presenters coming in. So just in that consideration, please just keep your preambles pretty short.

Next on the list I have Alan McIsaac.

Mr. McIsaac: Thank you, Chair, and thanks for the presentation.

I guess the comments I was going to make were a bit in the preamble, but I'll cut that short a bit. I just want to talk a little bit about the partnership we have on PEI between our farmers and our department, because it's phenomenal.

When I went into the department a few years back and I saw the maps for the first time, I was absolutely shocked. I hadn't seen that; but when you look at the work that's being done with the department, and a lot of this came through in the last presentation you made with the drones and how you're watching the soils and the farms, it's absolutely terrific.

John talked about environmental stewardship under the new CAP program, and we're doing a lot of that right now. So that's not a big jump for PEI to do, because our farmers have really taken that on. Because we know that our soils are key; if we don't have our soils, we don't grow any crop.

We also know what the value of agriculture is to the province. I think it's an absolutely terrific partnership, and very positive, and we've moved from that old rotation of potatoes-grain-hay, potatoes-grain-hay, because in a lot of times, hopefully the potato price is good because there's not much money in barley a lot of years and there's not much money perhaps in the forage, so you make it on the first year.

We've tried to change that as well, and John could tell you about the different crops that are coming in now, the pulses that would fit into a rotation. The soybeans, you really only want them once in about a five-year

rotation with the potatoes; but the farmers are really keyed into that and working with the department. Barry can tell you how many projects we've done on a yearly basis in the fields through the use of the drones and such, so think of that. Extremely positive, and we need that, but the farmers are really buying into the fact that there's soil. They know that. That's where their money comes from.

My question, I guess, kind of relates a bit to what Sonny was asking there, in the freeze-thaw, freeze-thaw, because even when I'm at Tim Hortons – I meet there with a lot of farmers in the mornings – they're talking about this winter. I'm just wondering, Kyra or Barry, when you go back over the terms since you started taking these measurements and watching the soils, have you followed what the winters might be like that?

Because I know in, what, 2014, we had about 17 or 18 feet of snow, this year we have none. Did you correlate any of that into that or can you tell us the difference of the effect on our soils in runoff because with 18 feet of snow you're going to have significant amount of runoff. How is that affecting the soils? Does that affect the map, per se, versus this year which I think is going to hurt not only perhaps our winter crops but maybe our forages as well?

Barry Thompson: We have not related weather directly to it. You pose an interesting question, though, is that – and you say about water and runoff. I would almost argue the case that the deep snows that we had, that was going down.

Mr. McIsaac: Yeah.

Barry Thompson: With what we have now, it's running across. The more it runs across, the more we lose. Because you look outside, I believe there's ice patches everywhere, so we have enough frost on the ground to keep the water from going down. When the heavy snows are there, as things melt, it releases and goes down in the system, so –

Mr. McIsaac: But there was no –

Barry Thompson: (Indistinct)

Mr. McIsaac: There was no relation.

Barry Thompson: No, we didn't put into that. Now, your forages, in my mind, and it's only my thinking here, is that it would survive better under those deep snow, obviously, because of the impact of all this water and all this ice and this breaking of the root system and all that type of thing. I really can't offer an answer (Indistinct)

Mr. McIsaac: Okay, good. Thank you.

Chair: Great, thank you.

Darlene Compton.

Ms. Compton: Thank you, Chair, and thanks for the presentation. It was a very informative.

Sonny touched on plowing. It's a bit of a pet peeve of mine, seeing that soil blowing all over the place in the wintertime. We have 85 acres and there's no plowing done in the fall. Can you just comment on the pluses of that versus plowing in the fall or plowing in the spring? Is it just a matter of time management, or is there more benefits to the soil to be left to the plowing in the spring?

Barry Thompson: You want to start?

Kyra Stiles: Yeah. Some of the benefits of keeping the crop until the spring plow would be you're keeping a living crop longer into the fall, and we're seeing warmer temperatures. You're still getting a lot of activity within the soil, good activity, beneficial microbial activity. You are reducing the amount of potential nutrient loss due to plowing. With some of the freeze-thaw cycles, we can see nitrogen movement during the thawing events from early fall plowing. So you're also retaining a lot of the nitrogen within your soil.

Some of the disadvantages of spring plowing is dependent on the winter. So if we have extremely snow – large amounts of snow or late thaws, like it's a very small period of time for the grower to go in and establish his crops for the next year, and it's a very small window that you need to get some of these crops on in order to follow the whole crop cycle for harvest. That would be a main deterrent for a producer, because we can never predict (Indistinct) –

John Jamieson: In a lot of cases we're getting our crop in just as we're already seeing a decline in sunlight in Prince Edward Island, so there is a timing piece there.

Ms. Compton: You mentioned perennial plants and cropping. In our district, a lot of blueberries and now quite a few acres of apples, and the impact that will have, will there be an increase in the organic soil matter, or the fact that it's the same plant for a number of years, does that decrease the organic matter with the pesticides and spraying?

Kyra Stiles: I would say that with a perennial crop, your main advantage is that you're reducing the amount of stimulation through tillage, and you are decreasing the amount of output that you would do through – like carbon output, because you are not doing these tillage events.

Barry Thompson: No, I think that's fair.

John Jamieson: Over time, even a past year, you'll see, I think, a slight increase in –

Barry Thompson: It fluctuates around a little bit, yeah.

Ms. Compton: Just one last question: Alan talked about the crop rotation going from potatoes-grain-hay to, possibly, it could be corn-soybeans-potatoes. Maybe not, that's not a three-year rotation. We know that that's not a better choice, but we see it over and over again, and I understand farmers need to make a living; but is there, through the crop management rotation that you do with farmers, encouragement?

I'm concerned that, yeah, we've decreased our potato acreage by quite a bit, but we've increased soybeans to 50,000-plus acres and the impact of GMO or Roundup beans versus natural soybeans and how does that factor in. Is there encouragement through the department with farmers that your rotation is not going to be corn, soybeans and potatoes?

Barry Thompson: Yeah. What would happen in that case is that discussion point would come out when they're working one-on-one with the growers. They would look at – maybe that rotation, there may be

suggestions made to alter that rotation, there may be suggestions made around the management of what we do in the fall or how we cover the soil or those type of things worked through it?

As well, to the management piece, when they're doing a management plan, there's also the discussion about nutrient loading that's in there. We're trying to introduce the fact that the impact of what you do on the soil is not only just soil structure and soil loss, it's nutrient. It's all the other activities that are in there.

I guess the short answer to your question is that there are those discussion points, but it's a matter of them working with the grower, and you would appreciate this in that the growers usually have their ideas and thoughts of what they want to put there, and now it's a matter of influencing them to consider other crops when they're going that route for that soil benefit.

John Jamieson: And we are starting to see an increase in pulses on Prince Edward Island.

Barry Thompson: Yes.

John Jamieson: That's generally pretty good for the soil –

Barry Thompson: Yes.

John Jamieson: – I think; and also some Brussels sprouts, cauliflower, some of them that provide more – some traction in the soil, I guess, over time.

Barry Thompson: (Indistinct) maybe (Indistinct) cover late in the fall, that kind of stuff.

Ms. Compton: Also in the district, there are a number of fields that are being left fallow through the purchase of the monks, right? They're leaving fields fallow. Are any of your soil samples, have you retrieved any to see the difference in the soil after – it's probably not even enough time yet, but leaving fields fallow and how much more nutrient there would be?

Kyra Stiles: I can't recall specific fields that were left fallow that we've sampled. I feel like, looking back through the crops

identified, there have been a few; but generally, leaving fields fallow would not be a recommendation that I would make in terms of improving soil quality or soil health. It's usually another issue that the producer is trying to deal with.

Ms. Compton: Organic, yeah.

Unidentified Voice: Yeah.

Chair: Richard Brown.

Mr. R. Brown: Thank you, Chairman.

Chairman, agriculture industries is not only important to rural PEI; it's extremely important to city residents, also. It's a major contributor to our economy, which is a major contributor to the wealth, which is a major contributor to people's wellbeing, so this is an extremely important topic.

The crop rotation thing, Phil Ferraro gave us a great presentation here, I think last year or the year before, on organics in the soil and the importance of organics in the soil; and you know, the crop rotation from my interpretation is supposed to be: Okay, you grow potatoes one year, your organics go down, and then you put two years of rebuilding your organics. So if we're not rebuilding our organics over the two-year cycle, then we're not doing what the spirit of the crop rotation act is about.

I was concerned about the crop rotation act, and the permits are issued based on soil erosion and not organics. I think in Phil's presentation to us at that time, he said what we should be doing through the crop insurance is saying: Look, if you're putting your land at risk by not having the proper organics in it, you should pay more crop insurance than you pay someone that is keeping the organics up.

So is there a method there that we can incentivize or say: Look, if you maintain your organics, your insurance go down because there's less risk of loss of crop. I thought that was a great idea. Why can't we do that? If I own a building and the insurance company says: Well, if you're not going to do this and this and this I'm going to charge you a lot more insurance because your building could burn down or you're putting your building at risk.

Shouldn't we be doing that through the crop insurance, saying: Look, if you're not going to keep the organics in your soil, you're putting your future crops at risk, so there's a bigger risk here, so we have to charge you more, as opposed to the farmer that's doing it?

John Jamieson: It's something we can certainly look at, and we have provided incentives in past through the crop insurance corporation for use of lime and some other items. I guess one of the challenges we would have is verifying that organic matter within the soil. Maybe we put an audit process or something like that.

It would be something that because crop rotation is a federal-provincial share piece, we would have to take it to the federal government and get it approved, but it's certainly something we could look at as an option.

Chair: Richard Brown.

Mr. R. Brown: Yeah, you know 23% of our greenhouse gases are coming from agriculture and we're committed to the Paris Accord and we're committed to reducing greenhouse gases because we're part of this world and we have to be a contributor to it.

With less organics means more fertilizers. Fertilizers are climate change, so this is an economic issue; a climate change issue. Our soil on Prince Edward Island is the basis of an industry. This is no different than Alberta's oil. Our soil is our oil, because Alberta has a resource. They can pull it out of the ground and sell it. If we don't have proper soil, we can't get the economic activity out of it, and same as mining. It's an extremely important asset here on Prince Edward Island and the more we can do to protect it and to make it prosperous is good for all Islanders and it's great for the economy of Prince Edward Island because we don't have six or seven or 8,000 jobs in the technology industry or we don't have a car company like Ontario and other provinces have in terms of big manufacturing facilities. Our big economic driver is our farmers.

I think we should really take a look at Phil Ferraro's report and say: Is there a way we

can – because what I'm hearing today, is if we grow potatoes and we grow something extra in the next – like I'm thinking, okay we grow potatoes – okay, for two years we're going to have a cover crop on it. It's going to contain the soil. Well, that's what crop rotation is about, is to say: One in three, you rebuild your soil over the next two years to be ready for your next crop. If we're not doing that, we're falling behind, so anything we can do to rebuild our soil to that point.

I'm disappointed that it's a soil erosion issue, not a – in crop rotation –

John Jamieson: (Indistinct)

Barry Thompson: (Indistinct)

Mr. R. Brown: Crop rotation should – soil erosion should be equal to organic matter when you want to change your management plan. If you can't maintain your organics, then you can't have an extra year of potatoes or an extra year of crop that doesn't produce the organics in it.

Am I right and wrong?

Barry Thompson: I think that's extremely complex and I think to make the suggestion that growing potatoes, grain and hay will decrease organic matter is not totally accurate.

Mr. R. Brown: So –

Barry Thompson: We can actually grow potatoes, grain and hay with management practices that probably could maintain it, but over time we've seen a bit of a decline. I think to throw growers all in the same basket, to say growing a three-year rotation declines organic matter, I think that's wrong because I think there's a lot of growers out there doing very good rotations with three years and with even two years that are able to maintain their organic matter.

These are trends, and trends are trends. Yes, that's correct and over time we've seen that. I think to put that all on the grower to say you can see a change in organic matter is very difficult, given the fact that to improve organic matter and the measures that we have to improve organic matter are such that we can't see those little defined changes

without a long-term period, that puts pressure on an industry that I don't think we would want to do. I can't see it going that way.

Mr. R. Brown: So you showed us a series of pictures over a period of time and the organic matter –

Barry Thompson: Is declining.

Mr. R. Brown: – is declining and declining.

Okay, why is it declining and declining?

Barry Thompson: It could be soil loss, could be creating that.

Mr. R. Brown: And why soil loss? Because we don't have organic matter to hold it, as your person said.

Barry Thompson: Soil loss. We have soil loss that we have measures that we put in place in the soil crop rotation act to try and keep the soil in place. That's one factor we have in there.

We have industry change. We've had livestock disappear. We've had changes in our rotations. We've had a lack of manures. We've had all of those other factors of coming into it and I think, as we pointed out in the last two to three cycles, we didn't have the decline that we had in the first two to three cycles. So, are we actually making things better? We're not sure because we haven't got the length of time that we need for those results to make that judgment call.

I know it's a long discussion we could have here back and forth, but I hear what you're saying and I don't know whether that's the exact approach you want to do to an industry.

Mr. R. Brown: So you have 3% in your soil, and you're saying these years it's not as bad. But, if we go from 3% to half a per cent, organics go down. Sure, as the curve goes down the effect is going to be different because there's no more to take out of it. Do you know what I'm saying?

Barry Thompson: I didn't see a 3 to a .5%.

Mr. R. Brown: What?

Barry Thompson: I didn't see a 3 to a .5%.

Mr. R. Brown: You said you had one down to zero.

Barry Thompson: (Indistinct) 3 to 2 (Indistinct) type of decline.

Mr. R. Brown: Okay.

Barry Thompson: I think over the 18-year period it wasn't as dramatic as you're expressing there. I think it's a little less (Indistinct)

Mr. R. Brown: Okay, we've gone from a 3 to a 2?

Barry Thompson: Maybe a 2, in that range, or a 2.5 (Indistinct) maybe a .5% (Indistinct)

Mr. R. Brown: Okay, I stand to be corrected.

Chair: Brad Trivers.

Mr. Trivers: Thank you, Chair.

First question is did any of the land that you were sampling include organic farms?

Kyra Stiles: Yes, there are a few.

Mr. Trivers: Did you find that on certified organic farms that the trend in the decrease in soil organic matter was the same or were they okay?

Kyra Stiles: We haven't divided out the samples into farms that are certified organic and farms that are not. What we do when we sample is we contact the landowner. In some points, we don't actually know who is farming the land if it's rented out. It could be just the landowner that we're speaking with, so we wouldn't have that information.

Mr. Trivers: The other question that was asked of me was about hedge rows. People see hedge rows being removed and they want to understand the impact that that's having on the land, and I was wondering if you can clarify the impact that removing of hedge rows has; whether it contributes to the decrease in soil organic matter. Does it contribute to soil erosion? What's your opinion on the removal of hedge rows?

Barry Thompson: I guess our recommendation would never be to remove a hedge row, first of all. We like to keep the field small for a number of reasons, or the size of the field as it is; for farming practices, the practicality of that. But there are instances where we get into soil erosion issues and in working with neighbouring farms if it's a different landowner and that type of thing.

The best way to deal with the soil erosion is to maybe move into another field next to it to divert soil, to form the soil or form the structures in a fashion where we may have to remove a hedge row. In removing the hedge row, we're hoping that we're actually reducing the amount of soil that's leaving that area. But, it's not a recommendation we would ever make. It's only something we would look at from the practical side of soil loss when we get into the soil loss issues. I don't believe removing hedge rows is the best thing, and that's my own personal opinion.

Chair: Brad Trivers.

Mr. Trivers: I wanted to ask the same questions about buffer zones around waterways, and how important it is to have an adequate buffer zone when it comes to soil organic matter as well as soil erosion.

Barry Thompson: Extremely important. To have buffer zones that are there, buffer zones are – whether it be for wild life habitat, whether it's to be a bit of a filter area should there be any soil leaving the field, but we're hoping that we've designed the fields in such a fashion that we're not losing that much soil.

If our follow-up question is about the width of the buffer zones, I don't think you could ever have a buffer zone wide enough to stop all the soil from moving down into the streams, but we have to be practical in the sense because how wide is too wide? We have to work with our industry and I believe that what we have right now is a pretty good-width buffer zone.

John Jamieson: But, the buffer zone is there more to protect the stream than it is to increase soil organic matter.

Barry Thompson: Yes, exactly.

Mr. Trivers: You'd mentioned in your presentation about helping educate people and farmers in particular, about these things, and I know there is a lot of misinformation out there as well as disagreements. I talked to a farmer this winter and said: Nothing wrong with fall plowing. There's absolutely nothing wrong with it and we can plow in the fall if we want to and that's just the way it is. But, we're hearing today, of course, that it can have a major impact depending on various variables.

I'm just curious, what has your education plan been? How are you engaging Islanders in general and farmers in particular and what is it going forward? How are you doing it?

Kyra Stiles: Based on different projects that we do, of course we're doing reports and fact sheets and presentations to different growers at conferences; but the more important side of the education awareness piece would be meeting with specific grower groups or one-on-one communication with growers pointing out different practices that we've identified that are useful for their farm, and trying to incorporate those with the specific management of that farm.

We may point out, in an easy way to say it, maybe this practice may not be the most beneficial if your goal is to increase soil organic matter but here are some other practices that we've identified that may, over time, influence positive change. I think to strengthen a lot of the education and awareness is when we visit the growers on their farm, or speaking with agronomists who are speaking with their own grower group and making sure that some of the work that's done at the department is being discussed on a large scale.

Barry Thompson: We've also had, in the watershed piece, if we could too, where you have your watersheds that are working with it in turn have the, I'll say, the general public and the farming community working together on the watershed. That's another unique way to keep that education base going because it helps the – I'll refer to the general public, to understand the challenges of the grower but also understand what they're doing to try and complement that.

John Jamieson: We've also provided funding to the agri-environmental groups.

We also have a research program that – I know the certified organic rep is here, and they have research dollars that we provide to them as do a number of other commodities. We have staff that organize, for example, the soil and crop conservation conferences up here next week (Indistinct) and it's two days of soil conservation presentations from our staff and others to farmers.

There's not only the one-on-one, the watershed piece, but also the programming that we provide for research to organizations. I know the potato board has a fairly rigorous research component. Some of it's around soil health, so there are a number of things that we do as a department to promote that educational component.

Chair: Peter Bevan-Baker.

Dr. Bevan-Baker: Thank you, Chair.

I'd like to just read – I know you want preambles short so I'll just read half the chapter, Chair.

Some Hon. Members: [Laughter]

Chair: (Indistinct)

Dr. Bevan-Baker: I'm just going to read the first sentence of a chapter in *A Time and a Place*. Doubtless you're familiar with the book and it's by John Paul Arsenault. The chapter is called Agriculture and the Environment on Prince Edward Island from 1969-2014, *An Uneasy Relationship*. He says: The contemporary food economy does not reward farmers for doing the right thing, just for producing food as cheaply as possible.

You talked in your previous answer, Barry, about the challenges of farming, which are many, economic just being one of them; but there's one way that government has helped tremendously and that's through the ALUS program in taking land out of production and various other things. I'm wondering whether you could talk about possibilities for expanding that ALUS program to things such as encouraging green cover in the fall, to eliminating fall plowing altogether or for giving money for better amendments like humid acid, for example.

Is there any talk in the department about expanding ALUS to help farmers who want to do the right thing? But there's no return on capital when you improve your soil so the incentive is just not there and that's where government has to step in. Can you talk about ALUS and whether you would consider expanding that?

John Jamieson: I'll just start. I'm glad you asked that question because we're actually doing a review of ALUS as we speak –

Dr. Bevan-Baker: Great.

John Jamieson: – looking at incorporating some new components and maybe eliminating others that are maybe legislated. So why are we paying for something that people are legislated to do and then taking those dollars and using them to incentivize other things?

I don't know, Barry, do you have –

Barry Thompson: No, you basically hit it right on the head.

It's under review now and ALUS will be renewed in April, coming this April, so you may see a change that's coming (Indistinct)

John Jamieson: I expect you will.

Dr. Bevan-Baker: I look forward to that.

Can you tell us how many potato farmers specifically on PEI have adopted the four Rs: the right source, the right place, the right time, the right amount? What percentage of farmers are using that?

Barry Thompson: I honestly can't tell you the actual numbers around that. It's a discussion point we're having with the Canadian Fertilizer Institute. We work with them on that for our program. We're partnered with them on that, and I also know that they are dealing directly for, our program and the Canadian Fertilizer Institute, are dealing directly with Cavendish Farms and Cavendish Farms growers.

To speak to that number directly, I really can't speak to that.

John Jamieson: I've met with the fertilizer institute last week and I challenged him to

provide us with numbers on how many acres are actually under the four R. They are trying to ascertain that and they were told quite bluntly that I want some real numbers, so we'll see what we come back with.

Dr. Bevan-Baker: If and when you get them, John, could you pass them onto me? I'd really appreciate that.

John Jamieson: Yeah, I will.

Dr. Bevan-Baker: I'd like to talk just for a moment about the impacts of fumigation, because I know there is some pressure to bring chloropicrin – would be the likely one. What in your estimation is the impact of fumigation on soil health, specifically on soil organic matter?

Barry Thompson: I guess I may start, Krya –

Kyra Stiles: Sure.

Barry Thompson: – and rely on you here too with the soil health piece.

Obviously, through the fumigation practice; the good and the bad. The microbial activity that's there is probably going to be cleaned out. Hit the restart button type of thing, which in turn would probably have an impact on the amount of organic matter generation because obviously the little guys like to eat and that's what's recreating the organic matter that's there. We're caught in that cycle, and that's a consideration as far as we're concerned when any kind of decisions are being made.

We offer up all the information we have to the decision makers to say these are considerations you have to look at. You are impacting on soil health. You will impact on soil health. We don't have numbers at which rate that microbial activity will regenerate, come back. We don't have that, so in our practice we would want to see a study of some sort for a period of time to say here is a positive. Here is a negative. Any test is a good test, whether you get a good or bad result, because you know at the end of the day what you're dealing with.

We don't really know where we are with that type of thing. We understand that it does impact on our soil health because of the

amount of microbial activity that is eliminated in a sense.

John Jamieson: If I could back up just a bit, Barry, and just kind of explain when you're talking fumigation, I think it's primarily for the potato crop. So, you would identify essentially where the roads are going to be in the spring. You'd shape them, and then you would apply the fumigation. I think you would have to at least if you ever did it, even in a study, you would have to have a green cover at bare minimum on that because if you shape those rows in a year like this, they would have been gone.

There are a number of considerations (Indistinct) –

Barry Thompson: A lot of challenges.

John Jamieson: A lot of challenges around it.

Dr. Bevan-Baker: Given that fumigation is available in every other province in Canada, there must be studies to show what the long-term impacts are on soil organic matter. Is that not available to you?

Kyra Stiles: I guess I'm thinking more so of the few studies that I have seen, some out of Manitoba, were less focused on the organic matter levels but looking at microbial community levels and in some scenarios you would see a difference in populations following the fumigation, but at times would be back to normal levels after a few years. It's not my area of expertise at all.

John Jamieson: We have to remember, in Manitoba and Alberta, their organic matter levels would be 10?

Barry Thompson: Yeah, they would be in the seven-eights and that (Indistinct)

John Jamieson: Seven-eights, and that's just natural compared to – the best we could get here is around four or five. They're already at a much better place than we are at. So, it's probably less of an issue as opposed to the impact on the microbial activity.

Dr. Bevan-Baker: There was a little bit of mention on crop insurance earlier, and crop insurance is really designed for those

farmers who mono-crop. If you have a catastrophic failure of one crop, you require crop insurance, or there is value in having it. There are many farmers who, if you like, self-insure by diversifying, by being organic, by making sure that all of their eggs are not in one basket in terms of their crops.

Organic farming has a long history here on Prince Edward Island and around the world. Organic farmers talk not just about growing crops, but they talk about growing soil. There's a real sort of understanding of the relationship between the health of the soil and the products that you're going to take off it.

John, you talked a minute ago about supports to organic farmers and I know there are some there. I'd be interested – and if you could talk to the approximate amounts that you give to organic farmers, for example, to encourage them during the transition phase or at any point. The supports you give to organics versus the supports the department offers to commodity growers, for example, do you have a relationship?

John Jamieson: I'd really have to come back with hard numbers on that. I do know that the certified organic is the only specific program that we have. All of the other programs we have are related to all commodities, but we do have a specific programming for certified organic that we don't have for other commodity groups.

But at the same time, organic farmers can also access all the other programming, and so it's not just a matter of saying: Well, if you're organic, you go in this direction, and if you're not, you know. If you're organic, you actually have an opportunity to use the organic program, plus all the other programs we have, so it's really not that easy a question. I would have to come back on the percentage that we have on organic versus other programming.

For example, like you said, I know I looked at, and I know a number of our organic farms use – all our programs, including the organic ones. So it's not that easy, but I could come back with some harder numbers. I just don't have them off the top of my head.

Dr. Bevan-Baker: Okay.

John Jamieson: I'd be guessing if I –

Chair: Anymore questions?

Dr. Bevan-Baker: One final question, Chair.

Chair: Okay, Peter Bevan-Baker.

Dr. Bevan-Baker: Again, I appreciate the nuance and the subtlety of that answer, John. I'm aware that it's not, that there are no hard barriers between programs.

A final question to everybody: Are you concerned about the long-term viability of the agricultural sector on Prince Edward Island if we do not change our current practices?

Mr. R. Brown: Leave with a bang.

Some Hon. Members: [Laughter]

John Jamieson: I think we have to be evolving and changing all the time. If you look at the goals we put up in the second slide, it talks about environmental stewardship and local promoting local food and working with the consumers and farmers to understand where their food – I think we have to evolve. If we remain static – like, a 1940s model of agriculture is not going to work today, as a 2016 model of agriculture may not work in (Indistinct).

I think we continually have to improve. We continually have to look at technologies that help us get better data to make better decisions. I think we have to allow for more diversity in agriculture. I think we have to be creative in how we support our industry. I think we have to be concerned, and I think we have to think about how do we move the industry forward, how do we support people of all size operations. It was nice to be at the federation of agriculture annual meeting and see a very small farm receiving the environmental stewardship award.

I think we need to think about how we support all components of agriculture and how do we move forward, knowing that we are seeing a changing climate. There are additional pressures, but there's opportunities. We have people here looking at – I met with some folks a couple of weeks ago that are looking at growing hemp here,

and the opportunities for hemp and extracting the bioactives from it, I think that's a really good opportunity here. Again, that's – and I think you're going to see probably hundreds of acres, and the two hemp growers we have now are certified organic hemp growers.

I think when we're seeing that there's interest in high-bush blueberries and apples and cherries and asparagus and pulses, we are seeing some change, and I think a lot of that change is good. We have to be able to have the good evidence to support it.

So I think we have to be concerned, but we also have to think about where do we see agriculture in the next five, 10, 15 years? We do know that by 2030 we're going to have to grow 70% more food just to feed the world, so that creates an opportunity; but how do we balance that opportunity with making sure that we have a healthy ecosystem?

That's the challenge, and that's why when we go back to when I talked about our values, that's why we spend a lot of time on figuring out how we can hire people with potential who can think through those issues and who can think about where do we want to take this industry, and that's why we have talent like Kyra and Barry and some of the folks behind me.

Chair: Okay, Alan McIsaac.

Mr. McIsaac: Thank you very much. I know we're coming to the end of it, and I'll just keep it short, but I just want to leave it on a positive note.

There was talk over there about educating everybody, and especially farmers, which kind of throws me off because our farmers are fully invested in their soils and in their business practices. They are also a very highly educated group. We'd take you to farms that – they are scientists themselves, in a lot of ways, and they are looking strongly toward the future.

The future of agriculture on PEI, as far as I'm concerned, is very strong; and a lot of that has to do with a partnership we have with the department of agriculture in the fact that programs – and I know I've mentioned it before, and I think Barry showed it at the

last presentation, the number of projects that we're doing with farmers and the dollars that farmers are putting into that to control our soils, keep them in place, but to grow agriculture, to continue to lead this province, I think it's very, very impressive. I want to make sure we leave this with the fact that we are very supportive of our farmers, who are doing an absolutely awesome job on their facilities.

Maybe I'd just get Barry, if you have off the top of your head, how many projects you did and basic total dollars? Would you have that over the last –

Barry Thompson: \$150 million invested by the province, \$3 million invested by growers.

Mr. McIsaac: Just an example like that, and they're working on their farms, doing grass waterways, berms, all that sort of thing, to maintain the soil. I think we need to educate the Islanders of the fact that the input of dollars and investment that our farmers are making, to make sure that they have food on the table every day.

Thank you very much.

Chair: Thank you.

Darlene Compton.

Ms. Compton: Thank you, Chair, and I'll just be quick.

I've listened to everyone here today, and the big change that I've seen over basically my lifetime on PEI is we've gone from small mixed farms to large corporate farms. You've talked about Alberta and the nutrients in their soil versus the nutrients here. We can't compete with that. So I applaud you for the work that you're doing, but we need to go back to what the Island is good at.

We can pull out hedgerows, we can make the fields bigger, but we have no more land; and even the yields – and I mean, I support the farmers and I know how hard each and every one of them work to make their farm better, but we're at a disadvantage from the get-go. So changing to perennial crops and all of that is really important.

Just the impact on going from small mixed farms to where we are now, I think, exactly explains what you're showing us. That's to me the bottom line. I just wanted to make that comment. I don't know if you want to comment on that, but to go back to the way we used to farm, smaller farms, we're a small place, versus trying to compete with corporate farming. Why don't we do what we do to the very best of our ability, not just try to compete corporately? That's –

Chair: Comment?

Barry Thompson: I couldn't say anymore.

Chair: Okay, great.

Thank you, Darlene.

Next we have Colin LaVie.

Mr. LaVie: Thanks, Chair.

You mentioned in your presentation that you do soil samples across PEI on farmers' fields. Are them fields owned by farmers or leased by farmers, or are they both?

Kyra Stiles: It would be both. Based on where the grid point landed, if it was on agricultural land we sampled from it. So we would contact the landowner to see if we could sample. In some cases the landowner is the farmer, and in some cases the landowner rented out the land to the farmer.

Mr. LaVie: Do you know who leases off the farmer? Like, who's farming that land?

Kyra Stiles: For the purpose of the study we don't need to know the farmer because we look at the crops over time. We don't pinpoint to individual farms who's farming what field.

Mr. LaVie: You're just interested in the soil.

Kyra Stiles: We're interested in the soil and what crop is being grown on it.

Mr. LaVie: So you know when you take a soil sample if it's organic field or not?

Kyra Stiles: No, we wouldn't.

Mr. LaVie: Oh, you –

Kyra Stiles: I guess referring to what I said earlier, sometimes we're aware of a farm just because we're kind of closely working with some landowners or they may mention it, but it's not information that we go looking for.

Mr. LaVie: So when you're doing a study, wouldn't that be an important piece of the study if it's organic or how the land is being used? Wouldn't that be important?

Barry Thompson: If you wanted to – yeah, if you get into the fact of looking at rotations practices and managements and you dig down into that, those are all very valuable pieces of information to work with. The design of the study to this point and the resources we've put into it, (Indistinct) looking at the overall and the general approach of how our soils are changing based on the cropping that we've seen in place there.

I couldn't argue with you. You're right. The more information we have about anything, the better it is to help us make decisions; but at this point, we haven't chased down all the rotations on all the properties over all that time – which would be sort of where you're coming to, I think.

Mr. LaVie: Yeah, so you're just – when you're doing that soil sample, you were just worried about the soil. You don't –

Kyra Stiles: So (Indistinct) –

Mr. LaVie: If it's organic or not, you're not – that's not a concern?

Kyra Stiles: I guess originally where the project began, it was about looking at the trend over time, the soil organic matter levels; and now that we get more results back and the longer the project goes and we see those trends, the questions arising as to how the trends are developing is going to create questions about how the fields are managed.

So I think it's something that likely we'll look into a little bit more intensively now that we're later on in the project, although originally the goal, if I can –

Barry Thompson: Yeah.

Kyra Stiles: – say, it would be purely looking at the trends –

Barry Thompson: Soil parameters.

Kyra Stiles: – in organic matter over time.

Barry Thompson: Yeah.

Chair: Colin LaVie.

Mr. LaVie: Thank you, Chair.

In your study, you make recommendations to the farmers?

Barry Thompson: No.

Mr. LaVie: You don't make any. There's no recommendations made?

Barry Thompson: No. The farmer receives a copy of the report, so he would know what the soil parameters were measured on that given year. He's always entitled to have that because it is his sample, really, but we don't make a recommendation to him because we wouldn't know the practices that he's applying and what he's actually going to be cropping there. We would provide him the information.

If he wished to discuss that sample with us, we're more than happy to sit and talk about that type of thing. We're happy to make the recommendations should he be willing to have that exchange with us, too, so it's just the situation where we're at with what we're collecting.

Kyra Stiles: It's not only soil organic matter that we're testing, so there's all these other macro nutrients and micro nutrients and pH levels that we're also testing that were just not part of this paper.

Mr. LaVie: When did the study start?

Barry Thompson: '98.

Mr. LaVie: '98, so at what point do you say: Okay, we've got to move in another direction or we've got to go with plan B or – do you just continue on the way you're going –

Barry Thompson: What I see evolving here, and we've talked about it today, is that

Kyra mentioned (Indistinct) this is about organic matter. We've got phosphorus, potash, all the micronutrients, all those type of things already measured in there. Kyra's alluded to soil health – microbial, biological activity – and as you can see, the questions you get from looking at just organic matter alone, we're generating questions all the time. The research community through Ag Canada? They think this is a goldmine to them, because it's a data set that they would not have had to start to formulate research.

So as we go forward and as I see it evolving, is that – through questions like this, and like your own – is that it's more to add to the project. It just continually grows and we bring in the soil health piece through the biological side. Because really, we've looked at the chemical and physical side, and now we're into the biologicals and we refer to about yields and that type of thing. We have fields out there, we don't know why the yields aren't better. We've always only looked at the physical and the chemical – could be in the biological.

Those are the things, so – I guess what I'm trying to get to is the fact that this project is certainly continuing to grow. I hope the project goes on for eternity because this small little island is an example around the world, because no one has the data sets, no one has the layers of information that we have. That's why we attract scientists to this research centre. It's unreal. I could go on and on, but I don't think I need to.

Some Hon. Members: [Laughter]

Chair: Thank you very much. My list is now exhausted. I want to thank each one of you for coming in today, Deputy Minister and Kyra and Barry. The work that you do, obviously, is very interesting, not only to yourselves but to the committee members because we've had almost two hours for presentation here today. I want to thank your department also for the research that they've done over the past with soil quality and your presentation today on organic matter and our soil here on Prince Edward Island.

So with that, I'm just going to take a two-minute break while our presenters collect their stuff and depart, and we'll come back in about two minutes.

[Recess]

Chair: Okay, committee members. Just a quick discussion here: We have another presentation to be made that we had on the schedule to come in. I'm looking at the time. That one went a little bit longer than what we anticipated, which is good. There's a lot of good questions and we had a good conversation. That's what we want to do on this committee.

So I want to ask some, all of the members, because I – in conversation, others have appointments this afternoon. Would you prefer to ask our presenters to come back again on the 16th to present to us and that way we give them lots of time to ask questions – for us to ask questions and for them to present – or would you prefer to continue on with today and I guess – I don't want to say for lack of rushing it through because other people have appointments.

My question is: Are you in favour of continuing on with the next presentation today?

Mr. McIsaac: Mr. Chair, are you talking about Friday in the morning again?

Chair: Yes.

Mr. McIsaac: Because the afternoon's booked.

Chair: Yeah, yeah.

Mr. McIsaac: I think we should be only booking one presentation per session –

Chair: We'll get onto that in our work plan.

Mr. McIsaac: Okay.

Chair: The question is: Do we want to continue with the second presentation today, or do we want to ask them to come back on the 16th, or the next available day?

Mr. McIsaac: I have a commitment –

Chair: Some discussion.

Brad Trivers.

Mr. Trivers: How long are we going to give them today? Are we going to cut it off hard at 1:00 p.m. or are we going to go to –

Chair: We're not going to cut off, that's why I want to make sure that we have presenters to come in and we have to give them time, in all fairness.

Mr. Trivers: I would say if we're going to have them today we need to make sure we complete it and go as long as we need to and I'm willing to do that but I know not everyone's schedule is accommodating.

Chair: That's what the question is on the floor.

So the question is – Peter, do you want (Indistinct) discussion?

Dr. Peter Bevan-Baker: No, I'd just like to say I absolutely want to hear from Cameron and I think this needs to be done.

But like the Auditor General, we never get through an AG report in one go. So if we don't get to the end of the questions and a certain number of people have to go, I think there's still value in hearing for the next hour or whatever.

Chair: We need to ensure we have quorum.

Dr. Peter Bevan-Baker: Sure, absolutely.

Chair: Brad Trivers.

Mr. Trivers: The other option would be to have them present today and if they don't finish today we have to bring them back in for a second session, like Peter is saying.

Chair: Their presentation is roughly 20 minutes. So they can present; it's the questions that we have in discussion afterwards.

Mr. Trivers: Let's start them off today, at least, I'd say.

Chair: Sonny Gallant.

Mr. Gallant: I agree 100% we start it off today, but I, as Mr. McIsaac, have to leave by about – between 12:30 p.m. and 12:45 p.m. at the latest. We could bring them back

if they're okay with that. I certainly agree with (Indistinct) presentation.

Chair: Is that the agreement that we do the presentation and then we'll see the time?

Great, thank you guys very much.

I guess we're ready for our next presentation so I'll ask them to come to the floor. When you get situated – we're going to start with our second presenters today and they're going to give us a briefing on the honeybee pollination expansion program and their concerns regarding the impact of pesticides on bee populations here on Prince Edward Island.

Again, I'm going to ask each presenter to state their name and their position, please.

John Jamieson: John Jamieson, deputy minister of Agriculture and Fisheries.

Sebastian Ibarra Jimenez: I'm Sebastian Ibarra Jimenez; I'm the Agri-Environmental Specialist for the Department of Agriculture and Fisheries.

Cameron Menzies: I'm Cameron Menzies; I'm the Provincial Apiarist and the berry crop development officer.

Chair: Thank you and welcome.

You can start your presentation and we'll have questions at the end of your presentation.

John Jamieson: I'm going to jump through the first couple of slides; we've already identified them in the previous slides. I'll let Cameron pick up the ball here.

Cameron Menzies: I'll just introduce myself here. My background is I studied at the University of Guelph with a BSc in biology. While I was studying and after I graduated, I was a honeybee research technician for many years. I worked down in the United States and here in Canada on numerous studies and I spent the last two years in Bible Hill, Nova Scotia working as an apiculturist with Perennia Food and Agriculture Inc. I've actually been with the department of agriculture about a month now, so I'm quite fresh.

I'm going to be speaking about our pollination expansion program but I'm going to give a little bit of a background behind that just to understand it. Actually, I'm going to speak about our import protocol as well on this presentation here.

That was one of the first things we started working on when I came on, was finalizing our import protocol. To have an educated decision with that protocol, first, a survey was conducted to see the number of honeybee hives available on PEI for pollination in the 2018 pollination season. In addition to that, because low-bush blueberries receive the highest demand for the pollination services here on PEI, the vast majority of it, a survey was also done with the blueberry growers here on the Island to see what their demand was going to be for the 2018 season.

You can see the numbers up here. There's a disparity between the number of hives that are domestically available on PEI for pollination and the demand from the blueberry industry. Of course, we just collected the numbers on the low-bush blueberry industry. There's an additional small demand from other crops such as apples and high-bush blueberries.

With that information, we decided that we were going to keep the border open with strict contingencies here. We are considering three areas that are eligible for hives to be imported from for our pollination. That's British Columbia, but outside of the Fraser Valley Regional District; Quebec, outside of the Saint-Laurent region; and Ontario north of the 401. The reason that we have these stipulations here as to where we can import hives is particularly this pest in that bottom right corner there, which is known as the small hive beetle.

The small hive beetle is a class B disease and pest here, meaning that we don't actually have established populations here on PEI. Some other provinces do, including Ontario, and this map here illustrates where the established populations are located. Hives that have been imported traditionally onto the Island here have been coming from the Niagara region in Ontario. That's an agriculturally – it's a good area for honeybees to be managed because of its climate.

You can see these numbers that are on these coloured areas here indicate the number of established beetles that have been found through the surveys from Ontario. What we have done here is we drew a line on the 401 from Mississauga through to the 402 right to the US border in Sarnia, and no hives that are managed south of that line are eligible for import into PEI.

In addition to setting that stipulation, there's going to be numerous rounds of inspection to ensure that the risk of importing this pest is as low as possible. First, and this has been done in previous years; it's a standard operation here, the exporting province, in this case Ontario, would do a particular round of inspection to see if the beetle is in the hives that are going to be exported. We are again requiring them to do that, and we're actually going to ramp up the amount of hives that they're going to be looking into.

In addition to that – this has not been done by PEI in the past, but Nova Scotia did this in 2016 – is we're going to be sending our own inspectors to Ontario to supplement the inspection that was done by the Ontario inspectors. We're actually going to be looking into 100% of the hives that are coming to PEI for inspection. Then once the hives are approved and we deem that they are small hive beetle free, they're eligible for import. We have the opportunity to inspect them even further once they're on PEI in the blueberry fields.

Our future goal here is to be able to meet our own pollination demand. Through our surveys this year, we found that there is that disparity so we're going to import, but it's important to stress that that is the goal here. To address that goal, we have our pollination expansion program. The two main purposes – this is stated right on the PEI government website here – is to support the expansion of the honeybee sector and to increase the PEI honeybee colonies available for fruit crop pollination. Mainly we're talking about, again, the low-bush blueberries, but also other crops such as the apple blossoms as well.

Our current program; we've actually received all the applications for this. We've approved the eligible applicants and we've sent them the letters of approval already.

This is for the 2017-2018 fiscal year. Eligible applicants are going to be receiving financial assistance for new bees, new colonies that they've purchased, and also new equipment that they've purchased to house these bees. We actually approved 17 applicants and that was – out of about 25 applicants we received, we approved 17 of them and there's going to be over \$150,000 that is going to be issued to these applicants for their assistance in the program.

Beyond 2018, in our next fiscal year starting April 1st, we're looking with our next funding – with the Canadian Agricultural Partnership, we're looking to continue our pollination expansion program to have further assistance available for beekeepers. Of course, the \$150,000 I was referring to before came out of the Growing Forward 2 partnership program.

In addition to this assistance that we're providing for established beekeepers, namely the pollination expansion program, our priority is also going to be with knowledge transfer. New beekeepers that are interested we want to put on introductory courses; and we're actually going to be holding this year, as early as this spring in 2018, and we want to establish a mentorship program as well. So after new beekeepers can take some of these courses, they can continue to be mentored in a field-realistic scenario to hone their beekeeping skills.

Our top priority with this knowledge transfer is promoting bee health on PEI. So beekeepers at all levels of experience, they need to be familiar with the honey bee pests and diseases they're continuously dealing with. Those are the ones that are already established on PEI, and ones we do not have yet, namely the small hive beetle. They need to be aware of the in-hive pest control products for these various pests and diseases, and we would like them to have a good understanding of integrated pest management so that we're not running into the issue of particular insecticides being used in the hives becoming – having the populations of these in-hive pests becoming resistant to these products.

We also are concerned with the impacts of the pest control products used in agriculture here on PEI on honey bees with the crops that they pollinate. Sebastian, I'm going to

hand this over to you now, and you can speak to this a little more.

Sebastian Ibarra Jimenez: Good afternoon, everybody. I don't know if the microphone's going to pick up my voice here. I hope. My name is Sebastian Ibarra Jimenez and I am the Agri-Environmental Specialist for the Department of Agriculture and Fisheries. A lot of people refer to me as the IPM specialist, and I talk to folks about different strategies they can use to tackle some of the pest issues that folks face when doing agriculture.

My background is in zoology. I did my undergraduate in Manitoba, in Winnipeg, and I worked there for a little bit before moving to Vancouver to do my Masters in Pest Management from Simon Fraser University. I was working there a little bit and teaching some of the biological and agronomical principles that go behind producing barley and hops for the production of beer. In the summers, I worked a little bit as an IPM field technician, recognizing diseases in several crops.

Before we delve into what the effects of pesticides are on our pollinators, we have to define what a pest control product is. A pest control product is any substance containing an organism or a substance derived from an organism, that's used to mitigate the effects of those organisms. The key word here is 'mitigate'.

A very important concept in IPM is differentiating the – 'mitigate' does not equal to eradication. It means bringing the numbers to levels that are below what we call economic injury levels. We want to make sure we take actions at the action thresholds. When anybody talks about action thresholds, it means that the pest numbers have surpassed what the cost of taking action is. That's a key principle in IPM.

Under the *Pest Control Act*, all pest control products (PCP's) have to be registered within Health Canada. It's the Pest Management Regulatory Agency that oversees the registration of these pest control products. As I said before, no pesticides can be used without being registered with PMRA, and every submission for a new active ingredient or a

new product has to go through a rigorous scientific assessment that takes into account human environmental health risks before they can be used.

Every product that's registered in Canada has to go through a reevaluation every 15 years, and special reviews can be triggered if new evidence is brought to light, or if new decisions are made in foreign jurisdictions. All these processes can lead into PMRA going into a special review or a reevaluation of a pest control product.

What are bees? Bees go beyond just our traditional European honeybee and the bumblebees that we use to pollinate. A bee is understood as an organism that belongs to the family *Apoidea* that usually possesses branched body hairs. If there are any taxonomists in the room, they'll appreciate it, because sometimes it's really hard to differentiate some organisms from the others, and I'll show late in the following slides some pictures of what some folks traditionally think of as wasps, but they are bees.

The key message here is that there's about 730 species of bees. So when we talk about bees, we're talking not just about the honeybee or the bumblebee but we're also talking about other species of bees. As it's been stressed, bees are vital to the pollination industry, especially true for the majority of fruits, a lot of vegetables, and field crops such as clover.

Here we have some pictures of some bees. On the top we've got the long-horned bees, *Melissodes*. They're called long-horned because of the long antennae. In the middle we've got some cuckoo bees. A lot of people think those are wasps, but they're truly bees. At the bottom we've got some *Osmia* bees, so those are what we call usually the mason bees. They make little nests made out of chewed paper. They belong under the leafcutter bees.

We keep on going. We've got our traditional European honeybee over here, and we've got some sweat bees here, *Halictidae*; they're called sweat bees because some of them are attracted to the scent of sweat. On the bottom right we've got a bumblebee, and so with these pictures my intent is to show the great diversity in the morphology of

some of the bees that are present in Canada; and to drive the message that when we talk about bees, we're not talking solely about the European honeybee.

There's many families including leafcutter bees, mining bees, sweat bees and members of the *Apinae*, which includes the European honeybee. We also see other species like carpenter bees and squash bees that are very important for pollination, particularly of cucurbits. As I mentioned earlier, the species that we know the most about are the European honeybee and the bumblebees because they are commercially used for pollination and production of honey.

European honeybees are an agricultural commodity. They are intensively managed. This is an example to bring home the message that we're heavily involved in how bees do their business. We select what type of bees, and what we see here are graphs of larvae put into queen cups, so we are just producing queens. Like a lot of agricultural commodities, there's heavy selection into what type of bees we want to have, and this is just to drive the message home that most agricultural crops, honeybees are one of those.

This is what honeybees are traditionally used for. We've got there at the bottom Cameron is probably getting stung in the back. This is a blueberry field in Nova Scotia. The last year, when I was taking one of the courses offered by Cameron in his previous position in Perennia; it was the Modern Beekeeper, and I had the opportunity to collaborate with him and go to some of these fields and observe some of the beekeeping strategies that folks use.

The interaction between pest control products and bees is complex. PMRA is conducting re-evaluations and special reviews of the insecticides clothianidin, thiamethoxam and imidacloprid. These are known as neonicotinoids. There's more neonicotinoids than the three that we have here, but these are the ones that are on the review that have been triggered by evidence that's been put forward in other jurisdictions as well as in Canada. There's been some concerns.

What are neonicotinoids? They're a Class 4A insecticide, meaning they affect the

nervous system of insects. They can cause ranging behavioural changes including abnormal foraging and reduced navigation capacities all the way to death. Compared to other pest control products, they can pose a reduced acute toxicity risk to some organisms.

Neonicotinoids are used across a lot of industries, including the blueberry industry, the potato industry, cereals, oil seed, and legume growers use them as well to protect from insects such as chafer, wireworms. Apples use them, cole crops use them, strawberries. At homes we use them to prevent damage or our pets carrying fleas. A lot of homeowners use them to protect their lawns from chafers, and they're also a tool in the toolbox to fight invasive species such as the emerald ash borer and long-horned Asian beetle.

PMRA has been monitoring the effects on pollinators from these insecticides since 2012. As I mentioned, there are multiple reviews and special evaluations that are tailored at assessing the effect of these specific neonicotinoids.

Right now, PMRA released their survey on the effects to European honeybees on the use of these neonicotinoids. On the first column, we've got the year of the survey followed by the number of colonies registered in Canada by Statistics Canada. On the next column we've got the percentage of the national colonies potentially affected through planting neonicotinoid-treated seed, which was what triggered some of these reviews. A lot of honeybee colonies were being affected at the time of planting. On the right, we've got the number or the proportion of national colonies potentially affected through spraying.

We can see the number of potentially affected hives reduce after 2013 and that's because PMRA imposed certain strategies that mitigate the spread of some of the dust created using these neonicotinoids, particularly in soybean treated as well as corn.

Current neonicotinoid activities; there's a lot of them. PMRA is doing a lot of reviews. They released recently in the past month, in December 2017, their proposed measures to

mitigate the effects of neonicotinoids and pollinators for both clothianidin and thiamethoxam. In March, they're going to release their review for the effect of pollinators on imidacloprid. The final decisions on those can be expected in December, 2018.

There's other reviews, particularly as to how these insecticides affect aquatic life, as well as other types of bees like cucurbit bees. Cucurbit bees; peponapis. That decision will be released in 2018 and of the proposed mitigation measures for imidacloprid, which is the active ingredient in pest control products such as Admire and (Indistinct), are to prevent the use of this active ingredient on all agricultural uses.

There was a response period that stakeholders could submit their responses, and right now PMRA is reviewing the responses received to this proposed decision. There are other propositions for clothianidin insecticides such as Clutch and Titan, and they are proposing to phase out foliar applications to orchard trees and strawberries as well as municipal uses, and reduction of these insecticides in cucurbits, as well as additional changes to the label to make sure that the risks of using them are mitigated.

Thiamethoxam, other insecticides such as Actara and Cruiser, are being proposed to phase out the foliar and soil applications to ornamental crops that will result in pollination exposure, as well as phase out soil applications to berry crops, cucurbits and fruiting vegetables, and phase out foliar applications to orchard trees; and foliar applications to legumes, outdoor fruit and vegetables and berry crops would no longer be permitted before or during bloom.

All these strategies are meant to reduce the potential effects that the use of these insecticides would have on pollinators.

Thank you for your time; I'm looking forward to your questions.

Chair: Great.

I'm going to open the floor now to questions.

Alan McIsaac.

Mr. McIsaac: Thanks very much.

Good presentation, guys. Cameron, I'm going to go back to the start with you.

Cameron Menzies: Yes.

Mr. McIsaac: You talk about the small hive beetle and we can't have it in here, and I know there are tracheal mites and that sort of thing. Maybe you would explain why we don't want to have the mites or the small hive beetle or whatever, and what it affects, either the honey or the bee itself, and why we're trying to protect the Island from these coming in.

Cameron Menzies: Okay, so the small hive beetle would be an additional pressure on beekeepers who are already dealing with a regime of pests and diseases that we currently have. The beetle itself, it does its most damage by – it attacks hives that are already weak. So it can proliferate in hives that are weakened and it can actually spoil honey crops.

A big issue with it is in stored – when beekeepers are keeping their honey sucrose, which they've removed, and other equipment in indoor storage facilities, of course there are no bees within these boxes here that they're storing. These beetles can consume the wax and the honey and as they defecate onto that equipment, it can cause stored honey to spoil; but like I mentioned earlier, they can also proliferate in weakened honeybee colonies.

We do promote good management and that's your first line of defence when it comes to a pest like this unlike – you may be familiar with the varroa mite. You could be keeping strong hives and the varroa mite can still do quite some damage to a colony of bees; but the small hive beetle, it proliferates in the weakened hives. It can cause honey crops to spoil, which induces economic damage to the beekeepers there.

Personally, I would not consider it as bad as varroa mites in terms of the potential damage it can do, but it is serious because it's an additional stressor and the economic impact it can have on honeybee colonies.

Chair: Alan McIsaac.

Mr. McIsaac: One other question there.

With regards to getting into becoming a beekeeper, what's the training take for that and what's the benefit for me to become a beekeeper, except that it's a – to some people, I'm sure it's a hobby. I know a friend that has the hobby, but what training do I need for that? I know there's an incentive on that, that's for sure. That's good.

Cameron Menzies: Yeah, the first thing you would want to do is take an introductory beekeeping course to learn the fundamentals of it, and also to really get an understanding of what you're getting into and to have an understanding of why you're getting into it.

You mentioned maybe I just want to have a few hives as a hobby, which is fine, but some people need to actually be able to differentiate their intentions by buying these bees before they get into it. The introductory courses I'm looking to put on, that's something I'm going to stress; is make sure you're thinking about why you're doing this.

Then, there are going to be some people who take these courses that do have the ambition to become commercial beekeepers somewhere down the road and that's where we're going to have further mentorship. So, you can go out in the field and work with real beekeepers who have experience, to get a sense of really what it takes to be a commercial beekeeper, and we may also recommend that they take a commercial beekeeping course held at Dalhousie University Agricultural Campus in Truro called the Modern Beekeeper, which I used to teach.

You're asking what's the benefit of getting into this. Well, we have a lot of beekeepers on the Island here who some actually do this fulltime. This is what they do; but some, they do it as a sideline operation which can supplement the income that you get from another career, and as our blueberry industry and various other crop industries continue to expand, that demand for pollination is going to continue to increase as well.

Becoming a beekeeper, a new beekeeper, if you do intend on being commercial you could meet that opportunity to pollinate crops. It's an economically viable industry

and we're looking to support that with education and training.

John Jamieson: If I could just add a comment: as Cameron mentioned, we've already identified that there's a deficit between what's available now and what the potential is. One of the reasons we brought in the expansion program is because we want to have local bees be able to meet our demand, but also because as we grow our diversity in agriculture and build on the perennial crops, we also have to build that pollination piece at the same time.

So, there's no sense of – I think that may have been a mistake in the past where we put a lot of effort into expanding the blueberry industry, but not a lot around, actually none, around building that pollination. As we build that perennial crop, we want to build that pollination at the same time and have them both increase. There is a business opportunity there as well.

Chair: Alan McIsaac.

Mr. McIsaac: One last question.

Just on that, because I know it's right. You can move from crop to crop. Are there any restrictions on us, say, starting our season early as a beekeeper and taking bees into, say, Annapolis Valley where the summer and spring starts a couple of weeks ahead of ours? Maybe their berries are ready before ours. Can we move our bees to Nova Scotia or to New Brunswick?

Cameron Menzies: This particular year we will not be able to. Nova Scotia has already released their import protocol and essentially, their borders are closed. Particularly due to this small hive beetle pest that we mentioned earlier.

John Jamieson: But also, Nova Scotia did put an effort into building their pollination a couple of years ago, as we have, so they have enough local bees to match their needs.

Mr. McIsaac: Thank you.

Chair: Brad Trivers.

Mr. Trivers: Thank you, Chair.

Thank you for your presentation.

I guess my first question is, how extensive is neonicotinoid use on PEI?

Sebastian Ibarra Jimenez: I don't have the number off the top of my head. Neonicotinoids represent a significant portion of the insecticides used. The Department of Communities, Land and Environment keeps track of the total sales of each active ingredient so that's something that we could get for you.

Mr. Trivers: Okay.

Sebastian Ibarra Jimenez: It's an easy way to get – we can easily get that.

Mr. Trivers: Thank you.

That would be great to have those numbers for sure.

One of the questions that my constituents are asking me is if we had any bee kills on PEI that are due to neonicotinoids.

Sebastian Ibarra Jimenez: As far as I know, PMRA tracks registered bee incidents potentially associated with neonicotinoids; and as far as I know, no incidents have been reported directly to PMRA. Individuals are more than welcome to bring up issues that they observe to either Cameron or myself, and then we (Indistinct) bring up these issues to our federal counterparts so that there's a national track of these incidents.

Chair: Brad Trivers.

Mr. Trivers: You mentioned there are some federal initiatives that are really looking at in particular just those three types of neonicotinoids, and limiting them and going out to 2024 I think it was or 2023. Are there any plans specific on Prince Edward Island, then, at this point? Probably not, given your previous answers, but are there any plans to limit the use of neonicotinoids on PEI?

Sebastian Ibarra Jimenez: I guess as John mentioned earlier, we like to make our decisions based on data and evidence, and we heavily rely on our federal counterparts to make the analysis of the risks associated with the use of these neonicotinoids. So we're waiting for some of the assessments conducted by them, to make sure that any decision we make is sound.

Mr. Trivers: Okay. I'm looking at a website that my daughter Annika created last year as a Grade 5 student, Save the Bees. She has some neat data there. She looks at the percent wintering loss of bees across Canada. It's 2014 data, and it's around 19.1% loss of wintering on PEI in 2014. I was wondering if that's an expected amount or what would that wintering loss be due to?

I know in Ontario it was a 58% loss, and that's why they're saying that was due to neonicotinoids and we saw the fact that bees from below that line in southern Ontario couldn't be imported; but can you comment on whether 19% loss is normal?

Sebastian Ibarra Jimenez: It is; 19% usually was considered normal. I'll let Cameron speak of it more, but to expect about a 15% winter mortality is a normal –

Cameron Menzies: Yes, that's an acceptable loss many beekeepers would consider; and it's important to understand that there are numerous pressures put on honeybees as livestock in addition to exposure to pesticides, both pesticides that are used in hive and in the environment as well.

I can speak to a few situations where if the hives are not fed enough in the fall going into winter, that can put them in a position where they're at risk to not making it through the winter; and if the pests and diseases within the hives were not kept in check and a good integrated pest management regime was not implemented in that operation, certain pests can go unchecked and run rampant and that can cause the risk of overwinter loss to increase.

There's really a lot that's going on there. So when you look at those numbers and try to pull out specific causes, it's a bit difficult I would say.

Mr. Trivers: My last question: Just wondering, and maybe you alluded to it, but are we doing any studies on Prince Edward Island in particular right here on the Island to find out if there is any impact of the neonicotinoid spraying or seeds on bees on Prince Edward Island?

Sebastian Ibarra Jimenez: There is a national initiative. It's called the national bee health survey?

Cameron Menzies: Yes.

Sebastian Ibarra Jimenez: PEI has participated in the national bee health survey, and samples from multiple beekeepers have been sent for analysis on measuring the overall health status of PEI bees. So there is monitoring on the status of the health of honeybees in the Island. Specifically a study targeting the effects of neonicotinoids on the effect of Island beehives has not been put in place.

Mr. Trivers: Go ahead.

Cameron Menzies: May I just add a little bit to that there? Yes, so one of the samples that are being taken with that survey is the pollen that is actually in the hives in the cells to determine the neonicotinoid residue in the hives; but to actually determine what the effect of the neonicotinoid residues on the bee health, that is not particularly a part of this survey.

Mr. Trivers: I just wanted to comment: I think it's really important, given the role of pollinators and the importance on Prince Edward Island, that we keep a really close eye on this. I think we're in good hands based on what I'm hearing today, but just wanted to encourage any participation; and not only in national studies, but if we have to put some money into doing our own studies, I would highly encourage that.

Thank you, Chair.

John Jamieson: Just if I could add a comment, one of the things that we've done in the last – Sebastian's been here a year, Cameron's been here a month, so we've ramped up the expertise in the department significantly just as a concern around pollination and bees.

Chair: Peter Bevan-Baker.

Dr. Bevan-Baker: Thank you, Chair.

I really appreciate the really clear and concise presentation that you gave us. I wanted to talk about the 3,000-hive shortfall that we currently have. You said that there

are 17 applicants that you've approved for this year? Presumably they will –

Cameron Menzies: Yes.

Dr. Bevan-Baker: – all have multiple hives associated with those applications, so how many years is it going to take us to, using native pollinators, to close that gap completely?

Cameron Menzies: The native pollinators, we're referring to the domestic hives that we have here on PEI.

Dr. Bevan-Baker: Yeah.

Cameron Menzies: We're going to have to come back and reassess this every year and continue to collect this data. One thing that we're going to look at in this pollination season here in 2018 is if there are any hives, domestic PEI hives that go unrented. We're going to keep track of that number as well.

We're going to continue to do the survey next year to see what the demand is from the blueberry industry and the other crops, and what is domestically available. Ideally, this program is going to be as short as possible to meet that gap, but it's really going to require continuous assessment.

John Jamieson: And one of the things that the applicants had to identify in their application is that they're actually growing, that we're not replacing existing capacity.

Dr. Bevan-Baker: Do you have a number on what the Island capacity for the number of beehives is in terms of what resources do we have here to support a certain number of hives?

Cameron Menzies: We do not yet, but that has been an issue that we consider a priority and we're going to look into trying to get some data. We're going to do some surveys to get some data on that.

Dr. Bevan-Baker: You mentioned that Nova Scotia has essentially closed its doors to bee importation, which suggests to me – and I think you've mentioned this – that they are currently clear of the small hive beetle.

Cameron Menzies: Yes.

Dr. Bevan-Baker: Why are we not looking to a local source like that, rather than going to Ontario –

Cameron Menzies: Yeah.

Dr. Bevan-Baker: – where there is, regardless of where you draw the line, there's certainly an increased risk.

Cameron Menzies: We actually – I should have mentioned that in the presentation. We did look to Nova Scotia first, and considered the logistics of importing hives from Nova Scotia. We were in communication with the provincial apiarist in Nova Scotia, Jason Sproule, and he did a survey to the Nova Scotian beekeepers to see what numbers they could put together in terms of hives that they might have surplus to what the Nova Scotian demand is, and we found that that is much lower than what that disparity is between the number of hives we have here and what is demanded by the blueberry industry.

Also there are some logistical issues. The hives that could have been available in Nova Scotia were spread around the province, and since New Brunswick actually has small hive beetle – it was reported last year – Nova Scotia would not allow their hives to go through New Brunswick onto the bridge onto PEI and back, so that left us with really only the ferry. We were in communication with Northumberland Ferries and there are some public safety issues there that we would have had to deal with. Logistically, it did not seem feasible to be able to import hives from Nova Scotia this year.

Dr. Bevan-Baker: Wow, another reason to keep the ferries going.

Chair: Peter, do you have another question?

Dr. Bevan-Baker: Yes I do, Chair.

Chair: Peter Bevan-Baker.

Dr. Bevan-Baker: Clearly the risk of importing the small hive beetle to Prince Edward Island is significant, or you wouldn't be as concerned as you are. The need for having these extra hives is because of the blueberry industry. Like many primary producers, the price of blueberries has been pretty dismal the last couple of

years and we're not – the farmers are basically not making money on their blueberries. Is it worth the risk to bring these bees in to support an industry which is really marginal financially, economically?

John Jamieson: Can I touch on a couple of things first?

Cameron Menzies: Please, yes.

John Jamieson: One of the things we already realize, and we've talked to – well, we've gone out to the blueberry growers and said: Are you planning to pollinate? The ones that have said yes have indicated how much capacity they require. We do know that frozen blueberry inventories are dropping significantly in the US, so we're fairly confident that the price will start to creep back up, and we're expecting a higher price again this year.

With the 100% inspections and all the other components and we had Dr. Carolyn Sanford, who is our provincial vet, do a really good piece of work on how we're reducing that risk; a fairly minimal level, and maybe, Cameron, you can speak to it a bit more on the measures we've put in place and how we've reduced the risk fairly significantly.

Cameron Menzies: We've actually gone beyond her recommendations. She comes from an epidemiological background here and she was actually consulting with me saying that looking into 100% of the hives may actually not be totally necessary. If you look into the majority of them, the risk starts to decrease significantly as to the presence of the pest that could be imported.

But, we feel that it's important to go beyond that, not only just to say that we looked in every single hive that's coming in here, but it's also we're keeping good relations with the beekeeping sector here, which is – they're quite interested in the risk of importing this pest, I will say. I believe it is worth the extra time and resources to look in every single colony as well.

John Jamieson: So we're doing 100% inspection. They're having the provincial apiarist in Ontario sign off, which we haven't had before. So, Ontario does the inspection for us and then we come up and

we do 100% inspection. We do inspection here when they arrive. We also put in pollen packs or pollen patties to attract the small hive beetle in Ontario so that in the meantime, if they should show up.

The other thing we've done is in our (Indistinct) we will also destroy the hives if they arrive, by burning. The people that will be importing or exporting the hives understand that if I send a hive to Prince Edward Island that may have a small hive beetle in it, they catch it, they're going to burn it. I'm not going to get that hive back. There's also that disincentive there as well.

Are there other things that I'm missing? There's the inspection piece. There's the burning piece. The pollen packs –

Sebastian Ibarra Jimenez: There's the trap.

John Jamieson: The traps.

Cameron Menzies: Yeah, we are also requiring small hive beetle traps that can be purchased and placed in the hives so that it's going to make it even easier for us that if there are small hive beetles in these hives, it's going to be more apparent that they are present when we do our inspections.

Dr. Bevan-Baker: One final question please, Chair.

Chair: Peter Bevan-Baker, sure.

Dr. Bevan-Baker: Clearly with the small hive beetle the evidence is there. When it comes to neonics, it's not quite as clear cut and I understand the ambiguity between the connection between the use of neonicotinoids and the potential impact on hives.

But going back to our previous discussion on crop rotation, can you give us – what I'm getting at here is the persistence of neonicotinoids or their breakdown products in the soil after they are sprayed. Do you have data on how many years after a neonic is sprayed in a potato field, for example, that the residue of that will still be present and, following on from that, is that another piece of evidence that would lend weight to the argument that we should be strictly enforcing three-year crop rotations, or more?

Sebastian Ibarra Jimenez: There are other assessments beyond the risks to pollinators that are taking place posed by neonicotinoids and those effects include damage to aquatic invertebrates; and so we are working in collaboration, and we have a very strong relationship with our federal partners both in PMRA and Agriculture Canada, in being updated as to what the results of those assessments are.

In terms of a number, I cannot remember off the top of my head how long it takes for each of these single active ingredients to break down into their different metabolites so I am afraid I cannot give you an answer at the moment as to how long it takes for each neonicotinoid to break down. What I can tell you is that they do wash off and sometimes that's the perceived risk to some of the aquatic invertebrates.

Dr. Bevan-Baker: Thank you, Chair.

Chair: Thank you.

I'm going to thank you for coming in today, John and Sebastian and Cameron. Two great briefings today from the department of agriculture. They always did a great job, and with your new hires I'm totally impressed, so good things moving forward.

John Jamieson: We've got about 30 more of these back at the office.

Chair: Wow, very impressed.

Thank you, guys, for coming in today.

We're going to move right on with our agenda. We have new business. Is there any new business before we get into our work plan?

Mr. R. Brown: No.

Chair: Seeing none, I'm going to go to number six which is reviewing of our schedule and our work plan priorities. Now, as of the last meeting we had the Northern Pulp wastewater treatment people in and there was some discussion afterwards of bringing other presenters in. There is a list here such as the DFO to talk about the Gulf and Maritimes regions; talked about a marine biologist coming in; talked about the PEIFA and the Nova Scotia fishermen

coming in; and talked about the Pictou Landing First Nations to coming in.

Do they take priority over what we've already had in our previous work plan prior to that meeting, that we had a list of priorities and we had some people already contact us, or some individuals already contacted to come in? That's what we have to discuss. Do we go with the Northern Pulp before the other priorities that we had?

The floor is open for discussion.

Dr. Bevan-Baker: Do we have a scheduled meeting on the 15th-16th?

Chair: We have a tentatively scheduled meeting on the 16th with Bobby Cameron and David McGuire coming in. They're going to talk about buy local – to encourage people to buy local and value added and cost production. They are tentatively scheduled for the 16th.

Dr. Bevan-Baker: Right, okay.

My concern is that we don't lose that date.

Chair: No.

Dr. Bevan-Baker: If we say, okay let's bump them to get the pulp people in and we can't do that –

Chair: Good, and personally I would agree with that. I guess what I'm asking for today is can we confirm?

Darlene?

Ms. Compton: I know I'm not on this committee, but I'd just like to speak for a minute about Northern Pulp. I went over to the protest on Tuesday and there was a lot of mention about our standing committee from fishers over in Pictou and a number of people who were at that protest, about how encouraged they were and how respectful they were to the fact that we had Northern Pulp here and that we really grilled them.

Chair: Good.

Ms. Compton: It really was impactful and I think it's important that we continue that conversation, and there is a very small or short timeframe as far as the decisions that

are going to be made for Northern Pulp and how they're going to impact both sides of the Strait. I just wanted to give you that little bit of input, because it was really, really well appreciated and recognized by all of the people that were there.

Chair: Great, thank you for sharing that.

We do have – is everyone in favour of March 16th going ahead with what I just – everyone's in favour?

Some Hon. Members: (Indistinct)

Chair: Great, okay, so March 23rd. The 23rd, what's that? The weekend after? That's the Friday after. Okay, and then the other date after that would be the following Friday too, right?

Clerk Assistant: Which is Good Friday.

Chair: Which is Good Friday, so that would be – we have the 16th and then the 23rd is the only other date available –

Clerk Assistant: Keeping with the committee's –

Chair: – this month prior to April.

Clerk Assistant: Yeah.

Chair: Okay, so we can – what my suggestion is, is that maybe we circulate. We find out who we can get in on what dates and we'll circulate that and ask everyone for their approval and we'll work from the 16th for now. That's confirmed, and then the other meetings we'll see as we contact individuals.

Now, there was no motion made. Darlene can't make a motion, but for us to prioritize – okay, Peter?

Dr. Bevan-Baker: I'll make that motion about the pulp people, and I have to reiterate what Darlene said. I was not at the protest, but I've received a large number of supportive emails from people in Nova Scotia who were very grateful for the work we did that day.

Chair: Brad?

Mr. Trivers: I just wanted to speak to the motion and say I agree as well, and I think that should be a priority item given the timeframes and the importance of the Northern Pulp dumping effluent into the Strait.

Chair: Alan McIsaac.

Mr. McIsaac: I agree with that as well. There was a lot of good feedback on that and we had a great presentation here, but we should hear from some of the others involved and I think that's going to be important.

I just wanted to add, too, that on the 16th we're going to be talking about buy local and I know we'll leave here and go over to the Easter Beef Show & Sale and buy a good, local steer.

Mr. R. Brown: Today?

Chair: Good plug, no that's next –

Mr. McIsaac: The 16th.

Chair: Yeah.

So, I'm going to ask the question even though the feedback came that it was all positive, that we ask Ryan, the clerk, to contact those individuals or whatever contacts, groups, that may be, regarding that topic, to give us available dates as to when they can come in and then we will circulate that and conduct a work plan from there.

All those in favour signify by saying 'aye'.

Some Hon. Members: Aye.

Chair: Contary, 'nay'? Great.

Is there any other thing on our work plan?
Seeing none –

Mr. McIsaac: I move we adjourn.

Chair: Thank you very much, Alan.

The Committee adjourned